BILINGUAL PUBLISHING GROUP

Macro Management & Public Policies

Volume 5 · Issue 3 · September 2023 ISSN 2661-3360(Online)

Editor-in-Chief

Dr. Sang-Bing Tsai

Zhongshan Institute, University of Electronic Science and Technology of China, China

Editorial Board Members

Volume 5 Issue 3 • September 2023 • ISSN 2661-3360 (Online)

Macro Management & Public Policies

BILINGUAL PUBLISHING GROUP

BILINGUAL PUBLISHING GROUP

Volume 5 | Issue 3 | September 2023 | Page1-77

Macro Management & Public Policies

Contents

Articles

BILINGUAL PUBLISHING GROUP

Macro Management & Public Policies

https://journals.bilpubgroup.com/index.php/mmpp

ARTICLE

Higher Education Admission Policy and Social Class of Ethnic Minority: The Case of Guangxi Zhuang Autonomous Region, China

***Lijun Ti*[1], *Xiaokun Yang*[2], *Wang Zhou*[3*]**

[1] *School of Public Policy and Management, Tsinghua University, Beijing, 100080, China*

[2] *Center for Studies of Ethnic Minorities in Northwest China, Lanzhou University, Lanzhou, Gansu, 730030, China*

[3] *Zhou Enlai School of Government, Nankai University, Tianjin, 300350, China*

ABSTRACT

Gaokao has been considered as the gatekeeper of intergenerational class reproduction in today's slowing social mobility in China. In order to bolster the fairness of Gaokao, the Policy of Bonus Scores for Ethnic Minority Candidates (PBSEMC) has been issued, whose, however, effectiveness in promoting upward social class has not been adequately empirically explored. The difference-in-differences (DID) analysis based on cross-sectional data, which is distinct from the traditional DID analysis paradigm, was implemented to assess the Reform of PBSEMC in the Guangxi Zhuang Autonomous Region in 1988. The results showed that PBSEMC had a significant and positive impact on the social classes of ethnic minorities, and gender, residence type and occupation type were also relevant to social class, aligning with the previous literature. The PBSEMC is effective in improving the social classes of ethnic minorities. However, the PBSEMC policy should be made more precise, in order to benefit the candidates who are in genuine need of assistance.

Keywords: Gaokao; Policy of bonus scores; Ethnic minority; Social class; Difference-in-differences analysis; Higher education

1. Introduction

Since the economic reform and participation in globalisation, China's total social wealth has increased substantially. However, the structural income difference between urban and rural areas, regions, industries, and communities has also continually grown. According to China's National Bureau of Statistics, the Gini coeffi-

*CORRESPONDING AUTHOR:
Wang Zhou, Zhou Enlai School of Government, Nankai University, Tianjin, 300350, China; Email: zhouwang@nankai.edu.cn

ARTICLE INFO
Received: 16 June 2023 | Revised: 30 June 2023 | Accepted: 10 July 2023 | Published Online: 17 July 2023
DOI: https://doi.org/10.30564/mmpp.v5i3.5789

CITATION
Ti, L.J., Yang, X.K., Zhou, W., 2023. Higher Education Admission Policy and Social Class of Ethnic Minority: The Case of Guangxi Zhuang Autonomous Region, China. Macro Management & Public Policies. 5(3): 1-15. DOI: https://doi.org/10.30564/mmpp.v5i3.5789

cient was approximately 0.17 to 0.18 in the 1960s and increased to 0.21 to 0.27 in the 1980s in China. Notably, since 2003, this coefficient has lingered within the alert zone (over 0.46) [1], which suggests an ever-widening gap between the rich and the poor. It is believed that some structural problems have already surfaced, such as the forming of the benefit distribution mechanism within the vested interests and the slowdown of social mobility [2].

An influential theoretical work, the status-attainment model, has claimed that individuals' professional achievement depends mainly on their level of education [3], which also brought a growing series of research efforts confirming the significant effect of education on status attainment [4,5]. Higher education is found to be strongly associated with social mobility [6]. Having higher education could widen occupational choices, and enhance economic and social status [7]. In addition, higher education can be a chief channel of intergenerational class reproduction [8].

The Gaokao (i.e., the Chinese college entrance exam) not only determines an individual's access to higher education, but also has a large influence on their subsequent career choice, income, and social status [9]. However, people's ability to obtain educational resources varies greatly across such a large country. Thus, whether candidates are treated fairly during the Gaokao has become a common concern for candidates, their families and the general public.

The Chinese government has issued a series of policies to bolster the fairness of Gaokao. One policy is the Policy of Bonus Scores for Ethnic Minority Candidates (PBSEMC). Although a significant amount of research has been conducted into the PBSEMC, the width and depth of this research are still insufficient [10]. The PBSEMC should not be regarded as a purely educational issue, since it is interlinked with the distribution of social benefits, and therefore power, in society. So far, however, many studies are of theoretical analysis [11,12]. This research provides some empirical evidence for these theoretical arguments.

However, there are not many empirical studies to demonstrate the effectiveness of this policy in promoting upward social class. This study will explore the impact of PBSEMC on the social classes of ethnic minorities.

2. The literature review and research questions

2.1 Policy context and content for PBSEMC

The Gaokao is the college entrance examination in mainland China. The Examination Centre within the Ministry of Education prepares the test papers, which are penned according to the latest programme of the test category constitution approved by the Ministry of Education, together with the Curriculum Reform and the teaching materials available across the various regions. Therefore, the test questions differ per region [13,14]. Previous research on social class focuses on how different social factors, such as economic development, institutional influence and history, have an effect on social class [2,15]. Some scholars claimed that the design of institutions under socialist national policies had a profound impact on the mobility of the national population [16]. The bonus scores policies of the Gaokao are the classic example of this institutional design.

The PBSEMC is a preferential policy that aims to promote ethnic equality in Gaokao [17]. There are 56 officially recognised ethnic groups in China. The Han ethnic group constitutes 90% of the population, and therefore the remaining 55 are classified as ethnic minorities. The PBSEMC aims to allow underprivileged ethnic minority students the opportunity to receive higher education by taking into account the relative difficulties they face in attaining a full education [17]. The PBSEMC can be divided into three main aspects [18]: (1) different treatment of different ethnic minority groups, who get different amounts of bonus scores for Gaokao marks depending on the size of populations of that group; (2) different treatment of ethnic minority groups in different regions, who get different amount of bonus scores for Gaokao marks depending on the level of education quality in different regions; and (3) uniform preferential treatment of all ethnic minority groups nationwide.

Results from the Gaokao determine which candidates will progress to higher education. A higher education level is most often indicative of a higher level of working efficiency, making highly educated individuals suitable for industries and occupations which demand high productivity [19]. Thus, higher education directly affects candidates' future social class [20]: The Gaokao is therefore a tool for both upward mobility and downward mobility. When educational resources are distributed equally—occupational and economic resources may be distributed relatively fairly, resulting in equitable social stratification. Therefore, we propose the following hypothesis:

The implementation of PBSEMC has a positive impact on the social classes of ethnic minorities.

2.2 Debates and existing research findings

The PBSEMC has an effect on every student who takes the Gaokao examination and hopes to progress to further education. As a result, the policy has received much attention from the public and academia [11,12,21]. Some scholars argue that Gaokao itself is an accurate measurement of students' educational attainment, providing each student with a fair opportunity to compete. However, for ethnic minority candidates, who are disadvantaged because of economic and historical reasons, the Gaokao represents merely formal equality, not substantive equity [10,12,21]. From this perspective, the government has a responsibility to regulate and redistribute societal resources to balance the interests of different ethnic groups [11]. The PBSEMC has the same objective.

There have been heated debates about the shortcomings of PBSEMC [22-24]. Some scholars found PBSEMC has a negative impact on both the quality of minority students in higher education institutions and the quality of minority candidates of Gaokao [25,26]. They expressed concern that the policy might ultimately result in minorities having 'diplomas without practical abilities'. Aside from this, some scholars consider it unfair to simply add a bonus score purely based on the ethnic identity of a given candidate, regardless of their actual economic situation [23]. The policy's definition of 'ethnic minorities' is also ambiguous, considering all minorities as a monolithic whole. In fact, there are vast differences between those belonging to the same ethnic group, in terms of social class and economic background. As a result, the PBSEMC policy may lead to new forms of social injustice due to the unclear targeting of beneficiaries, or negligence of other potential beneficiaries [24]. A few members of an ethnic group would receive its benefits and greatly improve their situation, but the rest of the ethnic group would receive none. Hence, 'the Matthew effect'—the rich get richer while the poor get poorer—may result in further inequality within ethnic minority populations [22,23].

Most of the existing scholarly research concerns the relationship between social mobility and Gaokao [19,20], but few studies focus on the effect of a specific policy, such as the PBSEMC, on social class.

The PBSEMC policy has now been implemented for over three decades and has attracted a great deal of attention from academic figures [11,12,22,24]. However, the majority of academic research has investigated the theoretical basis of PBSEMC and its shortcomings [10]. Relatively little research analyses the relationship between this preferential policy and its intended goal—improved social class of ethnic minorities. In addition, much of the existing research uses qualitative methodology, and few adopt quantitative or mixed methods of analysis [27]. This study adopts quantitative comparative analysis which would be helpful to infer the causal relations between the PBSEMC policy and social classes of ethnic minorities. Therefore, this study will analyse publicly available data from a random sample of China's 1% population survey in 2005. The analysis seeks to answer the question of whether PBSEMC has effectively promoted the social classes of ethnic minorities candidates of Gaokao.

3. Methods

3.1 Data source

Guangxi is a provincial autonomous region for ethnic minorities in China, and as of 2020, approximately 37.52% of its population, including 11

ethnic minorities such as Zhuang, Yao and Miao. Meanwhile, the region's government was an early implementer of PBSEMC, and therefore the case of Guangxi was chosen to study in this paper. The data for this study were drawn from the Chinese 1% National Population Sample Survey (CNPSS), which is also called mini-census. As the regularly and systematically collected census data about the Chinese population show, CNPSS is often used to identify long-term trends of Chinese social change. This study is based on a random sample of the 2005 1% mini-census survey. In the 2005 1% mini-census approximately 17,050,000 individuals were interviewed, representing 1.31% of the total estimated population of China in 2005.

The PBSEMC has undergone several stages of development. In the 1950s, its primary version stated that 'Ethnic minority candidates with lower scores can also be admitted to higher education institutions. In the 1980s, new legislation ruled that ethnic minority candidates should be differentiated according to the regions they lived, dividing Gaokao candidates by ethnic minority autonomous regions, mountainous areas, pastoral areas and areas where ethnic minorities were interspersed in predominantly Han areas. Candidates were offered different bonus scores depending on their region of origin [28]. The PBSEMC in Guangxi was also reformed in 1988 [29]. Accordingly, this study will limit its research to the impact of PBSEMC on candidates' social class in Guangxi. This study sample was selected by the following criteria, requiring each individual to meet either criteria 1 or 2, and must meet criteria 3.

Criteria 1. Individuals must belong to one of these 10 specific ethnic minorities: Zhuang, Yao, Miao, Mulao, Maonan, Hui, Yi, Jing, Shui or Gelao. Alternatively, the individual could belong to any of the minorities from Guangxi's 11 ethnic minority autonomous counties: Rongshui, Sanjiang, Jinxiu, Dahua, Duan, Bama, Luocheng, Longlin, Longsheng, Fuchuan, or Huanjiang. The Gaokao bonus score given to those who met the first criteria was 10 prior to the PBSEMC reform in 1988: After the reform, it was doubled to 20.

Criteria 2. Individuals must belong to an ethnic minority from one of the 33 counties and districts of Guangxi, including Baise City, Hechi City and Chongzuo City. Those who met the second criterion were not affected by the PBSEMC reform in 1988, and resultantly their bonus score remained at 10.

Criteria 3. Individuals belonging to any of China's ethnic minorities living in Guangxi, with a level of education equal to or greater than senior high school. This is due to the fact that only graduates of senior high school are eligible to take the Gaokao.

After removing the missing data, the research sample of this study involved 1,775 individuals.

3.2 Empirical strategy

Currently, the methods to quantitatively evaluate policy effects include Difference-in-Differences (DID) analyses, Regression Discontinuity (RD) analyses, Synthetic Control Methods (SCM) analyses, and Propensity Score Matching (PSM) analyses, among others [30-32]. Each method is applicable in certain conditions, which will not be detailed in this study. This article will adopt the DID analysis for the case study.

DID analysis may be extended to include multiple periods and multiple policy implementation points. Traditional DID analysis, however, is often applicable to panel data. Since the CNPSS data are cross-sectional, the DID analysis will be constructed based on cross-sectional information [33-38].

The 1988 reform of PBSEMC in Guangxi was not predictable. Therefore, this policy change represents an exogenous intervention and may be regarded as a quasi-experiment (or natural experiment). The effects of the policy implementation on the social classes of ethnic minorities may be defined as:

$$\Delta^2 = \left(Social\ class_{Policy=1}^{Cohort=1} - Social\ class_{Policy=1}^{Cohort=0}\right) - \left(Social\ class_{Policy=0}^{Cohort=1} - Social\ class_{Policy=0}^{Cohort=0}\right) \quad (1)$$

Based on Equation (1) (the meaning of values of dummy variables such as *Cohort* will be explained in the next paragraph), the baseline model for cross-sectional data was constructed in terms of the

variance of the birth cohort and whether individuals were affected by the policy intervention:

$$Social\ class_{icp} = \beta_0 + \alpha \cdot Cohort_{ic} + \gamma \cdot Policy_{ip} + \delta \cdot Cohort_{ic} \cdot Policy_{id} + X_{icp}\beta + \varepsilon_{icp} \quad (2)$$

In Equation (2), the dependent variable $Social\ class_{icp}$ is the socio-economic index (SEI) of individual *i,* belonging to the birth cohort *c*. The subscript *p* indicates whether the individual was affected by the policy intervention. For the explanatory variable, α is the fixed effects of the birth cohorts, and $Cohoet_{is}$ represents the dummy variable of the individual *i*'s birth cohort *c*. $Policy_{ip}$ is a dummy variable for whether individual *i* was affected by the policy intervention. δ is the coefficient of the interaction term of the birth cohort and whether individuals were affected by the policy intervention, which is also the policy effect the study focuses on. Moreover, X_{icp} is a series of selected control variables, and ε_{icp} is a random error term.

3.3 Measures

Although there are many studies that measure social stratification [39], in order to distinguish the Chinese population's social strata, a commonly used indicator, SEI, will be adopted to measure individuals' social classes. An estimate of the SEI was obtained using the formula found in the Chinese Occupational Prestige of Urban Residents Survey of 1999 [40]. This formula is:

$$SEI = 5.622 + 15.816 * \textbf{\textit{years of education}} + 0.763 * \textbf{\textit{income}} \quad (3)$$

In this study, **the educational level** in the survey was transformed into **years of education**, according to the following rubric: senior high school graduates have 12 years of education; professional college graduates have 15; university undergraduates have 16; and master's degree graduates have 18. The other independent variable, **income**, was represented by **personal monthly income** in the survey.

There are two core explanatory variables: The first is whether the individual was affected by the PBSEMC reform, and the second is their birth cohort. As previously discussed, the policy intervention of the PBSEMC reform is only relevant to the samples that meet condition 1 (see Section 3.1). For individuals who meet condition 2, their bonus Gaokao scores were 10 both before and after the implementation of the PBSEMC policy. Moreover, since the average age for individuals taking the Gaokao is 18 years old, individuals who were born before 1970 are very unlikely to be affected by the reform, as it was initiated in 1988. Resultantly, the research samples were divided into two cohorts: individuals born before 1970, and individuals born in 1970 and afterwards. These are shown in **Table 1** below. In addition to the core explanatory variables, a series of control variables were also included, containing **sex**, **age**, **registered residence type** (either agricultural or non-agricultural household registration), **marital status**, and **occupation types**. These factors were considered in order to exclude any other potential influencers of an individual's social class. **Table 2** details the assignments of values to variables.

Table 1. The birth cohort.

Age at the time of the survey	Year of birth	Age in 1988	Birth cohort	N
> 35	< 1970	> 18	Cohort1	956
≤ 35	≥ 1970	≤ 18	Cohort2	819

Table 2. The assignment of variables.

Variable	Assignment
Birth cohort	Cohort1 = 0; Cohort2 = 1
Policy intervention	No = 0; Yes = 1
Sex	Female = 0; Male = 1
Age	Continuous
Registered residence type	Agricultural household registration = 0; Non-agricultural household registration = 1;
Marital status	Unmarried = 0; Married = 1
Occupation types	Other = 0; Land contractor = 1; Government-affiliated institutions = 2; National enterprises = 3; Collective enterprises = 4; Individual businesses = 5; Private enterprises = 6

4. Results

This section describes the results obtained from

the analytical approach detailed in the previous section. The main analysis of results will be divided into two different stages:

(1) *Descriptive statistics*: exploring the features and scale of the data;

(2) *Difference-in-Differences analysis*: estimating the overall effects of the policy.

The primary stage of the analysis will provide a thorough descriptive representation of the data. The secondary stage will investigate whether the 1988 reform to the PBSEMC policy had an influence on the social classes of ethnic minorities.

4.1 Exploring the data

Table 3 shows the descriptive statistics of each main research variable. The relative proportion of men in the sample is greater than that of women; the average age of individuals in the sample is approximately 37 years old; more than half of them are married. The results showed that the average SEI of Cohort 2 was higher than the average SEI of Cohort 1, implying that the reform might have an association with the socioeconomic status of ethnic minorities. Most individuals in the sample were registered as living in non-agricultural housing. In terms of occupation, individuals engaged in government-affiliated institutions accounted for the largest proportion. Notably, there are more individuals engaged in individual businesses and private enterprises in *Cohort 2* than in *Cohort 1*, implying an observed change in the economic structure of this area.

4.2 Estimation of baseline model

As a result of the above data analysis, it is assumed that the reform of PBSEMC is positively associated with the socio-economic class of ethnic minorities. According to the estimation of the baseline model displayed in column (1) of **Table 4**, the interaction term of **birth cohort** and **policy intervention** is 69.096 ($p < 0.05$), which is statistically

Table 3. Descriptive statistics.

	Cohort1 (N = 956)	**Cohort2 (N = 819)**	**Full sample (N = 1775)**
Socio-economic index (SEI)	3250.437 (459.932)	3271.277 (385.901)	3260.053 (427.379)
Policy intervention	0.621 (0.485)	0.649 (0.477)	0.634 (0.482)
Sex	0.687 (0.464)	0.576 (0.494)	0.636 (0.481)
Age	44.558 (5.762)	28.279 (4.511)	37.047 (9.651)
Registered residence type	0.658 (0.475)	0.742 (0.438)	0.697 (0.459)
Marital status	0.962 (0.190)	0.602 (0.489)	0.796 (0.403)
Occupation types			
Other	*6.49*	*6.84*	*6.65*
Land contractors	*23.33*	*11.48*	*17.86*
Government-affiliated institutions	*37.34*	*33.09*	*35.37*
National enterprises	*15.59*	*15.87*	*15.72*
Collective enterprises	*3.03*	*5.13*	*4.00*
Individual businesses	*10.56*	*17.46*	*13.75*
Private enterprises	*3.66*	*10.13*	*6.65*

Notes: The sample means are numbers without brackets. The sample standard deviations are numbers in parentheses, and the percentages are numbers in italics.

significant at the 5% significance level, indicating a positive correlation between the policy intervention and the social classes of ethnic minorities. These results confirm the previous hypothesis: When all other conditions remain the same, the 1988 reform of PBSEMC has significantly benefitted the social classes of ethnic minorities in Guangxi. Additionally, other independent variables such as **sex**, **registered residence type** and **occupation type** are statistically significant, which is consistent with the pre-existing scholarly literature [41-43]. Specifically, the average social class of men tends to be higher than that of women; also, the average social class of individuals registered in non-agricultural housing is higher than that of those registered in agricultural houses. As for occupation, those who are employed in government-affiliated institutions, national enterprises, collective enterprises and private enterprises are shown to be members of a higher social class than individuals employed in other sectors. In particular, the social class of land contractors is lower than the other types of occupation.

Table 4. The results of estimation.

	(1)	**(2)**	**(3)**	**(4)**
Birth cohort	–25.573 (37.936)	52.093 (54.569)	–85.939 (77.349)	–19.882 (37.787)
Policy intervention	41.156* (23.047)	131.945*** (29.009)	–14.253 (49.818)	–63.413 (48.925)
Birth cohort * Policy intervention	**69.096**** **(34.246)**	**–86.041** **(53.088)**	**164.710**** **(65.454)**	**80.033**** **(34.156)**
Sex	96.463*** (17.496)	38.075 (23.736)	142.699*** (32.489)	99.770*** (17.490)
Age	2.120 (1.699)	7.989* (4.747)	-0.510 (9.489)	2.093 (1.693)
Registered residence type	108.721*** (27.478)	67.592* (35.289)	143.951 (52.061)	101.458*** (27.362)
Marital status	39.744 (24.691)	15.514 (30.766)	52.534 (51.769)	52.923* (24.741)
Occupation types (Other = 0)				
Land contractors	–374.568*** (39.901)	–378.752*** (59.565)	–409.095*** (81.814)	–371.314*** (39.765)
Government-affiliated institutions	210.196*** (36.587)	173.842*** (49.673)	167.012** (65.604)	227.652*** (36.730)
National enterprises	184.209*** (39.849)	173.694*** (53.843)	118.816* (71.616)	192.119*** (39.830)
Collective enterprises	227.753*** (52.834)	277.501*** (67.878)	188.585* (102.554)	224.389*** (52.653)
Individual businesses	18.360 (38.880)	66.575 (51.981)	–3.955 (70.271)	22.840 (38.749)
Private enterprises	134.714*** (45.383)	127.351** (57.043)	112.250 (85.432)	142.164*** (45.284)
Adjusted R^2	0.351	0.279	0.244	0.360
N	1775	819	617	1775

Notes: (a) column (1) represents the estimation of the baseline model corresponding to equation (2); column (2) represents the estimation of the baseline model but using only the samples of individuals born after 1970, corresponding to *Cohort2* in **Table 1**; column (3) represents the estimation of baseline model using the subsample aged between 30 and 40; column (4) represents the estimation of baseline model controlling regional fixed effects. (b) * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$; and standard errors in parentheses.

4.3 Robustness checks

The estimated results have verified the hypothesis proposed before. Nevertheless, the key to the identification of DID model is the so-called 'common trends' assumption, that is to say, if there had been no reform of PBSEMC, individuals in *Cohort2* would have been in the same trend of social class as *Cohort1* [44]. In this case, the study applied four methods to test the robustness of obtained results.

Firstly, Permutation Test (PT) was conducted to confirm whether the estimated results are truly statistically significant, or whether the significance shown is a result of Random Chance. The null hypothesis is that the reform of PBSEMC has had no effect on the social classes of ethnic minorities, which can be noted as H_0: $\delta = 0$. Under this null hypothesis, the estimated coefficients of the random sample will constitute a Permutation Distribution. This study randomised the time of the PBSEMC reform; in other words, it randomised the birth cohort of individuals in the original sample. Next, the baseline model was re-estimated, and the process was repeated 1000 times. As seen in **Figure 1**, the histogram shows the distribution of policy effects estimated from 1000 separate random samples. The dotted line represents the policy effect which was estimated in column (1) of **Table 4**, in which $\delta = 69.096$. The P-value indicates the proportion of the number of policy effects, that is δ in Equation (2), is greater than or equal to 69.096 across the 1000 total estimates in the permutation distribution. The P-value is 0.018, which rejects the null hypothesis that the PBSEMC reform has had no effect on the social classes of Guangxi's ethnic minorities. Thus, the estimated results of the baseline model are robust.

The second method was adopted to further test the robustness of the result, and to ensure that the implied policy effects were not actually caused by missing systemic factors which had a continuous impact both before and after the policy implementation [33-35]. If missing factors were involved, it would be expected that the re-estimated baseline model only with individuals born after 1970 should be similar to the results shown in column (2) of **Table 4**. Correspondingly, if there were no missing variables, the PBSEMC reform's effects should not be statistically significant for the birth cohort after 1970. To carry out this analysis, a 'virtual birth cohort' is built, consisting of individuals born after 1980. In other words, the baseline model was re-estimated using the cohort of individuals born between 1970 and 1980 as the control group and the virtual cohort as the treatment group. It was anticipated that the effects of the PBSEMC policy would not exist for the virtual cohort. As shown in column (2) of **Table 4**, the coefficient of the interaction term of birth cohort and policy intervention was estimated to be not statistically significant ($\delta = -86.041$, $p = 0.105$) and its direction is negative, suggesting that the effect of the policy is not due to missing variables. Therefore, the key assumption of DID analysis has not been violated, and the results are validated as robust.

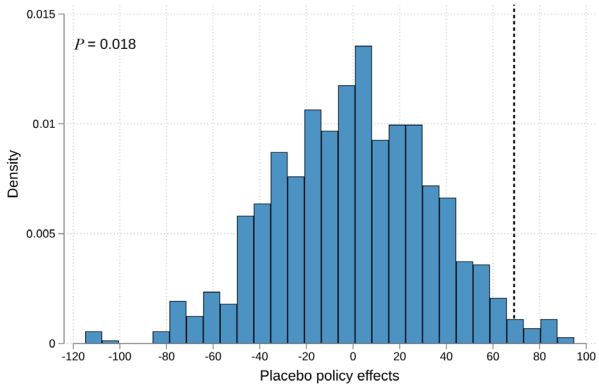

Figure 1. The permutation test.

Thirdly, given the large difference in the age means between the two cohorts in the baseline model, unobserved historical events over a long time span may become a confounder in the estimation of the policy effect of PBSEMC. Therefore, a sub-sample aged between 30 and 40 at the time of survey implementation in 2005 was selected to re-estimate the baseline model. The mean values of sample age for the two cohorts were 38.190 (N = 247) and 32.568 (N = 370) respectively, allowing the effect of historical events to be excluded to some extent. The results are shown in column (3) of **Table 4**, where it can be seen that the policy effect remains significant ($\delta = 164.710$, $p < 0.05$), again demonstrating that the

estimates from the baseline regression are robust.

Finally, considering the heterogeneity among the different regions where the sample is located, the dummy variables of locations at the prefecture level are included in the baseline model. As shown in column (4) of **Table 4**, the estimated policy effect on social classes of ethnic minorities is more prominent ($\delta = 80.033$, $p < 0.05$) compared with the baseline model after controlling regional fixed effects, and the effect is also significant at the 5% significance level.

5. Discussion

This article aimed to investigate the relationship between the 1988 reform of PBSEMC and the social classes of ethnic minorities in Guangxi. It aimed to utilise its results to assist policymakers to adjust and improve related policies in the future. This section is divided into four parts: The first will discuss and summarise the main findings of the research; the second will discuss the implications on policies and practises; the third will consider areas of potential future study; and the fourth will address the limitations of this study.

5.1 Discussion of main findings

PBSEMC has had a significant role in promoting the social classes of ethnic minorities in Guangxi

This study regards SEI as the basis for measuring the social classes of individuals, using a definition calculated by Xu [40]. It is clear that the PBSEMC policy has made it possible for a greater number of ethnic minority candidates to receive higher education, which also extends the average education years of the entire ethnic group. Since the official implementation of PBSEMC, the overall enrolment rate of minorities in universities has significantly risen. This is particularly significant considering that the lack of educational resources in ethnic minority areas, coupled with the restrictions of taking an examination in a different language, put ethnic minorities at a disadvantage when taking the Gaokao. Without the help of PBSEMC, it is immensely difficult for a member of an ethnic minority from a remote, rural region of China to gain access to prestigious higher education institutions, especially considering the fierce competition of the Gaokao examinations [12,21]. In 1950, the number of ethnic minority students in the Chinese higher education system was 1,285, accounting for 1.4% of the total number of students in higher education. By 1978 the number was 3,603, or 4.2% of the total; in 1996 it increased to 19,680, 6.5% of the total; by 2003 it increased massively to 625,200, 5.9% of the total; by the end of 2006, it was 1,226,900, 6.09% of the total. The most recent figures, released in 2018, show that there were 1.51 million ethnic minorities in Chinese higher education, making up 9.16% of the total number of students [45]. This is now almost identical to the overall proportion of minorities in the general population, suggesting that the PBSEMC policy has made the Chinese education system representative. The rapid increase in this proportion shows the remarkable effect of this policy, proving that higher education in ethnic minority areas has developed very quickly under the impetus of PBSEMC. Concordantly, the average income level of ethnic minorities who have received higher education has also increased. Therefore, aligning with the previous literature, the Gaokao have an indirect effect on the future social classes of ethnic minorities graduates through the educational diversion result that determines whether ethnic minority individuals can receive higher education [19,20,27].

Other factors that significantly impact the social classes of ethnic minorities in Guangxi

In addition to PBSEMC, the gender, the type of occupation and the registered residence type of individuals were also shown to have a significant impact on ethnic minority social class. It should be noted that this impact is not limited to ethnic minorities, but is also reflected across various demographic groups in the Chinese population [43,46]. Firstly, male students dominate in all key areas of society. A comparative study of social class and gender found not only that the proportion of men is greater in the upper and middle classes of Chinese society, but also that men of any class have more advantages in gaining political, cultural and economic resources [47].

Similarly, economic stratification and education stratification are also biased in favour of men [41,48]. As for the household registration type of the sample population, discrimination exists in all regions with different levels of development. This discrimination is primarily reflected in the amount of salary [43]. Particularly for individuals on average or low salaries, the earning differences triggered by household registration types are fairly considerable [42]. The results also indicate that occupation has a potent effect on ethnic minority social class. Those working in government-affiliated institutions, national enterprises, collective enterprises or private enterprises tend to be members of a higher social class than those employed in other occupations, and land contractors tend to be members of a lower social class than the other listed occupations. Indeed, different types of occupations are often considered as a symbol of the economic resources, power resources and cultural resources possessed by individuals, or as being synonymous with certain social classes, as they strongly correlate with an individual's wealth, power, and social prestige [46,49].

5.2 Implications

This research analysed the case study of the 1988 reform of PBSEMC in Guangxi, where the policy was reasonably comprehensive, with detailed divisions for the various ethnic groups and different regions, including ethnic minority autonomous counties, which means only a few specific ethnic groups or any ethnic minority groups from specific regions were able to take advantage of the policy. Nevertheless, there are still several elements of the policy which operate on a 'one size fits all' basis in other regions of China [50,51], where all the ethnic groups except the dominant ethnic group, Han ethnic group, are able to earn bonus points, leading to other potential problems regarding fairness and equality [23,24]. In addition, existing studies mostly focus on the social class discrepancies between Han citizens and ethnic minorities [10,12,21], largely neglecting the issues of social class within ethnic minority populations. In fact, there are significant differences within ethnic minority groups [23], and the inequalities in educational attainment within ethnic minority groups are greater than within the Han contingent [52]. This is proven by the researcher's calculation of the education differences amongst three ethnic minority groups, which considered the proportion of the population who were in the lower class, middle class and upper class. For these minorities, the standard deviation of the Generation Rate of Higher Education (GRHE①) was 3.73, compared to the 1.95 value of the Han ethnic group. Among the ethnic minorities, the GRHE of the lower class was 0.85; the GRHE of the middle class was 1.57; and the value for the upper class was far higher, at 7.64. These values indicate that wealthy ethnic minorities from these three groups are 9 times more likely to access higher education than their lower-class counterparts. In other words, PBSEMC may in fact benefit a small proportion of ethnic minorities, particularly those who have more comfortable lives. On the contrary, the individuals who urgently need assistance and who have struggled with the vicissitudes of poverty, are still excluded despite the PBSEMC policy [24]. Therefore, research on the internal social stratification of ethnic minorities would have profound importance.

In particular, regions inhabited by ethnic minorities are mostly areas with low levels of economic development and limited educational resources. But some minority-populated regions are richer and have an abundance of educational resources. Apparently, the living and educational conditions of these regions are completely different. We may therefore assume that it is unfair to insist that candidates from all minority regions receive the same amount of bonus points, since the richer minorities have already benefitted from a higher quality of life [22], which is worthy of further study. The effects of PBSEMC policy could be further evaluated along four dimensions: ethnicity, region, language, and college. The results would then inform how to design PBSEMC to benefit the candidates who are in most need of assistance.

① GRHE refers to the ratio between the proportion of the individuals of a social class in the students of higher education and the proportion of that social class in the whole professional population.

5.3 Limitations of the study

This study used the DID analysis based on cross-sectional data from the CNPSS of 2005. It analysed the success rate of the 1988 reform to the PBSEMC policy, with a specific focus on China's Guangxi Zhuang Autonomous Region. This study confirmed the positive effect of PBSEMC on the social classes of ethnic minorities in the region. Nevertheless, inevitable constraints still engendered the following limitations:

(1) The data source for this study was drawn from the CNPSS of 2005, which is now over 15 years past. However, this was the most recent data available, since the CNPSS of 2010 and 2015 are not yet in the public domain.

(2) This research only involves pilot policies in some areas of Guangxi. As a result, the sample is not adequately represented, and conclusions may not be applicable elsewhere in China.

Each of these limitations could be addressed by further research.

6. Conclusions

The Gaokao, which is the primary channel for accessing higher education in China, is also a channel for social mobility [19]. Since the preferential policies have an effect on every student who takes the Gaokao examination and hopes to access higher education, the bonus score admission policies of the Gaokao have been persistent and highly controversial in recent years [17,18]. PBSEMC is a typical example of a bonus score admission policy enforced by the national government, and discussions of it have often been heated [12,21]. Some scholars claim PBSEMC is beneficial to balance the interests of different ethnic groups, while others note that it may have a negative impact on the quality of higher education or the disadvantaged groups among ethnic minorities [22-25]. Most of them, however, admit that those who benefit from PBSEMC have a greater probability of receiving higher education than other candidates [18,26]. The results of the DID analysis of cross-sectional data confirmed that the 1988 reform of PBSEMC had a significantly positive effect on the social class of ethnic minorities in Guangxi. The findings also proved that gender, residence type and occupation type were relevant to social class, aligning with the previous literature [43,46]. The results suggest that PBSEMC is effective in improving the social classes of ethnic minorities, but the PBSEMC policy should be made more precise, in order to benefit the candidates who are in genuine need of assistance.

Authors' Contributions

All authors contributed equally to this work. All authors read and approved the final manuscript.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Data Availability

The CNPSS survey data are free and available in the public domain, and were accessed through the internet. Within this census, all respondents agreed to participate in the research and gave their consent for their personal data to be used in secondary research. Therefore, ethical approval was not required.

Funding

This work was supported by National Social Science Foundation (21BZZ021).

References

[1] Chinese National Bureau of Statistics, 2020. Zhong guo zhu hu diao cha nian jian (Chinese) [China yearbook of household survey]. China Statistics Press: Beijing.

[2] Zhu, G.L., Li, C.X., 2017. Xian shi hai shi feng xian: "jie ceng gu hua" bian xi (Chinese) [Reality or risk: An analysis of social class solidification]. Exploration and Free Views. (5), 76-82+102.

[3] Blau, P.M., Duncan, O.D., 1967. The American

occupational structure. John Wiley & Sons: Hoboken.

[4] Lin, N., Vaughn, J.C., Ensel, W.M., 1981. Social resources and occupational status attainment. Social Forces. 59(4), 1163-1181. DOI: https://doi.org/10.2307/2577987

[5] Blau, P.M., 1992. Mobility and status attainment. Contemporary Sociology. 21(5), 596-598. DOI: https://doi.org/10.2307/2075538

[6] Breen, R., 2010. Educational expansion and social mobility in the 20th century. Social Forces. 89(2), 365-388.

[7] Wu, K.M., Wu, D., 2021. Gao deng jiao yu yu she hui liu dong de guan xi: yi ge wen xian zong shu (Chinese) [Relationship of higher education and social mobility: A literature review]. China Economics of Education Review. (4), 118-128.

[8] Ishida, H., Muller, W., Ridge, J.M., 1995. Class origin, class destination, and education: A cross-national study of ten industrial nations. American Journal of Sociology. 101(1), 145-193.

[9] Zhao, C.L., 2008. She hui fen ceng, wen hua chuan tong yu gao kao zhi du gai ge (Chinese) [Social stratification, cultural tradition and reform of college entrance examination]. Theory and Practice of Education. (7), 22-26.

[10] Chen, L., 2019. Shao shu min zu gao kao jia fen zheng ce yan jiu hui gu yu zhan wang (Chinese) [Review and prospect of the research on the policy of bonus scores for ethnic minority candidates]. Education and Examinations. (3), 10-15.

[11] Ding, Y.Y., 2005. Shao shu min zu jiao yu ping deng wen ti ji zheng fu de jiao yu zheng ce xuan ze (Chinese) [Equality in education for ethnic minorities and educational policy alternative of the government]. Journal of Research on Education for Ethnic Minorities. (2), 17-22.

[12] Teng, X., Ma, X.Y., 2005. Zhong guo gao deng jiao yu de shao shu min zu you hui zheng ce yu jiao yu ping deng (Chinese) [China's preferential policy to minority nationalities in higher education and education equality]. Ethno-national Studies. (5), 10-18+107.

[13] Du, W.J., Si, Y.W., 2014. Guan yu gao kao fen lei zhao kao mo shi de ruo gan si kao (Chinese) [Reviews on the mode of classified enrollment in the Gaokao]. Journal of Teaching and Management. (25), 73-76.

[14] Liu, B., 2020. Xin gao kao zhi du gai ge de xian zhuang yu si kao: zhi du bian qian de shi jiao (Chinese) [The status and reflection of new college entrance examination reform: The perspective of institutional change]. China Higher Education Research. (1), 35-41.

[15] Van Leeuwen, M.H., Maas, I., 2010. Historical studies of social mobility and stratification. Annual Review of Sociology. 36, 429-451.

[16] Parkin, F., 1969. Class stratification in socialist societies. The British Journal of Sociology. 20(4), 355-374. DOI: https://doi.org/10.2307/588921

[17] Hu, Y.Z., Ga, Y.Q., 2016. Zheng que ren shi shao shu min zu gao kao jia fen zheng ce (Chinese) [Proper understanding of the Gaokao policy of bonus scores for ethnic minority candidates]. Journal of South-Central University for Nationalities (Humanities and Social Sciences). (5), 18-22.

[18] Gao, Y.H., 2014. Shao shu min zu gao kao jia fen zheng ce xiao guo diao cha yan jiu (Chinese) [An investigation into the policy of bonus scores for minority candidates at the college entrance examination]. Journal of Guangxi University for Nationalities (Philosophy and Social Science Edition). (3), 94-99.

[19] Liao, Y., 2005. She hui fen ceng yu gao deng jiao yu de hu dong (Chinese) [The interaction between social stratification and higher education]. Modern University Education. (5), 63-66.

[20] Zhang, M., Zhang, X.M., Tu, X.J., 2016. Gao deng jiao yu neng da po she hui jie ceng gu hua ma? Ji yu you xu probit ban can shu gu ji ji xia pu li zhi fen jie de shi zheng fen xi (Chinese) [Does higher education break down social class solidification? An empirical study based on ordered-probit semi-parameter estimation and shapely value decomposition]. Journal of Fi-

nance and Economics. (8), 15-26.

[21] Ao, J.M., 2006. Ge ti ping deng ,yi huo qun ti ping deng: shao shu min zu gao deng jiao yu zhao sheng zheng ce li lun yan jiu (Chinese) [Individual equality or groups equality: Admission policy for minority students in Chinese higher education]. Tsinghua Journal of Education. (6), 70-74.

[22] Zhang, S.Y., 2010. Wo guo gao kao zhao sheng zhong shao shu min zu you hui zheng ce de xin si kao (Chinese) [New thoughts on preferential policy for ethnic minority students in college entrance examination in China]. Journal of Research on Education for Ethnic Minorities. (5), 5-9.

[23] Siqingerile, 2013. Jiao yu gong ping shi jiao xia shao shu min zu gao kao qing xie zheng ce de xian shi chong tu yu gai jin dui ce (Chinese) [Realistic conflicts and improvement countermeasures of the preferential policy of the bonus scores for ethnic minority candidates from the perspective of educational equity]. China Youth Study. (2), 15-18+78.

[24] Huang, L.H., Qin, M.Z., Zhou, L.L., 2013. Xian fa shi ye xia shao shu min zu gao kao you hui zheng ce yu shou jiao yu quan de ping deng bao hu (Chinese) [The preferential policy for minority students in the college entrance examination and protection for the right to equal education in perspective of constitution]. Journal of Research on Education for Ethnic Minorities. (2), 37-41.

[25] Tang, D.X., 2002. Lun wo guo min zu jiao yu de you hui zheng ce (Chinese) [China's preferential policies of ethnic education]. Journal of Research on Education for Ethnic Minorities. (1), 40-45.

[26] Lan, J., Xiao, F.X., 2014. Shao shu min zu gao kao you hui zheng ce de xiao ji xiao ying ji fan si: ji yu min zu qu yu zi zhi de shi jiao (Chinese) [Negative effects and reflections of the preferential policies for ethnic minorities in the Gaokao: From the perspective of ethnic regional autonomy]. Guangxi Social Sciences. (1), 188-191.

[27] Chen, X., Dong, Z., 2010. Gao deng jiao yu fen liu yu she hui fen ceng liu dong yan jiu hui su yu zhan wang (Chinese) [Retrospect and prospect of research on higher education diversion, social stratification and social mobility]. Journal of Central China Normal University (Humanities and Social Sciences). (3), 149-155.

[28] Jin, D.H., Wang, A.L., 2007. Guan yu wo guo shao shu min zu xue sheng gao kao you hui zhao sheng zheng ce ruo gan wen ti de si kao (Chinese) [Development, characteristics and consideration on the problems of preferential enrollment policy of university entrance examination for minority students in China]. Journal of Northwest Normal University. (1), 84-88.

[29] Bureau of Statistics of Guangxi, 1988. Guangxi di fang zhi (Chinese) [Local chronicles of Guangxi]. China Statistics Press: Guangxi.

[30] Oh, I., Lee, J.D., Heshmati, A., et al., 2009. Evaluation of credit guarantee policy using propensity score matching. Small Business Economics. 33, 335-351.
DOI: https://doi.org/10.1007/s11187-008-9102-5

[31] Abou-Chadi, T., Krause, W., 2020. The causal effect of radical right success on mainstream parties' policy positions: A regression discontinuity approach. British Journal of Political Science. 50(3), 829-847.
DOI: https://doi.org/10.1017/S0007123418000029

[32] Chelwa, G., van Walbeek, C., Blecher, E., 2017. Evaluating South Africa's tobacco control policy using a synthetic control method. Tobacco Control. 26(5), 509-517.
DOI: https://doi.org/10.1136/tobaccocontrol-2016-053011

[33] Chen, Y., Zhou, L.A., 2007. The long-term health and economic consequences of the 1959-1961 famine in China. Journal of Health Economics. 26(4), 659-681.
DOI: https://doi.org/10.1016/j.jhealeco.2006.12.006

[34] Cheng, L.G., Zhang, Y., 2011. Zao nian de ji huang jing li ying xiang le ren men de chu xu xing wei ma? Dui wo guo ju min gao chu xu lv de yi ge xin jie shi (Chinese) [Does famine experience in childhood influence one's saving

decision? A New explanation of China's high household saving rate]. Economic Research Journal. (8), 119-132.

[35] Fan, W., Qian, Y., 2015. Long-term health and socioeconomic consequences of early-life exposure to the 1959-1961 Chinese Famine. Social Science Research. 49, 53-69.
DOI: https://doi.org/10.1016/j.ssresearch.2014.07.007

[36] Chen, Y., Fan, Z., Gu, X., et al., 2020. Arrival of young talent: The send-down movement and rural education in China. American Economic Review. 110(11), 3393-3430.
DOI: https://doi.org/10.1257/aer.20191414

[37] Tang, C., Zhao, L., Zhao, Z., 2020. Does free education help combat child labor? The effect of a free compulsory education reform in rural China. Journal of Population Economics. 33(2), 601-631.
DOI: https://doi.org/10.1007/s00148-019-00741-w

[38] Wu, X.W., Cao, Z.D., Wu, H.T., 2022. Gao deng jiao yu kuo zhang yu xiao jia ting jue qi: lai zi da xue kuo zhao zheng ce de zheng ju (Chinese) [Higher education expansion and the miniaturization of family size—Evidence from China's enrollment expansion policy]. Sociological Studies. (3), 92-114+228.

[39] Qiu, L.P., 2001. Zhi ye di wei: she hui fen ceng de zhi shi qi—Shanghai she hui jie gou yu she hui fen ceng yan jiu (Chinese) [Occupational status—An indicator of social stratification: A study on shanghai social structure and social stratification]. Sociological Study. (3), 18-33.

[40] Xu, X.X., 2000. Cong zhi ye ping jia yu ze ye qu xiang zhong kan zhong guo she hui jie gou bian qian (Chinese) [Viewing the changes of China's social structure from occupation evaluation and occupation orientation]. Sociological Study. (3), 67-85.

[41] Belkhir, J.A., Barnett, B.M., 2001. Race, gender and class intersectionality. Race, Gender & Class. 8(3), 157-174.

[42] Deng, Q.H., 2007. Cheng zhen ju min yu liu dong ren kou de shou ru cha yi: ji yu Oaxaca-Blinder he Quantile fang fa de fen jie (Chinese) [Earnings differential between urban residents and rural migrants: Evidence from Oaxaca-Blinder and quantile regression decompositions]. Chinese Journal of Population Science. (2), 8-16+95.

[43] Meng, F.Q., Deng, B.G., 2014. Lao dong li shi chang hu ji qi shi yu cheng xiang gong zi cha yi: ji yu fen wei shu hui gui yu fen jie de fen xi (Chinese) [Discrimination of household registration in the labor market and differences of urban-rural wage: An analysis based on quantile regression and decomposition]. Chinese Rural Economy. (6), 56-65.

[44] Yao, Y.J., 2019. Shuang chong cha fen yu san chong cha fen mo xing: yi ge jian ming jie shao (Chinese) [A brief introduction: Difference-in-difference model and difference-in-difference-in-difference model]. Journal of Translation from Foreign Literature of Economics. (1), 24-28.

[45] Chinese National Bureau of Statistics, 2019. Zhong guo zhu hu diao cha nian jian (Chinese) [China yearbook of household survey]. China Statistics Press: Beijing.

[46] Torche, F., 2015. Analyses of intergenerational mobility: An interdisciplinary review. The Annals of the American Academy of Political and Social Science. 657(1), 37-62.
DOI: https://doi.org/10.1177/0002716214547476

[47] Gu, H., 2013. She hui fen ceng zhong de xing bie bu ping deng: ji yu dui zhong guo di san qi fu nv she hui di wei diao cha shu ju de fen xi (Chinese) [On the gender inequality in social stratification: An analysis based on the data of the 3rd Chinese women's social status survey]. Journal of Shandong Women's University. (4), 31-40.

[48] Scherr, R.E., Robertson, A.D., 2017. Unveiling

privilege to broaden participation. The Physics Teacher. 55(7), 394-397.
DOI: https://doi.org/10.1119/1.5003737

[49] Lu, X.Y., Zhang, H.Y., Zhang, Q.Z., 1992. Zhuan xing shi qi nong min de jie ceng fen hua: dui Dazhai, Liuzhuang, Huaxi deng 13 ge cun zhuang de shi zheng yan jiu (Chinese) [Social stratification of farmers in the transitional period: Empirical studies of 13 villages in Dazhai, Liuzhuang and Huaxi]. Social Sciences in China. (4), 137-151.

[50] Bureau of Statistics of Beijing, 2019. Beijing di fang zhi (Chinese) [Local chronicles of Beijing]. China Statistics Press: Beijing.

[51] Bureau of Statistics of Shanghai, 2019. Shanghai di fang zhi (Chinese) [Local chronicles of Shanghai]. China Statistics Press: Shanghai.

[52] Hong, Y.B., 2010. Zu qun yu jiao yu bu ping deng: wo guo xi bu shao shu min zu jiao yu huo de de yi xiang shi zheng yan jiu (Chinese) [Ethnic groups and educational inequalities: An empirical study of the educational attainment of the ethnic minorities in western China]. Chinese Journal of Sociology. (2), 45-73.

BILINGUAL PUBLISHING GROUP

Macro Management & Public Policies

https://journals.bilpubgroup.com/index.php/mmpp

ARTICLE

Individual and Systemic Factors of Under-five Mortality in Nigeria: A Cox Proportional Hazard Model

Titus Kolawole Ojewumi

Department of Demography and Social Statistics, Faculty of Social Sciences, Obafemi Awolowo University, Ile-Ife, 220003, Nigeria

ABSTRACT

Despite considerable efforts to reduce under-five mortality nationwide, Nigeria has fallen short of achieving the Millennium Development Goals (MDGs) target of 67 deaths per 1,000 live births by 2015. Of all the documented factors of under-five mortality, little evidence exists on the impact of systemic barriers and individual factors (maternal health-seeking behaviour) on under-five mortality in Nigeria. The study used a nationally representative sample from Nigeria Demographic and Health Survey (NDHS) 2013 dataset. The target population was 20,192 women aged 15-59 years who had given birth to 31,480 children five years before the survey. Stata software was used for data analysis. The risk of death was estimated using Cox proportional hazard models and results are presented as hazards ratios (HR) with 95% confidence intervals (CI). Findings from the overall Model I-IV revealed individual factors (maternal health-seeking indicators) as significant factors of under-five deaths ($p < 0.05$). Children whose mothers received antenatal care coverage (ANC) outside health care facilities (HCF) (HR: 1.60, CI: 1.0-2.4, $p < 0.05$); or delivered outside HCF (HR: 1.02, CI: 0.7-1.5, $p < 0.05$) had elevated hazard risk of death before age five. Conversely, children who were presented for postnatal check within two weeks of delivery (HR: 0.60, CI: 0.5-0.8, $p < 0.05$), or delivered within the longer birth interval (HR: 0.67, CI: 0.6-0.8, $p < 0.001$) had significantly lower hazard risk of death before age five. As part of systemic factors, children whose mothers were covered by health insurance scheme had significantly (HR: 0.52, CI: 0.2-1.2, $p < 0.001$) lower risk of death when compared with their counterparts without health insurance coverage. The study emphasized the need to revitalize strategies and programs to improve women health seeking behaviour and investment in the health sector through health insurance, infrastructure, and supplies.

Keywords: Individual; Systemic; Under-five; Mortality; Cox-proportional; Hazards; Model; Nigeria

*CORRESPONDING AUTHOR:

Titus Kolawole Ojewumi, Department of Demography and Social Statistics, Faculty of Social Sciences, Obafemi Awolowo University, Ile-Ife, 220003, Nigeria; Email: ojetitus1@gmail.com

ARTICLE INFO

Received: 19 May 2023 | Revised: 3 July 2023 | Accepted: 17 July 2023 | Published Online: 28 July 2023

DOI: https://doi.org/10.30564/mmpp.v5i3.5735

CITATION

Ojewumi, T.K., 2023. Individual and Systemic Factors of Under-five Mortality in Nigeria: A Cox Proportional Hazard Model. Macro Management & Public Policies. 5(3): 16-33. DOI: https://doi.org/10.30564/mmpp.v5i3.5735

1. Introduction

Nigeria, a country that contributes disproportionate 11% to the global burden of infant and child mortality [1], with an estimated infant mortality rate of 75 deaths per 1000 live births, child mortality rate of 88 deaths per 1,000 live births and under 5 mortality rates of 157 deaths per 1,000 live births [2], has achieved a slight decrease in the past ten years. Infant and under-5 mortality rates have declined to 69 and 128 deaths per 1,000 live births respectively. Considering the trend since 1999, under-5 mortality has declined by 31 percent over a period of about 15 years from 185 deaths per 1,000 live births to 128 deaths per 1,000 live births respectively. With both rates declining, Nigeria still falls short of achieving MDG 4, target of 67 deaths per 1,000 live births as of 2015 [3]. Based on past trajectory, one in every 15 Nigerian children still die before reaching age one, and one in every eight fail to survive their fifth birthday [4]. Meanwhile, vaccine-preventable diseases, such as pneumonia, diarrhoea, and measles, account for about 40% of all these deaths, while other significant causes of death were malaria and neonatal causes [5].

Over the years, the Nigerian government and its international partners have made considerable efforts to reduce infant and child mortality nationwide. As part of the efforts, the Nigerian government in 1988 adopted a primary health care (PHC) policy with the latest review in 2004. Also, in May 2008 [6], the national health bill was drafted and adopted with an attempt to clarify the structure, roles, and responsibilities of the different levels of government in the provision of adequate, effective and efficient health care services. In addition, health sector reform programme (2004-2007) [7], national health insurance scheme (NHIS) and a series of reproductive health programmes were introduced including national malaria control programme; national contraceptives commodities quantification programme; national HIV/AIDS programme and opportunistic infection (OI); national AIDS and sexually transmitted infections control programme (NASCP) [8-10]; and expanded programme on immunization (EPI) with support from United Nations International Children's Emergency Fund (UNICEF) and United States agency for international development (USAID) [4]. Each programme operated separate procurement, storage and distribution and logistics management information systems with a responsibility of reaching the poor and the hard-to-reach people nationwide. However, despite all these concerted efforts by the government, stakeholders and international partners to address the health issues in Nigeria, outcomes have remained sub-optimal.

As a result, researchers have made considerable efforts to understand influencing factors for high rates of child mortality and the best strategies to adopt in combating the problem. As part of the findings, NDHS 2013 revealed that the mother's education is inversely related to a child's risk of dying and established that childhood mortality generally decreases as wealth increases [3]. A number of studies have shown that infant and child mortality rates are influenced by socio-economic and bio-demographic characteristics [11-13], while others [14,15] have established the influence of increased access to health programmes and infrastructures on maternal and child mortality in developing countries. Several other studies on infant and child morbidity or mortality are mainly hospital-based [16,17], with little attention given to individual (No. of ANC visits, place of ANC visits, quality of ANC, place of delivery, delivery assistance and post-natal care) and systemic factors (cost of care, distance to health care facilities, attitude of the health workers and health insurance coverage) of under-five mortality in Nigeria.

Despite the benefits of maternal health care services, maternal health-seeking behaviour is still poor in Nigeria. While studies have shown that utilization of health care services by mothers during pregnancy and delivery is a precondition that mothers will seek subsequent care after delivery for both themselves and their children [18], still many women in Nigeria do not receive prenatal care at all, and the care that is received is often characterized by an insufficient number of visits [2]. Also, the delivery care utilization is dominated by home births while the proportion of

mothers accessing post-natal care is relatively low. Hence, high-risk pregnancies are often not identified, obstetric histories are ignored and important information on child health care and survival is missed by a large proportion of mothers [4]. Therefore, major treatment of childhood illness among mothers is often dominated by self-care with the use of home remedies or over-the-counter drugs [19]. Thus, mothers and caregivers usually visit a health care facility after the illness has failed to respond to several drugs and ineffective home treatment or self-treatment. These healthcare-seeking practices increase the possible emergence of drug resistance with high rates of morbidity and mortality among under-five children in Nigeria [20].

Other associated factors of under-five deaths also manifested in the form of systemic bottlenecks. Studies had revealed the availability of health workers as essential ingredients for quality health care service delivery, their shortage or absence threatens the health of individuals and populations, destabilises health systems, and further exacerbates the existing health inequalities, resulting in more unequal societies globally. The uneven distribution of health care facilities and a dearth and attitude of health personnel in many developing countries had been established as the inhibiting factors of demand for health care [21,22].

In Nigeria, the health system has been in a deplorable and degrading state with an overall health system performance ranking 187th out of 191 member states of the world health organization [23]. For instance, it was specifically reported that 'most of the 23,000 frontline primary health care facilities often lack skilled practitioners, and a large percentage of the facilities do not have basic pharmaceuticals and commodities consistently in stock' [24]. Health services delivery in Nigeria are delivered through a weak health care system [25], and other indicators such as waiting times, staff attitude to work and public confidence in the health sector had been a significant issues over the years. As a result, the health system has in the last 10 years unable to deliver basic and cost-effective services for the prevention and management of common health problems especially at the local government areas (LGAs) and Ward levels.

In addition, health systemic bottleneck via sector-specific is a factor inhibiting successful health care delivery and utilization of health care system. According to OSSAP-MDG 2013 report, this sector-specific manifested majorly in service delivery (supply-side) in terms of cost of care; shortage of skilled health care personnel; waiting time due to delays in getting treatment; shortage of emergency obstetric care services; inadequate critical supplies in PHCs; and lack of adequate attention to special (disadvantaged) groups of mothers particularly in the case of obstetric and childcare [26]. Most affected are patients in Nigeria's rural areas, as the majority of them lack access to health care facilities and health personnel [27].

Therefore, this study set to answer questions related to systemic and individual factors of under-five mortality in Nigeria by examining the influence of individual (No. of ANC visits, place of ANC visits, quality of ANC, place of delivery, delivery assistance and post-natal care) and systemic factors (cost of care, distance to health care facilities, attitude of the health workers and health insurance coverage) associated with under-five mortality in Nigeria.

Theoretical consideration

This study finds its theoretical construct within Tipping and Segall framework and Sheeran and Abraham's 'health believe model'. Tipping and Segall in 1995 demonstrated that 'the decision to engage with a particular medical channel is influenced by a variety of socio-economic variables, age, the social status of women, the type of occupation, place of residence, access to services and perceived quality of the service' [28]. Whereas Sheeran and Abraham's [29] "health believe model" focused on two elements: 'threat perception' and 'behavioural evaluation'. Threat perception is a function of perceived susceptibility to illness and anticipated severity; behavioural evaluation consists of beliefs concerning the benefits of a particular behaviour and the barriers to it—(*cost of service, perceived quality of service, distance to health care facilities and attitude of health*

personnel etc.). The two elements "threat perception and behavioural evaluation" interact to influence mothers' health-seeking behaviour towards their personal health and that of their children [29]. These two models are appropriate in explaining individual and systemic factors of under-five mortality in any community.

Based on the established theoretical models, this paper dwells much on the relationship between systemic (cost of care, accessibility to health care, perceived quality of service, availability of personnel and drugs) and individual factors (no. of ANC visits, place of delivery, place of postnatal care, etc.) of under-five mortality in Nigeria from the standpoint of literature. Recent estimates of the United Nations Inter-agency Group for Child Mortality Estimation (UN IGME) (2012) put the 2011 global under-five deaths at around 7 million [30]. Though childhood mortality is declining worldwide, but still relatively high in Sub-Saharan Africa. Meanwhile, infant and child deaths have also been known to vary substantially across different regions of the world. These variations between the developing and developed nations are slightly more than 85-fold from a high of 128 deaths per 1000 live births in Nigeria to low of 101 deaths per 1000 live births in the United State [31].

Whitworth et al. in 2002 [32] showed that two neonates with similar biological characteristics may experience different neonatal mortality risks if exposed to different antenatal and obstetric health care due to differences in access and quality of care. Also, Harttgen et al. [33] added that there would be differences in health outcomes of children from two communities with contrasting characteristics and community conditions that would have impacted on health outcomes of individuals [34] through physical structures, social structures, and service provisions [35]. For instance, children born or raised in communities that lack a health care facility are likely to suffer poorer health outcomes compared to those children from communities where good health facilities are available [36]. Meanwhile, Antai in 2010 [13] argued that "the number of health facilities notwithstanding, the use of maternal and child health services is largely determined by mother's indigenous religious affiliation, and this significantly influences the risk of infant and child mortality". Also, patients' waiting time in a health facility has long been established as a factor that affects the utilization of health care services [37,38].

Again, from a theoretical standpoint, the increase in the availability of health care personnel is expected to influence the reduction in infant and child mortality. Pison et al. in their 2013's study of mortality trends in Senegal noted that though trends in mortality declines were a result of the combined effects of socioeconomic conditions, improvements in health programmes and infrastructures (like vaccinations) and changing epidemiological situations (HIV/AIDS and resistance to antimalarial drug chloroquine), the isolated changes in socioeconomic conditions did not correspond to reduction in child mortality [15]. This is consistent with similar studies by Ahmad et al. (2000) [39], as their study showed improved population health outcomes resulting from targeted health interventions regardless of socioeconomic contexts. Therefore, it can be assumed that economic growth in isolation without deliberate public health actions (removal of health systemic bottlenecks) cannot lead to child mortality reduction [40].

2. Methodology

2.1 Data collection method

This study used a secondary dataset obtained from the NDHS 2013 birth recode dataset. The survey design was cross-sectional to provide specific information on population and health indicators at the national, zonal, and state levels. Information collected includes birth histories, in-depth demographic and socio-economic information on illnesses, medical care, immunizations, anthropometric details of children and retrospective history of infant and under-five death from mothers [2]. The total sample frame was 38,948 women aged 15-59 who had given birth to 31,480 children five years before the survey. The target population in this study was mothers of children aged 0-59 months with a sample size of 20,192 women who had given birth to 82,933 children within the five years preceding the 2013 NDHS

survey.

2.2 Data analysis

The data were analyzed using STATA 12 software. The analysis involved three stages namely: i) univariate analysis to examine the mother and child's background characteristics such as age, marital status, religion, education, place of residence, etc., The bivariate analysis involved the use of Pearson's Chi-square test to examine the statistically significant variable of child survival. In the third stage, Cox proportional hazards regression model was based on the selected significant variables at bivariate level to examine: 1) isolated effect of each of the independent variables on child survival; 2) combine effect of the selected independent variables on child survival.

2.3 Cox proportional hazards model

Cox proportional hazards model (survival analysis) is appropriate in analyzing time-to-event as an outcome variable where it can be assumed that the explanatory variables have a multiplying effect on the hazard rates. This means that using the Cox proportional hazards model, both the occurrence of under-five mortality and the time when the child died were combined to generate the outcome variable. In addition, Cox regression analysis handles the censoring problem and permits the inclusion of censored observation. In medical and social science research, an observation is said to be censored when the outcome of interest has not occurred [41]. Using the Cox proportional hazards model, the probability of under-five death was regarded as the hazard.

The hazard was modelled using the following:

$$H(t) = H_0(t) \exp. (b_1X_1 + b_2X_2 + b_3X_3 \_ \_ \_ b_kX_k) \quad (1)$$

where X_1 ... X_k are a collection of explanatory variables and $H_0(t)$ is the baseline hazard at time t, representing the hazard for a person with the value 0 for all the explanatory variables. By dividing both sides of Equation (1) by $H_0(t)$ and taking logarithms, Equation (1) becomes:

$$\text{In } (H(t)/H_0(t)) = b_1X_1 + b_2X_2 + b_3X_3 + ... b_kX_k \quad (2)$$

where $H(t)/H_0(t)$ is regarded as the hazard ratio. The coefficients b_1 ... b_k are estimated by Cox regression (*Cox DR. 1972*).

Therefore, multivariate Cox regression hazard models were used to examine 'individual, systemic and background factors that influence child survival in this analysis by fitting six different models. Model 1 examined the joint effect of individual factors (maternal health-seeking indicators) on child survival. Model II examined the joint effects of systemic factors on child survival. Model III examined the joint effects of background factors on child survival. At the second level, Model IV considered all the selected explanatory variables to examine their combined effect on child survival. The analysis was done using Stata software (version 12). For national representativeness, all analyses were weighted with the standard weighting factors constructed by the Measure DHS.

3. Findings from the study

3.1 Univariate analysis

Percentage distribution of respondents' maternal and systemic factors of under-five mortality in Nigeria

Table 1 below presents the percentage distribution of the respondents by selected individual, systemic and background factors. Analysis by maternal factors showed that the proportion of children whose mothers received more than 4 ANC visits is about 3.0% point higher than the proportion of their counterparts whose mothers received less than 4 ANC visits. More than half (59.7%) of the children are of mothers who did not receive any ANC care or received ANC care at home and other places. Of all, less than half (41.0%) of the children are from mothers who did not receive any tetanus injection during pregnancy. Meanwhile, about 63.8% of these children were from mothers who received ANC care from trained health providers, as more than half of them (64.2%) were delivered outside health care facilities. Also, 60.0% of the children were delivered with no assistance or assistance from relatives,

traditional birth attendant (TBA) and others. More than two-thirds (71.6%) of these children were not presented for post-natal check within two weeks of delivery. And lastly, more than one-fifth (23.2%) of these children were delivered within a short birth interval to the previous birth.

Analysis based on systemic barriers to accessing health care shows that more than one-fourth (25.5%) of the children belonged to mothers who reported the cost of health care service as barrier to accessing health care while about one-fifth (19.9%) and about one-tenth (9.7%) of their counterparts are from mothers who reported cost and distance as well as cost, distance and attitude of the health workers respectively as barrier to accessing health care facilities.

Results from **Table 1** showed that the majority of the children are from mothers within the age bracket 20-39 years with only 2.8 % of them are from mothers within aged 45-49 years. About 96 % of them are from mothers who are currently married or living with a spouse. Analysis by region shows that larger proportions of the children (37.0%) are from mothers in the Northwest region followed by those from the Southeast region (8.9%). More than half (65.0%) of the children belong to mothers from rural areas. Also, the majority (61.9%) of the children are from Muslim mothers while 36.6% of their counterparts are from Christian mothers. Almost half (49.2%) of the children are from mothers with no education. More than seventy percent (70.3%) of the children are from currently working mothers, while about half (46.7%) of them are from the poorest households. Considering the individual barrier, about two out of ten (15.6%) were children of mothers who reported getting permission from their spouse as a barrier to accessing health care, while about one out of ten (6.2%) reported getting permission and not wanting to go alone as a barrier to accessing health care.

3.2 Bivariate analysis

Interpretation of the relationship between selected variables and under-five mortality using Chi-square and Cox proportional hazard ratio (Independent effect)

Table 1 below also presents the chi-square bivariate relationship and independent hazard ratio of the children's survival status by the selected individual, systemic and background factors. The analysis showed that under-five mortality was significantly associated with selected maternal health-seeking indicators ($p < 0.001$). The percentage of under-five deaths was significantly higher for: children whose mothers received less than 4 ANC visits (6.7%); children whose mothers received ANC care at home or other places (11.8%); children whose mothers did not receive any tetanus injection during pregnancy (6.9%); children whose mothers received no ANC care or received ANC from TBA/others (10.5%); children whose mothers delivered at home or other places (10.3%); children of mothers who received no delivery assistance or received delivery assistance from TBA, relatives/others (10.5%); children whose mothers did not go for post-natal check within two weeks of delivery (6.7%) and children who were delivered within shorter birth interval to previous birth (13.6%).

We found no significant relationship between systemic barriers to accessing health care facilities and under-five deaths ($p > 0.05$). However, the result revealed that the proportion of under-five deaths increased monotonically with reported systemic barriers: The proportion of under-five deaths increased slightly from 9.4% among mothers who reported cost of service as problems to 9.6% among those who reported cost of service, distance and attitude of health workers as problems. Also, the proportion of under-five deaths was significantly higher among children whose mothers had no health insurance cover (9.1%, $p < 0.001$) compared with their counterparts whose mothers had health insurance cover (4.7%, $p < 0.001$).

Analysis based on background factors revealed that mothers' age is significantly associated with under-five mortality. The percentage of under-five deaths was significantly highest for children whose mothers are within the lower age group 15-19 (11.9%), and higher age groups 40-44 (10.0%) and 45-49 (13.6%) respectively. Also, there exists a significant regional variation in the proportion of un-

der-five death from a high of 11.0% in the Northwest to a low of 6.3% in the Southwest. The proportion of under-five death is about 4.0% significantly higher among women in the rural area and among women with Islamic faith (10.0%). Under-five deaths significantly vary with mothers' level of education. The proportion of under-five deaths among children whose mothers had no education is about 6.0% point greater when compared with their counterparts whose mothers had secondary or higher education. There is no significant difference in the proportion of under-five deaths by mothers' occupational status. However, the proportion of under-five deaths is significantly higher (11.7%) among children whose mothers are within the lower wealth status than their counterparts within the middle (7.6%) and higher (5.0%) wealth status.

We found no significant difference in the proportion of under-five deaths by mothers who reported individual barriers to accessing health care facilities. Our study revealed no significant variation in the proportion of under-five deaths among mothers who reported no barrier (9.0%) and their counterparts who reported problems getting permission (8.8%), and those who reported both problems of permission and not wanting to go alone (9.7%).

The results of the bivariate Cox proportional hazard ratio (independent effect) were also presented in **Table 1** below. The table presents the unadjusted hazard ratios showing the independent effects of each of the individual, systemic and background factors on child survival. Individual factors (maternal health-seeking indicators) were significantly associated with higher hazards of under-five death. The risk of death before age five was about two-fold higher for children whose mothers display poor health-seeking behaviour during pregnancy, delivery and after delivery ($p < 0.001$). Children whose mothers receive: less than 4 ANC visits (HR: 1.35; CI: 1.2-1.5; $p < 0.001$); had no ANC care or received ANC at home/TBA/other places (HR: 2.43; CI: 2.2-2.7; $p < 0.001$); received no tetanus injection (HR: 1.36; CI: 1.2-1.6; $p < 0.001$); received ANC care from TBA/relatives/others (HR: 1.39: CI: 1.2-1.6; $p < 0.001$); delivered outside health care facilities (HR: 1.52; CI: 1.4-1.7; $p < 0.001$); received delivery assistance from TBA/relatives/others (HR: 1.53; CI: 1.4-1.7; $p < 0.001$); received no postnatal check within two weeks of delivery (HR: 2.00; CI: 1.7-2.4; $p < 0.001$); and children who were delivered within the short birth interval (HR: 1.90; CI: 1.7-2.1; $p < 0.001$) are at higher risk of death before age five when compared with their counterparts whose mothers display good health care seeking behaviour during pregnancy, delivery and after delivery.

Analysis based on systemic factors showed that children whose mothers reported cost of service (HR: 1.09: CI: 1.0-1.2; $p < 0.001$); cost and distance (HR: 1.06: CI: 0.9-1.2; $p < 0.001$); as well as cost, distance and attitude of health workers (HR: 1.11: CI: 1.0.9-1.3; $p < 0.001$); as a barrier to accessing health care had higher risk of death before age five than their counterparts whose mothers reported no problem. Also, children without health insurance coverage had a 100% significantly higher hazard risk of death before age five (HR: 2.00: CI: 1.7-2.4; $p < 0.001$) compared to their counterparts with health insurance coverage.

Analysis based on background factors of under-five death revealed that mothers' age, region of residence, place of residence, religious affiliation, level of education and wealth status significantly predict child survival to age five ($p < 0.05$). For instance, children whose mothers' ages were between 15-44 years had a lower hazard risk of death compared to their counterparts whose mothers' ages were between 45-49 years. Also, children from other regions had a significantly higher hazard risk of death than their counterparts from the southwest region. Children from rural area (HR: 1.62: CI: 1.4-1.8; $p < 0.001$), those of Islamic (HR: 1.35: CI: 1.2-1.5; $p < 0.001$) or other faiths had elevated hazard risk of dying before age five compared to their counterparts in the urban centers or of Christian faith respectively. Also, children whose mothers had no education (HR: 2.28: CI: 1.7-3.0; $p < 0.001$), had primary education (HR: 1.92: CI: 1.4-2.5; $p < 0.001$) or secondary education (HR: 1.29: CI: 0.9-1.1; $p < 0.001$) as well as children from poor (HR: 2.37: CI: 2.0-2.8; $p < 0.001$)

or relatively poor (HR: 1.52: CI: 1.3-1.8; $p < 0.001$) households had a higher hazard risk of death before age five than those whose mothers had tertiary education and from wealthy households respectively.

Though not statistically significant, findings still revealed that children whose mothers reported problem of permission (HR: 1.07: CI: 0.8-1.3; $p > 0.05$) has relatively higher hazard risk of dying before age five, whereas, children whose mothers reported no problems in accessing health care facilities has lower hazard risk (HR: 0.87: CI: 0.9-1.1; $p > 0.05$) of dying before age five when compared with their counterparts whose mothers reported joint problem of permission and not wanting to go alone.

Table 1. Percentage distribution of respondents' background factors and under-five mortality in Nigeria.

Variables	**Total (n = 31,828) N (%)**	**Child survival status (%)**		**Chi-Square/ p-value**	**Independent hazard ratio (C.I)**
		Alive	Dead		
Maternal factors					
Number of ANC visits				26.61***	
< 4 visits	10,010 (48.9)	93.3	6.7		1.35 (1.2-1.5)***
4 visits+	10,457 (51.1)	95.0	5.0		RC
ANC Places				426.44***	
ANC/home/other places	19,000 (59.7)	88.2	11.8		2.43 (2.2-2.7)***
Within HCF	12,828 (40.3)	95.0	5.0		RC
ANC Quality				28.57***	
NO Tetanus injection	8,394 (41.0)	93.2	6.9		1.36 (1.2-1.6)***
Receive tetanus injection	12,073 (59.0)	94.9	5.1		RC
ANC Provider				31.89***	
No ANC/TBA/VHW/Others	7,366 (36.2)	89.5	10.5		RC
Doctor/Nurse/Auxi/Midwives	12,981 (63.8)	93.0	7.0		1.39 (1.2-1.6)***
Place of delivery				104.1***	
Home/Other places	20,442 (64.2)	89.7	10.3		1.52 (1.4-1.7)***
within HCF	11,387 (35.8)	93.2	6.8		RC
Delivery assistance				117.8***	
Doctor/Nurse/Auxi/Midwives	12,719 (40.0)	93.1	6.9		RC
No assist/TBA/Rel/Others	19,108 (60.0)	89.5	10.5		1.53 (1.4-1.7)***
Post natal check within 2 weeks				83.18***	
No	14,661 (71.6)	93.3	6.7		2.00 (1.7-2.4)***
Yes	5,806 (28.4)	96.6	3.4		RC
Birth interval				220.26***	

Table 1 continued

Variables	**Total (n = 31,828) N (%)**	**Child survival status (%)**		**Chi-Square/ p-value**	**Independent hazard ratio (C.I)**
Short birth interval	5,935 (23.2)	86.4	13.6		1.90 (1.7-2.1)***
Long birth interval	19,608 (76.8)	92.6	7.4		RC
Systemic barrier				5.48	
No problem	14,316 (45.0)	91.4	8.6		RC
Problem—cost	8,104 (25.5)	90.6	9.4		1.09 (1.0-1.2)
Problem—distance	6,331 (19.9)	90.8	9.2		1.06 (0.9-1.2)
Problem—cost and distance	3,076 (9.7)	90.4	9.6		1.11 (0.9-1.3)
Insurance cover				10.71***	
No	31,353 (98.5)	90.9	9.1		RC
Yes	475 (1.5)	95.3	4.7		0.51 (0.3-0.8)***
		Alive	Dead		
Age group				49.00***	
15-19	1,597 (5.0)	88.1	11.9		0.87 (0.6-1.2)
20-24	6,237 (19.6)	90.9	9.1		0.65 (0.5-0.8)***
25-29	8,893 (27.9)	91.7	8.3		0.60 (0.5-0.8)***
30-34	6,974 (21.9)	91.4	8.6		0.62 (0.5 -0.8)***
35-39	4,926 (15.5)	91.1	8.9		0.65 (0.5-8.3)***
40-44	2,317 (7.3)	90.0	10.0		0.73 (0.6-1.0)*
45-49	885 (2.8)	86.4	13.6		RC
Marital status				1.847	
Never married/not living with spouse	1,337 (4.2)	89.9	10.1		1.13 (0.9-1.4)
Married/living with spouse	30,491 (95.8)	91.0	9.0		RC
Region				129.09***	
North Central	4,340 (13.6)	92.6	7.4		1.17 (0.9-1.5)
North East	5,578 (17.5)	90.3	9.7		1.55 (1.2-2.0)***
North West	11,775 (37.0)	89.0	11.0		1.75 (1.4-2.2)***
/South East	2,840 (8.9)	91.0	9.0		1.43 (1.1-1.9)*
South South	2,935 (9.2)	93.4	6.6		1.04 (0.8-1.4)
South West	4,360 (13.7)	93.7	6.3		RC
Residence				133.28***	
Urban	11,126 (35.0)	93.5	6.5		RC
Rural	20,702 (65.0)	89.6	10.4		1.62 (1.4-1.8)***
Religious affiliation				56.24***	
Christian	11,647 (36.6)	92.6	7.4		RC

Table 1 continued

Variables	Total (n = 31,828) N (%)	Child survival status (%)		Chi-Square/ p-value	Independent hazard ratio (C.I)
Islam	19,689 (61.9)	90.0	10.0		1.35 (1.2-1.5)***
Others	492 (1.6)	90.6	9.4		1.26 (0.9-1.7)
Level of education				182.22***	
No education	15,657 (49.2)	89.1	10.9		2.28 (1.7-3.0)***
Primary	6,127 (19.3)	90.8	9.2		1.92 (1.4-2.5)***
Secondary	8,211 (25.8)	93.4	6.3		1.29 (0.9-1.7)
Higher	1,834 (5.8)	95.1	4.9		RC
Occupational status				0.911	
Not working	9,463 (29.7)	90.7	9.3		RC
Working	22,365 (70.3)	91.1	8.9		0.96 (0.9-1.1)
Wealth status				256.51***	
Lower status	14,851 (46.7)	88.3	11.7		RC
Middle status	11,657 (36.6)	92.4	7.6		1.52 (1.3-1.8)***
Upper status	5,320 (16.7)	95.0	5.0		2.37 (2.0-2.8)***
Individual barrier				1.273	
No problem	24,918 (78.3)	91.0	9.0		0.87 (0.9-1.1)
Pro permission	4,949 (15.6)	91.2	8.8		1.07 (0.8-1.3)
Permission/not to go alone	1,962 (6.2)	90.3	9.7		RC

Note: * = p-value < 0.05, *** = p-value < 0.001.

3.3 Multivariate analysis

Cox proportional hazard regression model of the individual and systemic effect on under-five mortality in Nigeria (Model I-IV)

Table 2 below presents the Cox proportional hazard regression analysis of the effect of individual, systemic and background factors on under-five mortality in Nigeria (Model I-VI). The Model I-III examined the combined hazard effect of individual, systemic and background factors on under-five mortality having controlled for at most two of the factors in each separate model. Model IV however examined the combined hazard effect of all the selected variables on under-five mortality.

Having controlled for systemic and background factors in model I, results established individual factors (maternal health-seeking behaviour) as important predictors of under-five mortality in Nigeria. Results showed that the risk of death before reaching age five for children whose mothers received at least 4ANC visits is 20.0% point lower than the risk experienced by their counterparts whose mothers received less than 4ANC visits. Likewise, children whose mothers received: no ANC or received ANC from Home/TBA/Others (HR: 1.60: CI: 1.1-2.4; $p > 0.05$); no tetanus injection (HR: 1.05: CI: 0.8-1.3; $p > 0.05$); ANC from Non-Skilled providers (TBA/ Relative/Others) (HR: 1.14: CI: 0.7-1.8; $p > 0.05$); and delivered outside health care facilities (HR: 1.05: CI: 0.7-1.5; $p > 0.05$) had higher hazard risk of death before reaching age five. However, children whose delivery were assisted by trained health professionals (HR: 0.89: CI: 0.6-1.3; $p < 0.05$); who were presented for postnatal check within two weeks of delivery (HR: 0.57: CI: 0.5-0.7; $p < 0.001$); and those who were delivered within longer birth interval (=>24 months) to previous birth (HR: 0.70: CI: 0.6-0.8;

$p < 0.0001$) had lower hazard risk of dying before age five when compared with their counterparts whose delivery were not assisted by trained health professionals, were not presented for postnatal check and delivered within short birth interval respectively.

Our findings revealed no significant hazard ratio between systemic factors and under-five deaths ($p > 0.05$) in model II after controlling for selected background and maternal factors. However, findings showed that the risk of death before reaching age five were slightly higher for children whose mothers reported cost of service (HR: 1.08, CI: 1.0-1.2, $p > 0.05$), cost and distance (HR: 1.06, CI: 0.9-1.2, $p > 0.05$), as well as cost, distance and attitude of health workers (HR: 1.10, CI: 0.9-1.3, $p > 0.05$) as systemic barrier to accessing health care compared to their counterparts whose mothers reported none of the systemic barriers. In addition, children of mothers with health insurance coverage had a significantly lower hazard risk of dying before age five (HR: 0.52, CI: 0.3-0.8, $p < 0.001$), relative to children whose mothers had no health insurance coverage.

Having controlled for the selected maternal and systemic factors in Models III, our findings still established mothers' age, region, place of residence, level of education, wealth status, and individual barriers as significant predictors of risk of death before age five ($p < 0.05$). Whereas the hazard ratio of death due to marital status, religion and occupational status are less significant in predicting a child's death before age five ($p > 0.05$).

Analysis of the joint hazard effect of the individual (maternal) and background factors, having controlled for systemic factors in model IV, revealed place of ANC care, place of delivery, postnatal check and birth interval as significant predictors of hazard of death before age five ($p < 0.05$). The result affirmed that children whose mothers received ANC care outside HCF (HR: 1.61, CI: 1.1-2.4, $p < 0.05$), or delivered outside HCF (HR: 1.03, CI: 0.7- 1.4, $p < 0.05$) had relatively higher hazards of death before age five compared with their counterparts whose mothers received ANC within HCF or delivered within HCF. Also, children who received postnatal check within two weeks of delivery (HR: 1.10, CI: 0.9-1.3, $p > 0.05$) and were delivered within longer birth interval (=> 24 months) (HR: 0.61., CI: 0.5-0.8, $p < 0.001$) had about 10%-40%-point lower hazard risk of death before age five.

Model VI (final model) examines the joint influence of individual factors (maternal health care seeking indicators), systemic factors and background factors on child survival. Results, as presented in Model VI, still affirm a significant relationship between child survival and ANC places, place of delivery, postnatal check, and birth interval. Children whose mother received ANC care outside health care facilities (HR: 1.60, CI: 1.0-2.4, $p < 0.05$) or delivered outside health care facilities (HR: 1.02, CI: 0.7-1.5, $p < 0.05$) have relatively higher risk of dying before age five than their counterparts. Whereas, children who received postnatal check within two weeks of delivery (HR: 0.60, CI: 0.5-0.8, $p < 0.05$), or delivered within longer birth interval (HR: 0.67, CI: 0.6-0.8, $p < 0.001$) had about 40% point lower hazard risk of death in their first five years of life compared to their counterparts who were not presented for postnatal check or were delivered within short birth interval (< 24 months) to the preceding birth.

In addition, our analyses from this model VI still affirmed that there is no significant relationship between Systemic factors and child survival ($p > 0.05$). The result, however, showed that children whose mothers reported cost of service (HR: 1.50, CI: 1.0-2.2, $p > 0.05$), cost and distance to HCF (HR: 1.47, CI: 1.0-2.1, $p > 0.05$) as well as combined problems of cost, distance and attitude of health workers (HR: 1.22, CI: 0.9-1.7, $p > 0.05$) as a systemic barrier to accessing health care services are at higher risk of dying before age five compared to their counterparts whose mothers reported none of these systemic problems. Consistently, our findings still showed that children whose mothers had insurance coverage (HR: 0.52, CI: 0.2-1.2, $p < 0.001$) have a lower hazard risk of death before age five than their counterparts without insurance cover.

Analysis of the background variables in this final model VI showed that the age of mothers, place of

residence, level of education, wealth index and individual barriers consistently and significantly predict child survival ($p < 0.05$). For instance, being a child of a mother within the age bracket 20-44 years significantly have a lower risk of death before age five compared to their counterparts in the older age group (45-49). Also, being a child of a mother who had no education (HR: 1.26, CI: 0.7-1.7, $p < 0.05$) or had primary education (HR: 1.12, CI: 0.7-1.8, $p < 0.05$), or a child of mother from very poor household (HR: 1.39, CI: 1.0-2.0, $p < 0.05$) or relatively poor household (HR: 1.17, CI: 0.8-1.6, $p < 0.05$), or a child of mother residing in a rural area (HR: 1.25, CI: 1.0-1.5, $p < 0.05$) was associated with higher risks of under-five mortality. Also, being a child of a mother who reported individual problem with permission (HR: 1.24, CI: 0.8-1.9, $p > 0.05$), or permission and not wanting to go alone as individual barrier to access health care facilities was associated with higher risks of death before age five compared with their counterparts whose mothers reported none of the individual barriers (HR: 0.86, CI: 0.7-1.1, $p < 0.05$).

Model I = joint effect of Maternal factors; Model II = joint effect of the Systemic factors: Model III = joint effect of socio-demographic variables: Model IV = joint effect of both Maternal and Socio-demographic variables: Model V = joint effect of both Systemic factors and Socio-demographic variables: Model VI = joint effect of all the variables (Maternal, Systemic & Socio-demographics factors) = Full Model.

Table 2. Cox proportional hazard regression model of the individual and systemic effect on under-five mortality in Nigeria (Model I-IV).

Selected variables	**Model I Maternal factors**	**Model II Systemic factors**	**Model III Background factors**	**Model IV Overall effect of all the variables**
Maternal factors	Hazard ratio (CI)			
Number ANC visits				
< 4 visits	RC			RC
> 4 visits	0.79 (0.8-1.3)			0.99 (0.8-1.3)
ANC Places				
Within HCF	RC			RC
No ANC/Home/TBA/Others	1.60 (1.1-2.4)*			1.60 (1.0-2.4)*
ANC Quality				
Received tetanus injection	RC			RC
No tetanus injection	1.05 (0.8-1.3)			1.08 (0.8-1.4)
ANC Providers				
Trained health professionals	RC			RC
TBA/Relatives/Others	1.14 (0.7-1.8)			1.18 (0.8-1.8)
Place of delivery				
Within HCF	RC			RC
Outside HCF	1.05 (0.7-1.5)			1.02 (0.7-1.5)*
Delivery assistance				
TBA/Relatives/Others	RC			RC
Trained health professionals	0.89 (0.6-1.3)*			0.84 (0.6-1.8)
Postnatal check within 2 weeks				
No	RC			RC
Yes	0.57 (0.5-0.7)***			0.60 (0.5-0.8)***

Table 2 continued

Selected variables	Model I Maternal factors	Model II Systemic factors	Model III Background factors	Model IV Overall effect of all the variables
Birth Interval				
Short birth interval	RC			RC
Long birth interval	0.70 (0.6-0.8)***			0.67 (0.6-0.8)***
Systemic Factors				
No Problem		RC		RC
Problem-cost		1.08 (1.0-1.2)		1.50 (1.0-2.2)
Problem-cost/Distance		1.06 (0.9-1.2)		1.47 (1.0-2.1)
Problem-cost/Distance/Attitude		1.10 (0.9-1.3)		1.22 (0.9-1.7)
Insurance Cover				
No cover		RC		RC
Yes cover		0.52 (0.3-0.8)***		0.52 (0.2-1.2)***
Age group				
15-19			0.87 (0.6-1.2)	0.59 (0.3-1.1)
20-24			0.72 (0.6-0.9)*	0.39 (0.3-0.5)***
25-29			0.68 (0.5-0.9)*	0.43 (0.3-0.6)***
30-34			0.72 (0.6-0.9)*	0.45 (0.3-0.6)***
35-39			0.73 (0.6-0.9)*	0.60 (0.5-0.8)***
40-44			0.77 (0.6-1.0)	0.63 (0.5-0.8)***
45-49			RC	RC
Region				
North Central			1.85 (0.6-1.1)	1.73 (0.5-1.0)
North East			1.98 (0.7-1.3)	1.86 (0.6-1.3)
North West			1.09 (0.8-1.4)	1.91 (0.6-1.3)
South East			1.37 (1.0-1.8)*	1.16 (0.8-1.7)
South South			0.91 (0.7-1.8)	0.84 (0.6-1.2)
South West			RC	RC
Marital Status				
Never married/no spouse			1.23 (1.0-1.5)	1.35 (0.9-1.9)
Married/ with spouse			RC	RC
Residence				
Urban			RC	RC
Rural			1.24 (1.1-1.4)*	1.25 (1.0-1.5)*
Religious Affiliation				
Christian			RC	RC
Islam			1.00 (0.8-1.2)	0.90 (0.7-1.2)
Others			0.97 (0.7-1.3)	0.72 (0.4-1.2)
Level of Education				
No education			1.42 (1.0-1.9)*	1.26 (0.7-1.7)*
Primary			1.37 (1.0-1.9)*	1.12 (0.7-1.8)*
Secondary			1.08 (0.8-1.4)	0.87 (0.6-1.4)
Higher			RC	RC
Occupational Status				

Table 2 continued

Selected variables	Model I Maternal factors	Model II Systemic factors	Model III Background factors	Model IV Overall effect of all the variables
Working			RC	RC
Not Working			1.04 (0.9-1.2)	1.04 (0.9-1.2)
Wealth Status				
Upper Status			RC	RC
Middle status			1.23 (1.0-1.5)	1.17 (0.8-1.6)
Lower status			1.64 (1.3-2.1)*	1.39 (1.0-2.0)*
Individual Barrier				
No problem			0.81 (0.7-0.9)*	0.86 (0.7-1.1)*
Pro permission			0.84 (0.7-1.0)	1.24 (0.8-1.9)
Permission/Not wanting to go alone			RC	RC

Note: * = p-value < 0.05, *** = p-value < 0.001.

4. Discussion and conclusions

Understanding the impact of the individual (maternal health-seeking behaviour) and systemic factors (cost of care, distance to HCF, and attitude of health care providers) in determining childhood survival status is important to reduce childhood mortality in Nigeria through improved maternal health-seeking behaviour and easy access to health care facilities. Our findings revealed individual, systemic and background factors as important predictors of childhood survival status in Nigeria.

As shown from the findings, under-five mortality is relatively lower among children whose mothers display good maternal health-seeking behaviour during pregnancy, delivery and after delivery. Under-five deaths were significantly higher for: children whose mothers received less than 4 ANC visits; children whose mothers received ANC care at home or other places; children whose mothers did not receive any tetanus injection during pregnancy; children whose mothers received no ANC care or received ANC from TBA/relatives; children whose mothers delivered at home or other places; children of mothers who received no delivery assistance or received delivery assistance from TBA, relatives or others; children whose mothers did not go for post-natal check within two weeks of delivery and; children who were delivered within shorter birth interval to previous birth.

To achieve the full life-saving potential that ANC promises for women and babies, four visits providing essential evidence-based interventions—a package often called focused antenatal care—are required. Essential interventions in ANC include identification and management of obstetric complications such as preeclampsia, tetanus toxoid immunisation, intermittent preventive treatment for malaria during pregnancy (IPTp), and identification and management of infections including HIV, syphilis, and other sexually transmitted infections (STIs). As affirmed by this study, ANC care is an important pregnancy related care with life-saving potential for both mothers and babies as achieving at least 4 ANC visits is significantly associated with lower childhood mortality.

Also, quality of ANC care (proxy by receipt of tetanus injection), assisted delivery within health care facilities, early post-natal care and healthy behaviour of optimal pregnancy spacing have been established as significant factors associated with lower hazard risk of childhood mortality in this study. It can therefore be said that the quality of ANC care, delivery within health care facilities, the use of skilled attendants at birth and healthy behaviours towards early postnatal care and planning for optimal pregnancy spacing provides the windows of opportunities to improve childhood survival status in

Nigeria.

These findings are consistent with the study conclusion by Whitworth et al., in 2002 [32], which concluded that two neonates with similar characteristics may suffer different neonatal mortality risks if they are exposed to different antenatal and obstetric health care as a result of differences in access and quality of care. Also, Phathammavong et al., in 2010 [18], noted that mothers' utilization of health care services during pregnancy and delivery is a precondition that mothers will seek subsequent care after delivery for both themselves and their children. Therefore, effort should be geared at all levels towards strategies and programs to improve ANC care attendance, access to quality of care, delivery within health care facilities and healthy behaviour towards early postnatal care and long births interval as these will expose them to knowledge on all pregnancy-related risks and subsequent utilization of health care facilities.

Systemic barriers, though not statistically significant, have been identified as impacting negatively on the survival status of under-five children in Nigeria. Our study revealed that cost of service, distance to health care facilities and attitude of health workers stands as barriers inhibiting women from accessing health care services. Our findings revealed that the proportion of under-five deaths is higher among children whose mothers had systemic barriers in accessing health care facilities and relatively lower among children whose mothers reported no barriers in accessing health care services. This finding is consistent with findings by Adedini et al., in 2014 which pointed out resource-related barriers to health care utilization as an important factor driving high under-five mortality in Nigeria [36]. Health sector initiatives & investments through health infrastructure and supplies in all rural areas to reduce the distance to health care facilities as well as improvement in health service delivery through behavioural change communication approach (BCC) by the health care service providers will go a long way in increasing health care utilization and subsequently reduce childhood mortality.

Decrease in out-of-pocket expenditure through alternative health care financing mechanisms will also serve as an alternative approach in hastening progress towards reducing childhood mortality in Nigeria. For instance, our findings revealed that being covered by health insurance scheme ameliorate the cost of accessing health care, give mothers the confidence to access health care facilities and thereby reduce under-five mortality. However, the result further revealed that larger proportions of mothers were not covered by health insurance scheme with a higher proportion of under-five mortality. Therefore, efforts should be geared towards broader national coverage of health insurance scheme to accelerate progress in reducing under-five mortality in Nigeria. These can be achieved via an integrated health insurance routine system through provinces, districts, and health centres to reach all communities and hard to reach populations.

In concordance with previous findings which established that infant and child mortality rates are influenced by socio-economic and bio-demographic characteristics [11-13,42], this study also established that socio-economic inequalities are significant factors of under-five mortality. The study revealed that under-five mortality rates among children of mothers with no schooling are approximately six percentage points greater than among children of mothers with a secondary education. In addition, the proportion of under-five deaths is significantly higher among children whose mothers are within the lower wealth status than their counterparts whose mothers are within the middle and higher wealth status. Therefore, policy options to reduce socio-economic inequalities through women's education and empowerment will go a long way in improving national childhood survival status.

Implications for practice

Based on the findings, this study established that systemic factors contribute to childhood mortality as attitudes of health care workers often inhibit access to services among others. Thus, improving health care workers' attitudes towards health care infrastructure development will enhance and improve under-five health outcomes in Nigeria.

Limitations of the study

The limitation of this study emanated from the survey design as predetermined which did not include capturing the related systemic factors/variables at the facility levels. Subsequent studies should include triangulation of facility level survey data to wholistically measure the influence of systemic factors on childhood mortality.

Conflicts of Interest

The author declared no conflict of interest.

Data Availability Statement

The dataset for the study was 2013 NDHS accessible at https://www.dhsprogram.com/data/dataset_admin/login_main.cfm.

Funding

There was no funding for this research.

Ethical Approval

The study used a secondary data from 2013 NDHS dataset for which ethical approval had been obtained by ICF International from the Institutional Review Board (IRB) and Nigeria National Health Research Ethics Committee (NHREC) at the time the study was conducted, and data use access was granted by the dhsprogram https://www.dhsprogram.com/data/dataset_admin/login_main.cfm

References

[1] Morakinyo, O.M., Fagbamigbe, A.F., 2017. Neonatal, infant and under-five mortalities in Nigeria: An examination of trends and drivers (2003-2013). PLoS One. 12(8), e0182990.

[2] Nigeria Demographic and Health Survey 2008 [Internet]. National Population Commission (NPC) [Nigeria] and ICF Macro; 2009. Available from: https://dhsprogram.com/pubs/pdf/fr222/fr222.pdf

[3] Nigeria Demographic and Health Survey 2013 [Internet]. National Population Commission (NPC) [Nigeria] and ICF International; 2014. Available from: https://dhsprogram.com/pubs/pdf/fr293/fr293.pdf

[4] Country Implementation Plan for United Nations Commission on Life-Saving Commodities for Women and Children [Internet]. Federal Republic of Nigeria; 2013. Available from: https://www.researchgate.net/publication/315811553_Country_Implementation_Plan_for_United_Nations_Commission_on_Life-Saving_Commodities_for_Women_and_Children

[5] National Routine Immunization Strategic Plan 2013-2015 [Internet]. National Primary Health Care Development Agency; 2013. Available from: https://www.nitag-resource.org/resources/nigeria-national-routine-immunization-strategic-plan-2013-2015

[6] Integrated Maternal, Newborn and Child Health Strategy [Internet]. Federal Ministry of Health; 2007. Available from: https://maternalfigures.com/recwnX7ZBisPvWfnY

[7] Health Reform Foundation of Nigeria, 2006. Nigerian health review. Health Reform Foundation of Nigeria: Abuja.

[8] The National Strategic Health Development Plan Framework (2009-2015) [Internet]. TWG-NSHDP/Health sector development team; 2009. Available from: https://www.uhc2030.org/fileadmin/uploads/ihp/Documents/Country_Pages/Nigeria/Nigeria%20National%20Strategic%20Health%20Development%20Plan%20Framework%202009-2015.pdf

[9] National Human Resources for Health Strategic Plan 2008 to 2012 [Internet]. Federal Republic of Nigeria; 2007. Available from: https://pdf4pro.com/cdn/nigeria-hrhstrategicplan-2008-2012-who-2b01b2.pdf

[10] Saving Newborn Lives in Nigeria: Newborn Health in the Context of the Integrated Maternal, Newborn and Child Health Strategy [Internet]. Abuja: Federal Ministry of Health, Save the Children, ACCESS; 2009. Available from: https://www.healthynewbornnetwork.org/

hnn-content/uploads/Situation-Analysis-Exec.-Summ..pdf

[11] Orubuloye, I.O., Caldwell, J.C., 1975. The impact of public health services on mortality: A study of mortality differentials in a rural area of Nigeria. Population Studies. 29(2), 259-272. DOI: https://doi.org/10.1080/00324728.1975.10410203

[12] Griffiths, P., Madise, N., Whitworth, A., et al., 2004. A tale of two continents: A multilevel comparison of the determinants of child nutritional status from selected African and Indian regions. Health & Place. 10(2), 183-199.

[13] Antai, D., 2010. Migration and child immunization in Nigeria: Individual-and community-level contexts. BMC Public Health. 10(1), 1-12.

[14] Mosquera, P.A., Hernández, J., Vega, R., et al., 2012. Primary health care contribution to improve health outcomes in Bogota-Colombia: A longitudinal ecological analysis. BMC Family Practice. 13, 1-8.

[15] Pison, G., Douillot, L., Duthé, G., et al., 2013. Successes and Failures in the Fight against Child Mortality in Sub-Saharan Africa: Lessons from Senegal [Internet]. Available from: https://www.ined.fr/en/publications/editions/document-travail/successes-failures-fight-child-mortality-africa/

[16] Okoro, P.E., Igwe, P.O., Ukachukwu, A.K., 2009. Childhood burns in south eastern Nigeria. African Journal of Paediatric Surgery. 6(1), 24-27.

[17] Akinbami, F.O., Kolapo Hamzat, T.H., Orimadegun, A.E., et al., 2010. Body mass composition: A predictor of admission outcomes among hospitalized Nigerian under 5 children. Asia Pacific Journal of Clinical Nutrition. 19(3), 295-300.

[18] Phathammavong, O., Ali, M., Souksavat, S., et al., 2010. Antenatal care among ethnic populations in Luang Namtha Province, Lao PDR. Southeast Asian Journal of Tropical Medicine and Public Health. 41(3), 705.

[19] Sreeramareddy, C.T., Shankar, R.P., Sreekumaran, B.V., et al., 2006. Care seeking behaviour for childhood illness-a questionnaire survey in western Nepal. BMC International Health and Human Rights. 6(1), 1-10.

[20] Statistics at a Glance: Nigeria [Internet]. UNICEF; 2013. [cited 2014 Aug 19]. Available from: https://www.medbox.org/document/unicef-statistics-at-a-glance-nigeria#GO

[21] Akin, J.S., Guilkey, D.K., Hazel, E., 1995. Quality of services and demand for health care in Nigeria: A multinomial probit estimation. Social Science & Medicine. 40(11), 1527-1537.

[22] Ruckert, A., Labonté, R., 2012. The global financial crisis and health equity: Toward a conceptual framework. Critical Public Health. 22(3), 267-279.

[23] Global Health Observatory, Nigeria [Internet]. The World Health Organisation; 2013. [cited 2014 Jun 14]. Available from: http://apps.who.int/gho/data/view.main.ghe100-NGA?lang=en

[24] Adeloye, D., David, R.A., Olaogun, A.A., et al., 2017. Health workforce and governance: The crisis in Nigeria. Human Resources for Health. 15(1), 1-8.

[25] Child Survival: A Strategy for the African Region Report of the Regional Director [Internet]. WHO; 2006. Available from: https://www.afro.who.int/sites/default/files/sessions/working_documents/AFR-RC56-13%20Child%20Survival%20-%20Final.pdf

[26] MDGs Acceleration Framework 2013 [Internet]. Federal Republic of Nigeria and UNDP; 2013. Available from: https://www.undp.org/nigeria/publications/mdgs-acceleration-framework-2013

[27] Onwudiegwu, U., Awowole, I., 2012. Current trends in perinatal Mortality in developing countries: Nigeria as a case study. Perinatal Mortality. 27.

[28] Tipping, G., Segall, M., 1995. Health care seeking behaviour in developing countries: An annotated bibliography and literature review. Institute of Development Studies: Brighton, England.

[29] Sheeran, P., Abraham, C., 1996. The health

belief model. Predicting health behaviours: Research and practice with social cognition models. Open University Press: Buckingham. pp. 23-61.

[30] Most Recent Stillbirth, Child and Adolescent Mortality Estimates [Internet]. Inter-Agency Group for Child Mortality Estimation; 2012. [cited 2014 Jun 14]. Available from: www.childmortality.org

[31] World Factbook [Internet]. Wikimedia Foundation, Inc., [cited 2014 Nov 3]. Available from: http://en.wikipedia.org/wiki/The_World_Factbook

[32] Whitworth, A., Stephenson, R., 2002. Birth spacing, sibling rivalry and child mortality in India. Social Science & Medicine. 55(12), 2107-2119.

[33] Harttgen, K., Misselhorn, M. (editors), 2006. A Multilevel Approach to Explain Child Mortality and Undernutrition in South Asia and Sub-Saharan Africa. IAI Discussion Papers, No. 152; 2006 September 19; Georg-August-Universität Göttingen, Ibero-America Institute for Economic Research (IAI), Göttingen

[34] Ononokpono, D.N., Odimegwu, C.O., Imasiku, E., et al., 2013. Contextual determinants of maternal health care service utilization in Nigeria. Women & Health. 53(7), 647-668.

[35] Parry, J., Mathers, J., Laburn-Peart, C., et al., 2007. Improving health in deprived communities: What can residents teach us?. Critical Public Health. 17(2), 123-136.

[36] Adedini, S.A., Odimegwu, C., Imasiku, E.N., et al., 2015. Regional variations in infant and child mortality in Nigeria: A multilevel analysis. Journal of Biosocial Science. 47(2), 165-187. DOI: https://doi.org/10.1017/s0021932013000734

[37] Fernandes, C.M., Daya, M.R., Barry, S., et al., 1994. Emergency department patients who leave without seeing a physician: The Toronto Hospital experience. Annals of Emergency Medicine. 24(6), 1092-1096.

[38] Dos Santos, L.M., Stewart, G., Rosenberg, N.M., 1994. Pediatric emergency department walkouts. Pediatric Emergency Care. 10(2), 76-78.

[39] Ahmad, O.B., Lopez, A.D., Inoue, M., 2000. The decline in child mortality: A reappraisal. Bulletin of the World Health Organization. 78, 1175-1191.

[40] Cutler, D., Deaton, A., Lleras-Muney, A., 2006. The determinants of mortality. Journal of Economic Perspectives. 20(3), 97-120.

[41] Fox, J., 2008. Cox Proportional-hazards Regression for Survival Data [Internet]. Available from: https://socialsciences.mcmaster.ca/jfox/Books/Companion-1E/appendix-cox-regression.pdf

[42] Antai, D., 2011. Inequalities in under-5 mortality in Nigeria: Do ethnicity and socioeconomic position matter?. Journal of Epidemiology. 21(1), 13-20.

BILINGUAL PUBLISHING GROUP

Macro Management & Public Policies

https://journals.bilpubgroup.com/index.php/mmpp

ARTICLE

Value Relevance of Accounting Information and Share Rate: A Study of Manufacturing Companies in Nigeria

Ezejiofor, Raymond A.*[*], *Aigienohuwa, Osarenren O.

Department of Accountancy, Nnamdi Azikiwe University, Awka, 420007, Nigeria

ABSTRACT

This research work determined the impact of value relevance of accounting information on the stock price of manufacturing companies in Nigeria. More specifically, the study determines the impact of earnings per share and dividends on the stock price of Nigerian manufacturing companies. Ex post facto research and data were obtained from twenty audited annual reports and financial statements. This study used the ordinary least squares (OLS) estimation from 2012 to 2021 and covered ten years with the help of E-view 9.0 data analysis revealed that there is a positive insignificant relationship between stock dividends, earnings per share and stock price in the manufacturing sector in Nigeria.

Keywords: Share price; Earnings per share; Dividend per share

1. Introduction

Economic managers were especially interested in the equity marketplace due to its capability to offer buyers returns and get admission to capital for groups at low hazard [1]. In line with Nirmala, Sanju, and Ramachandran [2], equity markets play a vital position in maintaining enterprise boom as well as the financial system of a nation as a whole. Additionally, equity markets function as a gauge for ability growth. The fairness market, as described by Irfan and Nishat [3], is the marketplace wherein shares of public corporations are issued and traded over the counter or through exchanges. Fairness investments are solely dependent on percentage charges because they serve as indicators of whether or not investors must put money into a particular percentage. How-

*CORRESPONDING AUTHOR:
Ezejiofor, Raymond A., Department of Accountancy, Nnamdi Azikiwe University, Awka, 420007, Nigeria; Email: thaddray4life@yahoo.com; blessedosas@yahoo.com

ARTICLE INFO
Received: 25 June 2023 | Revised: 3 August 2023 | Accepted: 14 August 2023 | Published Online: 11 September 2023
DOI: https://doi.org/10.30564/mmpp.v5i3.5800

CITATION
Ezejiofor, R.A., Aigienohuwa, O.O., 2023. Value Relevance of Accounting Information and Share Rate: A Study of Manufacturing Companies in Nigeria. Macro Management & Public Policies. 5(3): 34-49. DOI: https://doi.org/10.30564/mmpp.v5i3.5800

ever, fair investments offer some additional blessings, including dividend profits, capital benefits, constrained liability, management, and possession. In step with Sharma, Kumar, and Singh [4], indexed corporations use accounting information to speak with buyers and the majority, that's one cause why fee relevance research is being carried out everywhere in the international. But, studies carried out in advanced and evolved international locations have suggested that the price relevance of corporation financial statements is diminishing [4].

Accounting is used by businesses to tell all stakeholders of their operating overall performance and function at a specific time. The marketplace's belief of a company's overall performance determines its fee, and accounting disclosures offer the essential statistics to aid this perception. Profits consistent with percentage (EPS), book value of equity in step with proportion (BVPS), and coins flows have all been the issue of numerous studies examining their cost relevance. Consistent with such research, earnings and e-book values incorporate sizable data for a corporation's fairness valuation [5].

Consistent with an overview of worldwide reviews on the motive and content of accounting records published considering 1970, the point of interest is on the wishes of external users and the usefulness of accounting information for making decisions. In step with Olugbenga and Atanda [6], the value relevance of accounting records has received a growing amount of interest within the accounting literature over the past ten years. One of a kind tactics to wealth creation have emerged over time because of the ever-changing environment in which accounting operates. In keeping with Lamberg [7], those environments consist of the statistics age, enterprise, and agriculture. To be able to produce accounting statistics that are beneficial for making financial decisions, the proper accounting model become used for every wealth-advent method. Consistent with Karğın [8], selection-makers ought to locate the accounting information in economic statements useful. Monetary statements need to meet a few essential necessities so as to provide this. Financial records can simplest be beneficial if they're accurate, up-to-date, and applicable to the problem at hand. Financial information is extra useful while it may be comparable, verifiable, updated, and easy to understand.

Mbekomize and Popo [9] used records from groups indexed at the Botswana stock trade from 2012 to 2018 to observe the statistical relationship between 4 sets of accounting statistics and marketplace percentage expenses. The facts were analyzed using the regular least squares regression method. In keeping with the findings, the most fee-applicable records for proportion fees are earnings, followed by dividends and e-book costs.

Recent research has modified its concern with increasing the book value of shares [10]. Many studies have been conducted to relate stock market values or stock market returns to accounting variables with similar or different results. Examining the aforementioned relationship tends to yield results that can be classified as significant or insignificant. The term value relevance has been used in previous studies to indicate the ability of accounting data to reflect changes in stock market values, while the literature focuses on developed stock markets in North America and Europe to examine the value relevance of accounting information, but emerging stock markets, especially in Middle Eastern countries, have been neglected [11,12].

However, all of the previous research on profits according to percentage associated with a sure time frame and given the dynamic nature of accounting, and given the opportunity of window dressing and doctoring of money owed generally among reporting companies. Pushpa, Bhatt and Sumangala; Balasundaram; Ikhatua, [13-15] pronounced that Cadbury's present case can have an effect on the integrity of accounting information and of price relevance. Bankole and Ukolobi [16] found that percentage rate and agency length are positively and significantly correlated. DPS, EPS, CFO, BVS, and SP all have negative and not significant. Rahmana and Liua's [17] reaction of the inventory rate is undoubtedly correlated with profitability, liquidity, and operational performance. There may be critical want for an updated look to fill

the gaps of what is currently recognised about the country of value relevance of accounting statistics on earnings per percentage in Nigerian companies.

In Nigeria, there's a constrained take a look at that has explored dividend per share variable as proxies for accounting facts to the pleasant of the researcher's understanding. The earlier findings have been characterised by uncertainty and previous research on the difficulty remembering related to a certain time body, there may be a want to revisit the dynamic nature of accounting data. This examination consequently determines the effect of value relevance of accounting data on the percentage rate of manufacturing corporations in Nigeria. In particular, the study intends to:

1) Determine the effect of earnings according to proportion on the percentage fee of producing companies in Nigeria.

2) Compare the impact of dividend in line with share on share fee of manufacturing corporations in Nigeria.

2. Literature review

2.1 Value relevance

The primary goal of monetary reviews is to provide data for making funding choices. According to Ghayoumi, Nayeri, Ansari, and Raeesi [18], the usefulness of the information in financial reviews depends on how useful it is for making investment choices. According to Glezakos, Mylonakis, and Kafuoros [19], statistics is applicable from the point of view of traders if it affects the investor's selections concerning equity investments. Relevance and dependability are vital additives of beneficial accounting records. In keeping with Halonen, Pavlovia, and Pearson [20], applicable accounting records should be able to persuade the investor's choice.

Price relevance of accounting data changed is also defined by Chen, Chen, and Su [21] because of the potential of financial declaration records to seize and summarize company fees. In line with Muhammed [22], the statistical relationships among statistics supplied in monetary statements and inventory marketplace values or returns can be used to measure fee relevance.

2.2 Earnings per share (EPS) and share price

The market price of an equity percentage is impacted using a number of things, one in all that's profits. An agency that sells items and services that are valuable to humanity's residents and makes money to cover its fees of production provides to and grows its reserve (retained earning reserve). When a successful enterprise starts constructing reserves, it'll additionally search for methods to amplify its operations and, as an end result, earn more money. In step with Sharma, Kumar and Singh [4], as soon as an enterprise begins incomes an appealing sum, there will be a growth in call for equity stocks, in order to result in a boom inside the fairness's market value.

Profits consistent with earnings per share (EPS) and book value per share (BVPS) had been recognized as the two most large accounting measures which have an enormous advantageous affiliation with organization's market cost, as measured by means of percentage prices [23-25].

Earnings are the objective of every enterprise, and it is often used as a basis for comparing overall performance. Businesses that are capable of improving the well-being of investors are visible as profitable by way of traders. The quantity of profit primarily based on the wide variety of first-rate shares of the agency is known as earning per proportion. This income is the ratio used to evaluate the control's potential to generate earnings for shareholders. Profitable operations display management's skill ability in capital management.

Ragab and Omran [26] additionally regarded the fee relevance of profits and e-book values in the Egyptian market between 1998 and 2002. They determined that profits per percentage EPS and BVPS had been all applicable and explained approximately 40% of the version in stock costs the use of both returns and charge fashions. The share of an enterprise's income allocated to each high-quality proportion of not unusual inventory is known as income in step with EPS. A business enterprise's profitability is

indicated by using earnings according to shares.

It is far greater accurate to apply a weighted average variety of shares extremely well over the reporting time period whilst calculating profits per percentage. EPS = net earnings – dividend on preferred inventory average excellent shares. In maximum instances, the single most sizable aspect in determining the rate of a proportion is income in step with percentage. The fee-to-earnings valuation ratio is based heavily on it as nicely [27].

2.3 Dividend per share and share price

Even though dividend policy is one of the subjects in finance that receives the most research, managers, policymakers, and researchers have debated for years whether or not dividend coverage influences inventory prices. Buyers, managers, lenders, and other stakeholders all rely upon dividend coverage. It is a method for figuring out whether or not the business can generate cash. The dividend yield, which is calculated as the annual dividend earnings in step with share divided by means of the modern share charge, is something that many buyers enjoy preserving an eye on. The earnings acquired when it comes to the proportion price is measured by using the dividend yield. When compared to different groups in its industry, the agency's low dividend yield can suggest two matters: Both companies are in hassle and can't manage to pay for to pay reasonable dividends or the share charge is excessive due to the fact the marketplace believes the company has mind-blowing potentialities and is not overly worried about dividend bills. However, excessive dividend yield can also imply a failing business and a low share fee. For boom organizations, dividend yield is of little importance because retained profits might be reinvested in expansion possibilities, ensuing in capital gains for shareholders.

In the history of monetary control, dividend coverage has been the problem of several controversies. This is because dividend policy is notion to have a large impact on how groups pick to finance and invest their money. A most beneficial dividend policy has to be one that is targeted on maximizing the shareholders' capital gain—shareholders are inquisitive about maximizing their proportion value and dividend charge [28]. The agency's ability to spend money on destiny projects relies upon the amount of dividends it will pay to its shareholders, so deciding on an appropriate dividend policy is important. If a business enterprise will pay out greater dividends, fewer funds can be to be had for mission funding. Debtors and lenders are also inquisitive about the quantity of dividend an employer pronounces because, if greater is paid out of the employer's income as a dividend, the agency might have much less money to be had to fulfill its obligations.

In line with Kalama [29], common stock valuation is based on dividends which are the only cash fee a stockholder receives at once from the corporation. The reaction of the stock rate to an unexpected announcement of a dividend change, alternatively, is associated with the dividend preferences of the marginal investor in that company [30]. In step with Yilmaz, and Gulay [31], it is miles expected that an agency's percentage price will both upward push and fall in response to alternate in its dividend coverage. One of the most essential techniques for distributing prices to shareholders is dividend announcement. Alternatively, some shareholders would rather have their reward reinvested in a new project to increase their capital profits. Management, managers, creditors, the government, and other stakeholders all rely upon dividend policy. Dividends are a manner for buyers to assess a corporation from a funding perspective in addition to a supply of income [28]. It serves as a foundation for figuring out whether or not the commercial enterprise generates coins. The enterprise's capability to put money into future initiatives is closely stimulated through the dividend payout to shareholders, so selecting the best dividend policy is crucial.

Dividend per share, or DPS, is the sum of the agency's dividend declarations for every great regular percentage. Divide the entire quantity of extraordinary regular stocks issued by the employer by using the total dividends paid by way of the business enterprise, consisting of interim dividends. An organ-

ization's dividend per percentage is calculated using dividends paid inside the maximum current area. The subsequent formulation is used to determine the DPS: Dividend per share (DPS) can be calculated by first deriving the enterprise's net income in keeping with the proportion as (net income divided through first-rate shares) accelerated by the corporation's payout ratio, that's the amount of profits paid in dividends divided by using the entire internet profits. DPS = total dividends paid out over a period less any special dividend divide by share outstanding.

$$DPS = D\text{-}S/SD$$

where:

DPS—Dividend per share

D—Sum of dividends over a duration (normally one (1) year)

SD—Special, one-time dividends

S—Shares for the period dividend in keeping with share.

On account of that agency's primary objective is to go back the fee to its shareholders, dividend in line with proportion matters. Dividends and a boom inside the fee of the inventory itself offer prices to buyers. As an end result, shareholder price is driven by a corporation's income and dividend payouts [27].

2.4 Accounting information and share price

The problem of the relevance of the accounting data is an essential one while considering how accounting data influences share prices. In keeping with Ibadin and Izedonmi [32], accounting information's relevance enables customers to assess the capability effects of transactions or other activities on cash flows and confirmatory fees. Value relevance, in line with Beisland [33], is the potential of financial announcement statistics to capture and sum up an organization's price. The usefulness of economic statements in equity valuation is the concern of the price relevance of accounting facts discussion [34]. In keeping with Beaver [35], price relevance studies the relationship between a security's fee and a fixed of accounting variables. He says that accounting data is relevant to value if it changes investors' opinions and moves approximately making an investment in a stock. Therefore, accounting records have to be able to meet the needs of customers, specifically buyers, when making selections.

In step with Chouinard and Youngman [36], accounting data is important to a powerful marketplace economic system. In keeping with Oyerinde [23], price relevance is measured by the connection between accounting information and returns on shares or market fee. As a result, accounting information is worthless if it has no big dating with an enterprise's operational performance or security market price. In line with the statement of the Framework for the Guidance and Presentation of Monetary Statements, which was published in 1989 [37], "fact is relevant if it impacts the monetary selections of customers by assisting them examine past, present, and future events." This definition of value relevance is consistent with this announcement. From the factor of view of investors, Katerina [38] described price relevance as data that impacts traders' selections concerning fairness investments. In step with Katerina [38], there are two numbers on fee relevance: the dimension perspective and the signaling angle. The size angle measures the market price signs of the enterprise, together with percentage fee, and accounting measures.

Additionally, they have a look at demonstrates that earnings' incremental value relevance has accelerated while e-book value has remained regular at some point of the pattern length. He involves the realization that earnings and e-book fees don't have any impact on incremental price across industries. These consequences had been defined through the character of the businesses in his pattern and the truth that intangible assets were now not covered in the valuation model.

2.5 Empirical review

Shamki [39] investigated the value and importance of accounting information related to stock market values of Iraqi service companies and stock market performance models, i.e. profit and book value of equity (separate and combined) for Iraqi service companies in four years 2015-2018. The study state

that in relation to the stock market value model, the value importance of profit and accounting value has grown independently; value. The importance of the results has increased, while it is insignificant in relation to the book value. On the other hand, compared to the stock market performance model, the value importance of the result either individually or together increased, while the accounting value decreased. In general, it has been shown that earnings numbers can significantly illustrate fluctuations in stock market values and stock market returns relative to book values. In addition, the results show that income and book value in particular are more value-based in the stock market value model. In contrast, these variables together are more value-based in the stock return model. According to the study, the gain can broadly illustrate changes in the stock market values of Iraqi service companies. Khomidah and Setiawan [40] examined the relationship between capital markets and accounting information in the banking sector of ASEAN countries, namely Indonesia, Malaysia, Singapore, Thailand and the Philippines. Specifically, this study examines the relationship between earnings per share (EPS) and book value per share (BVPS). This study documents accounting data in an emerging market context using a sample of listed banks from 2017 to 2019, using stock prices three months after year-end as the dependent variable. The sampling method of this study used a special sampling method to obtain 82 samples that met the criteria. This study uses a panel data regression technique. The results of this study show that earnings and book value have a statistically positive effect on stock prices. This study also shows that income is more closely related to value than other variables. A study by Yusuf, O.M., Okon, A.E., Uareme, I.E., et al. [41] extended Ohlson's model to include the mediating effect of corporate governance on the relationship between the value relevance of accounting information and stock prices of listed companies on the Nigerian Exchange Group (NGX).The study finds that management practices affect the relationship between accounting information and share price of listed companies in Nigeria. Rahmana and Liua [17] looked into the relationship between the change in stock expenses and the discharge of financial accounting records. The 1,272 indexed groups' A-proportion markets in Shanghai and Shenzhen inventory trade furnished the information. The ultimate percentage prices from 2009 to 2019 and selected agencies' annual reports from 2008 to 2018 had been used to compile the information. A stepwise regression version was used in this take a look at to select variables that have the ability to have great outcomes and to examine the regression of extra variables and stock rate. The realization became that the accounting range's price was applicable; the reaction of the inventory fee is positively correlated with profitability, liquidity, and operational efficiency. The evaluation indicates that, to the great of the researcher's knowledge, only a small number of studies have investigated dividend in step with share variables as proxies for accounting records. The preceding research on the difficulty was centered on a specific time period, so it is necessary to revisit the dynamic nature of accounting statistics. The previous findings were characterized by means of uncertainty. This examines the value relevance of accounting information on Nigerian manufacturing corporations' percentage charges in light of the aforementioned issues. Mbekomize and Popo [9] used statistics from agencies indexed on the Botswana inventory alternate from 2012 to 2018 to study the statistical relationship between four units of accounting records and marketplace proportion costs. The facts had been analyzed using the normal least squares regression approach. In keeping with the findings, the maximum cost-relevant facts for proportion expenses are income, followed by using dividends and e-book fee. Greater than another accounting amount combination, the aggregate of dividends and earnings changed into greater relevance to value. Bankole and Ukolobi [16] checked out the fee reliance on accounting records in 20 monetary service agencies listed on the Nigerian stock alternate between 2012 and 2018. The information that has been accumulated for this has a look at analyzing the usage of E-perspectives 10. We used the least rectangular regression tech-

nique to make our statistical picks. The Hausman check discovered that the random effect version is more appropriate than the constant effect version. Proportion charge and business enterprise length are positively and considerably correlated. DPS, EPS, CFO, BVS, and SP all have a terrible however non-great relationship, Ezejiofor [42] checked out the volume to which Nigerian production corporations' value relevance of monetary records has progressed on account of those international financial reporting standards (IFRS) changed into carried out. The once a year reviews and bills of the sampled businesses served because of the supply of the records. With the assistance of SPSS model 20.0, the information was analyzed and confirmed using the Chow take a look at and regression analysis statistical equipment. Consistent with the examination, manufacturing businesses in Nigeria's coins drift, market percentage charge, e-book value per percentage, and income per proportion have all multiplied because of the adoption of IFRS. Busari and Bagudo [43] regarded the relative importance of financial facts for economic establishments' consolidated and separate financial statements. As impartial variables, they used earnings in keeping with proportion, book fee in step with proportion, dividends in keeping with percentage, and coins flows in keeping with percentage. Even though consolidated financial records changed into greater fee relevant than separated financial facts, they observed that common, accounting information on each consolidated and separated financial data had been relevant to price. Mayadunne [44] studied how accounting information affects traders' choices about an organization's cost. The dreams of the observer had been to decide the connection between the market charge and the price relevance of accounting statistics, as well as the impact that accounting facts have on the decisions made with the aid of buyers. A sample of 21 banking, financial, and coverage corporations from the Colombo stock alternate in Sri Lanka have been used for this examination over a 5-year period from 2009 to 2013. Going back to fairness, earning yield, internet property value in keeping with proportion, and incomes consistent with percentage were used as independent variables, with market charges serving because of the based variable. The belief was that the connection between marketplace rate and going back on equity, earning according to share, and net belongings value according to percentage is giant and superb. Moreover, there may be no significant connection between marketplace price and income yield. In addition, the findings tested that the marketplace fee is significantly stimulated by way of the return on fairness, incomes in line with share, and net belongings price in keeping with proportion. Muhammad [45] investigated the impact of IFRS adoption on accounting records' fee relevance. A fee regression version primarily based on Ohson's model (1995). The based variable, accounting facts proxy by using e-book cost in line with proportion, income per proportion, dividend in keeping with proportion, coins waft from operations, and IFRS adoption, turned into regressed the use of everyday least rectangular regression with the unbiased variable. They have a look at used sampled information from 20 insurance corporations that have been listed in the Nigeria stock change between 2009 and 2014. Whilst the observer's findings imply that the adoption of IFRS has reduced the mixed value relevance of accounting information for the indexed insurance agencies, the unbiased variables that have been not stimulated via the adoption of IFRS were: After the adoption of IFRS, e-book cost consistent with percentage, earnings in line with proportion, dividend in keeping with share, and cash float from operations have an advantageous relationship with the charge of a marketplace proportion. By way of analyzing the relationship between income and proportion expenses, Uwuigbe, O.R., Uwuigbe, U., Jafaru, J., et al. [46] investigated the fee relevance of financial statements on the percentage prices of Nigerian businesses. Secondary information from the reality books of the Nigerian inventory trade and posted audited economic statements of indexed banks from 2010 to 2014 have been used within the look at to accomplish the purpose of the studies. The study used a purposive sample consisting of 15 banks that have been listed in the Nigerian inventory

trade during the study's time frame. The study found that profits consistent with proportion EPS and percentage charge are extensively and positively correlated. The aim of Webster's [47] has a look at of the value relevance of accounting records turned into to decide the connection between the inventory price of non-monetary agencies indexed on the Nairobi securities exchange and the extent of unfastened cash flows. The 42 non-economic agencies that were listed at the Nairobi stock change made up the population of the study; the study spans was 5 years, from 2011 to 2015. More than one linear regressions had been used for statistical analysis of the study's facts. The statistical regression end result confirmed a connection between the firms' proportion prices and loose cash go with the flow levels. Stock expenses have been discovered to be encouraged positively by way of unfastened cash waft. Samuel and Pradeep [48] got down to find out the factors that agencies use to set their proportion marketplace fees. Fourteen (14) agencies that were indexed on the Johannesburg stock change among 2009 and 2013 have been chosen for the study according to its goal. The statistical device referred to as more than one regression evaluation was used to study the secondary statistics about the companies. Dividend in keeping with share, income in step with share, and the price-profits ratio had been the look on independent variables, and proportion charges were the have a look at is established variable. According to the study, the price-earnings ratio, dividend consistent with proportion and earnings consistent with proportion account for about fifty-seven. 8% of marketplace proportion charge modifications. The ratio of unbiased variables became observed to have a fine and sizeable correlation with the structured variable, proportion fees. This study's findings advocate that companies can increase price-earnings, dividends consistent with share, and income per percentage to create value for shareholders. Zahid [49] regarded how company governance impacts firms' accounting information's value relevance on Kenya Stock Exchange (KSE). The study made use of secondary facts from 90 non-monetary groups that have been indexed on the trade for 11 years, from 2005 to 2014. The panel statistics estimation method and glued impact model were used to regress the independent variables over the established variable. The findings found that accounting facts on cost relevance are drastically encouraged by means of corporate governance. The income per percentage is positively and extensively impacted with the aid of board independence and board length, according to the personal correlation of the variables. Profits according to share are unaffected by means of audit quality, at the same time as e-book price in keeping with share is unaffected by way of board independence, board length, and audit first-class. Within the rising capital markets, Arkan, T. [50] investigated the importance of financial ratios derived from economic statements in predicting stock rate trends. The price relevance of accounting records to stock fee has been the problem of numerous studies, every with its very own specific set of findings. Using their accounting facts for the 2011/2012 fiscal 12 months, Oloidi and Bolade [51] analyzed the principal variables that affect the costs of equity stocks held by using organizations that might be listed on the Nigerian stock alternate. They used normal least square regression to evaluate the quoted price of the agency's stocks as of January four, 2011, with the alternative explanatory variables prior year percentage charge, profits, and dividends—in their examination of eighty groups. The study findings showed that dividends per share had a high-quality and considerable impact on fairness percentage charge at = 0.014, that profits according to share had a terrible effect at = 0.05, and that the share rate of the previous year had a sizable and fine have an impact on fairness percentage price at = 0.000. With an adjusted R-rectangular fee of 0.969, the studied variables' combined explanatory electricity (earlier year share price, income, and dividends) explained the equity share charge variant. This proved that these 3 explanatory variables have been chargeable for explaining about ninety seven% of the elements that decided the costs of fairness stocks. Umobong and Akani [52] looked into the differences in accounting statistics nice between production groups in Nigeria earlier than and

after IFRS adoption. For the 5 years 2009-2013, secondary information from the monetary statements of a sample of 4 listed cement production groups and seven listed breweries businesses became collected. The cross-sectional area survey turned into used, accounting variables were the challenge of multiple regression analysis, and equality of mean turned into tested to compare pre- and submit-IFRS results. The usage of incomes control, cost relevance, and well-timed loss popularity as independent variables, examined reveals a decline in accounting nice. Earnings and fairness e-book value are found to be much less relevant to price, and loss popularity is much less timely inside the publish-IFRS period than it becomes in the pre-IFRS duration. To determine the price relevance of accounting statistics in Nigeria, Omokhudu, O.O., Ibadin, P.O. [53] rent each the essential Ohlson's model (1995) and a changed version that includes dividends and cash flow from operations. Within the regression of proportion price and returns on accounting numbers, the examiner uses pooled and panel records. Ordinary least squares (OLS) estimation and dynamic version estimation with random and fixed results editions were employed. In keeping with the findings in their research, there has been a statistically good sized dating between company cost and earnings, coins float, and dividends, however there was no statistically huge courting among e-book value and company value. Investors should region more emphasis on income, dividends, and coins flows, instead of e-book values, according to these findings. Further, making an investment public should be knowledgeable of the accounting data used for investments; additionally, this sort of records wishes to be of excessive best to maintain traders from making negative choices about investments that can harm the economic system as an entire.

3. Methodology

3.1 Research design

Ex-Post-Facto research layout was the research design that became hired in this study. An *Ex-Post-Facto* study controls the cause-impact courting of variables. *Ex-Post-Facto* pursues the discovery factors which are allied with positive prevalence, circumstances, and activities through scrutinizing previous procedures.

3.2 Population and sample size

The research work used purposes sampling technique to select twenty (20) quoted industrial firms on the Nigerian Exchange Group at the end of 2021 fiscal year. This quoted consumer goods manufacturing firms are presented in the appendix (**Table A1**).

3.3 Source of data

Data were sourced from annual reports and accounts of the listed companies, particularly from the sampled firms' financial statements, as well as fact books and publications of the Nigerian Exchange Group served as sources for the data from 2012 to 2021 were used to calculate both the dependent and independent variables, using the companies whose data is available and the periods that covered the implementation of IFRS in Nigeria.

3.4 Model specification

The researcher adopted Ohlson's price model (1995) from two financial reports indicators (financial position and comprehensive income) being used to test the value relevance of financial reporting.

By the Ohlson's Model (1995) :

$$MKTPjt = \beta0 + \beta1\ BVSHjt + \beta2\ EPSjt + ejt$$

where, MKTPjt = the market price per share (SP) of firm j at time t;

BVSHjt = book value per share of firm j at time t;

EPSjt = earnings before extraordinary items per share of firm j at time t;

β0 = constant or intercept;

β1-3 = coefficients of explanatory variables;

εjt = error term.

In empirical models, the stock price is a linear function of earnings per share and dividend per share. Significant estimates of the regression coeffi-

cient of the control variables indicate a relationship between the variables. For this, the researcher modified the model of Ohlson (1995) as follows:

$SHP_{it} = \beta o + \beta_1 EPS_{it} + £_{it}$ (1)

$SHP_{it} = \beta o + \beta_2 DPS_{it} + £_{it}$ (2)

where,

SHP_{it} = share price for firm *i* at the end of year t;

EPS_{it} = earnings per share for firm i at the end of year t;

DPS_{it} = dividends per share for firm i at the end of year t;

£ = error term (part of the share price which is not interpreted by the model);

βo = the intercept;

β_1-β_2 = coefficient of explanatory variable.

3.5 Method of data analysis

This research work engaged regression analysis to evaluate and provides proof of the nature of courting among accounting records and proportion fee via E-view 9.0 statistical software program, the usage of coefficient of correlation which is a good measure of association amid variables, in order to expose the power of courting and the route of association as nicely.

3.6 Decision rule

Accept the alternative hypothesis (H1) if the p-value of the test is less than 0.05, else reject it.

4. Data analysis

From **Table 1**, SHP = company's share price, EPS = company's earnings per share, and DPS = company's dividends per share. The descriptive statistics of the variables show that the average SHP of the tested companies is 3.368. First, it was found that on average for nine (9) years (2012-2021), the sampled companies were characterized by positive accounting information (EPS = 5.77 and DPS = 0.54). The large difference between the maximum and minimum values of earnings per share (EPS) and dividend per share (DPS) indicates that the companies sampled in this study are not dominated by a high market price. Jarque-Bera (JB), which tests variables for normality or the presence of outliers or extreme values, shows that all our variables are normally distributed and significant at the 5% level, and the result can be generalized. This also means that least squares regression can be used to estimate pooled regression models.

Table 1. Descriptive statistics.

	SHP	EPS	DPS
Mean	3.034000	5.772000	0.542000
Median	3.185000	7.385000	0.510000
Maximum	5.870000	7.830000	1.090000
Minimum	0.780000	1.820000	–0.120000
Std. Dev.	1.862520	2.454741	0.375642
Skewness	0.047838	–0.563298	–0.078852
Kurtosis	1.634927	1.528459	2.356861
Jarque-Bera	0.780241	1.431105	0.182708
Probability	0.676975	0.488922	0.912695
Sum	30.34000	57.72000	5.420000
Sum Sq. Dev.	31.22084	54.23176	1.269960
Observations	10	10	10

Source: Researcher's computation using E-Views 9.0, 2023.

4.1 Pearson correlation matrix result

Table 2 shows an assessment of correlation analysis on the based and impartial variables. Primarily based on **Table 2**, SHP has a weak tremendous correlation with EPS. SHP has a bad correlation with DPS, however suggests a terrible correlation with SHP. Ordinary correlation evaluation on a sample of publicly listed businesses in Nigeria indicates no collinearity trouble primarily based on the significance of the correlation. Therefore, the overall model shows no collinearity problem for the countries.

Table 2. Pearson correlation matrix on variables for sample of manufacturing companies in Nigeria.

	SHP	EPS	DPS
SP	1		
EPS	0.10474	1	
DPS	0.07407	0.18404	1

Source: E-Views 9.0 Correlation Output, 2023.

4.2 Test of hypotheses

Hypothesis 1

Ho1: There is no significant relationship between earnings per share and stock price of industrial companies.

H1: There is a significant relationship between earnings per share and stock price of industrial companies.

The association between stock price and earnings per share was examined using least squares regression analysis as shown in **Table 3**. The coefficient of determination, known as the adjusted R-squared, expresses the variation in the dependent variable caused by variance in the independent variable. The results in **Table 3** show that the adjusted R-squared value was 0.213, indicating that changes in earnings per share accounted for 21% of the variation in stock price and that strange variables not included in the model accounted for 79% of the variation. This is indicated by the probability of the slope coefficients; P (0.7734 > 0.05). A t-value of 0.297897 indicates a positive relationship between EPS and SP, which is statistically significant at 5%.

The absence of serial correlation in the model is indicated by the Durbin-Watson statistic 0.721461. The null hypothesis was rejected and the alternative hypothesis was accepted as the F statistic for the EPS regression was 0.088743 and the associated F-probability was 0.773371.

4.3 Decision

As Prob (F-statistic) 0.773371 is greater than the critical value of 5% (0.05), there is no significant relationship between earnings per share and the share price of listed manufacturing companies on NSE at a 5% significance level.

Hypothesis two

Ho_2: There is no significant relationship between dividends and the share price of NSE listed manufacturing companies.

H_2: There is a significant relationship between stock dividends and the share price of NSE listed manufacturing companies.

Table 3. Regression analysis output of SHP and EPS of listed manufacturing companies in Nigeria.

Dependent Variable: SP				
Method: Least Squares				
Date: 07/28/23 Time: 21:54				
Sample: 2012 2021				
Included observations: 10				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.492720	1.660466	2.103458	0.0686
EPS	0.079473	0.266781	0.297897	0.7734
R-squared	0.020971	Mean dependent var		3.034000
Adjusted R-squared	0.212657	S.D. dependent var		1.862520
S.E. of regression	1.964635	Akaike info criterion		4.365346
Sum squared resid	30.87831	Schwarz criterion		4.425863
Log likelihood	–19.82673	Hannan-Quinn criter.		4.298959
F-statistic	0.088743	Durbin-Watson stat		0.721461
Prob(F-statistic)	0.773371			

Source: E-Views 9.0 output, 2023.

The association of share price (SHP) and dividend per share (DPS) was evaluated using the least square regression method in **Table 4**. The coefficient of determination known as adjusted R squared revealed the variation in the dependent variable caused by variations in the independent variable. According to the results presented in **Table 4**, the adjusted R squared value was 0.219, indicating that changes in DPS were responsible for 22% of the variation in SHP, while strange variables that were not included in the model were responsible for 78% of the variation. That is shown by the probability of the slope coefficients; P (= 0.839 > 0.05). DPS has a positive relationship with SHP, as indicated by the t-value of 0.210087, which is statistically significant at 5%.

The absence of serial correlation in the model is suggested by the Durbin-Watson Statistic of 0.724746. The null hypothesis was rejected and the alternative hypothesis was accepted because the DPS regression's F-statistic was 0.044137 and the associated F-probability was 0.838851.

4.4 Decision

As Prob (F-statistic) 0.838851 is greater than a critical value of 5% (0.05), there is no significant relationship between dividends and the share price of manufacturing companies listed on NSE at a 5% level of significance.

Table 4. Regression analysis output of SHP and DPS of listed manufacturing companies in Nigeria.

Dependent variable: SP				
Method: Least squares				
Date: 07/28/23 Time: 21:56				
Sample: 2012 2021				
Included observations: 10				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.834939	1.133978	2.499994	0.0369
DPS	0.367271	1.748186	0.210087	0.8389
R-squared	0.015487	Mean dependent var		3.034000
Adjusted R-squared	0.218827	S.D. dependent var		1.862520
S.E. of regression	1.970074	Akaike info criterion		4.370876
Sum squared resid	31.04954	Schwarz criterion		4.431393
Log likelihood	–19.85438	Hannan-Quinn criter.		4.304489
F-statistic	0.044137	Durbin-Watson stat		0.724746
Prob (F-statistic)	0.838851			

Source: E-Views 9.0 Co-integration output, 2023.

5. Discussion, conclusions and recommendations

The intention of these studies was to determine the association among the share costs of producing sector businesses which might be indexed on the NSE from 2012 to 2021 and the cost relevance of accounting facts. Consistent with the literature, researchers have now not yet reached a consensus concerning the relationship between the percentage charge and the fee relevance of accounting data. As a result, the relationship continues to be in its infancy. In step with facts evaluation, income per share had a poor and insignificant relationship with percentage price, whilst dividend consistent with share had a bad and good sized relationship with percentage fee in Nigeria's production quarter.

The outcome is constant with these findings: Omokhudu OO, Ibadin PO., Uwuigbe and co-workers, Oloidi and Bolade [53,46,51] who located a sizable bad courting between profits per share and proportion price, have been contradicted by means of

Mayadunne and Oloidi [44,51] who both observed that income per proportion EPS has a fantastic giant dating with percentage fee. Daye's findings are in keeping with this result even as Samuel, T.E., Pradeep [48] found a considerably terrible correlation among income consistent with percentage and proportion charge.

The following policy tips had been proffered from the findings and end of this observation:

The control of companies needs to make a public offering of ordinary shares and if in any respect possible, an advantage provides so one can improve funds for their shareholders because earnings consistent with share is notably correlated with the proportion price. As a result, organizations might also have greater opportunities to diversify their investments and notice a boom in their profits in step with percentage, which in flip will increase the cost of their shares.

The popularity that dividend payments have an effect on traders. For the reason that dividends have been found to have an effect on the fee of stocks, dividend coverage must allow for the charge of everyday dividends. This is due to the fact traders depend heavily on dividends.

Conflict of Interest

There is no conflict of interest.

References

[1] Gatua, F.K., 2013. Analysis of share price determinants at Nairobi securities exchange [Master's thesis]. Nairobi: University of Nairobi.

[2] Nirmala, P.S., Sanju, P.S., Ramachandran, M., 2011. Determinants of share prices in India. Journal of Emerging Trends in Economics and Management Sciences. 2(2), 124-130.

[3] Irfan, C.M., Nishat, M., 2002. Key fundamental actors and long-run price changes in an emerging market: A case study of Karachi Stock Exchange (KSE). The Pakistan Development Review. 41(4), 517-533.

[4] Sharma, A.K., Kumar, S., Singh, R., 2012. Value relevance of financial reporting and its impact on stock prices: Evidence from India. South Asian Journal of Management. 19(2), 60-77.

[5] Gee-Jung, K., Kwon, E., 2009. The value relevance of book values, earnings and cash flows: Evidence from Korea. International Journal of Business and Management. 4(10), 28-42.

[6] Olugbenga, A.A., Atanda, O.A., 2014. Value relevance of financial accounting information of quoted companies in Nigeria: A trend analysis. Research Journal of Finance and Accounting. 5(8), 86-93.

[7] Lamberg, E. (2004). *Income measurement: Some comments*. Estonia: Estonia Business School. [Электронный ресурс].– Режим доступа: http://www. emselts. ee/konverentsid/EMS2006/2_Rahandus_ja_pangandus/Eve_Lamberg. pdf

[8] Karğın, S., 2013. The impact of IFRS on the value relevance of accounting information: Evidence from Turkish firms. International Journal of Economics and Finance. 5(4), 71-80.

[9] Mbekomize, C.J., Popo, S., 2020. Value relevance of accounting information in the Botswana listed companies. International Business Research. 13(5), 1-46.

[10] Pirie, S., Smith, M., 2008. Stock prices and accounting information: Evidence from Malaysia. Asian Review of Accounting. 16(2), 109-133. DOI: https://doi.org/10.1108/13217340810889924

[11] Al-Akra, M., Ali, M.J., Marashdeh, O., 2009. Development of accounting regulation in Jordan. The International Journal of Accounting. 44(2), 163-186. DOI: https://doi.org/10.1016/j.intacc.2009.03.003

[12] Anandarajan, A., Hasan, I., 2010. Value relevance of earnings: Evidence from Middle Eastern and North African countries. Advances in Accounting. 26(2), 270-279. DOI: https://doi.org/10.1016/j.adiac.2010.08.007

[13] Pushpa Bhatt, P., Sumangala, J.K., 2012. Impact of earnings per share on market value of an equity share: An empirical study in Indian capital market. Journal of Finance, Accounting & Man-

agement. 3(2), 1-14.

[14] Balasundaram, N., 2013. The value relevance of accounting information and its impact on market vulnerability: A study of listed manufacturing companies in Sri Lanka. Merit Research Journal of Business and Management. 1(2), 30-36.

[15] Ikhatua, O.J., 2013. Accounting information and stock volatility in the Nigerian Capital Market: A GARCH analysis approach. International Review of Management and Business Research. 2(1), 265.

[16] Bankole, K.O., Ukolobi, I.O., 2020. Value relevance of accounting information and share price in financial service industry. Research Journal of Finance and Accounting. 11(8).

[17] Rahman, Md.J., Liu, R., 2021. Value relevance of accounting information and stock price reaction: Empirical evidence from China. Accounting and Management Information Systems. 20(1), 5-27.
DOI: http://dx.doi.org/10.24818/jamis.2021.01001

[18] Ghayoumi, A.F., Nayeri, M.D., Ansari, M., et al., 2011. Value-relevance of accounting information: Evidence from Iranian emerging stock exchange. International Journal of Economics and Management Engineering. 5(6), 830-835.

[19] Glezakos, M., Mylonakis, J., Kafouros, C., 2012. The impact of accounting information on stock prices: Evidence from the Athens stock exchange. International Journal of Economics and Finance. 4(2), 56-68.

[20] Halonen, E., Pavlovia, J., Pearson, R., 2013. Value relevance of financial information and its impact on stock prices: Evidence from Sweden. Journal of Contemporary Accounting & Economics. 9(1), 47-59.

[21] Chen, C.J., Chen, S., Su, X., 2001. Is accounting information value-relevant in the emerging Chinese stock market?. Journal of International Accounting, Auditing and Taxation. 10(1), 1-22.

[22] Muhammed, S.M., 2012. Value relevance of accounting information and stock market vulnerability—A study on listed companies in Dhaka Stock Exchange. International Journal of Research in Commerce and Management. 3, 23-27.

[23] Oyerinde, D.T., 2011. Value-relevance of accounting information in the Nigerian stock market [Ph.D. thesis]. Ota: Covenant University.

[24] Alfaraih, M., Alanezi, F., 2011. The usefulness of earnings and book value for equity valuation to Kuwait stock exchange participants. International Business & Economics Research Journal (IBER). 10(1), 73-90.

[25] Khanagha, J.B., Mohamad, S., Hassan, T., et al., 2011. The impact of reforms on the value relevance of accounting information: Evidence from Iran. African Journal of Business Management. 5(1), 96-107.

[26] Ragab, A.A., Omran, M.M., 2006. Accounting information, value relevance, and investors' behavior in the Egyptian equity market. Review of Accounting and Finance. 5(3), 279-297.

[27] Furhmann, R., 2017. How do you Calculate Return on Equity (ROE)? [Internet]. Investopedia. Available from: https://www.investopedia.com/ask/answers/070914/how-do-you-calculate-return-equity-roe.asp

[28] Bamidele, M.I., Luqman, S.O., (2018). The effect of dividend policy on stock price in Nigeria. EconPapers. 14(6), 55-71.

[29] Kalama, D.J., 2013. The relationship between earnings and share prices of firms listed at the Nairobi stock exchange [Master's thesis]. Nairobi: University of Nairobi.

[30] Dong, M., Robinson, C., Veld, C., 2005. Why individual investors want dividends. Journal of Corporate Finance. 12(1), 121-158.

[31] Yilmaz, A.K., Gulay, G., 2006. Dividend policies and price-volume reactions to cash dividends on the stock market: Evidence from the Istanbul stock exchange. Emerging Markets Finance and Trade. 42(4), 19-49.

[32] Ibadin, P.O., Izedonmi, F., 2013. Measurements in accounting: Issues and choices determinants. African Research Review. 7(2), 113-128.

[33] Beisland, L.A., 2009. A review of the value relevance literature. The Open Business Journal. 2(1), 7-29.

[34] Nilson, H., 2003. Essays on the Value Relevance of Financial Statement Information [Internet]. Working Paper, Department of Business Administration Umeå School of Business and Economics Umeå University Studies in Business administration, Series B. Available from: https://www.diva-portal.org/smash/get/diva2:142541/FULLTEXT01.pdf

[35] Beaver, W.H., 2002. Perspectives on recent capital market research. The Accounting Review. 77(2), 453-474.

[36] Chouinard, E., Youngman, P., 2008. Fair Value Accounting and Financial Stability [Internet]. Financial System Review, 35-40. Available from: https://www.bankofcanada.ca/wp-content/uploads/2012/01/fsr-1208-chouinard.pdf

[37] IASB, 2010. The Conceptual Framework for Financial Reporting [Internet]. IFRS Foundation. Available from: https://www.ifrs.org/issued-standards/list-of-standards/conceptual-framework/

[38] Katerina, H., 2005. The Value Relevance of Financial Accounting Information in a Transitional Economy: The Case of the Czech Republic [Internet]. European accounting review, 15(3), 325-349. Available from: https://ideas.repec.org/p/hhb/hastba/2005_010.html

[39] Shamki, D., 2022. Value relevance of accounting information: Insights from Iraq. Journal Port Science Research. 5(2), 117-125.

[40] Khomidah, T.N., Setiawan, D., 2022. Value relevance of accounting information: Study on banking sector in ASEAN. AKRUAL: Jurnal Akuntansi. 14(1).

[41] Yusuf, O.M., Okon, A.E., Uareme, I.E., et al., 2021. Value relevance of accounting information and share price: Moderating influence of corporate governance practice of listed firm in the Nigerian Stock Exchange (NSE). African Scholar Journal of Mgt. Science and Entrepreneurship (JMSE-7). 23(7), 337-351.

[42] Ezejiofor, R.A., 2018. Effect of IFRS on value relevance of accounting information: evidence from quoted manufacturing firms in Nigeria. International Journal of Trend in Scientific Research and Development. 2(5).

[43] Busari, K., & Bagudo, M. M. (2018). Comparative value relevance of accounting information for consolidated and separate financial statements of listed financial service firms in Nigeria. SSRN 3277485.
DOI: https://doi.org/10.2139/ssrn.3277485

[44] Mayadunne, M., 2017. An empirical study of the value relevance of accounting information on market price in sub financial sectors in Sri Lanka. IJRDO-Journal of Business Management. 3(6).

[45] Muhammad, A.C., 2017. IFRS adoption and value relevance of accounting information: A study of listed insurance firms in Nigeria [Master's thesis]. Zaria: Ahmadu Bello University.

[46] Uwuigbe, O.R., Uwuigbe, U., Jafaru, J., et al., 2016. Value relevance of financial statements and share price: A study of listed banks in Nigeria. Banks & Bank Systems. 11(4), 135-143.

[47] Webster, I.M., 2016. Relationship between free cash flows and stock prices of non financial firms listed at the Nairobi securities exchange [Ph.D. thesis]. Nairobi: University of Nairobi.

[48] Samuel, T.E., Pradeep, B., 2016. Determinants of Share Prices: The Case of Listed Firms on Johannesburg Stock Exchange [Internet]. Available from: http://hdl.handle.net/10566/3764

[49] Zahid, I., 2016. Corporate governance and value relevance of accounting information: Evidence from Pakistan [Master's thesis]. Islamabad: Capital University of Science and Technology.

[50] Arkan, T., 2016. The importance of financial ratios in predicting stock price trends: A case study in emerging markets. Finanse, Rynki Finansowe, Ubezpieczenia. (79), 13-26.

[51] Oloidi, G.A., Bolade, S.K., 2015. An empirical determinant of equity share price of some quoted companies on the Nigerian stock exchange. International Journal of Research and Development Organization. 1(8), 26-43.

[52] Umobong, A.A., Akani, D., 2015. IFRS adoption and accounting quality of quoted manufac-

turing firms in Nigeria: A cross sectional study of brewery and cement manufacturing firms. International Journal of Business and Management Review. 3(6), 61-77.

[53] Omokhudu, O.O., Ibadin, P.O., 2015. The value relevance of accounting information: Evidence from Nigeria. Accounting and Finance Research. 4(3), 1-20.

Appendix

Table A1. Names of sampled manufacturing companies in Nigeria.

7-Up Bottling Company Plc
Cadbury Nigeria Plc
Champion Brew. Plc
Dangote Flour Mills Plc
Dangote Sugar Refinery Plc
DN Tyre & Rubber Plc
Flour Mills Nigeria Plc
Golden Guinea Brew. Plc
Guinness Nig Plc
Honeywell Flour Mill Plc
International Breweries Plc
Multi-Trex Integrated Foods Plc
Nig. Flour Mills
Nascon Allied Industries Plc
Nestle Nigeria Plc
Nigerian Brew. Plc
Nigerian Enamelware Plc
PZ Cussons Nigeria Plc
Unilever Nigeria Plc
Union Dicon Salt Plc
Source: Nigerian Stock Exchange Website (2021).

BILINGUAL PUBLISHING GROUP

Macro Management & Public Policies

https://journals.bilpubgroup.com/index.php/mmpp

ARTICLE

The Impact of Trade Deficits and the Burden of Crisis Oriented Economy on the Livelihoods of Nepali People

Uttam Khanal

Humanities and Social Sciences, Tribhuvan University, Kathmandu, 44600, Nepal

ABSTRACT

29,164,578 people are living in Nepal. Out of them, 48.96% are men and 51.04% are women. The growth rate of the population is 0.93% annually. However, 216,957 individuals had been abroad for employment, education or other reasons. It has developed an addiction to imported products using remittances. The government delays spending the money allotted for capital improvements. The debt incurred by loans received from donors exceeds between 20 trillion and 80 billion of Nepal's entire yearly budget. Based on statistics from Nepal Rastra Bank fiscal years 2021/2022, export and import contributions to overall Nepal's foreign commerce were 8.40% and 91.60%, respectively. Due to the burden of debt and increasing trade deficit in the Nepalese economy, it has greatly affected the livelihood of the people. The increase in the prices of goods has made the lives of ordinary and low-income citizens very difficult. To reduce it, it is necessary to increase the production of indigenous products and promote their trade. Nepal needs to improve its ability to balance imports and exports. Economic dependency will reduce and the nation's focus on self-sufficiency will increase if the market is extended by raising the output of locally produced items. There will be an increase in hazards as the state's ability to function weakens. No nation can be entirely self-sufficient in the open global market of today by producing all the commodities and services it requires. Economic dependency will reduce and the nation's focus on self-sufficiency will increase if the market is extended by raising the output of locally produced items. There will be an increase in hazards as the state's ability to function weakens.

Keywords: Import; Export; Domestic product; Raw materials; Trade deficit; Production and consumption

1. Background

The decline of Nepal's economy has not stopped. It seems that there are two main reasons behind this, increasing foreign trade deficit and low domestic and commercialization. On the one hand, this has in-

*CORRESPONDING AUTHOR:
Uttam Khanal, Humanities and Social Sciences, Tribhuvan University, Kathmandu, 44600, Nepal; Email: Khanaluttam24@yahoo.com

ARTICLE INFO
Received: 2 June 2023 | Revised: 18 August 2023 | Accepted: 7 September 2023 | Published Online: 15 September 2023
DOI: https://doi.org/10.30564/mmpp.v5i3.5760

CITATION
Khanal, U., 2023. The Impact of Trade Deficits and the Burden of Crisis Oriented Economy in the Livelihoods of Nepali People. Macro Management & Public Policies. 5(3): 50-63. DOI: https://doi.org/10.30564/mmpp.v5i3.5760

creased the pressure of accumulated foreign currency and on the other hand, imports have increased and exports have decreased. As this sequence continues to increase, the life of common people is becoming very difficult. The life of common citizens has been made easy by low income and the pressure of price increases. There is no alternative to increase domestic production immediately to improve it. Effort has been made to raise this issue as an important issue and discuss it.

The per capita income of Nepali is $1293 US dollars. By comparing contribution of GDP is 24.5% in agriculture, 13.7% in industry and 61.8% in services. Similarly, the use of labor is 43.1% in agriculture, 21.24% in industry and 35.66% in services. The inflation rate is 7.87%, the inflation rate in food and beverages is 7.13% and in non-food and services is 8.45%. Among the population of Nepal, the number of people living below the absolute poverty line is 17.8%. Foreign currency in the accumulated fund is $7910 million US dollars [1].

The Constitution of Nepal 2015 envisages a socialist-oriented economy. A socialist economy means that the state plays a role in the fair distribution of goods and services by producing them at reasonable prices for ordinary consumers. The production of goods is done through private, cooperative, and partnership means, and the state plays a controlling role in distribution, supply, and price, so the market cannot go beyond the reach of the common people. If these things are applied in practice, no person's daily life will be difficult. He works according to his skills, and the income earned from the value of that skill makes life easier. That is, he can increase his income by using whatever skills and abilities; he has or has not employed [2].

Internal production should be increased to strengthen the Nepali economy and reduce dependence. The implementation of state policies, plans, and programs for promoting exports while increasing domestic production. It is a sad matter that even the goods are declared as exportable products. The Nepal Trade Integrated Strategy 2016 has focused on cardamom, ginger, tea, and medicinal herbs for the agricultural sector; textiles, leather, shoes, carpets, and cotton for industrial production to use skilled and semi-skilled personnel. Such as information technology and tourism, have been defined as export items with 12 sectors' main priority, but their import has not been stopped. In the 1950s, the crippled economy of South Korea was brought about by President Park Chung Hue's export oriented production policy, which brought economic miracles to the world even after the implementation of federalism.

Various policies, development plans, and programs have been implemented at the state level with the aim of encouraging domestic production to supporting export promotion. Although, export of promotion was prioritized in the policies and programs of the national budget, periodic plans, due to the lack of effective implementation of government. Such regulations policies, plans and programs remain limited to paper. However, according to economist Achyut Wagle, except for 1997 and 2015, sufficient foreign investment could not come to Nepal, which had a negative impact on domestic production.

Nepal Rashtra Bank Governor Mahaprasad Adhikari said that foreign investment of all kinds cannot be welcomed, as only foreign investment with good governance is in the interest of the nation. Black money may appear to add some foreign exchange in the short term, but it is not good in the long run. Therefore, he said that the state's policy regarding foreign investment should be made clear. The attitude of the state and the private sector regarding foreign investment should be changed, the official said. He alleges that the view that we are weak when foreign investment comes is seen as a problem in the private sector. With the influx of foreign investment, some institutions in Nepal are more competitive than before.

"Trade and Export Promotion Center" was established with the aim of promoting the country's trade and exports. Since there is a problem with data collection and analysis, the question has been raised about its justification. What is significant there has not been enough production of export goods in the country, and the problem of quality processing facil-

ities has also persisted. It seems that Nepali products are not able to easily win the hearts of domestic consumers in terms of quality. Therefore, due to the increase in the import of foreign-quality goods, the domestic product has been challenged both in terms of price and quality. The situation where indigenous products cannot compete with foreign quality goods, which are considered cheap from the point of view of technology and production cost, there is a danger of displacement of indigenous original goods.

The existing challenges mentioned above, with the aim of encouraging domestic production to replace imports are "our goods, our self-esteem". A campaign called Made in Nepal, Self Product has been launched with the slogan. It is believed that this campaign will be successful in positive vibrations to improvements for the overall economy of Nepal. Those goals and objectives cannot be fulfilled without the people being aware. Although this campaign was said to be worthwhile in creating awareness that indigenous products should be consumed, encouraged, and promoted, it was not successful. The cost and price of the product are not the choices of the ordinary consumer, but the quality and the lack of choices are their main sources of satisfaction.

While domestic production is decreasing, imports are continuously increasing in Nepal. Exports are lower than imports. According to the customs department, goods worth 7 trillion, 92 billion, 628 thousand or 90.75% were imported in the first six months of the current year. Similarly, only 80 billion, 800 million and 7,421 thousand rupees were exported during this period. It is 9.25% which means that 91% is imported while only 9% is exported. It does not accept the fact that domestic production has decreased due to a lack of market for Nepali products. According to Narayan Regmi, the spokesperson of the Ministry of Industry, Commerce, and Supply, the main reason that imports are many times higher than exports is the lack of domestic production.

According to the data of the customs department, petroleum products are the most commonly imported goods that are not produced in Nepal. In the month of January, diesel worth 70.10 billion and gasoline worth 33.53 billion were imported. The import of luxury goods, including fuel, has also increased abnormally. According to the statistics of the department, gold, which is on the list of luxury items, has been imported worth 29.20 billion rupees, while LP gas for cooking has been imported for 28.20 billion rupees. Nepal has spent 23.75 billion rupees on the import of soybean crude oil. It has spent 19 billion and 22 million rupees on the import of iron and 16 billion and 22 million rupees on the import of crude palm oil. Mobile sets worth 14.32 billion were imported during the review period. During this period, palm oil worth 13.8 billion rupees was exported, but the amount of profit was very low. The data from the department show that processed soybean oil was exported at 8 billion compared to those in Nepal [3].

2. Statement of the problem

Due to the increasing trade deficit and decreasing domestic production in Nepal, the goods used by common citizens are becoming dependent on imports. The increase in the population of unemployed citizens and the loss of employment opportunities will lead to a decline in purchasing power. This has made the lives of many citizens more difficult. With the declining domestic production of Nepal, the share of imports in foreign trade has reached close to 91% and exports only 9%. There has been a contraction in Nepal's economy. The burden of foreign debt has reached 20 trillion and 80 billion. The government is forced to set aside a large sum of money for foreign loan repayments and interest payments in every year's budget. Nepal's market is not able to sustain domestic production. The ceiling of the amount to be spent on capital construction allocated through the budget cannot be spent. The expenditure has increased every year; the state organs are getting weak because the development expenditure is not in that proportion. Domestic production can't increase as capital efficiency in human resource development. As production can't increase and internal consumption increases too much, the accumulated foreign exchange will be burdened, and the economy may face a crisis at any time. The livelihood of the common

people may be very difficult at that time. The interest of the common citizens in food, education and health of themselves and their families increases. People try to fulfil these basic needs in all circumstances, but if the economy goes out of control, it will not be possible. Therefore, the only option can increase the production and consumption of domestic goods by being aware of it before the crisis. In order to increase the production of indigenous goods, it is necessary to pay attention to the expansion of industries based on agriculture, forest products, water resources and indigenous raw materials.

The National Census 2021 showed the total population of Nepal is 29,164,578 in which the number of males is 48.96% and a female is 51.04%. Although the population growth rate is 0.93%, the production and supply of food have not been in the same ratio. Similarly, the population density is 198 per km^2 and the number of people living abroad is 2,169,578. The figure shows that the number of people with 2.2% disabilities, 6.09% of the population in the Himalayan region, 40.25% in the hilly region and 53.66% in the Terai region. Remittance accounts for 21% of Nepal's overall economy and 56% of foreign exchange earnings [4] and make a great contribution to supporting foreign imports and facilitating purchases. Last year, $8.3 billion dollars entered Nepal in the form of remittances, while $5.85 million dollars was taken by workers who came to Nepal from abroad.

The foreign trade deficit is increasing due to the negative effects on the country. Gross domestic product will increase and the components of production will shrink. To reduce the burning trade deficit, it is necessary to increase the domestic production of goods. If the production of goods can be increased completely, the economy will become more dynamic. As domestic production is decreasing, imports are continuously increasing in Nepal. According to this percentage, 91% is imported while only 9% is exported. It does not accept the fact that domestic production has decreased due to a lack of market for Nepali products. The main problem is the lack of domestic production, which is many times more imported than exported. The solution to this problem is to increase the production capacity of goods in Nepal and to make more use of local tools and equipment. If it is not possible, there will be a decrease in production and the import of goods from foreign countries will increase. There should be no delay on the part of the state to increase the production capacity of indigenous products, even in policy, planning and legal terms. Industrialists, merchants and general stakeholders also come in this work. There should not be delay in planning and legal. Industrialists, businessmen and general stakeholders also come into work. Not being able to move from one's place and not being able to increase production has become the root of the problem.

3. Objectives of study

It is necessary to have excessive mobilization of internal resources to improve domestic production while improving Nepal's economy. If the domestic production increases, its consumption can be increased and imports will decrease. With the use of internal resources, employment opportunities increase and the life of ordinary citizens becomes easier. It is necessary to create an environment where a lost person can light his stove to make the daily life and livelihood of the people. If there is no access to daily necessities due to rising commodity prices, unemployment, and poverty, life becomes very painful and difficult. The possibilities of agricultural production in Nepal are wide. With the products produced people can live their lives and do not have to die of hunger. Apart from this, if domestic production increases, imports will decrease, the accumulation rate of foreign currency will increase, and the state will become stronger.

To increase domestic production, you do not have to work hard to market products internationally and bring them to the attention of consumers. This emphasis should be placed on the development of small and medium industries to expand indigenous production and industrialization. Availability of raw materials, market prices and human resources should be feasible. The situation should be looked at in terms

of policy and legal provisions. The living standards of people are different from part to whole. There are some questions behind it. Why should not produce local resources to increase inter-productivity? What are the contributing factors to gradually increasing imports? Should imports get to change the livelihood of people? What are the internal factors to increase domestic product for making a sustained economy? These questions try to get answers for this paper. In the current situation, most of the industries in Nepal are becoming dependent on it, so it is necessary to take into account what the market is like and what domestic raw materials are available. If local raw materials can be used to produce indigenous raw materials, there is a situation where at least 200% profit can be made. It should be noted which factors are creating obstacles behind. The country should increase its production to meet the demand for domestic goods. Since it achievement for a country in today's world, the main objective of this study is to (a) utilization of domestic production for reduced trade deficit (b) to analyze the import and export for foreign trade and (c) to evaluate the overall impact of trade deficit for people's livelihood.

4. Methodology

The method is a very important part of the paper preparation. In this study, the primary data are least used because of the time boundary. A secondary source has been used as a source of information for analysis. An attempt has been made to find out the possibilities of facilitating people's livelihoods by analyzing that data. Nepal's agricultural sector is very fertile in terms of production and employment. By increasing the state's investment to attract the youth, gold can be found in the soil, and the country will become self-sufficient. Here, the data of all species in the field has not been studied for use. The situation of production, the law of import and export, rules, and regulations, as well as the data of Rashtra Bank and the Customs Department and Industry Department from 2021 to 2023, have also been used. To make the study credible, the Ministry of Finance says that the information obtained from the Department of Household and Small Industries was used in the study. Since the sample was not surveyed, this study has not revealed information that is invisible in small areas. Therefore, this study did not use various types of statistical tools to analyze data and answer other of the entire subject.

5. Presentation and discussion

5.1 An imported current economy and its present scenario

Looking at the data from the Customs Department, in 2021/2022, agricultural goods worth 3.23 billion and 77 million were imported. A large quantity of food was imported that year. Imports of rice were 50.78 billion, corn was worth 16 billion, green vegetables were 38.5 billion, fruits were 31.34 billion, edible oil was 82.90 billion, and sugar was 12.27 billion. There was an environment where Nepal could produce all these items by itself. Looking at the trading situation in the month of January 2023, the total foreign trade has decreased by 20.84%. Exports have decreased by 29.03%, while imports have decreased by 19.9%. During the reviewing period, there was a trade deficit of 8 trillion, 25 billion, and 73 million Nepalese rupees.

At that same time, Nepal imported 21.5 million kg of raw and frozen potatoes with 5.5 billion rupees. These potatoes come from India, Bangladesh, and Indonesia. As Nepal's dependence on onions has also increased, 86.3 million kg onions with 3.15 billion rupees have been imported. 22.1 million kilos of pulses have been imported at a cost of 2 billion, 44 million rupees. 1 billion 55.1 million kilos of chickpeas have been imported. About 10.9 million worth of beans, 79 million of green broad beans, 7.7 million 77 thousand kilos of pulses, and about 44 million kilos of garlic have been imported.

The import of tomatoes is also high. Nepal spent 2.87 million rupees to import 2.18 million kilos of lamb. Mushrooms worth 666 million rupees, mutton pepper worth 48 million rupees, sugarcane worth 287 million rupees, seed beans worth 152 million rupees, and pumpkin worth 136 million rupees are also

imported. Mushrooms from the European country of Serbia and chilies' from Taiwan are also imported to Nepal. Nepal has also imported vegetables from Thailand, Tanzania, Lebanon, Madagascar, Canada, Romania, Turkey, Brazil, Mozambique, South Africa, Venezuela, Ethiopia, and Malawi (Customs Department, 2022).

As Nepal's foreign trade is becoming completely import-oriented, the government cannot adopt restrictive measures. As a result, it is difficult to reduce the trade deficit without increasing the domestic product. After India made customs zero, the export of vegetable ghee and oil, imported from third countries to Nepal and exported after processing to India, seems to have decreased. The share of soybean oil in Nepal's total exports is 25.06%, while palm oil is 20.06%, and sunflower oil is 2.4%. The data shows that the export share of these three items alone is about 48%. The cardamom business is expanding in Nepal. In terms of export, more than 95% of cardamom is exported, and the remaining 5% is consumed in the domestic market. Last year, cardamom worth 7.3 billion rupees was exported from Nepal, so it is estimated that this year the price will decrease and exports will decrease [5]. At the beginning of the year, cardamom, which was between 900 and 1000 rupees per kg, was now sold for around 700 to 800 rupees. Most of the cardamom produced in Nepal is exported to India. India has been selling Nepali cardamom at a high price by adding value. If Nepal can add value, the attention of the government has not gone towards earning more foreign currency. Nepali cardamom can become strong in the international market if policy priorities are given, such as customs exemptions and easy financial facilities for the import of machinery.

You have to work hard to make your products stand out in the international market and gain the attention of consumers. At present, an industry has been set up for the processing of cardamom in Jhapa. This industry will prepare products in the form of labeling, packaging, and final goods. He made four products, the main ones from the country; work has been done to take them to the main city. The company is increasing its production and sending Nepali cardamom to Dubai and Qatar as the final goods are in their final stage.

Large industries can be operated by focusing on the development of small and medium industries for the expansion of indigenous production for industrialization. At present, most of the industries in Nepal are dependent There is a situation where at least 200% profit can be made if prepared materials can be produced from domestic raw materials. It will be a great achievement for a country like Nepal to produce goods that can meet the demand for indigenous products.

Imports of food-related items alone amount to 4 trillion. If production can be increased there, the economy will be relieved and many opportunities for employment can be created. Agrarian countries have to import trillions of tons of grains annually. Increasing domestic production should not be limited to agriculture or food. The roles of warehouses and local governments also come together from production to consumption. It is equally important to have financial access and appropriate use of tools and resources to increase the production of goods. According to trade experts, Nepal's trade deficit has increased due to the lack of raw materials required for domestic goods, the difficulty of finding foreign goods, the lack of quality goods and certification, etc. More problems have arisen due to the incomplete implementation of policies in the field of exports. Exchange rates, financial provisions, customs duty exemption, and other incentives have not been implemented. Merchants are facing a lot of problems due to the complexity of the procedures and records of most of the export transactions in Nepal. Fruits can be produced in the country. The import of food has also increased significantly. An accreditation board related to the quality required for increased exports has not been yet formed. After a private sector or government sector laboratory is recognized by the international organization ILAC, such a recognized quality testing body has to test other labs and give certificates. The exporters, who are facing many such problems, have not been clarified about the possibil-

ities and challenges of this sector and how they can be addressed through the monetary policy that will be implemented by the Central Bank in the coming years.

5.2 Prospects of the tourism industry

The official start of tourism development in Nepal was in 1952, after the establishment of democracy. Since then, the tourism sectors have been gradually developed and expanded. In 1962, more than 6000 tourists visited but in 2011, around 10000 tourists visited Nepal by air and land. These two statistics confirm that there has been a significant increase in the tourism sector. The contribution of the tourism sector to the gross domestic product has different countries of the world. In Latin American and Caribbean regions, the contribution of the tourism sector to the total national product was around 19% in 2014. In Mexico, as in the case of countries like Jamaica, this number is very low. The impact of national production on the national economy is also different due to the attraction of foreign tourists, etc.

The tourism sector occupies an important place in the Nepalese economy. About 8 million tourists from different countries come to visit Nepal every year, and it earns about 22.825 million in foreign currency. It has contributed 20% of the total employment in the economy and 3% of the gross domestic product. Tourism is an industry related to production activities. It also helps the tourists who come to visit the country earn money by selling goods and services. Besides helping to increase new economic activities, it contributes positively to various economic aspects such as the balance of payments, job creation, total income and productivity growth [6].

Agriculture, tourism, and water resources are the three main bases of the Nepalese economy. Tourism is also an important base. With the recent rate of outflow of skilled and unskilled human resources, the Nepali economy can be made more viable through the expansion and development of the tourism sector than through the development of agriculture and water resources. The tourism sector contributes to the country's total domestic product and employment. While analyzing the contribution, it should be said that tourism is the basis of sustainable development in the country. There are many opportunities and bases for the development and expansion of tourism in the Nepalese economy, such as geographical, natural, cultural, religious, and mythological ones. All doors should be kept open, starting at the policy-making level, to move these bases towards their destination.

Since Nepal's plains, hills, and mountains have different lifestyles. Customs and traditions have an understanding of the differences in nature. Tourism can be developed accordingly and the products can be combined at the national level. Due to all seven provinces falling under the federal characteristics, targeted programs can be conducted to achieve the goal of sustainable development in the tourism sector. Special attention should be given from the state level to developing infrastructure in potential areas while encouraging investment from the private sector. Emphasizing regional production and attracting tourists to use the goods and services produced by available resources at the local level. Its contribution to the total domestic product of the country can be increased. There are many tourist destinations within the geographical location, and natural and mythological heritage should be continued.

5.3 Potential for energy and water

Nepal's hydroelectric process, which started in 1911 with 1500 kilowatts of Farping hydro-electricity, had produced 6380 kilowatts of electricity by 2018. As of 2021, the electricity produced by the Nepal Electricity Authority is 636.69 megawatts, while the private sector's is 712.05 megawatts, amounting to 1348.74 megawatts. According to the Nepal Electricity Authority, more than 2200 megawatts of electricity have been produced in Nepal in the year 2023. Similarly, 180 megawatts of electricity are sold daily in India. Nepal has been importing up to 60 megawatts of electricity from India every day for the Far West region at a time of high electricity consumption [7].

According to projections, the peak load on 18, 2020 will be 1644 KW, peak load from 2021 to 2024

will be 2222 KW, the peak load from 2025 to 2026 will be 4078 KW, and the peak load in 2027 will be 4708 KW. In order to increase the supply by generating the electricity required by Nepal. The Gandaki project is working on 225 MW, Arun's first 200 MW, Arun's second 200 MW, Budhigandaki's 600 MW, and Kaligand's second 500 MW of production capacity. Similarly, Nepal should adopt a policy of producing the electricity it needs and selling electricity to India and Bangladesh at a cheap rate by constructing the second largest hydro-electric project. Among the projects, India has shown interest in, there is a possibility that huge projects like 7000 MW Pancheswar, 10000 MW Karnali and 7000 MW Koshi High Dam can be advanced.

In terms of land use, Nepal can build 12 dams and store water, generate 1,500 megawatts of electricity from 500 cubic meters of water in winter, and sell it to India and Bangladesh at a low cost. Similarly, this water can be provided to India and Bangladesh for irrigation and other purposes. Out of 3 million hectares of irrigable land in Nepal, one million hectares have been irrigated. This water can be used to irrigate the remaining part and earn a lot of income through agricultural production.

Agricultural productivity can be increased by the proper development of irrigation in Nepal. About 90% of the workforce is dependent on agriculture, contributing about 66% to the total national product. To increase its contribution, production and productivity should be increased for which irrigation is mandatory. Most of the rivers flowing in Nepal receive 200 billion cubic meters of water. It is estimated that there may be about 63 billion cubic meters of water under the land of Terai. The result of this water can play a very important role in the development of Nepal. About 6500 hectares of land have been irrigated through the Kanchanpur scheme. Sarada project 2800 hectares in Siraha, 3800 hectares in Banke from Rapti, 1200 hectares in Lothar, 1300 hectares in Rajapur, 8000 hectares in Baraganga, and Sunsari 66000 hectares from Morang, 200000 hectares from Kosi, 43000 hectares from Babai irrigation, 40000 hectares from Gandak scheme, and 4000 hectares from Babai scheme have reached irrigation facilities. Apart from this, if all the rivers can be connected in the power zone area from west to east through the canal network, irrigation can be done easily in all parts of the Terai.

5.4 Herbs and its earning

In Nepal, herbs are especially abundant in the Himalayan, hilly, and Terai regions. There is a lot of potential for different crops. The standard of living people can be improved by the proper development and utilization of conservation funds. Income can be increased by collecting medicinal and aromatic herbs scattered throughout the country. Collected crops have become a means of providing raw materials for the domestic industry. Job creation and huge revenue growth can be achieved through foreign exchange and earnings. The herbs can be collected properly and can be commercially useful to develop through farming.

Species of herbs have been identified for 700 in Nepal. More than 80,000 tons of herbs are produced annually. Various studies have shown that the market share of Nepali herbs in the world market is 0.2% and 90% are being exported as raw materials from Nepal to India and China. Nepal has been exporting herbs 5.5 billion rupees annually [8]. There is a demand for processed herbs in the Indian market. It is necessary to arrange for the proper collection and processing of herbs at the local level. It will benefit the poor and low-income people who are dependent on the same profession. The fact that treatment has been going on in the village for thousands of years can be studied in the introduction to herbs. Three hundred years ago in Nepal, Jaipratap Malla established a homoeopathic centre to manufacture and treat medicines from existing herbs in the country.

Although the area of Nepal is small, it is rich in natural resources due to its geography, biological diversity, and climate. At present, herbs have been used as a traditional livelihood for most of the people in the Himalayan and hilly areas. Apart from this, Mother Tincture was produced from homoeopathic herbs in Germany and presented to the world. If it is

successful, Nepal also has a lot of potential to gain economic benefits by becoming a hub for herbs. The government should play the role of a supporter by improving the policy, and sector structure and creating a comfortable environment for the collection, processing, and transportation of wasted herbs.

5.5 Increase and use indigenous agricultural products

If agriculture is developed, the country becomes self-reliant and employment is generated. The essentials for people are hemp, basic cotton, and health care. Even when the country's economic situation is in crisis, agricultural products help to protect people. The condition of people who earn their livelihood by making agriculture their main profession or business is normal. A person who produces agricultural work on private land or rents it to a company that runs an agricultural farm, group, cooperative, or business organization can also be formed. He works to produce things necessary for humans by utilizing water, land, and air. Farmers prepare the food items that are necessary for life by combining natural and human labor.

The country's economy is in a critical state in Nepal due to the state's indifference to the rights of the farmers and the agro profession is collapsing. In Nepal, 60.4% of the people dependent on agriculture have been cultivating 21% of the 3091 lakh hectares of land. According to the statistics of the Agriculture Department, as of 2021, food crops totalling 11,120,512, cash crops totalling 6,807,006, pulses 2,943,355, and other crops totalling 6,053,788 metric tons had been produced. Annual animal production is expected to be 95,322,382 and fish production is expected to be 104,000 metric tons. The state has not shown any interest in pricing these products or market management, which is necessary for the future (SAD, 2021) [9].

In order to reduce the trade deficit based on indigenous raw materials and import substitution and to emphasize the production and consumption of consumer goods of the same nature, the current government has instructed all government agencies to use internal production. Although the goods produced in Nepal are up to 15% more expensive than foreign goods, the government has instructed people to purchase domestic products while public bodies are purchasing stationery, furniture, fixtures, machinery, tools, etc. given the twelve-point directive, which emphasizes the use of domestic production.

According to the rule of seventeen of the Public Procurement Regulations 2007, there is a provision that Nepali goods must be purchased even if the goods produced in Nepal are up to 15% more expensive than foreign goods. The Nepal Federation of Commerce and Industry, the Confederation of Nepal Industry, the Trade and Export Promotion Center, and the Nepal Chamber of Commerce and their subordinate bodies have published the details of hospitality and tea, lunch, and the certificate of origin of indigenous goods or goods on their website. The public body can purchase domestic goods based on this description; the producers of domestic goods must list their products with the public body; and the provinces and local levels have also been instructed to follow and purchase this guide as a guide regarding the use of domestic goods.

According to Section 13 of the directive, the details of the purchase of indigenous goods by public bodies must be sent electronically to the central implementation and monitoring committee every three months. Commissions, ministries, or subordinate bodies should monitor their offices according to the guidelines. Priority should be given to the indicator of whether or not domestic goods are purchased. Prices and local levels should create a mechanism for the implementation of the guidelines.

"Make in Nepal, Made in Nepal" for the industrialization and development of the productive economy of Nepal has been launched. The government plans to reduce the trade deficit by protecting domestic products, identifying exportable goods and goods with comparative advantages, and increasing competitiveness. In the budget for industrialization and domestic production enhancement, "production growth campaign decade year 2022 to 2032", the Prime Minister's Nepali Production and Consumption Enhancement Program has been announced for

the growth of Nepali production, job creation and export-oriented business enhancement.

It seems that the announcement about advancing the private sector as an engine of economic growth will contribute to the development of the private sector in Nepal. The announcement encouraging the establishment of productive industries by connecting micro, domestic, and small industries in forward and backward integration will contribute to the promotion of small businesses. In order to achieve the goal of high economic growth, it is necessary to mobilize resources from the public and private sectors. It has been encouraging the private sector to produce goods, export promotion, and import substitution, and has kept industrialization and agriculture at the center. The state has announced that it will change the nature of the Nepalese economy and lay the foundation of a productive economy. It is understood that this will increase the consumption of goods produced in Nepal and contribute to the expansion of domestic industry.

If foreign investment is not a hindrance to the private sector but rather an environment where it should be seen as an asset, foreign investment will bring capital, technology, managerial skills and an excellent work style. It will be beneficial for domestic investors and products. There are examples of some institutions in Nepal becoming more competitive than before due to the influx of foreign investment. It is also seen that the quality of goods and services produced by foreign investment is good. Foreign investments should be made by making qualitative leaps in the fields of modern technology and management, and when foreign investment comes, qualitative leaps can be made in the fields of technology and management. It seems that Nepal should attract foreign investment in the fields of airports, tourism, hydropower and tunnel construction etc. Foreign investment is also needed in large hydropower projects, and foreign investment can be brought into tunnel routes as well.

5.6 Efforts to increase domestic production

To increase the export of domestic goods, the state should take initiatives for economic and diplomatic activities for embassies abroad. Controlling the uncontrolled entry of expensive goods from abroad, stopping customs fraud, and controlling illegal trade and imports will reduce the trade deficit. The government is coordinating with the concerned parties to reduce the cost of transportation in foreign trade. It is said to be used. It is considered important in the trade between Nepal and India as it is located near the Haldia seaport. If the issue of using the waterway terminal under construction in Haldia is also connected with the issue of using the waterways, the transportation cost will be reduced a lot. As the waterway is relatively cheaper for sea trade, it has been given priority. India put this waterway into use in 2018, and the World Bank has spent more than 140 billion dollars on such infrastructure development.

Estimates by the government, World Bank and Asian Development Bank about the economic growth rate of Nepal this year are different. The government has estimated that the economic growth rate will be 6%, while the Asian Development Bank has predicted that the economic growth rate will be 4.9%, and the World Bank has predicted that the economic growth rate will be 3.9%. The share of the agricultural sector in the total domestic production of Nepal is 27%, while the contribution of rice to agriculture is 20% of production (World Bank, 2021) [10].

According to the customs department, by January 1980, Nepal had imported rice worth more than 25 billion 78 million rupees. During the review period last year, rice worth 35 billion and 63 million rupees was imported into Nepal. At the same time, there has been a decline of around $10 billion in rice imports into Nepal. This year, one million 31 thousand 213 kg of rice worth 42.7 million 70 thousand rupees has been imported for seeds. Similarly, Nepal has imported 394.6 million kilos of rice worth 14.26 billion rupees. According to the data released by the Ministry of Agriculture, in the financial year 2021/22, 5130 thousand and 625 metric tons of rice were produced in Nepal, while in 2022, 5486 thousand and 472 metric tons of rice were produced in India. This year, 355 thousand and 847 metric tons of rice have

been grown.

This year, per-hectare productivity has increased by 3.79% while the overall rice production growth rate has increased by 6.94 % compared to last year. There is a decrease in rice production in an area of 20000 hectares. Paddy was planted in a total area of 1477 thousand 378 hectares, while this year it was planted in an area of 1447 thousand 789 hectares. In Madhes province, the maximum area of 375 thousand hectares and 340 acres were planted. The production in that place increased by 0.18% to 1.386 thousand 328 tons of rice. Although Nepal consumes an average of 112 kg of rice annually, that rate has increased to 130 kg. During the review period, Nepal has collected 1 billion, 462 million and 23 thousand dollars in revenue from rice imports [11].

In order to reduce the trade deficit, either import must be replaced or the country's exports must be increased. The growth rate of the industry in five years will be less than 3%. Due to low production, daily consumption of luxury goods, and increased consumption due to remittances, the trade deficit is shrinking. Similarly, there is a shortage of raw materials needed for indigenous products in the country. Nepal's trade deficit has not been reduced due to the non-discovery of value-added products abroad and a lack of product quality and certification. Quality testing laboratories should be developed in the country, and substandard foreign goods should be banned. Imports of petroleum products, electronic materials, automobiles, jewellery, cosmetics, etc. have increased significantly. The former president of the Federation of Nepalese Industries and Commerce says that increasing the export of domestic goods is the most appropriate way to reduce the trade deficit, which is increasing day by day. The government should make the export subsidies effective and simple. Policy arrangements should be made to encourage products that contribute significantly to exports and can add high value.

5.7 Development of small and medium industries and employment opportunities

Small and medium industries are developed as enterprises that make the economy run by operating from their limited resources. MSMEs are defined on the basis of capital investment, annual sales, assets, employees, etc. According to a study conducted by the World Bank, formally registered domestic and small industries contribute 60% of total employment, 80% of new formal job creation, and 40% of gross domestic product to national income in emerging economies. Such industries contribute about 22% to Nepal's economy. There is a figure of 2 million employed [10].

A study conducted by the National Bank has shown that small and medium enterprises are not able to use financial instruments and products to start and commit to their businesses. The study shows that small and medium businesses in Nepal contribute 22% to the gross domestic product. In addition, about 1.7 million jobs have been created. Looking at the financing situation of small and medium businesses in Nepal, at the end of June 2019, banks and financial institutions provided 3.26% of the total outstanding loans to small and medium industries except agriculture, energy, and tourism. By January of 1980, the decline in this situation was limited to 1.25%. The role of small and medium enterprises is important in all economies. They have significantly contributed to job creation, gross domestic product, and export promotion. In countries with emerging economies, small and medium industries seem to contribute up to 60% of total employment and 40% of total domestic product. 96% of the total businesses in the Asia Pacific region are small and medium enterprises. They employ 62% of the total workforce. According to the Asian Development Bank, small and medium industries account for 40% of exports in India and China.

It has been shown that most of the small and medium businesses in Nepal have raised financial instruments from sources other than the banking sector. It has been seen that the small and medium enterprises included in the study used an average of 33% from the sources of ancestral wealth, 26% from their own savings, 16% from banks and financial institutions, and the rest from other sources. The study

showed that after the operation, they were able to use the bank and financial instruments. It has been found that about 50% of the operating small and medium businesses have taken loans from banks and financial institutions, and 85% of them have received financial instruments from commercial banks.

Entrepreneurs consider the need for real estate collateral and procedural hassles as major problems in getting loans from the banking sector. Due to the lack of institutional capacity and the possibility of credit abuse, sufficient credit has not been provided to small and medium businesses. Sufficient venture capital and private equity companies have not been developed for the financing of small and medium businesses in Nepal. Some venture capital and private equity companies are operating. In order to promote such companies, the Nepal Securities Board has issued Specialized Investment Fund Regulations, 2018. Regarding the capital market, there is no separate securities market for small and medium enterprises. There is a problem with financing small and medium businesses in Nepal. At present, 34 thousand 512 cooperative organizations, including 13 thousand 578 savings and loan cooperatives, have supported the financing of small and medium enterprises.

5.8 Future way for solution

Foreign trade is at a loss. More than one year's budget of Nepal, the government has become a debt liability. Foreign debt has surpassed 20 trillion and now stands at 80 trillion. The government is obliged to allocate a large amount of money to the budget every year for foreign loan repayment and interest payments [12]. The foreign trade deficit has reached around 90%. The only alternative is to increase domestic production. Remittances are the source of foreign exchange earnings, we cannot be sure that the economy will be stable and sustainable depending on this. In order to create an environment of economic activity in the country and pay attention to liquidity management, the government should continue to strengthen the domestic production sectors, including the Agriculture CP Act, 2015 [13]. The daily life of ordinary citizens may become very painful due to the economic recession.

The state should dare to identify the potential areas of Nepali production and increase investment in that area to make the livelihood of the common people easy and simple. There is an urgent need to stop the country's youth and capital from migrating abroad. Due to Nepal's import oriented tax revenue, the government will not be able to achieve its target income with the decrease in imports. Due to the rectangular economy, it is necessary to conduct programs that can be done through exports in addition to remittances as a source of foreign exchange earnings [14]. The economic crisis that may occur in Nepal at any time can be dealt with. Even though the import of goods is stopped during the economic crisis, when domestic production is increased, it cannot cause a big deviation, and the people's livelihoods remain normal. Therefore, it will be in the interest of the country and the people to further tighten domestic production and consumption.

The government of Nepal should identify the pockets of local production and organize activities accordingly. If local resources and tools are identified, an environment of easy supply of raw materials is created; the industries will start opening gradually. As the industry opens, all kinds of local raw materials found there get a market. Because of the market, people lose a lot of job opportunities and other opportunities. As employment increases, there is no time for people to sit empty-handed. When the opportunity for a working environment is created, as the income level of every person rises, life and daily life become very easy from a public-private partnership relationship [15].

The purchase of goods produced by farmers has been sold to reach consumers through brokers. There is a situation where the farmers are not getting their price on the other hand; there is a situation where the farmers are fleeing from the agricultural profession. They are forced to leave the agricultural profession and embrace other professions. When the gift of natural land is given to private ownership by the state, there is a situation where the farmer does not get it

when there is housing or a plotting area on arable land. There is also a situation where people have to pay expensive rent for land that is either available or not available. Such an environment makes it difficult for the agricultural profession to increase production. Fertilizers, seeds, irrigation, medicines, environmentally friendly technologies, and other services required for agricultural production are far beyond the reach of farmers. Such tasks should be made simple and easy. The state should start all kinds of efforts to commercialize agriculture and remove policy and legal complications: agriculture, industry, tourism, hydropower, and forestry [16]. It is necessary to develop skills by opening small and medium-sized industries that produce herbs and indigenous raw materials. To increase the amount of investment from the state in capital construction, to use action plans, programs, and strategic business plans, to commercialize land, to arrange loans at simple interest rates in the production sector, to restrict the purchase of real estate and luxury goods, to discourage loans from VAC in such areas, and to improve the biological quality of the soil In order to increase the salvage production, promote the cultivation of advanced varieties of rice with an emphasis on the production of organic fertilizers, through which waste management can be done and the use of chemical fertilizers can be replaced.

6. Conclusions

In Nepal, the production and use of indigenous products is decreasing. Due to this, the environment of self-employment of citizens is gradually disappearing. If this type of problem is not solved in the long term, the contribution of internal resources to the total gross domestic product will decrease and the life of the citizens will become more difficult. Increasing domestic production creates opportunities to reduce imports and balance foreign trade. It reduces imports and helps increase exports. Increasing exports also means creating an environment in which citizens and the country become empowered. If the government is able to identify the areas of production and increase the access of the common people to the production of domestic goods through an investment-friendly environment, there may be a wreckage situation in the supply chain.

Due to a lack of domestic production and remittances of foreign currency, the Nepali economy is currently in crisis. The budgeted funds for capital projects are put off by the government, and Nepal's annual budget is outstripped by the debt generated from donor loans. As a result, when imports surpass exports, the economy of the nation becomes vulnerable and dependent. Due to a total market share for imported goods and low levels of domestic manufacturing, Nepal's current account deficit is concerning. To maintain a balance between imports and exports, it is important to encourage domestic capital development, local resource and equipment use, and export growth.

The market is expanded by increasing the output of locally produced goods, economic dependency will decline and attention to self-sufficiency will rise. A socialist-oriented economy, where the state participates in the equitable distribution of commodities and services, is what the Constitution of Nepal 2072 envisions. To lessen economic dependency and put more emphasis on self-sufficiency, Nepal should enhance its capacity to balance imports and exports. To support the Nepali economy and lessen dependence, internal manufacturing should be raised. State policies, plans, and programs should be successfully implemented in order to increase domestic output while boosting exports.

Conflict of Interest

There no conflict of interest.

References

[1] Report of National Population and Housing Census [Internet]. NPHC; 2021. Available from: https://censusnepal.cbs.gov.np/results

[2] Constitution of Nepal [Internet]. Available from: https://lawcommission.gov.np/en/wp-content/uploads/2021/01/Constitution-of-Nepal.pdf

[3] A Statistics of foreign trade of Nepal 2022: Report published by department of custom, minis-

try of finance, Kathmandu.

[4] Budget Speech 2021/22 [Internet]. Government of Nepal. Available from: https://www.mof.gov.np/site/publication-detail/3064

[5] Bhoosal, Y.L., Byanjankar, R., 2022. An Empirical Study On The Determinants Of Government Revenue In Nepal [Internet]. Available from: https://www.nrb.org.np/er-article/an-empirical-study-on-the-determinants-of-government-revenue-in-nepal/

[6] Foreign Investment and Technology Transfer Act, 1992 [Internet]. Available from: https://cn.nepalembassy.gov.np/wp-content/uploads/2017/11/foreign-investment-and-technology-transfer-act-2049-1992.pdf

[7] Annual Report of Nepal Electricity Authority [Internet]. NEA. Available from: https://www.nea.org.np/annual_report

[8] The Global Risks Report 2022 [Internet]. WEF; 2022. Available from: https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf

[9] Statistical Information on Nepalese Agriculture [Internet]. SAD; 2021. Available from: https://moald.gov.np/wp-content/uploads/2022/07/STATISTICAL-INFORMATION-ON-NEPALESE-AGRICULTURE-2077-78.pdf

[10] The Innovation Imperative for Developing East Asia. World Bank East Asia and Pacific Regional Report [Internet]. World Bank; 2021. Available from: https://openknowledge.worldbank.org/entities/publication/3e82eb68-87e1-5307-aaf7-03ab4dd9e2b7

[11] Customs Tariff 2020/2021 [Internet]. Department of Customs; 2021. Available from: https://customs.gov.np/uploads/Pages/1611309259_np.pdf

[12] Foreign Investment Policy [Internet]. Government of Nepal. Available from: http://www.investnepal.gov.np/portal/index.php?p1=content&p2=9

[13] Commercial Trade Policy 2015 [Internet]. Ministry of Commerce. Available from: https://www.fncci.org/ckfinder/userfiles/files/02%20TradePolicy_2015.pdf

[14] Foreign Investment and Technology Transfer Act, 2019 [Internet]. Available from: https://www.lawcommission.gov.np/en/wp-content/uploads/2019/09/The-Foreign-Investment-and-Technology-Transfer-Act-2019-2075.pdf

[15] Public Private Partnership and Investment Act 2019 [Internet]. Available from: https://ibn.gov.np/uploads/documents/public-private-partnership-and-investment-act-ppp-and-investment-act-2019pdf-1483-330-1657605913.pdf

[16] Industrial Statistics (2021/22) [Internet]. Government of Nepal. Available from: https://doind.gov.np/detail/145

BILINGUAL PUBLISHING GROUP

Macro Management & Public Policies

https://journals.bilpubgroup.com/index.php/mmpp

ARTICLE

Demand for Money and Inflation in Ethiopia

Solomon Senbeto Godana

Monetary and Financial Analysis Directorate, National Bank of Ethiopia, P.O.Box 5550, Addis Ababa, Ethiopia

ABSTRACT

One of the vital components of the macroeconomic model that helps policymaking is the demand for money function. Having reliable predictions on the money demand function helps in determining the optimum growth of money supply which is vital in controlling the inflation rate in the economy and also preventing monetary disturbances from affecting real output. In order to formulate and estimate the money demand function in Ethiopia, this study used quarterly data from 2000Q3 to 2021Q2 and employed the Ordinary Least Square method and Engle-Granger two-stage procedure for empirical analysis. The empirical result from the models indicates that, in the long run, all variables (real GDP, CPI inflation, real effective exchange rate, real interest rate and lagged real money balance) are significantly affecting the demand for money in Ethiopia. Whereas, the estimated coefficients of the short-run variable show that the real effective exchange rate, CPI inflation, and lagged real money balance are the main determinants of demand for money while the real GDP and real interest rate are insignificant. Another important finding is that absolute value of the coefficient of the error correction term implies that about 54.2% of the disequilibrium in real money demand is counter-balanced by short-run adjustment in each quarter. The study suggests that in conducting monetary policy, policymakers should consider not only the behavior of income and price but also the movement of exchange rates. The study also calls for appropriate formulation and estimation of the all-encompassing demand for money function that is capable of bringing stability to the growth of money coupled with sustainable economic growth.

Keywords: Demand for money; Consumer price index (CPI); Gross domestic product (GDP)

1. Introduction

The balanced money demand function holds a crucial role in the development and execution of monetary policy. Simply put, the demand for money represents the quantity of financial assets that indi-

*CORRESPONDING AUTHOR:
Solomon Senbeto Godana, Monetary and Financial Analysis Directorate, National Bank of Ethiopia, P.O.Box 5550, Addis Ababa, Ethiopia; Email: solomonsenbeto2010@gmail.com

ARTICLE INFO
Received: 11 May 2023 | Revised: 12 September 2023 | Accepted: 18 September 2023 | Published Online: 22 September 2023
DOI: https://doi.org/10.30564/mmpp.v5i3.5722

CITATION
Godana, S.S., 2023. Demand for Money and Inflation in Ethiopia. Macro Management & Public Policies. 5(3): 64-77. DOI: https://doi.org/10.30564/mmpp.v5i3.5722

viduals desire to possess in the form of cash. Economists have identified three fundamental rationales for holding money. Firstly, it serves as a medium of exchange, enabling individuals to purchase goods and services. Secondly, it can be utilized as a store of value for precautionary measures, providing a buffer against unforeseen contingencies. Lastly, money is also used to capitalize on attractive investment opportunities requiring cash expenditure, as its value is relatively stable compared to other assets such as stocks, bonds, or real estate.

According to Halicioglu and Ugur [1], having a reliable money demand function is crucial for the effectiveness and success of the monetary policy program. The demand for money is a vital factor in determining economic variables like interest rates, inflation, exchange rates, national income, and investment in the economy. The absence of a stable money demand function can adversely impact economic stability, leading to fluctuations in real output. Therefore, it is essential to ensure that the money demand function is stable and can adjust to changes in money supply to maintain stability in the economy.

In light of the current economic conditions, it is imperative that the monetary authority adopts and executes effective monetary policies. However, this can only be achieved if the country has a stable money demand function and appropriately estimated money demand equations. A well-founded money demand function is considered to be fundamental in conducting monetary policy, as it allows the use of monetary aggregates in a way that has a predictable influence over economic variables and facilitates the establishment of economic policies [2]. When there is a reliable consistency between the variation in money and the movements in income, prices, and interest rates, monetary targeting policy becomes a valuable tool for controlling inflation.

The sound money demand function also links money to the real economy, allowing the monetary authority to anticipate policy effects on inflation, real income, and interest rates [3,4]. Therefore, it is decisive for central banks as it enables them to select effective monetary policy instruments. Additionally, it ensures correct predictions of the effects caused by money-supply shocks on the aggregate income and offers valuable information into the relationship between money and inflation. When there is a well-founded money demand form, central banks can pursue their policy objectives with more confidence about the effect of policy action on economic performance.

The demand for money function has been widely studied due to its crucial role in analyzing an economy's performance, particularly in the formulation and transmission of monetary policies. However, most of the research has been conducted in developed countries, primarily in Western countries. In contrast, there have been fewer studies on the formulation of the demand for money function in developing countries, although there have been positive developments in recent years.

The literature on the money demand function in Ethiopia and its relationship with inflation and other macroeconomic variables is quite limited. As a result, there exists a dire need for a comprehensive study to model the demand for money and its impact on inflation, real income, and interest rates. This study aims to bridge this gap and provide valuable insights into the monetary landscape of Ethiopia.

The main objective of this study is to formulate and assess the demand for money function in Ethiopia and particularly examine its relationship with the CPI inflation. In accordance with the above objective, the study determines the effect of real GDP, exchange rate, lagged value of money demand, and real interest rate on demand for real money balance in Ethiopia, and also shows the trend and change of money supply and CPI Inflation.

The remainder of the paper is structured as follows: The next chapter summarizes the historical development of money balance and inflation in Ethiopia. Chapter three is devoted to a brief review of theoretical issues and empirical evidence relating money demand and its relation with main inflation. The data, methodology and empirical result will be presented in the fourth chapter. The final chapter comes out with conclusions and some policy impli-

cations.

2. Historical development of money and inflation in Ethiopia

Over the past two decades, the economic landscape of Ethiopia has undergone significant changes. The implementation of the structural adjustment plan has led to an increase in government spending through external financing and a loosening of fiscal policy. In order to spur economic growth and development, successive strategic plans have been also implemented to reform the country's economy. To achieve these reforms, the government has had to increase its level of investment, which has in turn stimulated additional demand and bolstered economic growth. These growths have in turn led to increasing government spending and generating additional economic demand from various actors.

According to the research conducted by different scholars, it is widely believed that an increase in the money supply, within a reasonable limit, can result in a significant boost to both investment and economic growth in the short run; in the long, however, it just causes inflation. The broad and reserve money supply in Ethiopia, as shown in **Figure 1** below, has been growing steadily since 2000. From 2000 to 2007, monetary aggregates grew at a moderate pace. However, both broad money and reserve money have started to increase steadily and have continued to do so since 2007, although reserve money increment has not been as large as broad money. Between 2000 and 2007, the aggregate amount of money in circulation (broad money) increased by about 12 billion Birr. However, over the course of just four years following this period, it experienced a remarkable surge, rising by 33 billion Birr. In the period from 2010 to 2021, the overall money supply grew by a modest 1.2 trillion Birr, culminating in a total of 1.41 trillion Birr by the close of Q2 2021/2022. On the other hand, the country's reserve money saw an increase of 14 billion Birr from 2000 to 2007. However, from 2007 to 2021, the stock of money in the country grew by an additional 314 billion Birr, ultimately reaching a total of 341 billion Birr by the end of Q2 of the fiscal year 2021/2022.

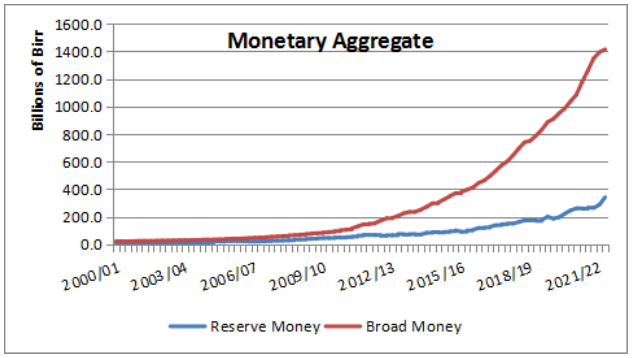

Figure 1. Trend in broad and reserve money.

Source: National Bank of Ethiopia.

Based on the data presented in **Figure 1**, it is evident that the reserve money statistics for Ethiopia demonstrate an average reserve money value of 117.5 billion Birr from the period of 2000/2001 to 2021/2022. The minimum value was recorded at 8.787 billion Birr in 2000/2001, while the maximum value was observed at 341,947 billion Birr in the second quarter of 2021/2022. These figures represent a significant increase in base money supply and consequently broad money.

The graphical representation in **Figure 2** shows the correlation between money supply growth and inflation in Ethiopia. Over the period of study, there has been a fluctuating but overall minor increase in money supply growth on both a quarterly and yearly basis. In many underdeveloped countries, inflation tends to be unstable in the economy. Similarly, inflation in Ethiopia has been characterized by continuous fluctuations, with an overall upward trend. Since 2002, the rate of inflation has increased at a faster pace, which coincided with improvements in the economy. Inflation occurs when the quantity of money in circulation grows at a faster rate than the economy's ability to produce new goods and services. This results in a situation where the supply of money outstrips the supply of goods and services, thereby causing an increase in prices. The underlying cause is that the excess money available chases a relatively limited quantity of goods, thus making them more costly to acquire.

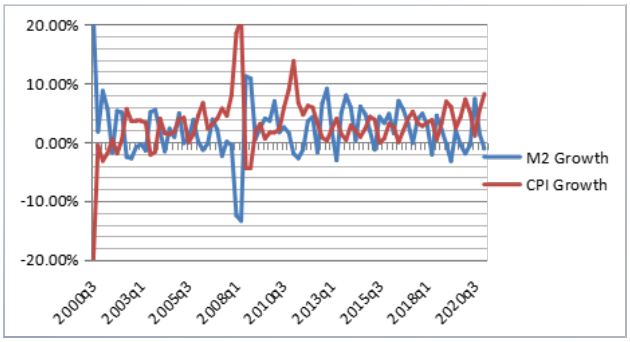

Figure 2. Trend in broad money growth and consumer price index growth as a proxy for inflation.

Source: National Bank of Ethiopia and CSA.

According to data presented in **Figure 3**, it is evident that the real GDP growth in Ethiopia on average has remained consistently high between the years 2000Q3 and 2021Q2, while the growth of money supply has experienced fluctuations. Despite variations in the early 2010s, the period after 2005 witnessed stable and rapid growth, largely attributable to the government's adoption of its Growth and Transformation Programs (GTPs). The government's substantial investments in health and education services, as well as in the development of transportation and industrial infrastructure, including hydroelectric power plants and transmission lines, have all contributed significantly to the country's rapid and consistent economic growth over the past two decades, as noted by the World Bank (2020).

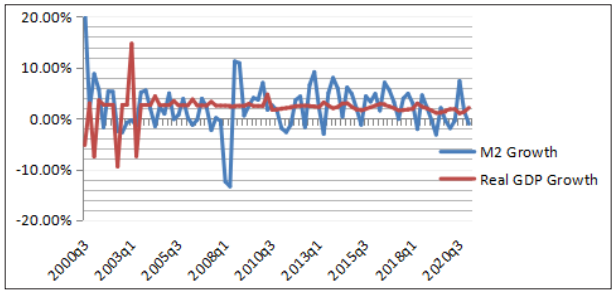

Figure 3. Trend in broad money growth and real GDP growth.

Source: National Bank of Ethiopia and CSA.

3. Literature review

3.1 Theoretical framework of money demand

Theoretical explanation of money demand has been a subject of controversy among the different money demand theories, and these theories have evolved over time. This section briefly defines the developments of the money demand beginning from the classical theory of aggregate demand to Milton Friedman's modern quantity theory of money.

Classical theory

Classicalist's quantity theory of money demonstrates that people use money merely for payment purposes. That means people hold money for current transaction purposes—for personal and business exchange of goods and services.

According to Fisher's Quantity Theory of Money, the main factor that affects the level of inflation in an economy is the quantity of money circulating in the economy. They advocate that there will be a proportionate change in the price level as change in the quantity of money supplied, other things remain constant.

The transaction approach of Fisher's Equation of Quantity theory of Money formally is stated as follows:

$$MV = PY \quad (1)$$

where, M = total quantity of money in circulation in the economy, V = velocity of circulation, P = average price level (GDP Deflator), T = real GDP demand.

Equation (1) above demonstrates that the total money paid to purchase goods and services which is MV (velocity multiplied by stock of money) is equal to their value PT (price of goods and services multiplied by the number of real transaction). Nominal stock money circulating in an economy is purely controlled by the monetary authority that it canned as an exogenous variable. On the other side, the real people's demand for goods and services in any given period of time is a function of real income that there will be a higher demand for goods and services as increase in national income.

Fisher's equation measures only the volume of business transaction. And thus, it failed to measure the purchasing power of money and also neglected the role of the interest rate as one of the causal factors between money and price. The relationship between the rate of price and money in a fisher's quantity theory of money equation is independent of

the rate of interest.

Keynes' theory of money and prices

Keynes in his General Theory (1936) criticized the classical quantity theory of money and argued that the quantity of money and its value of prices have no direct, proportional and predictable relationship between them and also postulated that the changes in money supply may be transferred to real GDP and employment through interest rates and investment. His theory provided us with the causative mechanism by which the change in the level quantity of money brings to the change in the level of price.

Keynes's theory of demand for money is termed as 'Liquidity Preference' for demand for money. According to Keynes, the desire for liquidity arises because of three motives; the transactions motive, the precautionary motive, and the speculative motive. Keynes advocates that households, businesses, governments, and central banks hold cash relates for the sake to satisfy the current need for cash transactions for personal and business exchange. The lack of systematic harmonization between the receipt from the economy and expenditure leads to a rise in the demand for money holding.

$$M^t = f(Y) \tag{2}$$

where, M^t = money demand for transactions, Y = revenue, $\frac{dM^t}{dY} > 0$.

People also desire to hold money to cover unforeseen and unpredictable contingencies since entities are sometimes insecure as to when they will have the required cash balance in day-to-day life (precautionary motive).

$$M^p = f(Y)$$

where, M^p = money demand in precaution, Y = revenue.

Whereas, the store value of money function is emphasized by the speculative motive of the demand for money as investors and traders employ strategies to keep money in liquid form to take advantage of future market uncertainty resulting in a change in the interest rate. Economic entity's desire to buy the bonds depends on the interest rate as the potential buyers would willing to purchase and make profit at least the current interest rate on their bond portion of their portfolio.

$$M^S = f(I) \tag{3}$$

where, M^s = money demand for speculative, I = interest rate.

The demand for money of transaction, precaution and speculative purpose are written in the form of:

$$M^t + M^p + M^S = f(Y, I) \tag{4}$$

Another theory Keynes modeled regarding money demand is liquidity trap concept. A liquidity trap is described as the period where the economy have experienced very low level of interest rate and high level of savings. In other, word economic entities are holding cash rather than asset which yields close to 0% of interest rate. It is caused when entities hold cash balance for unexpected incidents for instance instabilities, lack of income in the hands of the consumers, lack of investment by the private or government entities or due to falling net exports, or deflation. Economists called it a liquidity trap as growth in money supply gets trapped in sphere influence and thus could not stimulate the level of investment and interest rate. Keynes argues that in the period of the existence of liquidity monetary policy would be ineffective to stimulate aggregate demand.

Friedman's restatement of the quantity theory of money

Milton Friedman's Quantity Theory Money (Monetarist) advocates his theory in supporting the classical theory with minor adjustment and reinforce Keynes's speculative motive within the system of asset price theory. Milton advocates that the people's money demands are determined not only by interest rate and permanent income but also wealth, the opportunity cost of holding money, and inflation. He considered the stability of the demand for money as just real world facts demonstrated by empirical studies and the impact of money supply movement on GDP spending and income is predictable [5]. Monetarists advocate that when there is an unexpected change in money supply there will be immediate adjustment as this change in the long run will only affect nominal variables.

3.2 Empirical literature

There are a number of studies that have been studied by many scholars to assess the demand for real money balance function and its relation to inflation in the case of both a cross country and single country analysis. In the case of Ethiopia, however, there has generally been lacking in the empirical literature. This section will discuss the available empirical literature of different countries' demand for money and its relation to other macroeconomic variables.

For instance, for the period of 1971/1972 to 2008/2009 and employing the error correction model (ECM) in Ethiopia, Mamo [6] investigated the determinants money demand function and estimated its function. He found that the real GDP positively impacts peoples' demand for real money balance whereas inflation expectation and money demand are negatively related. He also found that depending on the degree of local currency appreciation or depreciation the impact of real effective exchange rate would be positive or negative.

In the same way, Abate Yesigat et al. [7] examined the determinants of demand for money and its stability in Ethiopia by employing the ARDL bounds testing approach. Their finding shows that the real money balance and its determinants of real GDP, interest rate, exchange rate, and inflation have a long-run correlation. The money demand function was stable over the period of their consideration and they suggest that monetary aggregating monetary policy targets would be effective to achieve the monetary policy objective in Ethiopia.

Haile [8] carried out the performance of the demand for money function in Ethiopia for the period 1970/1971 to 2002/2003 by employing Engle-Granger two-stage procedures and estimating broad and narrow money. Alike Abate Yesigat et al.'s finding, he found that in the long run income, exchange rate, and interest rate are significant determinants of demand for money. Findings also identify that in the short-run broad money definition is well defined by interest rate and exchange rate than the narrow money definition.

The researcher aimed to discuss the long-run monetary policy condition in Ethiopia from 1970 to 2000. The Ethiopian economy had experienced a huge political ideology shift, an economic downturn, and two consecutive periods of drought in those decades. The study found that political and economic changes in those periods country experienced higher inflation and demand for money due to a shortage of production. Although political ideology shifts in a country and production drops had long-run monetary policy consequences, narrow money demand was stable [9].

For the period of 1990Q1 to 2016Q3 in Ghana, Bernard and Sin-Yu Ho [10] tested Friedman's hypothesis that the change in monetary uncertainty caused an increase in money demand and a fall in the velocity of money by emphasizing the effect of monetary uncertainty on the demand for money. Contrary to Friedman's hypothesis, they found that in both the short-run and long-run monetary uncertainty has a negative and significant impact on the demand for money. Ruling out monetary policy as a source of uncertainty, they believe that there is a stable demand for money as a smooth growth rate of monetary aggregate. Because of a stable demand for money function, they suggest that demand for money changes could be anticipated and monetary policy objective can achieve its objective.

Two studies that carried out the empirical analysis of the factors that affect the demand for money in Pakistan for the period 1975-2009 and 1960-1999, respectively, found that income, inflation, and exchange rate significantly determine the demand for money. The study also reveals that the rates of interest, market rate, and bond yield are important causes for the long-run money demand behavior [11,12].

Similarly, Djambak, Syaipan, et al. [13] analyze the impact of interest rates, inflation rate, and GDP growth variables on demand for money in Indonesia for the period 2005 to 2018. The study found that money demand is positively affected by inflation but statistically insignificant, whereas the effect of interest rate and economic growth is negative and statistically significant in Indonesia.

By using monthly data for the period 2005 to 2012 and employing the Ordinary Least Square method and the Granger Causality test, Rosli, Norhidayu, et al. [14] analyzed factors that affected demand for money in Japan incorporating crises, consumer price index, industrial production index, and bond rate. Their finding shows that there is the existence of a relationship among variables significantly affecting money demand, and also the presence of bidirectional causality between CPI and bond rate to monetary.

John R. Moro [15] estimates modem version of the quantity theory of money growth, real GDP growth, and inflation for 81 countries. In his long run estimation, he found that high long-run inflation is driven by equally high long-term money growth (one-for-one relationship). In the countries with relatively low money growth and inflation, the one-for-one relation breaks down.

We can broadly summarize that there are studies available on the relationship between demand for money and inflation from the review of empirical as well as theoretical literature, but most of them are advanced and emerging economies level. A comprehensive study focusing on the estimation and formulation of different macroeconomic policies incorporating money demand function is lacking in Ethiopia. The proposed study intends to fill the gap by analyzing the relationship between money supply and variables that affect the level demand for money.

4. Methodology, data and estimation result

4.1 Model specification

Conventional demand for money theory advocates that the behavior of money demand function is determined by scale and opportunity cost variables. Gujarati in 1968, as cited in Ghatak estimated demand for money function through the conventional standard equation approach for least developed countries by undertaking scale and opportunity cost variables as determining factors. The scale variable in the money demand function is used as a measure of economic performance related to economic activities. The theory argues that variables such as income, expenditure, and wealth are dominant variables considered as scale variables. Economic performance measurements such as income, expenditure, and wealth are considered as scale variables whereas, interest rate (domestic and foreign), general price level, and expected exchange as well as inflation rate are opportunity cost variables.

The functional relationship of the money demand function is generally presented in Equation (5) below.

$$M/P = f(SV, OCV) \tag{5}$$

where, M = monetary aggregates in nominal terms, P = price, SV = scale variables, OCV = opportunity cost variables.

Money market is a market in which economic entities interact with each other through central bank supply of money to the economy and its demand from individuals, firms and other institutions. This study assumed that the quantity of money supplied to the economy and demanded by the economic entities is equal-which means the money market is at an equilibrium level. Having assumed that the money market long run would be at equilibrium, an approach of nominal money supply in a country is going to be used as a demand for money [7]. This paper follows similar fashion and real demand for money will represented by the real money supply (nominal money supply divided by inflation rate).

Accordingly, the Ethiopian long-run real money demand function can be well modeled in the following forms:

$$MD = f(RGDP, CPI, REER, RIR, MD1) \tag{6}$$

where, MD = the stock of money, $M2P$ = real money demand, $RGDP$ = real GDP, CPI = consumer price index, REER = real effective exchange rate, RIR = real interest rate, $MD1$ = the previous year real tock of money.

After specifying the long-run demand for the real money balance model, the study reformed the function in logarithmic in the following form:

$$lM2P = \beta 0 + \beta 1 lRGDP + \beta 2 lCPI + RIR + \beta 3 lREER + \beta 4 l(M2P1) + \varepsilon \tag{7}$$

where, *lM2P* = Log (Real Money Balance), *lRGDP* = Log (Real Gross Domestic Product), *lPE* = Log (Consumer Price Index), *RIR*= (Real Interest Rate), *lREER* = Log (Real Effective Exchange Rate), *l*(*M2P*1) = Log (Lagged Real Money Balance), ε= error term.

Variable explanation

(i) Real money balance

The model of real demand for money is closely connected to the real money supply. In this study, the real money demand is implicitly represented as the amount of the money supplied to the economy that will be deflated by the general price level (MD/P).

(ii) Real GDP

Real GDP is regarded as the most important scale variable for measuring demand for money, and it has been used for most empirical research in developing economies. Real GDP is a macro-economic variable that is measured as the current value of goods and services produced by a country in a particular period, after adjusting for inflation. Other things being equal, GDP is considered a good measure of the total economy's income, and as GDP increases, so does the income of people, and as income increases, so does demand for money. At the same time, people's demand for money would increase at higher GDP and income levels.

(iii) Real interest rate

In most of the research papers, interest rate is one of the most important opportunity cost variables in the estimation of money demand function [16]. Interest rates play a crucial role in shaping investment opportunities within a well-functioning financial market. However, this is not the case in many underdeveloped financial market countries, Ethiopia included, where national policies dictate the rate rather than market forces. In Ethiopia, the official rate is the bank's savings rate, which is infrequently adjusted and has minimal effect on lending rates, resulting in stagnation within the financial sector. Thus, this study used real interest rate as one of opportunity cost variables. Real interest rates are calculated by adjusting the nominal lending interest rate by the inflation rate in the economy.

(iv) Real effective exchange rate

Due to the fact that the domestic currency depreciates or appreciates in nominal terms, we were unable to measure the competitiveness of one currency in relation to the index of partner country's currencies. Hence, in this study, we used real effective exchange rate (REER) to measure the performance of domestic currency in relation to an index (or basket) of other partner country's currencies. For example, in the case of Ethiopia, due to higher foreign exchange intervention by the monetary authority and information asymmetries and risks in the parallel market, the official exchange rate would be below the market clearing rate.

(v) Consumer price index

Inflation denotes the general and continuous increase in the prices of goods and services over a specific period of time. This is a crucial factor utilized in demand for money model specification and is typically measured by the growth of the Consumer Price Index (CPI). The CPI is a metric that measures the average change over time in the price paid by society for a market basket of goods and services.

4.2 The data sources

With the purpose of estimating and formulating the demand for money in Ethiopia, this study used secondary data which were drawn from Central Statistical Agency (CSA), Ethiopian Ministry of Planning and Development and National Bank of Ethiopia (NBE). The study employed quarterly data that covers the period from 2000Q3 to 2021Q2. The data of Consumer Price Index and GDP were collected from CSA and Ethiopian Ministry of Planning and Development, respectively. The data for monetary aggregate, exchange rate, and interest rate were obtained from NBE.

4.3 Estimation result and analysis

Unit root test

It is mandatory to verify the integrating properties of the variables before determining the statistical specification of the model. In order to determine

whether the variables in the money demand function are stationary or not, the study performs the Augmented Dickey-Fuller (ADF) unit root tests. If the calculated test statistic is greater than the ADF critical values in absolute terms, then we will accept the null hypothesis of unit root for the variables which implies that the series under investigation is nonstationary. In contrast, the alternative hypothesis claims that the series is stationary. In this regard, as we can see from **Table 1**, all variables of interest on our money demand function model have unit roots at a level and stationary at first different-integrate order one I (1). There again, real money demand (M2P), real GDP (RGDP), Consumer Price Index (CPI), the real effective exchange rate (REER), real interest rate (RIR), and lagged value of real money demand (M2P1) are integrated of order one.

The long run money demand model

As the summary of result displayed in **Table 2**, in the long run estimation model the coefficients of the all variables considered are consistent and statistically significant implying that the variables included in the model explain significantly real money balance in the long run. Demand for real money balance is determined positively by real income, lagged value of real money whereas, inflation, real effective exchange rate and real interest are explained negatively.

The long run estimation model result reveals that there is a positive and statistically significant relationship between real GDP and demand for real money balance as income elasticity for money demand is statistically significant at the 5% level. The finding is in line with Keynes, the Cambridge school, and Baumo-Tobin's theoretical work on money demand which shows that when real income rises, individual demand for money increases. The study found that a 1 percent increase in real income will lead to 0.34 percent increment in the demand for real money balance. Many studies support an argument of decrease of income elasticity of money demand when there are financial and technology development, macroeconomic stability, accessible money substitutes and liberalization of an economy. This result is in line with the findings [17,18] for Sierra Leone and for Nigeria.

The other important variable that positively affects the real money balance, in the long run, is its lag value. For the period of the study review, the demand for real money balance in Ethiopia has been continuously increasing. Thus, in general, other things remain the same last year's demand for real money balance has a significant and positive effect on the current period demand for real money.

The study found that the inflation rate (measured by CPI growth) has a negative elasticity of –0.14, which is statistically significant at the 5% level. This confirms Friedman's theoretical expectations, suggesting that a general increase in the price of basket goods and services will result in a decrease in the demand for real money balance in Ethiopia. Specifically, the study found that a 1% increase in CPI inflation would lead to a 0.14% decrease in the demand for real money balances in the long run. As the price of consumer goods and services goes up, people tend to turn to alternative forms of investment such as land and real estate, commodities, and equity holding, which leads to a decrease in demand for Birr. As the inflation rate increases, economic entities prefer money holding to asset holding to match the expected rise in nominal expenditure [19].

The real effective exchange rate (REER) coefficient is negative and statistically significant. REER is explained as the value of a domestic currency against a weighted average of several foreign currencies. The negative coefficient of REER indicates that where domestic currency depreciates, the public tendency towards holding foreign currency will increase, and domestic currency appetite will reduce which in turn increases demand for money. This indicates that the public will substitute foreign currency for domestic currency when there is a better investment opportunity.

In addition to real GDP, real effective exchange rate and CPI inflation, there is an interest rate variable that the study estimated in the demand for money function. In the long run, the movement of real interest rate has a negative and statistically significant effect on demand for money. This implies that in the long run, the demand for real money balances in Ethiopia is also affected by the domestic real interest rate.

Table 1. Unit root test Augmented Dickey-Fuller test.

Variable	*Level/first difference*	*ADF test statistics*	*Critical value*		
			1%	*5%*	*10%*
LM2P	Level	–0.742	–3.534	–2.904	–2.587
	First diff.	–8.064	–3.535*	–2.904**	–2.587***
LRGDP	Level	0.426	–3.534	–2.904	–2.587
	First diff.	–12.122	–3.535*	–2.904**	–2.587***
LCPI	Level	1.667	–3.534	–2.904	–2.587
	First diff.	–8.137	–3.535*	–2.941**	–2.609***
LREER	Level	–0.975	–3.534	–2.904	–2.587
	First diff.	–5.658	–3.535*	–2.941**	–2.609***
RIR	Level	–2.948	–3.534	–2.954	–2.587***
	First diff.	–7.410	–3.535*	–2.941**	–2.609***
LM2P1	Level	–0.181	–3.534	–2.904	–2.587
	First diff.	–8.450	–3.535*	–2.941**	–2.609***

(***), (**) and (*) denotes 90%, 95% and 99% confidence interval respectively.

Source: Author's computation using STATA results, 2022.

Table 2. Long run estimation result.

lm2p	***Coef.***	***Std. Err.***	***t***	***P > t***
lrgdp	0.335	0.097	3.460	0.001
lcpi	–0.137	0.055	–2.480	0.015
lreer	–0.148	0.051	–2.910	0.005
rir	–0.148	0.071	–2.080	0.041
lm2p1	0.898	0.035	26.000	0.000
cons	–0.759	0.334	–2.270	0.026
R-Squared	0.9923			
Adjusted R-Squared	0.9918			
SSR	0.027			
no. of observations	84			
F(5, 78)	1997.4 (0.000)*			
DW stat	1.712			

Source: Author's computation using STATA results, 2022.

The coefficients in the long run for all variables have the expected sign in line with economic theory. However, the ADF statistics results for stationarity indicate that all the variables are stationary after first difference i.e. I (1). After the study found that variables specified in the money demand model are stationary at the first difference I (1), the next step is determining whether there is a significant long-run relationship among variables.

Test for co-integration

It's important to make sure that variables are stationary and co-integrated to avoid any misleading regression incidents. A study using the ADF unit root test found that all variables in the money demand form were stationary after the first difference. The theory of co-integration suggests that even if variables in a regression have a unit root, their linear long-run combination between variables can still be stationary. Once the co-integration of variables has been tested and the long-run model has been estimated, the next step is to establish a short-run dynamic error correction model.

To determine if there is a co-integration between variables, it is important to check the stationarity of the residual term that generated from the variables being regressed. If the test statistic exceeds the critical values for the MacKinnon test in absolute terms, it means that the null hypothesis of no unit root for the error term holds true, indicating that the residual term is stationary at I (0). However, if the test statistic falls below the MacKinnon critical values, then the null hypothesis will be rejected. **Table 3** shows that the residual term is stationary at the 1%, 5%, and 10% MacKinnon critical values.

Table 3. Co-integration test.

Variable	Test statistics	1% critical value	5% critical value	10% critical value
E	–8.49	–5.563	–4.13	–4.585

Source: Author's computation using STATA results, 2022.

From the above analysis, it has been determined that the variables utilized in our money demand function are co-integrated. This signifies that there are significant relationships between the real money balance and the explanatory variables, indicating that the regression model is not spurious.

Normality test

Based on the study's findings, it can be concluded that the data used in the analysis are normally distributed. The normality test is used to assess whether the data adhered to a normal distribution, which is necessary for measuring the effect of the explanatory variable on the dependent variable. The study employed the Shapiro-Wilk SW test to test the normality of the residual term, and when the null hypothesis was rejected (the SW was less than the relevant critical value), the residual term was considered as normally distributed. **Table 4** shows that the statistical probability of Shapiro-Wilk's test was 0.0505, which is greater than the 5% significance level. Therefore, the study's data can be considered normally distributed.

Autocorrelation

The Breusch-Godfrey serial correlation LM test is a statistical method utilized to assess the existence of correlation among residuals. The null hypothesis of no autocorrelation will be rejected if the probability of chi-square falls below the 5% significance level. Conversely, if the probability exceeds the 5% significance level, the null hypothesis will be accepted. This test is a crucial tool for data analysts to ensure the reliability and accuracy of the data under analysis.

Table 4. Shapiro-Wilk W tests for normal data.

Variable	obs	W	V	z	prb > z
E	84	0.95995	2.861	2.31	0.0505

Source: Author's computation using STATA results, 2022.

Upon analyzing the data presented in **Table 5**, the study found that there is no autocorrelation problem. This is due to the statistical probability of the chi-square from the Breusch-Godfrey LM test of 31.8% is greater than the 5% significance level. As a result, it can be concluded that the residuals are not correlated, and the data being analyzed is both reliable and accurate.

Table 5. Breusch-Godfrey LM test for autocorrelation.

lag(p)	chi^2	df	Prob > chi^2
1	0.997	1	0.3181
	H0: No serial correlation		

Source: Author's computation using STATA results, 2022.

The short run dynamic error correction model

After the study was tested the variables included in the regression model are being co-integrated and found a significant error correction term, the dynamic error correction model is estimated and presented in **Table 6** below. The study of how individuals, business men and governments behave financially is a topic of great interest in analyzing money demand. The models employed in this field play a crucial role in understanding the dynamics of such behavior. It agreed that the error correction model is a valuable tool for analyzing money demand, as it considers all variables and can even be suitable for analysis in adverse conditions [20]. Additionally, it helps us understand the behavior of economic agents out of equilibrium, which is important as the statistical behavior of the demand for real balances does not provide insight into this behavior in the long run.

Based on the analysis of the short-run dynamic error correction model, it has been determined that CPI inflation, real effective exchange rate, lagged real value of money balance, and lagged error term variables serve as essential factors influencing monetary adjustments. Through the analysis, it appears that real GDP and real interest rate have no influence on the demand for real money balance. On the contrary, variables such as CPI inflation, real effective exchange rate, lagged real value of money balance, and lagged error term have been identified as crucial factors in determining money demand balance for the period from 2000Q3 to 2021Q2 in Ethiopia.

Based on the analysis of **Table 6**, we can see that the error correction term (ECM) is –0.542, which is significant at the 5% level. This negative sign is in line with our expectations, and it suggests that the variables are co-integrated. The error correction term coefficient shows that 54.2% of real money balance disequilibrium is offset by quarterly adjustments. This implies that there is a significant correlation between the different variables. Moreover, it suggests that when the real money balance value is at disequilibrium, households tend to reduce their demand in the subsequent quarters. Therefore, it is crucial to address this disequilibrium over time in order to achieve long-term equilibrium.

The results of the study suggest that the independent variables exert a significant influence on the demand for real money balance. Notably, the coefficient of determination indicates that roughly 75% of the variability in the dependent variable is explained by the independent variables. This finding underscores the importance of addressing disequilibrium in the real money balance over time, as doing so is essential for attaining long-term equilibrium.

Table 6. Short run estimation result.

D.lm2p	***Coef.***	***Std. Err.***	***t***	***P > t***
D.lrgdp	0.831	0.103	0.810	0.422
D.lcpi	–0.793	0.650	–12.210	0.000
D.lreer	–0.090	0.052	–1.720	0.090
D.rir	–0.066	0.079	–0.830	0.409
D.lm2p1	0.504	0.135	3.720	0.000
ECM_1	–0.542	0.152	–3.570	0.001
Cons	0.014	0.002	7.010	0.000
R-Squared	0.75			
Adjusted R-Squared	0.73			
SSR	0.01			
no. of observations	83			
F(6, 76)	(38.59)**			
DW stat	1.87			

Source: Author's computation using STATA results, 2022.

5. Conclusions

The money demand function has always been an essential component of macroeconomic models and policymaking. Having reliable predictions on the money demand function helps in determining the optimum growth of money supply which is vital in controlling the inflation rate in the economy and also prevents monetary disturbances from affecting real output. Thus, the aim of this paper was to formulate and estimate the money demand function by using the framework of Ordinary Least Square method and Engle-Granger two-stage procedure for quarterly data covering the period from 2000Q3 to 2021Q2.

The study conducted an analysis of the factors that impact the demand for money in Ethiopia. The study considered variables such as real GDP, CPI inflation, real effective exchange rate, real interest rate, and lagged real money balance for analysis.

Stationarity of variables was assessed afterward and determined that they were all integrated of order one. Additionally, con-integration tests were conducted and discovered a significant long-term relationship between these variables.

Based on the analysis conducted for the period of 2000Q3 to 2021Q2, the demand for real money balance in Ethiopia is affected by all variables that study considered such as real GDP, CPI inflation, real effective exchange rate, real interest rate, and lagged real money balance. It was found that real income and the lagged real value of money balance have a positive effect on the demand for real money balance, while inflation, real effective exchange rate, and real interest rate have a negative effect. These factors play a significant role in estimating the real money balance in the long run, and their impact should be taken into consideration for effective economic planning.

Based on the short-run dynamic error correction model, it appears that CPI inflation, the real effective exchange rate, the lagged real value of money balance, and the lagged error term are the primary determining factors for monetary adjustments. It is of note that real GDP and real interest rate do not seem to have a significant impact on the demand for real value money balance, suggesting that real income and interest rate may have a weaker effect in the short run.

The error correction term appears to play a crucial role in rectifying the disequilibrium in real money balance. According to the study's finding, short-run adjustments counter-balance approximately 54.2 percent of the disequilibrium in each quarter. This suggests that if the value of real money balance exceeds its equilibrium level, the money holder may reduce their demand during the next quarter. This pattern holds true for any given period and highlights the significance of the error correction term in restoring balance to the real money balance.

It is imperative for policymakers to adopt a comprehensive approach when formulating monetary policy. When conducting this policy, it needs not only taking into account the movement income and pricing, but also the fluctuation of exchange rates. Through the creation and evaluation of a comprehensive demand for money function, policymakers can accomplish stable growth in money and facilitate sustainable economic advancement. It is of utmost importance to consider all these factors holistically in order to arrive at informed decisions that benefit the economy at large.

Conflict of Interest

The author declares no conflict of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Funding

This research received no external funding.

Acknowledgement

I would like to express my gratitude to the MMPP editorial office of Bilingual Publishing Group as well as my colleagues at National Bank of Ethiopia for their expertise and support in writing the manuscript.

References

[1] Halicioglu, F., Ugur, M., 2005. On stability of the demand for money in a developing OECD country: The case of Turkey. Global Business and Economics Review. 7(2-3), 203-213.

[2] Goldfeld, S.M., Sichel, D.E., 1990. The demand for money. Handbook of Monetary Economics. 1, 299-356.

[3] Judd, J.P., Scadding, J.L., 1982. The search for a stable money demand function: A survey of the post-1973 literature. Journal of Economic Literature. 20(3), 993-1023.

[4] Friedman, B.M., 1988. Lessons on monetary policy from the 1980s. Journal of Economic Perspectives. 2(3), 51-72.

[5] Ghatak, S., Ghatak, S., 1995. The Keynesian and monetarist views on the importance of money. Monetary Economics in Developing Countries. 8-45.

[6] Ambe, M.E., 2019. Money demand and economic growth in Ethiopia. Developing Country Studies. 9(1).

[7] Yesigat, A., Rao, T.K., Nagaraja, G., 2018. Determinants of demand for money and its stability in Ethiopia. International Journal of Research and Analytical Reviews. 5(4), 349-360.

[8] Kibret, H., 2003. Economic Reform and Stability of the Money Demand Function in Ethiopia [Internet]. Available from: https://nbebank.com/wp-content/uploads/pdf/staff%20working%20paper/Economic%20Reform%20and%20Stability%20of%20the%20Money%20demand%20function%20in%20Ethiopia.pdf

[9] Sterken, E., 2004. Demand for money and shortages in Ethiopia. Applied Economics Letters. 11(12), 759-769.

[10] Iyke, B.N., Ho, S.Y., 2017. Monetary uncertainty and the demand for money in Ghana. The Journal of Developing Areas. 51(4), 1-13.

[11] Anwar, S., Asghar, N., 2012. Is demand for money stable in Pakistan?. Pakistan Economic and Social Review. 1-22.

[12] Qayyum, A., 2005. Modelling the demand for money in Pakistan. The Pakistan Development Review. 233-252.

[13] Djambak, S., Kahpi, M., Rohima, S., et al., 2020. Analysis factors that influence the money demand in Indonesia. Proceedings of the 5th Sriwijaya Economics, Accounting, and Business Conference (SEABC 2019). Atlantis Press: Amsterdam. pp. 184-188.

[14] Kadir, N., Nayan, S., Abdullah Fahami, N., 2013. Factors affecting demand for money in Japan/Norhidayu Rosli, Norsiah Kadir, Sabri Nayan and Norasyikin Abdullah Fahami. International Journal of Undergraduates Studies. 2(3), 15-18.

[15] Moroney, J.R., 2002. Money growth, output growth, and inflation: Estimation of a modern quantity theory. Southern Economic Journal. 69(2), 398-413.

[16] Laider, D.E.W., 1993. The demand for money: Theories, evidence and problems. Pearson: London.

[17] Mansaray, M., Swaray, S., 2012. Financial liberalization, monetary policy and money demand in Sierra Leone. Journal of Monetary and Economic Integration. 12(2), 62-90.

[18] Iyoboyi, M., Pedro, L.M., 2013. The demand for money in Nigeria: Evidence from bounds testing approach. Business and Economics Journal.

[19] Sriram, S.S., 2000. A survey of recent empirical money demand studies. IMF Staff Papers. 47(3), 334-365.

[20] Ericsson, N.R., MacKinnon, J.G., 2002. Distributions of error correction tests for cointegration. The Econometrics Journal. 5(2), 285-318.

BILINGUAL
PUBLISHING
GROUP

Tel:+65 65881289
E-mail: contact@bilpublishing.com
Website:https://journals.bilpubgroup.com

2661-3360
03
9 772661 336231