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CONTENTS

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PARETO OPTIMALITY: IS IT VALID AS A CRITERION FOR JUDGING SOCIAL EFFICIENCY IN AN ISLAMIC ECONOMY

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Abstract. *Optimization aims to reach the best, and in order for optimization to have meaning, there must be a function of goals that are maximized, and there should be more than one solution available to choose the best among them. The most efficient situation according to Pareto optimization is the situation in which we cannot make a member of society better off without making a member or other members worse off in the country under consideration. The maxima we arrive at is just one of an infinite number of Pareto optimizations from which we cannot choose without assuming a scale of values to evaluate individual utilities because there is always a system for weighing these utilities that makes any point optimal. Thus Pareto optimization is a criterion that requires the existence of a function of value goals that is different in the Islamic economy from that in the capitalist economy.*

Justice in the Islamic economy has a concept based on rights regulated by Islamic Sharia, and this makes difference in the content and scope of the optimization process, which makes justice an organic component of the concept of efficiency in the Islamic economy, and the criterion of Pareto optimization is a criterion that does not achieve justice by itself.

Pareto optimization is a quantitative criterion that depends in its judgment on efficiency on the overall quantitative result and does not take into account qualitative aspects of great importance in relation to the concept of efficiency and its judgment in the Islamic economy.

Reaching a situation in which it is not possible to improve the situation of some people without making others in a worse situation, which is what is known as Pareto optimization can serve as a criterion for judging efficiency in the Islamic economy if the rulings of the Sharia in the acquisition, use, and spending of funds are applied in the economy under consideration, taking into consideration there is a difference in the content and scope of the maximization process, which makes justice an organic component of the concept of efficiency in the Islamic economy, and the difference in the concept of justice itself, and if the concept of "improving the status of some" is determined within the framework of achieving sufficiency, and the concept of "worse situation" is determined by violating sufficiency. Based on the foregoing, we suggest that the Pareto criterion, by itself, is not sufficient to judge efficiency in the Islamic economy.

Keywords: *Pareto, Pareto Efficiency, Pareto Improving, Pareto Optimal, Redistribution.*

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Introduction

Islam is concerned with preserving money, as one of the five purposes of Islamic Sharia, and using money to fulfill the needs of people in order to help them worship God. within the framework of justice. Hence there is an urgent need for a criterion of efficiency in order to evaluate the economic policy alternatives with regard to the rational allocation of resources. Among the criteria offered by classical economics for judging social competence is the Pareto optimality criterion. The question arises, is this criterion suitable for judging the efficiency of resource allocation in the

Islamic economy? This question raises other questions: Is Pareto optimality recognized as enough criterion for judging efficiency in the traditional economy? What are the most important defects of this criterion? Does this criterion have no value dimensions? Welfare economics works to allocate a group of alternatives that include the best solutions by excluding those that seem less preferable than other solutions, and the next step (which is choosing the best or optimal among the available alternatives) is a matter of personal evaluation that does not fall within the scope of scientific analysis, "preface" (Bohm, 1987). Can this criterion remain valid for use in Islamic economics?

In light of the foregoing on the subject of the research, we put forward the following hypothesis for this research: "Pareto optimization is an insufficient criterion for judging efficiency in Islamic economics".

Literature Review

There are many studies on the efficiency of resource allocation, from which we extract the following recent research:

1. Iwan Setiawan, "Maqashid Shariah's Criticism of the Pareto Optimum Theory", MUQTASID Jurnal Ekonomi dan Perbankan Syariah 11(1):14-28, June 2020.

The results of this research show that the optimum Pareto theory has weaknesses and does not guarantee justice for the whole community. For instance, in achieving maximum efficiency, others must be sacrificed. This is contrary to the concept of the Islamic economy which emphasizes justice for all parties to a transaction. This research shows that Pareto efficiency cannot be used as a basis for achieving economic goals since it is not impartial (https://www.researchgate.net/publication/342288332_Maqashid_Shariah's_Criticism_of_the_Pareto_Optimum_Theory).

However, this research did not accurately explain efficiency in the Islamic economy. It did not address how to avoid the deficiency in the Pareto optimization criterion to become applicable in the Islamic economy, nor did it present an accurate concept of justice that could be applied in this economy.

2. Widiyanti, Dwi Retno, "Redistribution Adjusts Efficiency In Economy; Islamic Paradigm", Universitas Brawijaya 1 September 2015 Online at https://mpra.ub.uni-muenchen.de/67809/ MPRA Paper No. 67809, posted 12 Nov 2015 07:54 UTC.

In this research, the term efficiency is taken from the efficiency concept initiated by Vilfredo Pareto (1848-1923).

This research shows the concept of Islam in regulating the redistribution of wealth, examines how the concept of redistribution gives the benefits of economic efficiency and uses the partial equilibrium model to study how zakat gives the adjustment on the equilibrium of aggregate demand-supply side, compared with how taxation and subsidies do (https://mpra.ub.uni-muenchen.de/67809/1/MPRA_paper_67809.pdf).

This research does not discuss the validity of the Pareto optimization criterion for judging efficiency in Islamic economics, what it added in this regard is that it showed analytically the advantage of the zakat system in promoting the achievement of efficiency compared to a method of taxes and subsidies as methods of redistribution of income and wealth.

3. Aydin, Necati, "Pareto efficiency in individualistic vs. altruistic society", "The International Journal of Systems and Ethics - Emerald Group Publishing, Vol. 30.2014, 4, p. 304-324. This paper shows that Islam offers a comprehensive paradigm that focuses attention on spiritual, moral, social, and material needs in a balanced manner Particularly when it comes to a welfare policy, a major difference exists between capitalism and Islamic economics. Whereas capitalism promotes a secular individualistic society, Islamic economics aims for an altruistic society.

This paper shows that free market equilibrium does not maximize social utility. It theoretically demonstrates that even under efficient allocation of material goods, there is still room for Pareto improvement through the redistribution of resources. The paper suggests a role for the government to reach optimum-level income transfer for social welfare maximization.

The paper suggests income transfer through altruistic acts would provide higher social welfare. Therefore, it is in the best interest of nations to promote altruistic behaviors and support voluntary welfare programs for higher social utility. Originality/value – The paper contributes to the Islamic moral economy doctrine by proving that altruistic behaviors encouraged by Islamic teaching could provide higher social welfare (https://www.econbiz.de/Record/pareto-efficiency-in-individualistic-vs-altruistic-society-aydin-necati/10011145159).

This paper did not explain the concept of efficiency in the Islamic economy, nor did the paper show a governing criterion for increasing efficiency through the policy of redistributing income and wealth, nor did it provide, in our opinion, an accurate concept of justice in the Islamic economy.

4. Chapra, M. Umer, "Islamic Economics: What Is and How It Developed", Islamic Research and Training Institute.

The researcher sees that all conventional economists have never been value-neutral. They have made value judgments in conformity with their beliefs. Without justice, it would be difficult to realize even development. Muslim scholars have emphasized this throughout history. Development Economics has also started emphasizing its importance, more so in the last few decades.

Justice and the well-being of all may be difficult to realize without a sacrifice on the part of the well-to-do. The concept of the Pareto optimum does not, therefore, fit into the paradigm of Islamic economics. This is because the Pareto optimum does not recognize any solution as optimum if it requires a sacrifice on the part of a few (rich) for raising the well-being of the many (poor). This concept did not harmonize with Islamic economics. In fact, Islam makes it a religious obligation of Muslims to make a sacrifice for the poor and the needy, by paying Zakat at the rate of 2.5 percent of their net worth. This is in addition to the taxes that they pay to the governments as in other countries (https://eh.net/encyclopedia/islamic-economics-what-it-is-and-how-it-developed/).

However, this research did not accurately explain efficiency in the Islamic economy. It did not show a governing criterion for increasing efficiency through the policy of redistributing income and wealth in the Islamic Economy, nor did it present an accurate concept of justice that could be applied in this economy.

What does our search add?

Our research:

1. Present an accurate concept of efficiency in the Islamic economy, in which justice is an organic component, unlike the concept of efficiency in the traditional economy which does not include justice.

2. Present a precise concept of justice in the Islamic economy.

3. Our research proves that Pareto optimization can serve as a criterion for judging efficiency in the Islamic economy if the rulings of the Sharia acquisition, use, and spending of funds are applied in the economy under consideration, taking into consideration there is a difference in the content and scope of the maximization process, which makes justice an organic component of the concept of efficiency in the Islamic economy, and the difference in the concept of justice itself, and if the concept of “improving the status of some” is determined within the framework of achieving sufficiency, and the concept of “worse situation” is determined by violating sufficiency.

Research related concepts

Priority in fulfilling needs:

It is intended to classify the degree of importance of goods in terms of their entitlement to fulfill them, so they are arranged in descending order, starting with the necessary, then the quasi-necessary, then the improvements. Goods are divided in this way based on their service for a necessary, quasi-necessary, or improvement purpose.

Priorities also mean the classification of uses for individual expenditure in terms of the degree of entitlement to whom the spending is directed. They are arranging a descending arrangement that begins with the person spending on himself and his dependents, then spending on the owners of merit expenditures from his relatives, then spending for the sake of God in general,

then saving. It is clear that these priorities, with their two branches, are based on the guidance and purposes of Islamic Sharia, and do not leave entirely to the discretion of the individual without a guide from Sharia.

Moderation in spending:

In fact, the broad concept of moderation in spending includes, among other things, taking care of priorities and achieving sufficiency in meeting needs. However, in this analysis, moderation will be limited to a narrow concept related only to the scope and amount of spending. So that spending is characterized by moderation if it does not include spending on taboos, and it is within the framework of what is known about the likes of this individual, and the care of right justice between the needs of the present and the future, and finally, if this spending does not absorb all of the income unless this income is already insufficient, except to achieve sufficiency of the necessities.

Commitment return and legitimate utility:

Commitment return is intended, in this research, an indirect return estimated by the individual, resulting from his commitment to the requirements of Islamic Sharia in his economic decisions. This return expresses the state of contentment and conscience comort that a Muslim sense from his feeling that he has fulfilled what God has commanded in terms of halal and moderation in spending, and caring for rights and priorities within the framework of ability.

This does not negate the material return that can result from this commitment, which may be represented, for example, in preserving health as a result of moderation. It also does not negate the blessings that an individual can get, as well as the reward in the hereafter, but we exclude it because it cannot be subjected to analysis.

As for legitimate utility, it is intended as a direct return that the individual also appreciates, and that results in making various economic decisions. Utility derives the adjective "legitimate", from its permissibility in the Islamic Sharia.

The concept of "right justice":

Right justice is based on giving everyone who holds a right his right, as defined by Islamic Sharia, and is based on combining and reconciling different rights, as well as between moral principles and material interests. So it does not recognize absolute rights and freedoms but rather sets controls for these freedoms and rights that will establish a balance that does not bias a party without a party.

Right justice is the characteristic of Islam in everything, not just in allocating resources (See, for example, verses Nos. 18 of Surat Al-Imran, 159 and 181 of Surat Al-A'raf, and 60 of Surat Al-Nahl). The right justice concept in the area of resource allocation is aimed at achieving justice in meeting needs, that is, moderation in meeting needs according to priorities and within the framework of achieving sufficiency for all people (See the verse 29 from Surat Al-Baqara).

Sufficiency level in meeting needs:

Its amount is determined in a way that is sufficient for the moderate fulfillment of needs with its three levels of necessities, quasi-necessities, and improvements. This moderation in fulfilling the needs is determined in light of the income available to the individual, and that is for those who achieve his sufficiency by themselves or the sufficiency of the likes or (if the likes cannot be found) with the sufficiency of the middle class, and that is for those who achieve part of their sufficiency, or all of his sufficiency, from the distribution institutions In the Islamic system.

The duration of sufficiency is determined in a way that achieves the sufficiency of life for those who can achieve the sufficiency of themselves but lacks a tool for work or capital for trade, for example, and in a way that achieves the sufficiency of a Hijri year for the incapable of earning such as the blind, or the one who gains what is not sufficient for him.

Methods

This is theoretical research, and by God Almighty's will, we will use a comparative descriptive approach to check the research hypothesis, so we will discuss the controversy regarding

the Pareto optimality criterion in traditional economics and the differences in the value judgments within which this criterion operates in both traditional and Islamic economics. And then access to prove or deny the research hypothesis.

Accordingly, we will divide the research into two sections:

The *first section*: the position of traditional economics on Pareto optimization

The *second section*: the position of Islamic economics towards Pareto optimization.

Then, in light of these two sections, we present the results and recommendations.

Results

4.1. The position of classical economics on Pareto optimization can be recognized by the following: the need for the existence of value judgments under which efficiency standards operate

Optimization aims to reach the best, and in order for optimization to have meaning, there must be a function of goals that are maximized, and there should be more than one solution available to choose the best among them.

It is known that welfare economics is that branch of economics that tries to explain how to identify socially efficient solutions to the problems of resource allocation for the national economy, and how to reach them. In other words, welfare economics works to choose from the set of available alternatives the best solution by excluding those that seem less favorable than the other solutions. This requires defining the concept of the best target. There is no doubt that the concept of the best requires a personal evaluation that does not fall within the scope of scientific analysis.

How we understand and describe economic issues and the results that we reach in the form of economic policy depends on the logical premises that we started from in the form of hypotheses.

A distinction should also be made between the market as a mere institution and the actual market, which influences and is affected by the institutions and forces within which the market operates. There is a difference between the market as an institution and a product of institutions, and the concept of the market as a price mechanism. Markets are not efficient in themselves, but they can produce efficient results. Therefore, the expressions "efficient functioning of markets" and "efficient markets" are expressions without substantial content.

The results that are characterized by efficiency, although they take place in the markets, are obtained from the actions of the dealers in the markets and not from the markets alone. . Efficiency cannot be used to define correct structures without prior value premises in the light of which calculation can be made. Therefore, resources are not allocated by the markets themselves, but by the institutions and forces that markets operate through them, in addition to the actions of the dealers. The term market includes a mechanism, institutions, and transactions, all together at the same time (Samuels and Warren, pp. 357 – 358).

Can justice be separated from efficiency?

The debate on the criterion of well-being from Pareto to Barron to Hicks, Kaldor, Iskowski, and Little did not add to the subject of evaluating policy changes (which benefit some people while harming others) on purely factual grounds. Efficiency cannot be separated from justice. In recognition of this complete failure, Bergson suggested for a long time that welfare changes should be evaluated by a social welfare function, that is, a map of whether different combinations of individual benefits order according to a set of implicit judgments about the distribution of income. Unfortunately, it is not clear whether these judgments will be the value judgments of the economists, the project, the electorate, or any other particular group. Nor is it clear how we can resolve the problem of differences in such judgments. It is these differences in the value judgments of different people and groups that are the source of concern in welfare economics. The new welfare economics, starting from Pareto, was an attempt to show what can be said about general welfare without resorting to interpersonal comparisons (Cudd and Ann, pp. 596 - 597).

The real function of welfare economics is to break into the discipline of applied ethics rather than avoid it. In any existing social system, there is a tendency for there to be a good degree of consensus on social ends. In any case, economic policies are almost always meant to end that are

themselves incompletely understood, rather, the goals conflict with one another. The goal of welfare economics should be to influence social consensus by clarifying the aims and instruments of various policies and by showing the consistency or inconsistency of specific relationships between means and ends. This is not a vain aim for a reform of the content of welfare economics, because the recent work of economists like Arrow, Black, and Buchanan (Arrow, Kenneth and Scitovsky, Tibor, "Readings in Welfare Economics", Part 3) on social choice and democratic group decisions goes along this way, raising the possibility of the emergence (in the near future) of some sort of intersectional branch of politics and economics, which will rescue welfare economics from the theoretical problem it worries (Cudd and Ann, pp. 596 - 597).

Is there agreement on Pareto optimality as the sole criterion for rationality?

In neoclassical and contemporary economics, rationality is defined as optimizing certain economic variables, i.e. maximizing, or minimizing, some quantities, and an example of this is maximizing profit and economic benefits.

Within the framework of defining rational (or not rational) behavior within the scope of utility theory, optimality assumes maximization of utility. In this way, the benefit analysis is based on the basic assumption of rationality that the individual, in a framework of given prices and a definite amount of resources, chooses the groups of commodities which is on top of his preferential scale.

In addition to the concept of rationality as an optimization of utility, there is another concept that rationality means achieving satisfaction in what is known as the theory of efficiency limits. Supporters of this theory believe that the optimization contains implausible elements with regard to complete rationality that depends on complete information, and instead presents the concept of limited rationality that reflects the reality of life. This limited rationality expresses satisfaction as expressed by achieving a certain level of profit rather than optimization that requires profit maximization.

There are multiple answers to the question: What is rationality?: Among these answers is that rationalization is the implementation of logic, knowledge, and science, and a link between means and goals, that it is followed by pleasure and self-benefit, that it is economy and efficiency, and that it is consistency and satisfaction, and many other concepts. However, we can decide that these answers converge when traditional economics and social theory suggest a collective vision in defining and analyzing rationality. It seems that these answers show a vast diversity in light of the dominance of a logical model of rationality in the contemporary economy and rational social choice. Thus, the rationality model of maximizing benefit or profit is nothing but a simplified form.

Therefore, some contemporary economists suggest that a more complex approach should be adopted that allows the rationalization of goals as well as the rationalization of the means to achieve them. This should at least be applied to rational social choice, breaking away from the marriage bond with neoclassical theory and working within a family of convergent, asymmetric theories rather than being bound by a single model. Rational social choice it is not the same: the optimization of neoclassical theory (Zafirovski, Milan, p. 38).

Limitations of Pareto Optimization:

Traditional and neo-traditional economists were interested in using efficiency criteria to prove that the market economy system is efficient. Traditional economics has presented several criteria in this regard, perhaps the most important of which are: the utilitarian pentami approach, which is based on the expression of utilities and costs in a quantitative form and deducting costs from the utilities to reach the net benefit so that the most efficient economic alternative is the one that achieves the largest net utility. It is clear that the rational and ethical basis for this approach is what individuals want, and this approach has been criticized in terms of the fact that it requires a quantitative measurement of utilities, and in terms of the fact that the idea of utilities is an internal, personal idea and not objective. This characteristic does not negate by what some have tried to give an objective meaning of efficiency despite the personal utilities, costs, and goals, by taking the preferences of individuals as data.

The Italian economist Vilfredo Pareto (1848-1923) tried in his book "Political Economy" in 1906 AD to overcome this difficulty by dispensing with the measurement of utilities and relying on the mere ability of individuals to arrange the different economic conditions in a gradation that shows their preference from the point of view of their own preferences. And Pareto showed that the efficiency situation is achieved when we cannot, by selecting specifically available alternatives, make one person better without making another worse. Within the framework of the welfare theory in the traditional economy, and by excluding the problem of externalities and public goods, a competitive economy guarantees the achievement of an economic outcome that meets the Pareto optimality criterion.

However, the competitive economy which achieves this consequence optimization does not necessarily mean that it is a good economy, as optimization and quality are not synonymous because optimization does not take into account the pattern of distribution. An alternative of greater total utility may conceal severe distributive disadvantages, so there can be several situations all of which are Pareto-optimal, but some are good and some are not. Hence a complementary theory of welfare has been developed according to which, through minor modifications (which may include a transfer of money between individuals) the competitive mechanism of profit and utility maximization can achieve any desired Parity situation.

Nevertheless, the issue of defining the socially preferred situation among the situations that fulfill the Pareto criterion is something that goes beyond the scope of the capabilities of this criterion and constitutes a fundamental shortcoming in it. Many proposals have been made to remedy this shortcoming, including the standard of justice presented by (John Rawls), and according to this criterion, alternative (X) is more just than alternative (Y) if the person is in the worst condition under alternative (X) is in a better position than the person which is in the worst condition under variant (Y). Also among these criteria is the voting mechanism and the adoption of the alternative chosen by the majority. Sam Wilson also provided a criterion according to which alternative (X) is socially preferable to alternative (Y).

If for each consequence(z) of consequences (Y) there is a consequence (w) of consequences (X) thus (Y) is considered a Pareto optimum.

Some believe, rightly, that the reason for the limitations of welfare economics in the traditional economy is due to the separation of economics from the science of morals, and the restriction of rational calculation to self-benefits with the claim of achieving the public interest as well.

This was reflected in the standards of well-being, the most prominent of which is the Pareto criterion, which operates within the framework of calculating subjective utilities, avoids comparisons between benefits, and assumes a given distribution of income, which leads to unacceptable results with regard to social optimization. As the author says, "Within the scope of this criterion, a social condition can be a point of Pareto optimum although some people living in extreme misery and others enjoying luxury and extravagance as long as the poor cannot be made better without cutting off the luxury of the rich. The writer also shows that the claim that social optimization requires, among other things, Pareto optimization is a claim based on the belief that if the change is beneficial to all persons, then it is a good change for society. Still, the matching of interest with benefit is far from clear. On the contrary, if interest is interpreted in a sense other than self-utility, Pareto optimization defined in terms of these utilities would lose its status even as a necessary condition rather than a sufficient condition for general social optimization (Sen Amartya,"Economics-Moral and Ethical Aspects", pp.32-33).

4.2. The position of Islamic economics on Pareto optimization

The position of Islamic economics on Pareto optimality can be identified in the following exhibition:

The difference in the philosophical basis for each of the capitalist and Islamic systems

The capitalist system is based on individualism and utilitarian philosophy.

Individualism is a moral, political, or social outlook that stresses human independence and the importance of individual self-reliance and liberty. It opposes most external interference with an individual's choices, whether by society, the state, or any other group or institution (collectivism or statism), and it also opposes the view that tradition, religion, or any other form of the external moral standard should be used to limit an individual's choice of actions. Ethical Individualism, then, is the position that individual conscience or reason is the only moral rule, and there is no objective authority or standard it is bound to take into account.

Some Individualists are also Egoists (the ethical position that moral agents ought to do whatever is in their own self-interest), although they usually do not argue that selfishness is inherently good. Rather, they would argue that individuals are not duty-bound to any socially-imposed morality and should be free to choose to be selfish (https://www.philosophybasics.com/branch_individualism.html).

"As for utilitarianism, "nature has placed mankind under the governance of two sovereign masters, pain and pleasure. They alone point out what we ought to do and determine what we shall do; the standard of right and wrong, and the chain of causes and effects, are both fastened to their throne. They govern us in all we do, all we say, all we think... A man may claim to reject their rule but in reality, he will remain subject to it. The principle of utility1 recognizes this subjection and makes it the basis of a system that aims to have the edifice of happiness built by the hands of reason and of law. Systems that try to question it deal in sounds instead of sense, in caprice (whim) instead of reason, and in darkness instead of light. But enough of metaphor and declamation! It is not by such means that moral science is to be improved" (Bentham, 2017).

"By 'utility' is meant the property of something whereby it tends to produce benefit, advantage, pleasure, good, or happiness, to prevent the happening of mischief, pain, evil or unhappiness to the party whose interest is considered. If that party is the community in general, then the happiness of the community; if it's a particular individual, then the happiness of that individual 'The interest of the community' is one of the most general expressions in the terminology of morals; ... The community is a fictitious body composed of individuals … Then what is the interest of the community? It is the sum of the interests of the members who compose it" (Bentham, 2017).

As for the Islamic economic doctrine, it does not agree with this philosophy and instead offers the philosophy of justice, which is based on achieving a balance between the different interests of individuals and the group. This is done by establishing right justice between these interests by giving everyone who has a right his right as indicated by the Islamic Sharia. Individual freedom is guaranteed and safeguarded, and the interests of the group are observed and considered, within the framework of a fair balance that is established between them, regulated by the Islamic Sharia.

Right Justice in Islam, in our opinion, does not negate the pursuit of personal utility, but the Islamic Sharia sets a framework for this utility to protect it from the whims and the shortcomings of human knowledge hence limiting it to the pure real benefit, not the imaginary benefit, which may be harmful, or its harm may be greater than its benefit, or it may be useless.

Sharia sets detailed rights for all segments of society so that all people's needs are fulfilled within the framework of lawfulness and moderation and care for priorities and justice between the present and the future while respecting the value of legitimate humanitarian work and approving Disparity in income and wealth if it is from legitimate sources and fulfills the rights imposed by Sharia in funds.

At the root of the characteristics of the Islamic system, there is an inherent role for each of the individuals and the state and each has its own field. The role of the state narrows and expands according to the circumstances and according to the requirements of accomplishing the tasks entrusted to it in the Sharia. This role is never absent, otherwise, it would violate the system's philosophy, characteristics, and goals.

One of the most important duties of the state is to take care of achieving justice and development, and it has many tools for that, including managing and allocating public property resources and controlling markets in order to achieve the objectives of the system.

The market in the Islamic economy is a tool and not a leader in the resources allocation process it works within the framework of auspices of achieving the right justice and development.

The difference in the concept of efficiency:

The concept of efficiency in the allocation of resources in the traditional economy includes achieving static efficiency, that is, achieving the maximum output from a certain amount of available resources, provided that this output is a preferred compromise. Achieving dynamic efficiency necessitates that the economy achieves an optimal expansion across time, and finally necessitates achieving distributive efficiency, ie that the distribution of income associated with the achieved output be fair.

This concept of efficiency is valid for application in all societies at this higher level of abstraction, but if we move to a lower level of abstraction, the matter may differ as a result of differences in concepts of the preferred composition of output, optimal growth rate, and fair distribution of income, which raise the need for the existence of value judgments that guide the social preferences of the community under consideration.

Social efficiency in allocating resources assumes the existence of alternative uses for certain resources and then choosing the alternative that achieves the best possible result, that is, there is a behavioral process that includes a choice between alternatives that results in the allocation decision, and aims to make the best decisions. Value judgments play a role in guiding human behavior in the selection process and defining the concept of the best choice.

It is assumed that human behavior is framed in Islam by the Islamic creed and its Sharia, and when this behavior is framed by that, it is rational behavior. Righteousness in Islam is a very important concept. In general, rationality in Islam means, in the opinion of the writer, adherence to the Islamic creed and its law, as they are the way to direct measures towards their goal. In the Holy Qur'an, God, may He be glorified and exalted, has described all religion as rationality (Verse 256 of Surat Al-Baqarah of Holly Koraan), and the Islamic religion is nothing but the belief and Sharia of Islam. rationality in the field of economics does not deviate from that either, as it is adherence to God's commands and prohibitions in this field, and this includes all economic activities, including the allocation of resources, which is, as we mentioned above, a selection process that results in allocation decisions, and this choice in the Islamic economy is framed by Sharia frameworks the most important it in our point of view is:

1. That it does not conflict with Islamic Sharia: texts and objectives.
2. To aim at fulfilling legitimate needs from the Islamic Sharia perspective and through Islamic legitimate methods as well, without wasting resources.
3. To fulfill these needs, it must abide by the Sharia priorities and the public interest without wasting the legitimate individual interest, unless they conflict.
4. To be committed to fulfilling needs in moderation, and to achieving balance in fulfilling needs between the present and the future.

Thus, the human behavior governing the selection process is supposed to be framed by Islamic Sharia and from it derives a criterion of what is best in relation to the results of allocation. It is assumed in this that production is only done to meet legitimate needs in moderation and according to their priorities across time. It is also assumed that the evaluation of the process of fulfilling needs is done through caring for legitimate preferences in the first stage, and then by nurturing individual preferences in a later stage.

In the first stage, allocation is made between spending in the present and spending in the future, then between groups of necessities, semi-necessities, and improvements according to their priorities. The criterion for allocation at this stage is mainly represented (Because changes in prices can play a role in this stage of allocation if they are in such a way as to leave an impact on the real income, which represents the capacity ceiling in allocation) in the legitimate obligation to limit the choice to the Halal circle and to use the criterion of legitimate priorities within the limits of moderation and balance between the present and the future. This is within the framework of income as it represents the ceiling of the available capacity. At a later stage, the allocation takes place

within the groups between the items of different goods and services, and at this stage, individual preferences and relative prices can play a major role.

Thus, there is a major role for legitimate priorities, moderation, and balance, and in general, the legitimate commitment, along with the level of income with regard to determining the main proportions in individual spending, as well as at the level of the economy, not only in the present, but in the allocation between the present and the future as well, and this can provide a base for fair comparisons between the different utilities. Then in the next stage, the choice among alternatives within groups can be influenced mainly, in addition to real income, by relative prices and individual preferences.

Thus, it can be said that an Islamic economy is characterized by rationality in the allocation of resources when the allocation leads to the production of a volume of output that satisfies the legitimate needs of all members of the nation according to its priorities across time and by the lowest possible cost, and when the final distribution of income associated with that is fair, and all of this is within the framework of full adherence to the Islamic Sharia. It is not the "maximum possible amount of output" from certain resources. Although the two matters appear to be formally similar in the possible outcome, this is not the case specifically. In this case, the amount of resources used is disciplined by meeting specific needs and using the least possible amount of resources to meet these needs. While the second saying means allocating a certain amount of resources to produce the maximum amount of output, and this output may come in excess of what is needed to meet the needs characterized by moderation and care for priorities and justice between the present and the future.

But what is the difference between the concept of efficiency in the Islamic economy as we see it, and the concept of efficient allocation of resources in the traditional economy? The difference between the two concepts lies, in fact, in the words “preferred”, “optimal”, and “fair”, which are mentioned in the definitions of static, dynamic, and distributive efficiency. Hence, the difference between the concept of efficient resource allocation, as presented by the author, and the concept of efficient resource allocation in the traditional economy, is a difference in value judgments.

This difference is evident in the response of Shuaib's people to him when he commanded them to give full measure and weight and not to underestimate people's things, as they responded to him with what means that the concept of rationality for them to do with their money whatever they want (Holy Quran, Surat Hud: Verse 87). The criterion of what is “better”, “optimal” and “fair”, that is, the criterion of efficiency for them is that a person can do whatever he wants with his money, which is a saying that means that the individual is the source of value judgments. Whereas in the Islamic economy, the criterion of “better”, “optimal” and “fair”, in our opinion, is taken from Islamic Sharia and is determined in light of the criteria of right justice.

This is reflected in our assumption that the allocating behavior, in the Islamic economy, is guided by two mechanisms, instead of a single mechanism, which is the mechanism of maximizing the return of commitment with Sharia in the first stage, and in the next stage mechanism of maximizing the utility. This makes the right justice a criterion of efficiency and not a policy objective that may conflict with considerations of pure efficiency.

In light of this concept, justice is an integral part of efficiency in the Islamic economy, because it is necessary to expand the scope of efficiency, that is, to expand the content of the process of maximization to include all the needs considered by the Islamic Sharia. ... By adhering to Islamic legitimacy, including moderation, preventing a waste of resources in things that are harmful or useless, or whose harm exceeds their benefit ... By adhering to priorities that are having guidance from the purposes of the Islamic sharia that prevents wasting a measure of resources in Less interest at the expense of greater interest.

Discussion

1. The concept of efficiency in the Islamic economy differs from that in the traditional economy as a result of the different value judgments within which the concept of the optimal combination of goods and services, the concept of the optimal growth rate, and the concept of fair

distribution of income are determined. These concepts are defined in the traditional economy within individualism and utilitarianism. In contrast, these concepts are defined within the framework of value judgments derived from Islamic Sharia, which crystallize in caring for what is lawful (Hlal), moderation, and priorities that have guidance from the Sharia, as well as right justice that takes into account giving everyone his right as defined by this Sharia.

2. This follows that there are two mechanisms for economic behavior: the mechanism of adherence to Sharia in the first stage and the mechanism of maximizing the benefit in the next stage. As a result of activating the mechanism of maximizing the return of commitment, justice becomes an organic component in the concept of efficiency in the Islamic economy. This is contrary to the concept of efficiency in traditional economics, as it is magnified by Pareto optimization. Thus, the content of the objective that the positions of efficiency maximize according to the criterion of Pareto optimization differs from this objective in the Islamic economy, where Pareto optimization takes the fairness of income distribution as a given.

3.When it is desired to correct the conditions of Pareto optimization through the income redistribution policy, it differs from the Islamic economy in two respects:

The first: is the difference in the concept of justice.

The second: is the ambiguity of the basis on which the redistribution policy is based, which takes place on the basis of a comparison of benefits, while in the Islamic economy, it is assumed that there is a basis that can be controlled to a large extent, where justice includes, among what it includes, the assumption that the allocation achieves the level of sufficiency for all members of society, in normal circumstances, and this is considered a condition for achieving efficiency in the Islamic economy.

Conclusion

1. Pareto optimization is a criterion that requires the existence of a function of value goals that differ in the Islamic economy from that in the capitalist economy.

2. The concept of efficiency that the Pareto criterion is used to judge is different in the Islamic economy than in the traditional economy.

3. Justice in the Islamic economy has a concept based on rights regulated by Islamic Sharia, which, in our opinion, unlike traditional economics, is an organic component of the concept of efficiency in the Islamic economy, and the criterion of Pareto optimization is a criterion that does not achieve justice by itself.

4. Pareto optimization is a quantitative criterion that depends in its judgment on efficiency on the overall quantitative result and does not take into account qualitative aspects of great importance in relation to the concept of efficiency and its judgment in the Islamic economy.

5. Reaching a situation in which it is not possible to improve the situation of some people without making others in a worse situation, which is what is known as Pareto optimization, can serve as a criterion for judging efficiency in the Islamic economy if:

a. The rulings of the Sharia acquisition, use, and spending of funds are applied in the economy under consideration.

b. taking into consideration there is a difference in the content and scope of the maximization process, which makes justice an organic component of the concept of efficiency in the Islamic economy, and the difference in the concept of justice itself

c. If the concept of “improving the status of some” is determined within the framework of achieving sufficiency, and the concept of “worse situation” is determined by violating sufficiency.

This gives us a guide with regard to income redistribution policy: if the transfers are made from people’s surplus money and do not affect their sufficiency, and give to others to complete their sufficiency, then these transfers will improve the position of efficiency in the Islamic economy, and this is assuming that other factors remain the same.

6. Based on the foregoing, we suggest that the Pareto criterion, by itself, is not sufficient to judge efficiency in the Islamic economy.

Research recommendations

1. The criterion of Pareto optimality in judging social efficiency in Islamic economics should be accompanied by qualitative criteria, It can if met, be an appropriate and neutral quantitative criterion.

2. There is no need in the Islamic economy for the criteria that were presented to avoid the shortcomings in the Pareto optimization criterion with regard to comparisons between benefits for the purposes of redistributing income to achieve more justice and efficiency, because these criteria, in addition to being all based on the concepts of individualism and utilitarian, which may not be compatible with the Islamic values, have not been spared criticism in their environment. The Islamic economy, in our opinion, provides us with a guide to the justice of income distribution and social and individual preferences, which the pure mechanism of markets cannot do.

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THE INFLUENCE OF SUBJECTIVE NORMS, FINANCIAL LITERACY, TRUST, AND GOVERNMENT REGULATION ON BEHAVIORAL INTENTION TO INVEST IN CRYPTOCURRENCY

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Abstract. *Despite the fact that cryptocurrency is regarded as a highrisk speculative cryptocurrencies, the growth in the number of cryptocurrency owners in Indonesia continues to grow every year. The low level of financial literacy and the trust factor in crypto investment are the reasons why the government is worried about the increasing number of crypto investors. The study will provide an explanation for the rise in cryptocurrency investment based on the following variables: subjective norms, financial literacy, trust, and governmental regulation. Gender is utilized as a moderating variable to analyze the difference in cryptocurrencies investment between men and women. This study used a quantitative methodology, the data were collected using a questionnaire survey of respondents who were at least 17 years old, and had invested in non-cryptocurrencies. Financial literacy and trust were discovered to have an impact on the forming of investment intentions in cryptocurrency. Women are known to have higher trust than men in investing in cryptocurrencies. This research is expected to provide input to the Indonesian government in developing strategies to establish a safer environment for investors and to minimize the amount of risk associated with cryptocurrency investment.*

Keywords: *crypto assets; Theory of Planned Behavior; financial literacy; trust; government regulation.*

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Introduction

Cryptocurrency is a new technological disruption in the financial sector that is currently attracting worldwide attention. Cryptocurrency is a series of cryptographic codes that can be stored, transferred and used as a means of payment using blockchain technology, namely a digital distributed ledger to record every transaction and store data continuously (Norisnita & Indrianti, 2022). Over 320 million people have used cryptocurrencies between 2009, the year Bitcoin first appeared, and 2022 (TripleA, 2022). Cryptocurrency as a digital currency can be used to replace fiat currency as a means of payment. According to letter number S-302/M.EKON/09/2018 from the Coordinating Minister for the Economy, cryptocurrency is not accepted as payment in Indonesia and is instead only treated as a commodity asset that can be traded in a futures exchange under the control of the Commodity Futures Trading Regulatory Agency (Bappebti). Commodities assets are investments with a high risk but have the potential for earning considerable revenue in a short

period of time. Cryptocurrencies also go against Law Number 7 of 2011's Article 1 Points (1) and (2), which specifies that only the rupiah is recognized as the official currency and legal tender in Indonesia. According to Bank Indonesia, using cryptocurrency as a way to exchange fiat money and using it as payment can cause a country's currency to become unstable. Based on this explanation, it can be concluded that cryptocurrency cannot be used as a means of payment, but it can be used as a choice of crypto assets in Indonesia.

According to data from the Ministry of Finance, the number of Indonesians who own cryptocurrencies is growing year on year (Putri, 2022). It is known that, as of June 2022, the number of cryptocurrencies owners in Indonesia has surpassed 15.1 million, surpassing the 9.1 million stock investors (Ramli, 2022). The number of cryptocurrencies continues to grow in comparison to the previous two years, reaching 4 million in 2020 and 11.2 million in 2021 (Putri, 2022). As a result of this rapid growth, Indonesia was ranked fifth in Southeast Asia, following Thailand, Vietnam, Singapore, and the Philippines, as the country with the most cryptocurrencies owners in 2021 (Chainalysis, 2022; Trinugraheni, 2022).

Even though it has been recognized that cryptocurrency is a commodity asset by law, the government has persisted in advising the public not to invest in it. According to letter No. 20/4DKom, the government is taking this action because it fears that cryptocurrencies will be used to launder money or finance terrorism because of their high volatility and dependence on supply and demand According to letter No. 20/4DKom, the government's reason for doing this is that cryptocurrency values fluctuate greatly because they are based on supply and demand, do not have underlying assets that underlie prices and also trade values are very volatile so that they are vulnerable to inflation and are feared to become a means of money laundering or terrorism financing. Other risks associated with this investment include the absence of third-party authorities to regulate and supervise transactions, the anonymity of users in transactions, which is feared to increase the crime rate, the fact that it is not yet immune to hacking threats, the lack of a refund system if the transfer is incorrect, and the difficulty in harmonizing regulations that apply to regulate crypto investments (Pham et al., 2021; Purwati, 2019).

Because of the numerous risks associated with investing in cryptocurrencies, the government believes that the Indonesian people are currently inadequate to adopt the presence of this new tech. This statement is based on the fact that financial literacy in Indonesia is still considered low (Pratomo, 2022). According to the findings of an OJK, it is stated that the financial literacy level of the Indonesian people in 2022 is 49.68% (OJK, 2022). The OJK believes that the current percentage of financial literacy of the Indonesian population is still low, so they are not ready for the presence of cryptocurrency, even though there was an increase of 38.03% compared to 2019 (Pratomo, 2022). OJK discovered in their study that there were still a lot of people who did not know how to handle their own finances and did not comprehend the features of various available investment products (Pratomo, 2022). Prior studies discovered that a person's financial literacy influences whether or not they will invest (Samsuri et al., 2019). The government is concerned about the rapid growth of cryptocurrency asset owners in Indonesia because, despite the fact that financial literacy remains low, the number of cryptocurrency owners continues to rise, considering that this type of investment asset requires advanced financial knowledge.

Aside from financial literacy, the government is concerned about two aspects of the growing public intention to invest in cryptocurrencies: how people's trust is formed and whether or not their intention to invest is influenced by other people. Trust is an important factor in the introduction of a technological disruption, in this case crypto (Koroma et al., 2022). Trust can be defined as one's readiness to place oneself in a vulnerable position by expecting favorable outcomes in the future (Kaur & Rampersad, 2018a). Trust is very important in extending user involvement to continue using the technology (Alaeddin & Altounjy, 2018). As a new type of investment asset, the government is questioning how public trust is formed so people want to invest in cryptocurrency. According to several studies, current cryptocurrencies owners' trust is influenced by the sense of security and guarantees provided by service providers, precisely crypto exchanges (Tang et al., 2021; A. Wijaya et al., 2021). This research, however, needs to look into it further.

According to Delfabbro et al. (2021), the effect of FOMO (fear of missing out) can influence a person's behavioral intentions; people who have FOMO are usually driven to engage in a behavior that has no clear basis. Delfabbro et al. (2021) explained that FOMO stems not only from oneself but also from the testimonials of others. People will flock to invest in the same coins after seeing others make large profits from their crypto investments, for example. However, if the value of the coin deteriorates and falls in price, they will suffer a significant loss (Delfabbro et al., 2021). The government is concerned that individuals with FOMO who are encouraged to invest by others are to blame for Indonesia's explosive growth in cryptocurrency asset owners.

Based on this explanation, the researcher found several research gaps. To begin, cryptocurrency investment is known to be high risk, so good financial knowledge is required. According to Jureviciene and Jermakova (as cited by Samsuri et al., 2019), someone who lacks sufficient financial knowledge will not want to invest. People with low financial literacy should avoid investing in high-risk assets like cryptocurrency, but researchers have discovered that the number of crypto investors is growing each year. Second, previous research indicates that someone is willing to invest in cryptocurrency not because of the cryptocurrency's blockchain system, but because they believe in crypto exchanges (Tang et al., 2021; A. Wijaya et al., 2021). There must be evidence of the factors that lead someone to trust in cryptocurrency investing. Third, researchers believe it is necessary to conduct research on the impact of the social influence on a person's intention to invest, because there are indications of FOMO of becoming wealthy quickly through cryptocurrency investment. Not only that, but government regulatory factors must be considered, as the law governing cryptocurrency investment in Indonesia has been passed, regardless of whether it affects their intentions.

Based on the research gaps found, research regarding the factors that cause behavioral intention to invest in cryptocurrencies in the context of Indonesia needs to be carried out. The novelty in this study is to combine the factors of subjective norms in the Theory of Planned Behavior with other factors such as financial literacy, trust and government regulations which were carried out separately in previous studies. This study will also use gender as a moderator between the four previously mentioned factors on behavioral intentions. The goal of this study is to explain what factors contribute to the emergence of behavioral intentions to invest in cryptocurrencies, resulting in an increase in the number of crypto investors, as well as to serve as a source of information and input for the government in developing laws governing crypto asset investment in Indonesia.

Literature Review

2.1. Cryptocurrencies

Crypto assets come in a variety of forms, including cryptocurrencies, stable coins, and NFTs. Cryptocurrencies can be used as a medium of exchange, an investment, or to gain access to goods and services. In this study, the crypto asset referred to by the researcher is cryptocurrency. According to Harwick, as cited by Rice, cryptocurrencies are virtual assets that can be used as digital currency and can be exchanged by transferring assets and other forms of financial instruments (Rice, 2019). According to DuPont (as cited by Pham et al., 2021) cryptocurrency can operate using a technology known as block chain. Cryptocurrency is not controlled by the government or the banking system of financial institutions (Park & Park, 2019). Based on this definition, cryptocurrency is an encrypted virtual asset that operates using block chain technology without being controlled by specific authorities and can be used as a means of payment or investment.

In Indonesia, cryptocurrency is regarded as a digital asset with material properties rather than a currency used for payment (F. N. A. Wijaya, 2019). Wijaya explained cryptocurrency as a digital asset based on the law of objects and as a digital asset in his research. He stated that some characteristics of cryptocurrencies are in line with Indonesia's current law of goods. According to Wijaya, every object and right that can be subject to property rights falls under the definition of "material" as stated in Article 499 of the Civil Code (F. N. A. Wijaya, 2019). Wijaya explained that

objects are divided into several groups, one of which is tangible goods and intangible goods, then transferable goods and untransferable goods. The nature of cryptocurrencies that can be transferred digitally makes cryptocurrencies referred to as transferable goods, in accordance with the material law article 505 of the Civil Code. Then, cryptocurrency in the form of electronic data makes cryptocurrency an intangible good, according to material law article 503 of the Civil Code, which states that intangible goods are objects that cannot be seen in shape but have value. Cryptocurrencies can be both transferable and intangible, as well as proprietary. According to paragraph 2 of Article 22 of the Government Regulation on the Implementation of Electronic Systems and Transactions (PP PSTE), electronic information or documents that can be transferred must explain mastery and ownership. Cryptocurrencies have a different unique code for each address to show ownership, but it cannot explain the owner's name, address, or domicile. These codes denote that the asset is subject to goods rights. Wijaya also stated that cryptocurrency is a digital asset because it is a physical object contained in an electronic system that has value and can be owned or controlled by legal entities or individuals. Franco also stated that digital assets are objects whose ownership is digitally recorded and controlled directly by the owner (Franco, 2015).

Cryptocurrency is used not only as a digital currency, but also as an investment by classifying it as a commodity asset due to its high risk speculative assets and potential for very high profits in a short period of time. Based on this explanation, cryptocurrency can be defined as an intangible commodity that can be traded and has a legal basis for use in digital transactions.

2.2. Investment Theory

In general, financial investment can be defined as putting money aside to buy financial products with the expectation of making large profits within a certain period. An investment is a commitment to postpone or sacrifice funds or resources currently owned in order to obtain future profits (Hasani, 2022; Huda & Hambali, 2020; Laopodis, 2020). The financial products in financial investment can be cryptocurrencies, stocks, equity, gold, etc. Profit in financial investment is the change in price that occurs from the purchase price and the selling price in the future. When investing, risk occurs when the selling price does not exceed the initial price (Mardhiyah, 2017). A person will not experience decent profit if the risk of the investment they chooses is not high, as there is a one-way and linear relationship between risk and income expectations (Mardhiyah, 2017).

2.3. Theory of Planned Behavior

Theory of Planned Behavior is a theory that attempts to predict and comprehend the factors that drive behavior that are not under the control or choice of the individual. According to Ajzen (as cited by Yadav & Pathak, 2017), three factors influence people's behavior: attitudes, subjective norms, and perceptions of behavioral control. Attitudes influence behavior because beliefs about the outcomes are the foundation for engaging in certain behaviors (Syarkani & Tristanto, 2022; Tseng et al., 2022). Subjective norms influence behavior because perceived group pressure influences certain behaviors (Khan et al., 2019; Tseng et al., 2022). Perceived behavioral control influences behavior because of beliefs about the existence of factors that facilitate or inhibit a behavior, making it easy or difficult to perform (Ajzen, 2020). Although this theory is frequently used to predict behavior, Zhang (2018) and Anggraini (2021) argue that it has a flaw, namely its limited scope because it only focuses on individual rational behavior without incorporating human emotions, which usually influence human behavior .

The researcher makes reference to the study by Huong et al., which found that only subjective norms had an impact on the formation of intention to invest in cryptocurrencies (Huong et al., 2021). The opinions of the appropriate key individuals can influence investor intentions to invest in cryptocurrencies, according to Huong et al (2021). The influence of crypto experts' and influencers' opinions on social media, as well as the influence of FOMO has inclined people to invest in cryptocurrencies.

2.4. Financial Literacy

Financial literacy is defined as the extent to which a person understands the main concepts of finance so that he has the confidence to manage personal finances appropriately, making short-

term financial decisions as well as long-term financial planning (Zhao & Zhang, 2021). Financial literacy is also defined as the ability to use financial resource management knowledge and skills to achieve long-term financial stability (Jariyapan et al., 2022). According to Zhao and Zhang (2021), financial literacy has two dimensions: objective financial knowledge and subjective financial knowledge. Subjective financial knowledge refers to an individual's belief in how much they know about finance, whereas objective finance refers to an individual's understanding of financial concepts, principles, and instruments. According to Lusardi and Mitchell (2020) having good financial literacy will prevent people from making poor financial decisions because it means they understand various types of investment instruments and can manage investments wisely.

In Indonesia, crypto assets are a new investment instrument. Before selecting cryptocurrency as their preferred investment asset, sufficient financial literacy is undoubtedly required.

2.5. Trust

According to Kethineni and Yao (as cited by Koroma et al., 2022), trust is believed to have a significant role in the disruption of existing technology. According to Tang et al. (2021), trust is critical in the early stages of introducing technology. Mendoza et al. (2018) explained that when someone lacks trust, they will have doubts about using it. Trust is defined as the willingness to put oneself in a vulnerable position in the expectation of favorable outcomes or positive future behavior characteristics (Kaur & Rampersad, 2018b). Trust is a sense of security and guarantees that service providers can provide to increase behavior in using technology, in this case, exchanges that provide buying and selling crypto assets (Tang et al., 2021). If someone feels confident after using new tech-nology for the first time, they can expand their involvement to continue using the technology (Alaeddin & Altounjy, 2018). According to other research, it is critical to build trust-based relationships in order to increase the number of investors in crypto assets (Rekabder et al., 2021). According to Soedarto (as cited by Miraz et al., 2022) and Ku-Mahamud et al. (2019), trust is an important factor in behavioral intention (Rekabder et al., 2021).

When investing in cryptocurrencies, cryptographic methods available in the crypto ecosystem can ensure transaction confidentiality and security while also making transactions anonymous (Mendoza-tello et al., 2018). Users are forced to trust the block chain system during the transaction process when investing in cryptocurrencies , which Beck et al. (2016) refer to as a trust-free investment. This is clearly distinct from other investments, so the trust factor in this investment warrants further investigation.

2.6. Government Regulation

According to Irma et al. (2021), there are five reasons why cryptocurrencies in Indonesia require strict regulation and supervision. First, there is the payment system and rupiah currency management. If cryptocurrencies are used as a means of payment, this is in violation of Law No. 7 of 2011, which states that the Indonesian state currency is the rupiah and must be issued by the government. Second, there is the risk of outflow of capital that could affect the domestic economy and could affect Bank Indonesia's monetary policy. Third is the risk of financial system stability in cryptocurrencies transactions. Crypto cannot be used as currency because of its unstable value. Fourth, is the risk of violations of Anti-Money Laundering and Prevention of the Financing of Terrorism (APU-PPT). The central government is concerned about the anonymity of cryptocurrency transactions be-cause it appears to support money laundering, fraud, and even terrorism financing. Fifthly, there is a risk of violating consumer and personal data protection due to the lack of an authority overseeing the buying and selling of cryptocurrencies (Perkins, 2020). Based on these findings, further research into the impact of government regulation on the intention to invest in cryptocurrencies is needed.

2.7. Gender

Alshamy (2019) found that a person's intention to invest is influenced by their gender, supporting previous research that gender influences investment intentions due to differences in risk tolerance between men and women (Bannier & Neubert, 2016; Lemaster & Strough, 2013). Men and women have different perspectives on investing (Astika & Sari, 2019): men tend to prefer

riskier investments, whereas women prefer less risky investments. According to Bayyurt (as cited by Astika & Sari, 2019), this is due to women having lower self-confidence in terms of investment than men. Men are more aware of investment risks than women are (Altowairqi et al., 2021) and are more likely than women to enjoy taking risky investment actions due to their physiological nature (Marlow & Swail, 2014). Based on this explanation, further research into the effect of gender on the intention to in-vest in crypto assets is warranted.

2.8. Relationship between subjective norms and behavioral intention to invest in cryptocurrency

Several studies have produced conflicting findings regarding the relationship between subjective norms and behavioral intentions. Several studies have found that subjective norms have no effect on the intention to invest in cryptocurrency (Arias-oliva et al., 2019; Ayedh et al., 2020; Echchabi, Omar, et al., 2021; Mazambani & Mutambara, 2019; Nurbarani & Soepriyanto, 2022; Nurhayani et al., 2022; Zamzami, 2020). In contrast to these findings, other researchers discovered that subjective norms influence behavioral intentions to invest in cryptocurrency (Almajali et al., 2022; Anser et al., 2020; Echchabi, Aziz, et al., 2021; Pham et al., 2021). According to Huong et al. (2021), in a study to determine the behavioral intention to invest in cryptocurrencies in Vietnam, it was found that subjective norms have a positive and significant influence on the intention to invest in crypto assets among the three predictor variables of behavioral intention in the TPB model. According to Huong et al. (2021), the right key person can convince someone to invest in cryptocurrency while other research finds that people who are regarded as important and trustworthy by investors have the greatest influence on their intent to invest in cryptocurrency (Gazali et al., 2019; Jariyapan et al., 2022). Based on the explanation provided above, the researcher proposes the following hypothesis:

H1: Subjective Norms have an influence on Behavioral Intentions to Invest in Cryptocurrency

2.9. Relationship between financial literacy and behavioral intention to invest in cryptocurrency

An investor must be financially literate in order to maximize investment opportunities from the various investment products available as these are considered complex instruments (Rasool & Ullah, 2020). Financial literacy can be defined as a person's ability to comprehend, analyze, manage, and communicate personal financial issues (Rahayu et al., 2022). Someone with good financial literacy will want to participate in risky investments and will be able to make prudent choices regarding investments (Samsuri et al., 2019). Thus someone who wishes to invest in extremely risky cryptocurrencies must have a high level of financial literacy. Based on the above explanation, the researcher proposes the following hypothesis:

H2: Financial Literacy has an influence on Behavioral Intentions to invest in cryptocurrency

2.10. Relationship between trust and behavioral intention to invest in cryptocurrency

According to Soedarto (as cited by Miraz et al., 2022), trust is one of the factors that influence people's behavior intentions. The relationship between intention and belief is a critical foundation for someone's behavioral intentions when using technology (Ku-mahamud et al., 2019). As a new investment option in Indonesia, the more trust people have in crypto assets, the more likely they are to invest (Lim et al., 2022). Based on the explanation above, the researcher proposes the following hypothesis:

H3: Trust has an influence on Behavioral Intention to invest in cryptocurrency

2.11. Relationship between government regulation and behavioral intention to invest in cryptocurrency

Government regulations and support have made a significant contribution to avoiding uncertainty in the use of new technology, specifically cryptocurrency (Wu et al., 2022). The behavioral intention to use cryptocurrency is significantly influenced by government regulations

because clear regulations can avoid uncertainty in transactions, provide security, can provide protection, and with government supervision can solve problems experienced by users (Albayati et al., 2020; Putra & Darma, 2019; Saputra & Darma, 2022). Threats by governments to ban cryptocurrencies in their respective countries can also reduce people's intentions to use cryptocurrency in those countries (Gillies et al., 2020). Based on the explanation above, the researcher proposes the following hypothesis:

H4: Government Regulations have an influence on Behavioral Intentions to invest in cryptocurrency

2.12. Gender moderates subjective norms on behavioral intentions to invest in cryptocurrency

Gender has been used as a moderator between subjective norms and behavioral intentions in several studies. Venkatesh's UTAUT theory explains how gender influences the relationship between social influence and behavioral intentions (Venkatesh et al., 2022). Cabanillas et al. (2021) stated that there was a relationship between subjective norms and gender-moderated intentions in the use of new technology, which in this study could be crypto. In contrast, another study found no positive relationship between social influence and behavioral intention moderated by gender in the use of cryptocurrency in Indonesia (Novendra & Gunawan, 2017). According to Nurbarani and Soepriyanto (2022), demographic factors such as gender cannot moderate the relationship between subjective norms and the intent to invest in cryptocurrency assets. Based on the explanation above, the researcher proposes the following hypothesis:

H5: Gender moderates the relationship between Subjective Norms and Behavioral Intentions to invest in cryptocurrency

2.13. Gender moderates financial literacy on behavioral intentions to invest in cryptocurrency

Previous research has found a link between gender, financial literacy, and behavioral intention. Previous research has found that men have better financial literacy than women (Chen, 2021; Falahati & Paim, 2011; Lachance & Legault, 2007) while other studies have found that women have more financial knowledge than men (Kim et al., 2011; Lusardi & Tufano, 2015). Asandimitra et al. (2019) discovered that career women have high financial literacy due to their discipline in developing good financial plans and being consistent in continuing to invest their extra funds for investment.

Other research has found that gender has no effect on financial literacy or behavioral intentions, for example, financial literacy has been shown to have no effect on women's investment decisions (Bannier & Neubert, 2016). Other research indicates that men and women have the same behavioral intentions because there is no difference in financial literacy between men and women regarding financial behavior, which in this case can be considered investment behavior (Ansar et al., 2019; Fazli & Aw, 2021). In their research, Pertiwi et al. (2020) discovered that gender cannot moderate the relationship between financial knowledge and financial decisions, which can be interpreted as an investment. Gender does not influence different perceptions of their investment decision. Based on the explanation above, the researcher proposes the following hypothesis:

H6: Gender moderates the relationship between Financial Literacy and Behavioral Intention to invest in cryptocurrency

2.14. Gender moderates trust on behavioral intentions to invest in cryptocurrency

Previous research has discovered a link between trust, gender, and behavioral intention, indicating that women are more likely than men to believe in low-risk investments (Astika & Sari, 2019; Senkardes & Akadur, 2021). According to Wang, Keller, and Siegrist (as cited by Oliveira et al., 2017), based on gender, women prefer investments in the form of art, antiques, or gold and silver, which have less risk than investments made by men, such as stocks, houses, land, or, in this study, investment in crypto assets. Gender does not moderate the relationship between beliefs and

behavioral intentions, according to other studies, which found no differences in men's and women's beliefs about their behavioral intentions (Kayani et al., 2021; Yang et al., 2021; Zamzami, 2021). Based on the explanation above, the researcher proposes the following hypothesis:

H7: Gender moderates the relationship between Trust and Behavioral Intention to invest in cryptocurrency

2.15. Gender moderates government regulation on behavioral intentions to invest in cryptocurrency

The government plays a significant role in persuading men and women to invest in cryptocurrencies (Kayani et al., 2021). Government regulations are known to influence people's desire to own cryptocurrencies (Huang, 2019). Huang (2019) explained that men are more likely to want to own cryptocurrencies if the government can implement regulations to reduce risk in crypto transactions. His research discovered that they have no effect on the actions of women. Based on the explanation above, the researcher proposes the following hypothesis:

H8: Gender moderates the relationship between Government Regulation and Behavioral Intentions to invest in cryptocurrency

The following figure explains the research framework that was developed by the previous study.

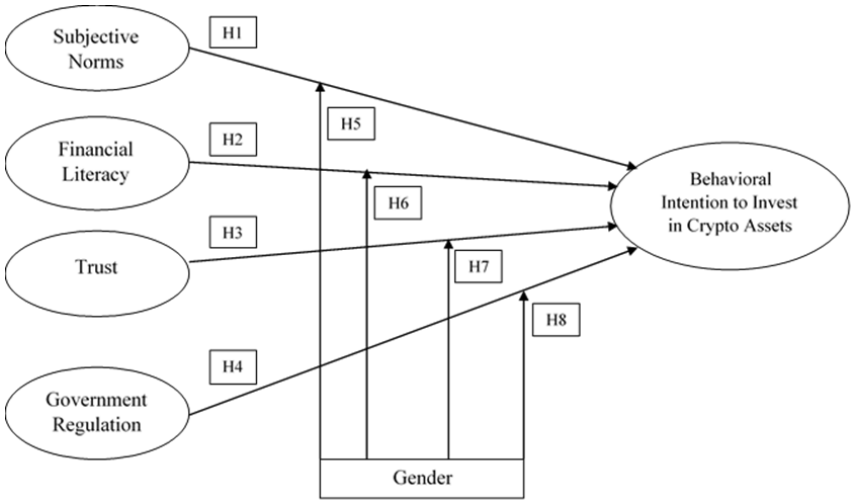

Figure 1. Research framework of this study

Source: It's a modification from Huong et al. (2021), Cristofaro et al. (2022), Mendoza-tello et al. (2018), Putra & Darma (2019), and Pham et al. (2021)

Methods

This study employs a quantitative approach, including PLS-SEM analysis. PLS is used to test theories with small datasets, such as a small number of samples, and to explain whether or not there is a relationship between latent variables, as well as to confirm a theory (Ghozali & Latan, 2015). The PLS-SEM analysis is divided into two sub-models: the measurement model (outer model), which explains how the manifest variable represents the latent variable to be measured, and the structural model (inner model), which demonstrates the strength of estimation between latent variables (Ghozali & Latan, 2015). This study employs a purposive sampling approach, with criteria being respondents who have experience investing in assets other than cryptocurrency and are 17 years old, as they are considered legally able to invest. Furthermore, 196 respondents were obtained who answered the questionnaire in the distributed survey, and 149 respondents who had invested were chosen. This study employs four point Likert scale measurements, with 1 indicating Strongly Disagree, 2 indicating Disagree, 3 indicating Agree, and 4 indicating Strongly Agree. The intention to invest in cryptocurrency is investigated using four variables, namely subjective norms, financial literacy, trust, and government regulations, with gender acting as a moderating variable. The

analysis was divided into four stages: descriptive analysis, outer model analysis to determine the validity and reliability of the research questionnaire, inner model analysis to test the effect between variables and hypothesis testing, and multi group analysis to compare two groups, namely men and women, and their influence in moderating the relationship between variables.

The question items of construct variables and indicator items are shown in Table 1.

Table 1.
Operational research variables

No	Construct Variable	References	Indicator	Indicator Code
1	Subjective Norms (SN)	(Cristofaro et al., 2022; Pham et al., 2021)	Opinions of important people in my life, such as family, spouse, and close friends, influence my decision to invest in crypto assets.	SN1
			I intend to invest in crypto assets due to pressure from people who influence me.	SN2
			Because of the advice of those close to me, I intend to invest in crypto assets.	SN3
2	Financial Literacy (FL)	(Cristofaro et al., 2022; Zhao & Zhang, 2021)	I intend to invest in cryptocurrency because I am knowledgeable about crypto assets.	FL1
			I intend to invest in crypto assets because I am capable of dealing with problems during the investing process.	FL2
3	Trust (TR)	(Alaeddin & Altounjy, 2018; Mendoza-tello et al., 2018; Miraz, 2020)	I believe in the services provided by Indonesian exchanges (for example, Tokocrypto, Indodax, Tokoin, Pluang, Pintu), so I intend to invest in crypto assets.	TR1
			I believe in the security of data privacy in crypto assets.	TR2
			I believe that investments in crypto assets are trustworthy because they avoid fraud and reduce transaction risks.	TR3
			I intend to invest in crypto assets because I am confident in the legality of crypto assets.	TR4
			I am confident in the security of the crypto asset transaction system.	TR5
			The transparency provided by crypto assets encourages me to invest.	TR6
4	Government Regulation (GR)	(Putra & Darma, 2019; Saputra & Darma, 2022)	I intend to invest in cryptocurrency because the government supports the existence of crypto assets	GR1
			I intend to invest because of the government's efforts to reduce risk in crypto assets	GR2
			I intend to invest because the government wants to be responsible by regulating the use of crypto assets	GR3
5	Behavioral Intention (BI)	(Broome, 2011; Pham et al., 2021)	I intend to invest in crypto assets	BI1
			I intend to make crypto assets a viable investment option.	BI2

Results

4.1 Characteristics of the Respondents

The characteristics of the respondents (Table 2) from the survey conducted included by the researcher are gender, age, last education, profession and whether they know crypto or not.

It is known that the most respondents in this study were women (60%) compared to men (40%). Based on age, the 23-28 age group and the 29-33 age group dominated with percentages of 80% and 9%. Based on the level of education, most of the respondents were bachelor graduates (86%), then master graduates (16%) and finally high school graduates (5%). Based on their profession, most respondents are private employees (65%) and entrepreneurs (10%).

Then, from all the respondents who filled out the survey it was found that as many as 85% of respondents knew about the term crypto while the other 15% did not know about crypto.

Table 2.
Respondent's characteristics

Characteristic	Criteria	Frequency (*n* = 149)	Percentage (%)
Gender	Male	60	40%
	Female	89	60%
Age	17-22	5	3%
	23-28	119	80%
	29-33	14	9%
	34-39	4	3%
	40-44	1	1%
	45-50	4	3%
	>50	2	1%
Education	High School	5	3%
	Bachelor's Degree	128	86%
	Masters Degree	16	11%
Profession	Unemployed	4	3%
	Student	5	3%
	Private sector employee	97	65%
	Civil servant	6	4%
	Entrepreneur	15	10%
	Freelancer	4	3%
	Others	18	12%
Know Crypto Assets	Yes	127	85%
	No	22	15%

4.2 Outer Model Analysis

Outer model analysis is carried out by testing convergent validity, discriminant validity, and reliability. The outer model can demonstrate how each indicator block relates to its latent variables (Ghozali & Latan, 2015). Convergent validity testing is used to determine the relationship between indicators and construct scores (Ghozali & Latan, 2015). Convergent validity is indicated by outer loading and average variance extracted (AVE) values greater than 0.5 for each indicator (Hair et al., 2019). To ensure that each concept from each latent model is distinct from other variables, discriminant validity testing is performed (Ghozali & Latan, 2015). Discriminant validity is determined by the cross-loading value and the results of the Fornell-Larcker criterion measurement. The cross-loading value must be above 0.70 to be said to have good discriminant validity (Hair et al., 2019). Meanwhile, the value of the Fornell-Larcker criterion test on the same variable must be higher compared to other variables (Hair et al., 2019). Reliability testing is required to determine how consistent the results of a study are when repeated. The value of composite reliability and Cronbach's alpha, which must be greater than 0.70, can be used to assess reliability testing (Ghozali & Latan, 2015).

Table 3 shows that the outer loading value of all indicators is greater than 0.50. The AVE value is also greater than 0.50, indicating that all indicators used in the study have a high correlation between indicators in the same variable. Furthermore, based on the value of Cronbach's alpha and composite reliability, the value is greater than 0.70, indicating that all of the indicators of subjective norms, government regulations, financial literacy, trust and behavioral intention that are used in this research are valid and reliable.

Furthermore, as shown in Table 4, the value of the cross-loading of all indicators of each variable behavioral intention, financial literacy, government regulation, subjective norms and trust that are used in this research is greater than 0.70 when compared to other variables.

Table 3.
Convergent validity and reliability test results

Variable	Indicator	Outer Loading	AVE	Cronbach's Alpha	Composite Reliability
		> 0.50	> 0.50	> 0.70	> 0.70
Subjective Norms (SN)	SN1	0.906	0.786	0.867	0.917
	SN2	0.827			
	SN3	0.924			
Government Regulation (GR)	GR1	0.933	0.843	0.909	0.941
	GR2	0.927			
	GR3	0.893			
Financial Literacy (FL)	FL1	0.927	0.868	0.849	0.930
	FL2	0.937			
Trust (TR)	TR1	0.810	0.709	0.918	0.936
	TR2	0.800			
	TR3	0.825			
	TR4	0.867			
	TR5	0.885			
	TR6	0.863			
Behavioral Intention (BI)	BI1	0.954	0.908	0.899	0.952
	BI2	0.952			

Table 4.
The cross loading test results

Indicator	BI	FL	GR	SN	TR
BI1	**0.954**	0.592	0.437	0.468	0.819
BI2	**0.952**	0.642	0.452	0.411	0.796
FL1	0.583	**0.927**	0.565	0.299	0.602
FL2	0.623	**0.937**	0.549	0.403	0.667
GR1	0.528	0.575	**0.933**	0.542	0.585
GR2	0.347	0.514	**0.927**	0.433	0.447
GR3	0.362	0.547	**0.893**	0.416	0.460
SN1	0.396	0.331	0.439	**0.906**	0.447
SN2	0.274	0.196	0.402	**0.827**	0.364
SN3	0.467	0.422	0.500	**0.924**	0.519
TR1	0.724	0.699	0.522	0.487	**0.810**
TR2	0.615	0.481	0.331	0.396	**0.800**
TR3	0.657	0.486	0.487	0.472	**0.825**
TR4	0.740	0.601	0.534	0.452	**0.867**
TR5	0.712	0.529	0.426	0.390	**0.885**
TR6	0.808	0.624	0.480	0.445	**0.863**

In the Fornell-Larcker criterion test (Table 5), the AVE square root value of the variable is already higher with the variable itself than with the other variables. Based on this calculation, it shows that all variables have a good level of discriminant validity.

Table 5.
Fornell-Larcker criterion test results

Variable	BI	FL	GR	SN	TR
BI	**0.953**				
FL	0.648	**0.932**			
GR	0.466	0.598	**0.918**		
SN	0.443	0.376	0.509	**0.887**	
TR	0.847	0.682	0.554	0.511	**0.842**

4.3 Inner Model Analysis

Inner model analysis is carried out by testing the coefficient of determination (R2), effect size testing (f2) and path coefficients testing. Testing the coefficient of determination (R2) measures

how far is the model's ability to apply variations in the dependent variable (Ghozali & Latan, 2015). In measuring the coefficient of determination, if the test results show a value of 0.75 or more then it is considered to have a strong influence, a value of 0.50 or more is considered to have a moderate effect and a value of 0.25 or more is considered to have a weak effect.

Table 6.
The measurement results of the coefficient of determination

Variable	R^2
Behavioral Intention	0.729

According to Table 6, the research model has a strength classification of 0.729. Based on these findings, the variables of subjective norms, government regulations, financial literacy, and trust can explain 72.9% of behavioral intentions, while the rest can be influenced by other variables. These findings also demonstrate that the influence of exogenous variables, such as subjective norms, government regulations, financial literacy, and trust, has a moderate effect on the endogenous variable, behavioral intentions.

The effect size test (f2) was used to determine whether or not changes in the value of exogenous constructs to endogenous constructs had any effect (Ghozali & Latan, 2015). In the effect size test, a value of 0.35 or greater indicates a large effect, a value of 0.15 or greater indicates a moderate effect, and a value of 0.02 or greater indicates a small effect (Hair et al., 2017).

Table 7.
Effect size test results

Variable	**BI**
BI	
FL	0.041
GR	0.008
SN	0.002
TR	0.973

This research also proofs that the trust variable (TR) has the greatest influence on behavioral intention (BI) with an f2 value of 0.973. The financial literacy variable (FL) has a moderate influence on behavioral intention (BI) with an f2 value of 0.041. Finally, two variables, government regulations (GR) and subjective norms (SN), have the least influence on behavioral intention (BI) with respective f2 values of 0.008 and 0.002 (Table 7).

Furthermore, the path coefficients must be tested to determine whether the hypothesis has a positive or negative direction (Ghozali & Latan, 2015). When testing path coefficients, the critical t-value must be higher than 1.96 with a significance level of 5% and the p-value must be less than 0.05 (Hair et al., 2017). This test can be performed by using a bootstrapping procedure to assess the effect of exogenous variables on endogenous variables by testing hypotheses (Hair et al., 2019). The purpose of bootstrapping is to determine the level of significance or probability (Ghozali & Latan, 2015). With bootstrapping analysis, a t-statistic value will be obtained to test whether or not the exogenous variable has a significant effect on endogenous variables and the p value will be compared with the significance level value to determine whether the hypothesis is accepted or rejected (Ghozali & Latan, 2015).

Table 8.
Path coefficients, t-value and p-value test results

Exogenous Variable	Endogenous Variable	Relationship Direction	T Statistics (> 1.96)	P Values (< 0.05)
	BI			
FL	0.155	Positive	2.009	0.045
GR	-0.063	Negative	0.952	0.341
SN	0.027	Positive	0.483	0.627
TR	0.763	Positive	11.564	0.000

According to the path coefficients test results in Table 8, the TR variable has the highest level of relationship with BI, with a path coefficients value of 0.763, while the GR variable has the lowest level of relationship with BI, with a path coefficients value of -0.063. Furthermore, the variables GR and SN to BI have t-values less than 1.96, whereas the variables FL and TR to BI have t-values greater than 1.96. The table shows that the p-values of the GR and SN variables are greater than 0.05, while the FL and TR variables are less than 0.05. Based on the data processed with the bootstrap procedure of 5000, the GR and SN variables have no significant relationship with the BI variable. Meanwhile, there is a significant relationship between the variables FL and TR to BI.

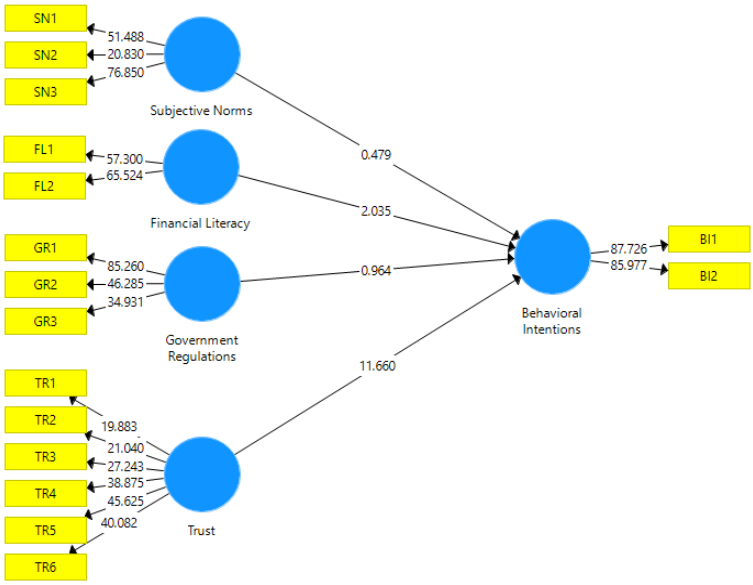

Figure 2. Path coefficients test results

4.4 Multigroup Analysis

Gender is used as a moderator between subjective norms, financial literacy, trust, and government regulations on behavioral intentions in this study. In this study, multigroup analysis is required to compare data analysis between the characteristics of men and women. The multigroup analysis was performed to see if there were any differences in how exogenous variables affected endogenous men and women. A bootstrapping procedure of 5000 was used in the test to determine the r-square value as well as the t-statistics value. This procedure is used to determine the effect of the exogenous variables' significance on the endogenous variables.

Table 9.
R-Square and t-statistics score in the male and female groups

Male			Female		
R-Square	**Endogenous Variable**	**t-statistics**	**R-Square**	**Endogenous Variable**	**T-statistics**
Exogenous Variable	**BI**		**Exogenous Variable**	**BI**	
SN	0.24	1.6	SN	0.146	1.818
FL	-0.047	0.418	FL	-0.099	1.274
GR	0.09	0.854	GR	-0.015	0.245
TR	0.603	4.894	TR	0.863	11.258

The study showed that the trust variable has the highest r-square value in the male group category, with a t-statistics value above 1.96, that is 4.894. This indicates that only the trust variable has a moderate effect on the behavioral intention to invest in crypto assets in the male group category. Furthermore, in the women's group category, the trust variable has the highest r-square value of 0.863 with a t-statistics value of 11.258. Only the trust variable has a strong influence on the behavioral intention to invest in crypto assets in the women's group category.

The Smith-Satterthwait test is required after bootstrapping to determine the moderating effect of gender on the intention to invest in cryptocurrency (Ghozali & Latan, 2015). This test is performed by calculating the path coefficient of each subsample that will be compared and tested for significance.

Table 10.
Smith-Satterhwait test results for gender subgroups

Variable	Description	Male	Female
Subjective Norms (SN)	Path Coefficients	0.09	-0.015
	Standard Error	0.105	0.062
Financial Literacy (FL)	Path Coefficients	0.24	0.146
	Standard Error	0.15	0.081
Government Regulation (GR)	Path Coefficients	-0.047	-0.099
	Standard Error	0.113	0.078
Trust (TR)	Path Coefficients	0.603	0.863
	Standard Error	0.123	0.077

The t-statistic value is calculated as follows:

$$t\,SN\ \frac{0.09-(-0.015)}{\sqrt{0.105^2+0.062^2}}=0.96$$

$$t\,FL\ \frac{0.24-(-0.146)}{\sqrt{0.15^2+0.081^2}}=0.60$$

$$t\,GR\ \frac{(-0.047)-(-0.099)}{\sqrt{0.113^2+0.078^2}}=0.43$$

$$t\,TR\ \frac{0.603-(-0.863)}{\sqrt{0.123^2+0.077^2}}=-2.01$$

The t-statistic value must be greater than 1.96 to indicate that the moderating variable has a significant effect on gender. According to the calculation above, only the confidence variable (TR) has a value greater than 1.96, indicating that the two paths differ significantly between men and women. Gender appears to moderate the relationship between trust and behavioral intention (BI).

The result of hypotheses testing is explained in the following Table 11:

Table 11.
Hypothesis testing

Hypothesis	Hypothesis Test	Results
H1: Subjective Norms have an influence on Behavioral Intentions	Subjective Norms have no significant effect on Behavioral Intentions	Rejected
H2: Financial Literacy has an influence on Behavioral Intentions	Financial Literacy has a significant effect on Behavioral Intention	Accepted
H3: Trust has an influence on Behavioral Intention	Trust has a significant influence on Behavioral Intention	Accepted
H4: Government Regulations have an influence on Behavioral Intentions	Government Regulations do not have a significant effect on Behavioral Intentions	Rejected
H5: Gender moderates the relationship between Subjective Norms and Behavioral Intentions	Gender does not moderate the relationship between Subjective Norms and Behavioral Intentions	Rejected
H6: Gender moderates the relationship between Financial Literacy and Behavioral Intention	Gender does not moderate the relationship between Financial Literacy and Behavioral Intention	Rejected
H7: Gender moderates the relationship between Trust and Behavioral Intention	Gender moderates the relationship between Trust and Behavioral Intention	Accepted
H8: Gender moderates the relationship between Government Regulation and Behavioral Intentions	Gender does not moderate the relationship between Government Regulation and Behavioral Intentions	Rejected

After testing all eight hypotheses, only three were accepted, namely the variables of financial literacy and trust, which are known to influence the behavioral intention to invest in cryptocurrency. Gender is also known to moderate the relationship between trust and behavioral intentions, with women having more trust in cryptocurrency as a new investment asset than men.

Discussion

This study aims to find out the causes of the intention to invest in cryptocurrency in Indonesia. Researchers also use variables of subjective norms, financial literacy, trust and government regulations as determinants of this behavioral intention. Gender is also used as a moderating variable to determine whether men and women have different investment intentions.

The study's findings show that subjective norms have no influence on one's intent to invest in cryptocurrency assets. Other people's influence and opinions are known to have no impact on their intention to invest. Ayedh et al. (2020) explained that, because other people have no experience investing in crypto assets, they cannot provide influence or opinions that can lead to someone's intention to invest. According to Mazambani and Mutambara (2019), subjective norms may have no effect because investment is considered a private matter that does not require the intervention of others.

Financial literacy was found to have an influence on the intention to invest in cryptocurrency assets. According to the findings of this study, respondents already have good financial literacy, which means that their intention to invest in cryptocurrencies is motivated by a desire to avoid the risks associated with investing. This high level of financial literacy is also due to the respondents' experience in investing, which means they not only have knowledge, but also understand how to apply it. The respondents' ages, which ranged from 23 to 28 years old, also indicate that the younger generation is more willing to take risks than the older generation. The younger generation is also more adept at using technology to access information, which helps them make more informed investment decisions.

Trust is also known to have an influence on the intention to invest in cryptocurrency assets. This research can prove that respondents do not only believe in crypto exchanges, but also in the blockchain system itself. Trust can arise because they already understand cryptocurrency technology and how to use it. Nonetheless, factors regarding avoiding scams and the legality of crypto still need to be improved. This is certainly the duty of the government to provide a safer crypto investment environment for all investors in Indonesia.

Government regulations were found to have no influence on the intention to invest in cryptocurrency assets. This indicates that the increasing intention to invest in cryptocurrencies is not influenced by applicable law. Besides because they already have good financial knowledge, the risk resilience of the respondents is also high so that government regulations do not affect the formation of their behavioral intentions.

This study also discovered that, although gender can moderate the relationship between trust and behavioral intentions, it cannot moderate the relationship between subjective norms, financial literacy, and governmental regulations on behavioral intentions. Both men and women are unaffected by social pressure or environmental influences to invest. There was also no difference between men and women in terms of the effect of their financial literacy on the intention to invest in cryptocurrency assets. Both men and women have the same knowledge regarding this investment. In this study, there was no effect of government regulations on investment intentions between men and women. This study discovered that women have higher trust in the services provided by crypto exchanges and blockchain systems than men, which influences their intention to invest in cryptocurrency assets.

Conclusion

7.1 Conclusion

The research aims to find out the factors that can influence someone to have the intention to invest in cryptocurrency. This study analyzes the influence of subjective norms, financial literacy, trust and government regulations on the intention to invest in crypto assets.

According to the research findings, only financial literacy and trust, two of the four exogenous variables chosen, have an effect on the intention to invest in cryptocurrency. This indicates that their intention is formed based on the knowledge they already have about cryptocurrencies and their applications, so that they finally trust the blockchain system used in crypto transactions and exchanges as a means of buying and selling their assets. This study also discovered that women's trust is greater than men's in influencing their intention to invest in crypto assets. Women today are more willing to make risky investments than men.

7.2 Limitations and Recommendation

This study seeks to explain the causes of the intention to invest in cryptocurrencies which continues to increase in Indonesia. The limitation of this study is that the majority of respondents are residents of the capital, where it is easier to obtain information about cryptocurrency investing. Because the majority of respondents are city dwellers, the results are less diverse. Not only that, but their education level in urban areas is higher than in other areas. Further research on cryptocurrency investment needs to be conducted on respondents who have never invested at all. As such, research can be conducted on students at school or university, which may yield results that differ from this research.

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CENTRAL BANK INTERVENTION FUND AND AGRICULTURAL OUTPUT IN NIGERIA: AN ARDL APPROACH

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Abstract. *This paper examines the impact of central bank financial intervention funds on Nigeria's agricultural exports from 1990 to 2020 with the specific objective of determining the extent to which the funds are financed by the Agricultural Credit Guarantee Fund (ACGSF) in the agricultural sector concerned. Agricultural exports both short-term and long-term during the period were under review. The study uses annual time data obtained from the CBN and WDI database. The Auto-Regressive Distributed Lag (ARDL) technique and the ARDL Bound test were used to determine the short-term and long-term relationships of the variables. The results show that ACGSF shows a positive and significant relationship of agricultural export growth in the short run with coefficients of 0.23, 0.33 and 0.19, but a negative and insignificant relationship of agricultural export in the long run. The analysis also shows a positive and insignificance of employment in agriculture in relation to agricultural production in the short term, while negative and significant in the long term. The 68.3% of the change in the dependent variable, as revealed by the adjusted R2, is due to the combined effect of the independent variables. The study therefore seeks for greater and appropriate funding of the government scheme or monetary authority to have a positive impact on long-term agricultural exports in Nigeria and should ensure immediate repayment of loan(s) to the qualified farmer to avoid diversion, political influence and delay in poor implementation process due to bank deposits of money in the country.*

Keywords: *Agricultural Credit Guarantee Scheme Fund, Agricultural Exports, Employment in Agriculture, Agricultural Sector.*

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Introduction

Agriculture is the cultivation of crops and the care of livestock and is the main source of income for most households. Crop production, livestock, forestry and fishing are all sub-sectors of the agricultural sector. Crop production is the biggest driver in this industry; the agricultural sector has problems such as an outdated land tenure structure, limited research and technology, and procurement and distribution problems. In sub-Saharan Africa, agriculture accounts for about 20% of GDP, more than any other region on the planet. From Nigeria to the lush region east of the African Trench, the continent covers 60% of the world's undeveloped land.

Due to the importance of agriculture in the region, cash crops such as coffee or rice are grown for commercial purposes and serve the same services as sugar cane, potatoes, corn and yams are other valuable cash crops. According to data from the Food and Agriculture Organization's Business Statistics Database (Minot, 2010), it is the most produced cash crop in Africa. Cassava, commonly known as yucca, is the world's most productive cash crop. Sugarcane production in Africa is more than 200 million tonnes per year, accounting for 63% of world production. Cassava is less well known in the Western world, despite providing food for 800 million people worldwide.

Cassava is a major root vegetable from which Africa produces 97 percent of the world's sweet potatoes. Nigeria, Ghana, Benin and Ivory Coast make up the "Yam Belt" of West Africa. Approximately 60 million people are directly or indirectly employed in the production of yarn belts. The composition of agricultural GDP in the agricultural region is a significant contributor to Africa's GDP, but what is its role in other parts of the world? Agriculture is an important aspect of the economy in South Asia, as it is in sub-Saharan Africa. India produces more than 24% of the world's rice, while Bangladesh buys nearly 7% of the world's production. Currently, India produces nearly 14% of the world's wheat supply. Agriculture, on the other hand, only accounts for 1% of North America's GDP. The number of farms in the US has declined from a peak in 1930 from 7 million to 2 million in 2020 (Ayodimeji, 2022).

Because of these difficulties, despite Africa's large agricultural sector, productivity is still a problem. Nigeria has been dealing with a high food price crisis for two years in the past, pushing inflation head above the low double-digit rate in 2021. The gap between food and core inflation has consistently exceeded five percent. In Nigeria, however, the decline in agricultural production began to come with the rise of oil in the early 1970s; inconsistencies in government policy did not make farming attractive. Lack of technology to enable farmers to produce large quantities to meet local consumption and foreign needs, environmental art such as drought, pests that damage agricultural products, poor transportation, damage of infrastructure and restrictions on trade contributed to a significant decline in agricultural production (Orji, Ogbuabor, Alisigwe & Anthony-Orji, 2021).

However, financial institutions play a significant role in actually delivering financial support in many emerging and developing economies, particularly Nigeria. As financial entities, banks serve as intermediaries, raising money from surplus units and transferring it to deficit units for use in the economy's productive sectors (Ibrahim & Alagidede, 2018). Deposit Money Banks focus on industrial priorities while acting as lubricants and promoting growth in all economic sectors through their loan policies (Dori, 2016; Ogbuabor & Nwosu, 2017).

Both internal and external financial institutions can play a role in financial development. The central bank, commercial banks, and other domestic financial organizations that finance or extend credit to various economic sectors, such as the agricultural sector (Dori, 2016). On the other hand, international financial institutions like the World Bank, International Monetary Fund (IMF), and African Development Bank also offer financing in the form of credit for purposes including reducing poverty and promoting agricultural development, economic growth, and development. All domestic financial institutions, including credit institutions, financial development institutions, and commercial banks, are under the jurisdiction, supervision, and management of the Central Bank. The expansion of the agriculture sector is influenced by financial institutions in many developed and emerging nations. Access to financial services for farmers is essential to development and

access to modern farming output and its essential component to end poverty and further development of the economy (Awunyo-vitor, 2014).

The Apex Bank of Nigeria's development finance initiatives include the direct or indirect economic involvement of the bank in the formulation and implementation of various policies, plans, programmes, innovations and guidelines aimed at providing adequate or sufficient finance and credit to Nigeria agricultural sector, with the primary objective of accelerating economic growth and development (Dori, 2016; Abili, 2018).

Nigeria's agriculture sector was the most significant economic sector prior to the discovery of oil in terms of contributions to local exports, job generation, and foreign exchange profits (Olomola, 2010; National Bureau of Statistics, 2014). The world's expanding population is fed by agriculture, which also serves as a key source of raw materials for other businesses. This sector has long been considered the most significant employer of employment in most developing countries (Orji, Ogbuabor, Alisigwe & Anthony-Orji, 2021; Agbenyo, Jiang & Antony, 2019). Agriculture also links the subsistence sector with the modern sector, which helps stimulate economic growth. Up to 80% of the country's total food is produced by smallholder farmers and subsistence farmers (Okunola, 2017; Ogbuabor & Nwosu, 2017).

In general, the lack of access to adequate finance and capital that Nigeria's agricultural sectors require is a major problem, preventing them from accessing sufficient and effective inputs to increase production. Financial industries lend a disproportionately low portion of their loan portfolios to agriculture and various problems such as ineffective policies and lack of managerial skills of financial institutions. Banks are hesitating to borrow money to farmers. Most farmers have no collateral and find it difficult to meet the strict requirements of bank loans (Bada, 2018).

The disposition of financial institutions is a consequence of the ongoing agricultural crisis that calls for improved agricultural productivity and farmers' livelihoods, which calls for government spending and direct-to-farmer interventions by the Apex Bank of Nigeria. Farmer with the focus of solving the long-term problems of the financial institution. (Dori, 2016). The Central Bank of Nigeria's role in fostering economic expansion and a sound economy extends beyond monetary policy (Dori, 2016), demonstrates how credit schemes like agricultural export refinancing, rural finance and bank support, agricultural credit guarantee scheme, commercial agricultural credit scheme, small and medium industries credit scheme, anchor program, commercial agricultural bank loan, and so on, work in the development finance industry (Dori, 2016; Adamgbe, Belonwu, Ochu & Okafor, 2020).

The Agricultural Credit Guarantee Scheme Fund (ACGSF), established to assist Nigerian farmers increase their bank credit, the Nigerian Agricultural and Cooperative Bank (NACB), which was established to promote medium- and long-term loans to farmers, and the Agricultural Credit Guarantee Scheme Fund (ACGSF) were all created to assist farmers in overcoming financial difficulties and improving their access to funds. In order to develop smallholder farmer-reputable major processor ties and stimulate financing in the Agricultural Sector Bank (CBN), the Central Bank of Nigeria (CBN) introduced the Anchor Borrower Program in 2016.

Despite the number of interventions and programs that are in place, the Nigerian agricultural sector is still struggling with insufficient funds and capital required by the sector. As Nigeria's population grows, food production cannot sustain its population growth, leading to increased levels of imported food and the cost of imports. There is therefore a growing need for adequate financing of agricultural investment and effective access to agricultural credit facilities to meet the growing demand for food and meet the rapid growth of the world's population and the changing food choices of the rising class. Emerging markets such as Nigeria are targeting higher prices for agricultural products. This study therefore examines the impact of the Central Bank's Financial Intervention Fund on agricultural exports in Nigeria, by using the ARDL approach to examine the effects of the central bank funding scheme on agricultural exports in Nigeria (ITA, 2021; Akinrinola & Okunola, 2020).

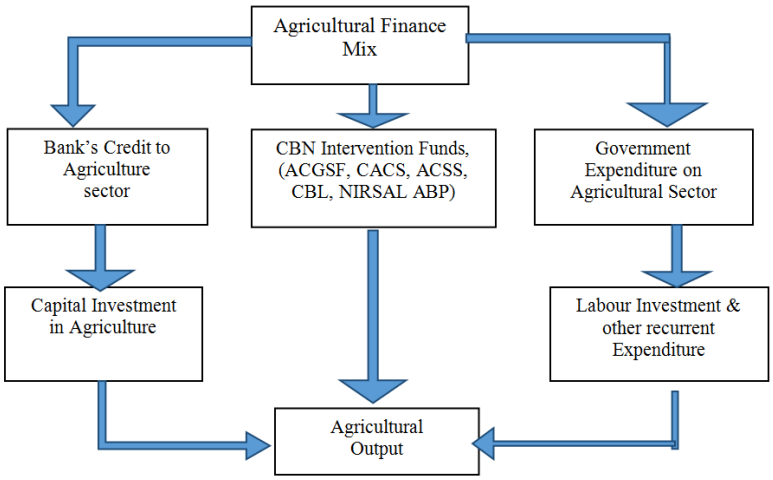

Figure 1: Agricultural Finance Mix

Source: Adapted from Okuneye and Ajayi (2021) and Modified by Author

The conceptual framework of agricultural finance and output is showed in figure 1 above. From the Figure 1 above, it is obvious that agricultural finance such as bank loans for agriculture, government spending on agriculture as well as CBN intervention funds such as ACGSFL, ABP, CACS, significantly boosts the flow of funds to the agricultural sector through agricultural capital investment and agricultural labour investment.

Literature Review

Agricultural capital investment is the usage of funds for the procurement of farm products and capital goods that enhance to farm production, while agricultural labour investment refers to the use of funds for the payment of wages and salaries to farm employees. Capital investment and labour investment impact the productivity of the agricultural sector as capital products purchased for workers in the agricultural industries together complement to the sector's development effort (Okuneye & Ajayi 2021).

Agricultural financing has witnessed tremendous hindrance in Nigeria in recent times particularly as it concerned credit supply from financial institutions. This is apparently due to the fact that agricultural lending is considered to be more risky, having low returns on investment and unprofitable relative to other sectors (Enyim, Ewno & Okoro, 2013). As a matter of fact, most financial institutions have lost utmost interest in agricultural finance (Obilor, 2013) and thus, leaving the peasant farmers which form the bulk of the employment component of the sector to rely on the informal source of credit supply like cooperatives associations, family, friends and money lenders (Akinleye, Akanni & Oladoja, 2003). One major error of this arrangement according to Nwankwo (2013) is that the informal sources cannot meet the credit needs of the farmers adequately.

Consequently, a number of financial institutions have been set up by the government (CBN intervention) to expand the credit flow to the industry, such as the Agricultural Credit Guarantee Scheme Fund (ACGSF) and the Agricultural Credit Support Scheme (ACSS), the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), the Nigerian Development Agency for Small and Medium Enterprises (SMEDAN), and the Special Presidential Cassava and Rice Initiatives. Others include, but are not limited to, the Rail, Roads and Rural Infrastructure Directorate (DFRRI), the National Economic Empowerment and Growth Plan (NEEDS), FADAMA, an Hausa term for irrigable property, selective credit management, agricultural subsidies and the 2014 Youth Employment in Agriculture Program (YEAP), which contributed to the implementation of the Agricultural Transition Agenda (ATA), which became the Youth Employment in Agriculture Program (YEAP) in 2014 (Ogboru, Abdulmalik & Park, 2018). Anchored Borrower Programme recently launched by CBN in 2016 (CBN, 2016), Private sector-led accelerated agriculture development scheme {P-SADDS} (CBN, 2020).

Theoretical Review and Framework

The Post-Keynesian Growth Approaches

The post-Keynesian approach, an alternate paradigm for analyzing growth, emphasizes the impact of demand factors. In the post-Keynesian tradition, Kaldor is the most important economist. Thirlwall, McCombie, and Thirlwall were all greatly influenced by his work claims that "growth is demand-determined for the simple reason that when factors of production are freely mobile, no growth rate can be restrained by supply." Because capital and labor are extremely mobile, growth must be driven by demand. Demand adjusts supply. We cannot go back to the pre-Keynesian belief that supply adapts to demand. John Hick proposed that endogenous banking lending should be more significant than central banks money supply for the interest rate (Ramesh & Roger 2021).

Furthermore, post-Keynesian economists contend that convergence at the level is unlikely. Instead, due to the action of cumulative causation mechanisms, uneven growth or divergence is the more likely outcome. As a result, Obadan and Odusola (2010) not only disputed the mainstream neoclassical convergence approach, but also laid the groundwork for a more interventionist strategy, based on the establishment of a more rigorous study of the processes that support divergent policies that encourage private investment, he suggests increase in non-government spending (Haris, 2005).

The Endogenous Growth Model

The concept of economic growth is a key indicator of a country's economic development. In comparison to the previous era, it indicates a quantitative change and signifies a positive change in gross domestic product (GDP). Since the commencement of systematic economic analysis, economic development has faced intellectual obstacles. In the modern sense, the economic growth model began with Harrod and Dormar and continued with Solow's neoclassical growth theory, which has been based on exogenous dynamics. The model was criticized for treating technological breakthroughs as exogenous variables and neglecting to account for disparities in economic growth between countries. Exogenous growth has been attacked in this context for not being in accord with economic realities and for being insufficient in explaining the phenomena of economic growth. Theories of exogenous growth were replaced by endogenous growth theories beginning with Romer and Lucas from 1980s (Gleen, Aguilar, Joao, Dias & Arnold, 2021).

As a contrast to neoclassical growth theory, endogenous growth theories, which began with contributions by Romer, pointed to significant progress in terms of growth models beyond birth. In this context, technological development is based on exogenous variables including neoclassical growth models and endogenous growth models as endogenous variables such as endogenous growth models. Today, models have been developed that go beyond the Solow model in order to fully grasp the economic growth process (Atgur, 2019).

According to Mankiw (2009), the technological progress is an endogenous variable and closely affects the growth rate. On the other hand, it is important long run economic growth in terms of welfare level of people living in a country. They have made significant progress countries that can realize a stable and rapid economic growth in terms of welfare level of citizens in long run. Solow model is based on increases in total factor productivity from outside the model to realize long run increases in per capita production. Increases in factor productivity include research and development activities carried out by firms; training and work during training and all these activities are sensitive's to economic environment. Endogenous growth has the ability to answer on how are increases in factor productivity increases; what is the amount of public funds spent on public education; how are increases in factor productivity affected by subsidies for R&D; it is meaningful that the government intervenes to promote economic growth (Pelloni, Alessandra, Thanasis & Tadesco, 2018).

Theoretical Framework

The theoretical foundation of this study is premised on the production function, Endogenous Growth model formulated by Romers and Lucas (1988). An aggregate Production function expresses the relationship between output and inputs which express as:

$$Q_t = f\left(A_t, K_t, L_t, H_t, \mathcal{E}_t\right) \quad (1)$$

where Q_t represent output, which is the dependent variable, L_t is labour, K_t represent investment capital, H_t is human capital are three input factors which are the independent variables, while A_t is exogenous level of technology and $\mathcal{E}_t$ represents error term.

In this context, output represents the contribution of the agricultural sector of the Nigeria Gross domestic product (GDP); labour employed and human capital represents effective workers employed in the agricultural sector, while K represents capital investment in monetary terms as a proxy of CBN interventions funds on agricultural sector in Nigeria.

Therefore the aggregate production function of equation (1) can be written as:

$$Q_t = A_t K_t^a (L_t H_t)^\beta \mathcal{E}_t \tag{2}$$

Taking the Log of Equation (2), the relationship for growth can be expressed as:

$$\log Q_t = \log A_t + \alpha \log K_t + \beta \log (L_t H_t) + \log \mathcal{E}_t \tag{3}$$

Where $\log A_t = \theta$, and $\log \mathcal{E}_t = \mathcal{E}_t$, therefore, equation (3) can be written as:

$$\log Q_t = \theta + \alpha \log K_t + \beta \log (L_t H_t) + \mathcal{E}_t \tag{4}$$

Where $\theta = const$, α, β are the coefficients of the variables while $\mathcal{E}_t$ is the error term. Adequate financing and investment from both public sources (Government and CBN) and private financial institutions (Banks) as a capital plays critical role in enhancing output in agricultural sector (Akande & Ola-David, 2010).

Empirical Review of Related Studies

In order to ascertain the affinity between deposit bank loans and Nigeria's tillage production over the period of 1980 to 2013, Agunuwa, Inaya, and Preso (2015) looked into the effect of deposit money bank funds on farming in the nation, and increased association among deposit money bank loan and agricultural output was found using ordinary least squares (OLS) methodologies, however, a negative affinity between deposit money banks, interest rates, and tillage output was found. Additionally, the findings indicate a strong positive correlation between Nigerian government spending and agricultural output. The study suggested that a way of funding in agricultural financing appealing to deposit money banks, the agricultural credit guarantee scheme should improve its requirements for credit guarantees and the interest rate in the agricultural sector should be subsidized.

Anetor, Ogbechie, Kelikume and Ikpesu (2016) utilizing the vector autoregressive (VAR) proposal, researchers examined the effect of loan availability and several deposit money banks' lending strategies on tilling output. The research discovered that, while the commercial credit sector in agriculture has a compelling effect on farming production, the ACGSF did not do well in explaining the presentation of the agricultural sector employ timely figures through the analytical news of the Apex Bank of Nigeria for the sample period 1981–2013. The research recommends that the government encourage commercial banks to make investments in the agriculture sector by offering lending facilities at interest rates below market rates.

Dori (2016) evaluated the effect of nations loan assured fund on agriculture and wealth growth using descriptive statistics and content analysis. Through the secondary data analysis, it was discovered that the scheme expands beneficiaries' access to modern agricultural inputs, outputs, income, and stable livelihood in Nigeria while increasing the flow of credit to farmers. Additionally, it has enhanced Nigeria's GDP, foreign exchange revenues, agricultural exports, food production, food security, local food import replacement, and rural development.

Eseyin (2016) examined different alternatives to agricultural investment and their implications for poverty reduction in Nigeria from 1985 to 2012. Using two-model timely econometric analysis with Cobb-Douglas production function, the result shows that capital, labor

and ACGSF lag effects were discovered to be statistically relevant. The research concluded that private investment should be encouraged by expanding credit facilities under the ACGSF.

In their 2017 study, Mboto, Atseye, and Lawal looked at the effect of loan on nation's agricultural exports from the years 1999 to 2016. They specifically observed at the effect of tillage deposits and bank loans. Agricultural Exports in Nigeria: Bank of Nigeria. The results show that bank credit guarantee as well as the Agricultural Credit Guarantee Scheme Fund has a symbolic effect on farming exports in the nation using annual data sourced from the Central Bank of Nigeria statistical Bulletin for the period. Descriptive statistics and OLS multiple retrogression techniques were used to explain the statistics. The report suggests, among other things, that the government, via appropriate authorities, channel credit to the agricultural sub-sector via selective credit management measures.

Akerele, Ashaolu, Sanusi and Egbetade (2017) discovered the impacts of the Agricultural Credit Guarantee Scheme Fund on farming output in three different sub-sectors of tillage in nation. Statistics on the volume of exports in the sub-sector of agriculture, livestock and fisheries and the amount of funds allocated to individual sub-sectors between 1982 and 2013 were subjected to an econometric (current) analysis. The results show a positive and statistically relevant effect of the volume of funds allocated to the sub-sectors of plant and animal production on growth production in individual subsectors. Likewise, the amount of funds allocated by the fisheries sub-sector to fish exports has an increase effect on fish exports and is notable at the 10% level. While an increase in pool size in one year may increase crop and fish production in the same year, it may take up to 2 years for livestock production to expand significantly. The results concluded that the expansion of the Agricultural Credit Guarantee Fund has many positive signs for agricultural growth, especially in the crops and livestock sub-sector, but has a weak impact on fish production. The study proposes additional incentives to increase agricultural production and proposes measures to ensure that funds are used for specific agricultural activities

Omekwe, Bosco and Obayori (2018) examined the determinants of Nigeria's agricultural exports from 1985-2016. It uses econometric co-integration testing techniques and the error correction model (ECM) approach, and the results of the Johansen test discovered that there is a cointegration comparison that fits the model for the ECM. Meanwhile, ECM results show that Agricultural government financing is positive and important in relation to agricultural exports, agricultural loan have an increase and notable impact on agricultural exports. In inclusion, climate change has a plus value on agricultural production. The study concluded that financing agriculture; Agricultural credits such as climate change are determinants of agricultural exports from Nigeria. However, the study recommends increasing the infrastructure fund in the annual budget to ensure infrastructure in rural areas where many agricultural products are produced, and rural farmers should be encouraged to access credit in the agricultural sector.

Emenuga (2019) investigated over the course of 37 years, from 1981 to 2017, the effect of commercial bankers on the expansion of the real estate market in Nigeria. Information about the agricultural sector's commercial bank credit, interest rates, agricultural productivity and agricultural credit guarantee schemes Central Bank of Nigeria Statistical Bulletin. According to the Johansen co-integration test and error correction model, bank loans and agricultural development in Nigeria have long-term relationship methodologies that were utilized to arrive at this conclusion. The study discovered that ECM was unfavorable and statistically significant at the 5% level. According to the study, interest rates were negatively correlated with agricultural growth in Nigeria, whereas commercial bank loans for agriculture and the loan guarantee method were favorably correlated. The research concluded deposit money banks notably impact the growth of agriculture in the nation and suggests the delays and difficult access to credit should be removed in other to diversify the economy and increase agricultural production hence help economic growth.

Akinrinola and Okunola (2020) investigated the effectiveness of federal Agricultural Credit Guarantee Program (ACGS), which, from 1978 to 2014, was the Federal Government of Nigeria's main approach to credit. The ARDL was used to analyze the long-run and short-run dynamics of ACGS and agricultural growth co-integration frontier test, and the findings indicated that there is a

strong link between total credit, total credit, and agricultural productivity. The findings indicate that while the overall amount of credit has a large productivity ratio in the long run, the total quantity of credit is not important over the long term. In the short term, backlog for is more significant to the level of productivity than the overall quantity of loans. A_t delays, the total amount of debtors had a negative but sizable productivity ratio.

Ibitomi and Ijaiya (2020) studied how Nigerian agricultural exports were affected by agricultural financing schemes. Data were analyzed employing Ordinary Least Squares (OLS) regression and dataset obtained from the Monetary Authority of Nigeria's quarterly releases and the Department Of statistics (NBS) (CBN). Agricultural Credit Guarantee Program Funds (ACGSF), Commercial Banks of Agriculture Credit (CBCA), Government Expenditure on Agriculture (GEA), Annul Rainfall (AR), and Population Growth (PG) are all positively correlated, according to the data. The capital stock (CS) and interest rate (IR) have a negative, considerable impact on agricultural productivity, respectively. According to the study's findings, agricultural investment practices have a significant impact on Nigeria's agricultural exports, and more money should be spent on agricultural expenditures to boost production and give farmers access to finance to increase agricultural output.

Adeshina, Tomiwa and Eniola (2020) studied how Nigerian agricultural exports were affected by agricultural financing schemes. Data were analyzed using Ordinary Least Squares (OLS) regression with data acquired from the Central Bank of Nigeria's (CBN) Statistical Bulletins and the National Bureau of Statistics (NBS). Agricultural Credit Guarantee Program Funds (ACGSF), Commercial Banks of Agriculture Credit (CBCA), Government Expenditure on Agriculture (GEA), Annul Rainfall (AR), and Population Growth (PG) are all positively correlated, according to the data. The capital stock (CS) and interest rate (IR) have a negative, considerable impact on agricultural productivity, respectively. According to the study's findings, agricultural investment practices have a significant impact on Nigeria's agricultural exports, and more money should be spent on agricultural expenditures to boost production and give farmers access to finance to increase agricultural output.

Ebere, Oresanwo, Omogboye and Timothy (2021) investigated from 1981 to 2019 the viability of agricultural exports using agricultural financing from Nigeria. The study discovered that while agricultural expenditure has less of a direct relationship to agricultural exports in Nigeria, credit grants provided to the farming production have a direct moderating impact on exports in Nigeria. There is also a one-way warning that covers both agricultural loans and farm expenditure. Agriculture exports' one-way feedback impact on Nigeria's agricultural spending is another factor. The projected commitment of the government to invest in the agricultural sector and enhance the national budget's allotment to the agricultural sector in Nigeria is the paramount thing to boost agricultural ouput production and ensure food all through the year.

Afolabi, Ikpefan, Osuma and Evbuomwan (2021) studied Nigeria's economic growth with agricultural credit between 1981 and 2017. Using annual information from the World Development Indicators and the Statistical Bulletin of the Central Bank of Nigeria (CBN) (WDI). The research findings using Auto-Regressive Distributed Lag (ARDL) demonstrate a considerable long-term impact of DMBCA on economic growth, while there is a short-term direct association between the two. With a direct link in the short run and an inverse relationship in the long run, ACGSF is not important in either the short run or the long run. The report recommends that coordination tests be carried out by the federal government to make sure that farmers, particularly small farmers, have simple access to financial help and subsidies offered and that the resources are dispersed appropriatel.

Methods

Research Design

The study made use of ex post facto research design. An ex- post facto investigation seeks to reveal possible relationships by observing an existing condition or state of affairs and searching back in time for plausible contributing factors. Ex- post facto design is considered to be appropriate

for this study because the study is non-experimental, and investigate causal relationship between the dependent variable (agricultural output) and the independent variables CBN intervention schemes.

Data and Sources

This study use annual time series secondary data. These are described as data previously obtained for purposes other than the present study. The data is sourced from Statistical Bulletin of the Central Bank of Nigeria (CBN), International Labor Organization and World Bank Data (ILO).

Method of Data Analysis

The analysis in this study was done in two stages, namely: descriptive analysis and inferential analysis. The relevance of descriptive analysis is to provide insight into the distribution pattern of time series value of the variables overtime. On the other hand, the inferential analysis serves as the basis on which the research hypothesis was tested in other to achieve the research objective, and answer the research question.

Model Specification

The study specifies the following functional relationship between agricultural sector output and CBN financial intervention funds, drawing on the theoretical framework and the research of Oluleye and Toba (2014):

$$AO = f\left(ACGSF\,,\,EA\right) \tag{5}$$

Where: ACGSF stands for support for the agriculture credit guarantee program agricultural industry as a stand-in for CBN intervention funds, and AO stands for agricultural output (measure of agricultural output performance). More econometric models that are appropriate for the study's goals are built on the foundation of this straightforward functional model. Equation (5) can be expressed in a linear econometric:

$$AO_t = \beta_0 + \beta_1 ACGSF_t + \beta_2 EA_t + \varepsilon_t \tag{6}$$

Where: AO_t , $ACGSF_t$, EA_t are as defined earlier. β_1 and β_2 are the coefficients of the slope, which represents the intercept and is the error phrase that was adopted by the method to capture the effect of some elements which impact agricultural output but are not directly encompass on the approach. It shows the nature and the magnitude of the effect a given change in the Agricultural Credit Guarantee Scheme ($ACGSF$) and employment in agriculture has on agricultural output.

Method of Model Estimation

$$\Delta AO_t = \alpha_0 + \sum_{j=1}^{p} \varphi\ \Delta AO_{t-1} + \sum_{j=0}^{p} \beta\ _{jt-j} + {}_j \Delta EA_{t-j} + \lambda_1 AO_{t-1} + \lambda_2 ACGSF_{t-1} + \lambda_3 EA_{t-1} + \varepsilon_t \tag{7}$$

Where Δ denotes the first difference of variables, ε_t is random disturbance term, AO_t is the dependent variable (Agricultural output), φ, β, and ϕ represents the short-term dynamics estimates of the explanatory variables; λ_1 to λ_3 are the long-run estimates of the explanatory variables, while a_0 is the constant parameter.

Apriori Expectation

Employment in agriculture is anticipated to have a positive association with agricultural output, as is the Agricultural Credit Guarantee Scheme (ACGSF) in respect to farming output. The following are the a *priori expectations* for the indicators for the parameter coefficients: ACGSF and EA's elasticity on agricultural output (AO) in Nigeria are 1 and 2, respectively. Consequently, 1>0 and 2>0.

Explanatory Variables	Dependent Variable (Agricultural output)
ACGSF	+
EA	+

Results

Descriptive statistics, the Augmented Dicker Fuller and Philip Perron tests for unit roots, and the ARDL bound test technique were used in the analysis of the data to identify the variables' short - and long-term associations.

4.1. Descriptive Analysis

Along with kurtosis, skewness, standard deviation, and Jarque-Bera statistics, the descriptive statistics also include mean, median, and kurtosis. Results of descriptive data were shown in Table 4.1 for Nigeria's agricultural output (AO), agricultural credits guarantee scheme funds (ACGSF), and employment in the agricultural sector (EA). The median and mean values provided evidence of the great degree of consistency among all the relevant variables. Because the mean and median values fall between the minimum and maximum values for all the series, they exhibit a higher level of consistency. Additionally, it was inferred that the values of the study's variables clustered around their average values, suggesting that the distribution of all the variables used might follow a normal pattern.

The standard deviation gauges a variable's variability or how far it deviates from its average. A low standard deviation value indicated that a variable's value typically falls within a narrow range of the mean, whereas a high standard deviation value showed that the variable's value typically deviates from the mean value. The findings indicate that while AO and ACGSF values deviate from the mean value, EA has a low standard deviation of 5.6197

Skewness is another indicator of distribution. This gauges the skewedness and irregularity of the data series' mean-centered distribution. A normal distribution has zero skewness, while distributions with a positive or negative skewness have the right tail or left tail, respectively. Since they have positive values, variables like AO and ACGSFL are favorably skewed to the right, but EA is negatively skewed due to its negative value.

The kurtosis statistic assesses the peakiness and flatness of the series' distribution. The kurtosis of the normal distribution is 3.which is referred to as mesokurtic. The distribution is referred to be platykurtic in relation to normal if kurtosis is less than 3, and hyperkurtic in relation to normal if kurtosis is greater than 3 is regarded leptokurtic relative to normal distribution. Due to their values being fewer than 3, the variables AO, ACGSF, and EA in Table 4.1 are platykurtic. The Jarque-Bera statistic, sometimes known as the J-B statistic, is used to check for normalcy in the series' distribution. It compares the skewness and kurtosis of the series to those with series that have a normal distribution. If the likelihood of the Jarque-Bera statistic is more than 5%, the decision criterion is to reject the normal distribution null hypothesis. The findings demonstrate that the null hypothesis of a normal distribution is accepted for the variables AO and EA, which have a normal distribution since their J-B statistical probability values are rejected at a level of 5%, whereas the null hypothesis cannot be rejected for the variables ACGSF.

Table 1
Descriptive Statistics

	AO	EA	ACGSF
Mean	8216.52	43.8556	3063928.0
Median	4932.76	44.6450	544997.9
Maximum	18348.18	50.5700	12997004.0
Minimum	2303.51	34.4367	24654.90
Std. Dev.	5530.40	5.6197	3906479.0
Skewness	0.5321	-0.2974	1.0467
Kurtosis	1.73	1.6169	2.77
Jarque-Bera	4.5719	2.8335	7.3776
Probability	0.1017	0.2425	0.0250
Observations	40	40	40

Note: AO= Agricultural output, ACGSFL= Agricultural Credits Guarantee scheme Fund Loan, and EA=Employment in Agriculture

Source: Author Computation, 2022

4.2. Analysis of Correlation

The correlation study reveals the potential strength of degree of linear correlation among the variables utilized as well as the direction of correlation between the chosen variables, which can be either positive or negative as the coefficient lies within the boundaries of +1 and -1. A negative perfect linear relationship and a positive linear relationship, respectively, are indicated by correlation coefficients of -1 and +1. The goal is to show how the CBN financial intervention funding variable (ACGSF) and agricultural output in Nigeria relate to one another. According to Table 4.2's correlation analysis, there is a relationship between AO and the explanatory factors that might be both positive and negative. A positive correlation between AO and ACGSF suggests that when the value of ACGSF allocated to agriculture rises, the value of agricultural output rises as well, which results in the development of agriculture in Nigeria. However, in Nigeria, there is a negative association between AO and EA. This suggests that when the EA's value rises, the value of investments and financial involvement in the agricultural sector fall, which in turn causes a decline in agricultural output

Table 2
Correlation Matrix

	AO	ACGSF	EA
AO	1.000		
ACGSF	0.840	1.000	
EA	-0.992	-0.833	1.000

Source: Author Computation, 2022

4.3. Unit Root Test

The foundation element tests can be used to identify the variables' integration order. In this study, enhanced versions of Philip Peron (PP) and Dickey Fuller (ADF) are employed. The ADF and PP tests are based on the null hypothesis of a unit root. The outcomes of the root unit tests are displayed in Table 3 and Table 4, respectively. The Table 3 displays the outcomes of the unit root test with intercept, whereas the results of the unit root test with intercept and trend were shown in Table 4. Multiple integration orders might be seen in the two Tables. Under the unit root test, the variables are stationary at the initial differences with intercept in except for the agricultural output (AO), which appeared must remain still and level with the ADF and PP in Table 3. At level with the ADF and at first difference with the PP unit root test, the ACGSF is stationary. Table 4, contrasted with, showed the outcomes of the root unit test with mixed integration orders for the trend and intercept. Agricultural output (AO), ACGSFL, and EA are stationary at initial differences when using both ADF, while EA is stationary at level. Although other variables showed stationary at the start of differences, AO is stationary at the same level as the PP test. The variables combine the I(0) and I(1) series, according to the research's overall result. These findings add to the supporting evidence for the distributed auto-regressive lag model (ARDL). The research findings using the ARDL method that is shown in Table 5.

Table 3
Unit Roots Test of the Variables (with Intercept)

Variables	ADF Test			PP Test		
	Level	1st diff	Status	Level	1st diff	Status
AO	-3.734** (0.012)	-	I(0)	-4.080*** (0.005)	-	I(0)
ACGSF	-5.340*** (0.000)	-	I(0)	-	-6.646*** (0.0000)	I(1)
EA	-	-6.430*** (0.000)	I(1)	-	-4.670*** (0.001)	I(1)

*Note: ***, ** and * denotes 1%, 5% and 10% significance level respectively*
Source: Author's Compilation 2022

Table 4
Unit Roots Test of the Variables (with Trend and Intercept)

Variables	ADF Test			PP Test		
	Level	1st diff	Status	Level	1st diff	Status
AO	-	-23.671*** (0.000)	I(1)	-6.230*** (0.000)	-	I(0)
ACGSF	-	-11.230*** (0.000)	I(1)	-	-12.312*** (0.0000)	I(1)
EA	-5.762*** (0.001)	-	I(0)	-	-4.608*** (0.007)	I(1)

*Note: *** and ** denote 1% and 5% significance level*
Source: Author's Compilation 2022

4.4 Regression Results

Table 5
Estimated short-run of the error correction version of the ARDL model

ARDL Error Correction Regression				
Dependent Variable: D(LAO)				
Selected Model: ARDL(1, 3, 2)				
Case 2: Restricted Constant and No Trend				
Included observations: 28				
Short Run ECM Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LACGSF)	0.230076	0.076602	3.003541	0.0073
D(LACGSF(-1))	0.336380	0.088642	3.794809	0.0012
D(LACGSF(-2))	0.194144	0.087227	2.225738	0.0383
D(LEA)	-14.52055	4.484342	-3.238057	0.0043
D(LEA(-1))	14.19748	4.522944	3.138990	0.0054
ECM(-1)*	-0.283706	0.033031	-8.588975	0.0000
R-squared	0.741520	Mean dependent var		0.082355
Adjusted R-squared	0.682774	S.D. dependent var		0.073703
S.E. of regression	0.041512	Akaike info criterion		-3.338277
Sum squared resid	0.037911	Schwarz criterion		-3.052804
Log likelihood	52.73587	Hannan-Quinn criter.		-3.251005
Durbin-Watson stat	2.043925			

Source: Author's computation, 2022

According to the calculated model for goal one, agricultural output is positively impacted by the agricultural loan guarantee plan fund ($\beta = 0.2300, t = 3.0035, p = 0.0073$). This suggests that increasing ACGGSF causes an increase in Nigerian agricultural output. Ceteris paribus, the outcome demonstrates that an increase in ACGSF of 1% will result in an increase in agricultural output of approximately 0.007%. The positive link is statistically significant, as shown by a p-value of less than 0.05 for the t statistics of ACGSF in this study, level of significance.

Additionally, the results of the short-run coefficient estimates of the ACGSF demonstrated that the positive and statistically significant coefficients of lag zero to three of the ACGSF. The total of the (ACGSF) coefficients (from lag 0 to lag 3) is positive and significance in the short run. These findings indicated that ACGSF has a notable favorable effect on AO in the federation during the short term. On the other hand, the employment in agriculture (EA) showed positive and significant effects on AO at the initial difference in the short run, whereas it showed negative and significant effects on AO at the lag zero in Nigeria. This suggests that an increase in EA has been able to prompt a considerable short-term increase in Nigeria's agricultural output.

The Agricultural Credit Guaranteed Scheme Fund and Employment in Agriculture account for 68.28 percent of fluctuations in agricultural output in Nigeria, according to regression

coefficients of 0.74152 and 0.6828, respectively. The remaining 31.72 percent of agricultural variations is not captured by the model. There is no autocorrelation among the residual terms in the model, according to the Durbin-Watson statistics of 2.0439, which is within the allowed range. This supported the calculated equation's good behavior.

The short-run estimation of the error-corrected ARDL model's outputs indicates that the model's coefficient of error correction term (ECM) is significant at the 1% level of significance. These supported the occurrence of co-integration and the stability of the long-term nexus between the variables. The ECM is statistically significant and negative. It is used to gauge how soon the equilibrium is returning in the event of distortion and divergence from the model's short-run dynamic and stable equilibrium. The model's ECM coefficient for model (-0.2837) revealed that 28.37% speed adjustment or convergence after a shock. This means that any short-term changes in agricultural output.

Table 6
Bound Test for Cointegration (Dependent Variable: Agricultural Output, LAO)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	15.92772	10%	2.63	3.35
K	2	5%	3.1	3.87
		1%	4.13	5

K *is the number of exogenous variables in the model*
Source: Author's computation, 2022

Table 6 the F-statistic of 15.9277 is higher more than upper, lower critical value bounds at a 1% level of significance, according to the results of the ARDL bounds testing that confirmed the existence of a long-term connection between the factors. As a result, the null hypothesis that there is no co-integration is disproved.

Table 7
Estimated Long-run of the ARDL model

Levels Equation				
Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LACGSF	-0.027561	0.183922	-0.149853	0.8825
LEA	-12.37857	2.428261	-5.097709	0.0001
C	24.25430	4.962342	4.887672	0.0001

Source: Author's computation, 2022

This demonstrates that the variables being studied in Nigeria have a long-term nexus. It suggests that, if the variables diverge in the short run by displaying components of disequilibrium and divergence, the presence of cointegration suggested that the variables would eventually reestablish equilibrium and convergence following distortions and deviation in the short run. The presence of cointegration is a definite sign that it is time to move forward with estimating the model's long-term and short-term coefficients.

Tables 7 give the ARDL long-run estimates of the variables, which demonstrate that while EA had unfavorable and large an impact on agricultural output in Nigeria, ACGSF had a poor and minimal effect. Long-term effects on agricultural output (AO) in Nigeria are mitigated by an increase in ACGSF per unit. The research by Afolabi et al. provides support for this study (2021). This suggests that over time in Nigeria, ACGSF impacts have a detrimental impact on AO.

Test of Hypothesis

Research Question

How is the effect of Agricultural credit guarantee credits scheme on agricultural sector output in Nigeria?

Research Hypothesis

H1: Agricultural credit guarantee scheme fund has no positive and significant effect on

Research Objective

Examine the effect of Agricultural credit guarantee scheme fund to agriculture on the agricultural sector output in Nigeria.

Table 8
Estimated short-run of the error correction version of the ARDL model

ARDL Error Correction Regression				
Dependent Variable: D(LAO)				
Selected Model: ARDL(1, 3, 2)				
Case 2: Restricted Constant and No Trend				
Included observations: 28				
Short Run ECM Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LACGSF)	0.230076	0.076602	3.003541	0.0073
D(LACGSF(-1))	0.336380	0.088642	3.794809	0.0012
D(LACGSF(-2))	0.194144	0.087227	2.225738	0.0383
D(LEA)	-14.52055	4.484342	-3.238057	0.0043
D(LEA(-1))	14.19748	4.522944	3.138990	0.0054
ECM(-1)*	-0.283706	0.033031	-8.588975	0.0000
R-squared	0.741520	Mean dependent var		0.082355
Adjusted R-squared	0.682774	S.D. dependent var		0.073703
S.E. of regression	0.041512	Akaike info criterion		-3.338277
Sum squared resid	0.037911	Schwarz criterion		-3.052804
Log likelihood	52.73587	Hannan-Quinn criter.		-3.251005
Durbin-Watson stat	2.043925			

Source: Author's computation, 2022

The estimated model for objective one shows that agricultural credit guarantee scheme fund exerts a positive effect on agricultural output $(\beta=0.2300, t=3.0035, p=0.0073)$. This indicates that rising ACGGSF leads to increase in agricultural output in Nigeria. Ceteris paribus, the result shows that a rise in ACGSF by 1% will lead to a rise in agricultural output by about 23%. The p-value of the t statistics of ACGSF of 0.2300 is less than 0.05 level of significance for this study, showing that the positive relationship is statistically significant.

The regression R-Square 0.74152 and Adjusted R-square of about 0.6828 show that 68.28% of variations in agricultural output in Nigeria is caused by Agricultural Credit Guaranteed Scheme Fund and Employment in Agriculture. The other 31.72% of variations in agriculture sector output is not captured by the model.

The Durbin-Watson statistics of 2.0439 which lies within the accepted region revealed that there is no autocorrelation among the residual terms in the model and this confirmed that the estimated equation is well behaved. The outcomes of the estimated short-run of the error correction version of the ARDL model shows that the coefficient of error correction term (ECM) for model is significant at a 1% level of significance. These affirmed the incidence of cointegration and a stable long-run nexus between the variables. The ECM is negative and statistically significant. It is used to measure how quickly the equilibrium is restoring in the case of distortion and divergence from a dynamic and stable equilibrium of the model in the short run. The ECM coefficient for model (-0.2837) revealed that 28.37% speed of adjustment or convergence to long-run equilibrium after a shock. This implies that any short-term deviation of the agricultural output (AO) was restored in the long run.

Table 9 shows the ARDL bounds testing which affirmed the grounds of a long-run relationship within the variables. It revealed that the F-statistic of (15.9277) is higher than upper and lower bounds critical values at a 1% level of significance.

Table 9
Bound Test for Cointegration (Dependent Variable: Agricultural Output, LAO)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	15.92772	10%	2.63	3.35
K	2	5%	3.1	3.87
		1%	4.13	5

K is the number of exogenous variables in the model
Source: Author's computation, 2022

Hence, the null hypothesis for no co-integration is rejected. This shows that a long-run nexus occurs amid the variables under study in Nigeria. This further implies that if the variables diverge in the short run by showing elements of disequilibrium and divergence; the presence of cointegration suggested that the restoration of equilibrium and convergence among the variables after distortions and deviation in the short run. The existence of cointegration is a clear indication to continue with the estimation of the short-run and long-run coefficients of the model.

Table 10
Estimated Long-run of the ARDL model

Levels Equation				
Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LACGSF	-0.027561	0.183922	-0.149853	0.8825
LEA	-12.37857	2.428261	-5.097709	0.0001
C	24.25430	4.962342	4.887672	0.0001

Source: Author's computation, 2022

Tables 10 provides the ARDL long-run estimates of the variables and it shows that ACGSF exert negative and insignificant effect on agricultural output while EA impacted positively and significant on agricultural output in Nigeria. The coefficient of ACGSF in the long run is negative and not significant; a unit rise in ACGSF reduces the impact on agricultural output (AO) in the long run in Nigeria. This study is supported by the study of Afolabi et al (2021). The negative relationship implies that ACGSF effects have a negative influence on AO in the long run in Nigeria.

Determining out how much of an influence the Central bank's financial intervention fund has on Nigeria's agricultural output is the main goal of this study. The outcome of the research demonstrated that ACGSF has, on the short term, increased agricultural productivity in Nigeria. This satisfying association fits a priori expectations. This shows that higher ACGSF allocations to the agricultural sector result in higher agricultural output in Nigeria. In order to raise agricultural output, income, employment generation, potential, and standard of life in the short term, more people are buying and embracing new, higher-quality seeds, fertilizer, and technology. The null hypothesis, according to which there is no connection between ACGSF and AO, is disproved. This outcome is in line with research by Mile et al., (2021); Abbas, (2021), and Udoka et al (2016). However, in the long run, ACGSF bring about the decline in AO because the study's finds that there is an unfavorable association between ACGSF and AO, AO declines as a result of ACGSF. Therefore, in the long run in Nigeria, the alternative is rejected while the null hypothesis is supported. Long-term effects on agricultural output (AO) in Nigeria are mitigated by an increase in ACGSF per unit. The research by Afolabi et al. provides support for this study (2021). According to the findings, agricultural employment (EA) has a considerable detrimental impact on AO. This study indicates that increase in EA has not been able to produce significant growth in the agricultural output in Nigeria in the long run.

4.5. Diagnostics and Stability Tests

The study performed diagnostic tests for the residuals and a stability test of the coefficients to verify the dependability and stability of the ARDL estimations. The findings are shown in Table 3. The Breusch-Godfrey LM test of autocorrelation and the ARCH test for conditional heteroscedasticity were both applied to the residuals in this investigation. The Ramsey Reset test was also utilized in the study to check for model misspecification and coefficient stability.

Table 11
Diagnostic Tests

	F- Stat	Probability
	Model	
Normality Test	1.3262	(0.5153)
Serial Correlation LM Test	1.6561	(0.2202)
Heteroskedasticity Test	0.7427	(0.6670)
Ramsey Test	0.09311	(0.9268)

Source: Author's computation, 2022

Since the P-values for both statistics are greater than 0.05, the results of the diagnostic tests in Table 6 demonstrated that the model is free from serial or autocorrelation and heteroscedasticity. The residual term for the model is demonstrated by the normality test to be regularly distributed. A P-value of larger than 0.05 is also reported by the Ramsay RESET results, indicating that the functional form of the models is accurately described and that the coefficients are stable over time. Since the ARDL model estimates pass all of these diagnostic tests, this indicates that they are dependable and acceptable.

4.6. Stability Tests

The study uses the recursive residuals' cumulative sum (CUSUM) and continuous sum of squares (CUSUMSQ) estimations to confirm the parameter stability of the ARDL model. Figure 4.1 of the model displays the CUSUM and CUSUMSQ results. Because the figures showed that the lines are inside the 5 percent crucial boundaries, indicating that the derived model is stable, the coefficients are comparatively stable, consistent, and consistent.

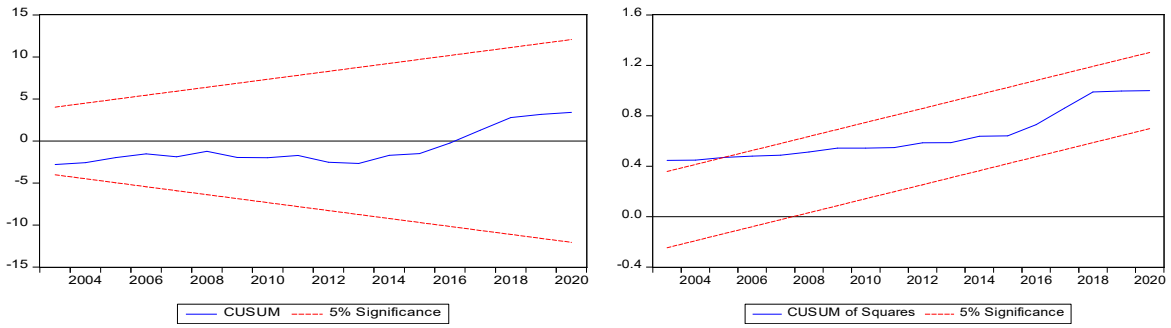

Figure 1. Stability Test of ARDL Model

Source: Author's computation, 2022

The general objective of this study is to determine how impactful Central bank financial intervention fund on the agricultural output in Nigeria. The results from this study show that ACGSF has increased agricultural output in Nigeria. This positive relationship is in line with apriori expectation. This implies that an increase in ACGSF to the agricultural sector lead to an increase in agricultural output in Nigeria. The increased in credit has led to increase in the acquisition and adaptation of new improved quality seeds, fertilizer and machine to increase agricultural output, income, employment generation, potentialities and standard of living in the short run. The null hypothesis that there is no relationship between ACGSF and AO is rejected. This result is consistent with the study of Udoka et al (2016); Abbas, (2021) and Mile et al (2021). However, in the long run ACGSF bring about the decrease in AO because the study reveals negative and insignificant relationship between ACGSF and AO in the long run. The null hypothesis is therefore being accepted while the alternative is rejected in the long run in Nigeria. The coefficient of ACGSF in

the long run is negative and not significant; a unit rise in ACGSF reduces the impact on agricultural output (AO) in the long run in Nigeria. This study is supported by the study of Afolabi et al (2021)

Discussion

The goal of the research was to determine how Nigeria's agricultural output is affected by Central Bank Financial intervention monies. Time series were produced using the WDI and the CBN Statistical Bulletin. In order to observe the impact that explanatory variables have on the dependent variable, The Agricultural Credits Guarantee Scheme Fund (ACGSF) and Employment in Agriculture were employed as the study's two explanatory variables for agricultural. The study's model is determined using the ARDL estimation technique. The goal is to examine how Nigeria's agricultural industry functioned between 1990 and 2020 in relation to the Central Bank intervention fund proxy used by Agricultural Credit Guarantee Scheme Funds (ACGSF). The model for the investigation was based on the endogenous growth theory. In accordance with the study's goal, prior research on credit financing intervention plans and agricultural sector performance was reviewed.

The dependent variable was the output of the agricultural sector, and the explanatory variables were ACGSF and EA. The research design used secondary data as the foundation for the data analysis, and the ARDL bound test method with the indication of short run and long run analysis was used for the analysis. The study's conclusions are as follows: The results show that the short-run impact of ACGSF is statistically significant at the 5 percent level (P-value = 0.007) on agricultural sector output, however the long-run impact of ACGSF on agricultural sector output is unfavorable and statistically negligible at the same level $(\beta = -0.0276; P - value = 0.883)$ on the long run in Nigeria throughout the time of the research.

The consequence is that an increase in the money for the Nigerian agricultural loan guarantee plan led to a short-term boost in agricultural output. A rise in EA has considerably stimulated an increase in AO in Nigeria in the short run, while a decline in EA has diminished the impact of AO on EA in Nigeria in the long run, according to the positive and significant association between agricultural employment and agricultural output. The diagnostic tests completed for all of the model's estimations were proven to be reliable and stable, according to the robustness checks for all of the study's objectives.

According to the regression R-Square and Adjusted R-Square, agricultural factors account for around 68.28% of fluctuations in agricultural output in Nigeria is brought about Fund for the Agricultural Credit Guarantee Scheme and Employment in Agriculture. The other 31.72% of variation in agriculture sector output is not captured by the model. There is no autocorrelation among the residual components in the model, as evidenced by the Durbin Watson statistics of 2.0439, which is within the allowed range, the estimation model is well performed.

Conclusion

This study examines the impact of Central Bank intervention funds on agricultural sector output in Nigeria from 1990 to 2020. This is to determine the extent to which the funds are financed by Agricultural Credit Guarantee Scheme Fund (ACGSF) in the agricultural sector, using autoregressive distributed lag (ARDL) approach. Though there has been much discuss on this study area, it is clear that the agricultural sector is said to be hindered in terms of poor access to funds by farmers to finance their agricultural production in order to promote economic growth.

The findings of the study shows that the ACGSF in the short run has positive significant impact on agricultural sector output, while in the long run, it has unfavorable and negligible impact on agricultural sector output in Nigeria, within the study period. This suggests that the impact of CBN intervention funds is not felt on agricultural output in the long run. Thus, implying that the funds have been diverted for other purposes by the farmers.

In the short term, the outcomes are in line with studies by Udoka et. al. (2016), Abbas, (2021) and Mile et. al. (2021), whereas research by Afolabi et. al. (2021) confirmed the result findings in the long run.

The outcome of this research therefore suggests that the CBN intervention funds should be monitored to achieve its purpose and regulations should be put in place for proper coordination of the funds; whilst the defaulters of the funds should be duly sanctioned.

However, the basic limitation of the study is inaccessibility of data for larger period of time, also, collating data from different CBN journals on time series prove very difficult with cost and time implications.

Implications of the Study

This study has implications on agricultural sector performance, the results show that ACGSF shows a positive and significant relationship of agricultural export growth in the short run, but a negative and insignificant relationship of agricultural export in the long run. The study suggests that the Central Bank should employ dynamic initiative in handling credit funding to the farmers, as the study shows an insignificant short run and long run effect on agricultural sector performance. Also, this study envisaged more on CBN/Government contribution to the agricultural growth contributing to less dependence on the oil sector in boosting economic development.

Recommendations

The following recommendations emerged from the results of the analyses:

1) In order for the ACGSF to have a long-term beneficial effect on Nigeria's agricultural prosperity, the government or monetary authority has to provide additional and sufficient funds for the program.

2) The country's central bank and decision-makers should ensure that credit (loans) are distributed directly to qualified farmers in order to prevent political influence, diversion, and delays in the slow implementation process driven on by deposit money institution.

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THE ANALYSIS OF ALBANIAN ECONOMIC DEVELOPMENT THROUGH THE YEARS

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Abstract. *The economic situation of a country can be explained through a dynamism of a group of indicators and factors that affect the continuity trend flow of economic growth. Also, the historical aspect is one of the most meaningful factors defining a country's development stage. Although the indication of the social and political conditions, unpredictable situations like the Covid-19 pandemic have negatively affected the economy's growth trend. However, to evaluate the overall economic situation is necessary to consider an evaluation basis that will lead to the tendency of the living standard. The study is undertaken for the Albanian case, a country in transition based on its economic development, from 1991 to 2021. The key assessment factor considered in this study is the GDP, as one of the most meaningful evaluators of the living standard. After analyzing the Albanian economy by considering the historical phases of the economic development of this country, there is a created model for identifying the potential relations between the Gross Domestic Product, Consumption Expenditures, Trade Balance, and Foreign Direct Investments for explaining the actual living standard and generating its forecast for upcoming years. At the end of the study are given the results and the recommendations.*

Keywords: *Development, Economy, Living Standard, GDP.*

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Introduction

Economic development is a complexity of indicators that change through the years and affect growth and living standards. The evaluator that is generally used for assessing this development is the Gross Domestic Product, which includes all produced goods in the country for a particular time, generally one year, using the national and foreign producing factors. This indicator is one of the most important ones for analyzing economic development because it defines growth, which is widely explained and treated by Vangjeli (2022). However, the GDP (Gross Domestic Product) cannot be studied as an independent variable, because it is the result of the common effect of investments, consumption, governmental expenses, and trade balance, regarding the studies of Alesina (1988), Nordhaus (1989) and Abel & Bernanke (2003). This can be considered in the condition of an open economy, where the country has external relations with other countries and as a result can import and export goods. This study considered the Albanian case, by considering three important periods: the period of a centralized economy, the period after communism, and the period after the pandemic of Covid-19, referring to the studies of Muço (1997), Gabel (2023) and OECD

(2020). Firstly is given a visualized form of the GDP trend during these three periods, and then created a model, where the GDP is studied through being about consumption, trade balance, and foreign direct investments instead of private investments. The study limits consist of the exclusion of some important indicators like government expenses and private expenses, but there are included foreign investments to identify the impact on the GDP and the living standard. The stochastic created model consisted in generating an optimized study and then forecasting the continuity for some upcoming years to see the trend of the economic development.

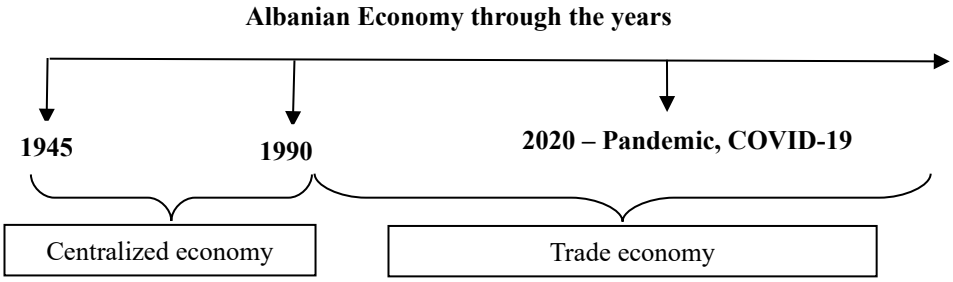


Figure 1. The phases of the Albanian economy

Source: elaborated by the authors

The Communist Regime in Albania was evident from 1945 to 1990. So, the duration of a monopolist economy was about one century. Every aspect of life was centralized and strictly controlled by the state's power. The main economic activity was agriculture, which was collectivized, because of the centralization of micro-producers and transformation into macro-state firms, based on Gabel (2023). Agricultural land, production organization, trade, and production factors were structured and administered by the state. Private investments and entrepreneurship were inexistent. From 1950 to 1960 was highly considered the industrialization of Albania. The results of this reform were optimistic because half of the GDP was generated by industrialization. However, in 1980 the economic condition worsened, the foreign capital decreased, the economic decisions were not the optimal ones, state reserves were the lowest compared to previous times and as a result, a considerable economic crisis happened. The impossibility of managing this crisis lead to the fall of the communist regime in 1990, referring to Muço (1997). After 1990, the trade economy replaced the centralized one. So, the state had not the authority of controlling and determining the functionality of economic aspects anymore. Private investments and entrepreneurship started to happen. The prices were determined by the forces of supply and demand. The micro-producers were free to continue their activity independently and without the tendency of being collectivized and centralized in a macro-state farm. After 2008 the Albanian economy was fully adapted to the market economy. One of the crucial economic shocks that happened during the decentralized years of the economy was the Covid-19 pandemic, when the lockdown affected negatively the profits of the businesses, increased the loans, lowered economic development, worsen the living standard, and as a result, the gross domestic product had experienced a decrement according to OECD (2020).

Theoretical overview

Economic development is tightly connected to the Gross Domestic Product Level (GDP). The Gross Domestic Product indicates the value of all final products/services of the economy, produced through using national and international producing factors like labor, land, capital, technology, and entrepreneurship, during a particular period. The performance of the economy can be effectively assessed through GDP because it is an important indicator of economic activity, by Vangjeli (2022) and Alesina (1988), Nordhaus (1989). The types of GDP are:

- Nominal GDP- It evaluates the value of the product using the prices of the time when the product is produced
- Real GDP- It evaluates the produced product in every period using the price of a base year. So, the product is evaluated yearly, but the considered price for making the assessment is one of a particular year that is considered the base year. The rhythm of economic increment

is the one of the Real GDP increment, as a result of the: changes of economic reserves, increment of the population, increment of the capital, differences of the effectivity in the producing factors' work, and differences in the level of work occupation. The ratio in the percentage of Nominal GDP with Real GDP generates the Deflator GDP, which determines the difference in the percentage of the price level of the current period compared to the base year.

- GDP/person-It evaluates the value of output on an individual basis. The level of this type of GDP increment is the best indicator that allows assessing the living standard and the economic situation continuity in the long term.

The reconciliations of the Macroeconomics Equilibrium

The living standard can be evaluated and explained by the performance of economic development through the GDP level. Based on macroeconomic studies the Gross Domestic Product is an important indicator, which can be observed by presenting it related to other economic indicators like investments, government expenses, trade balance, and consumption, based on Vangjeli (2022), Alesina (1988), Nordhaus (1989) and Abel & Bernanke (2003).

$GDP = C + I + G + NX$,where:

C represents the expenses of families for the purchase of products/services, I represents the private investments by the private sector's businesses, G represents the government expenditures like the transfer payments, and represents the trade balance, which is the difference between the Exports and Imports, and as a result, the trade balance can be positive when the Exports exceed the Imports and the contrary.

Literature Review

Our paper provides an empirical analysis of the long-run determinants of economic growth. The factors that we have taken in our analysis are trade balance, consumption, and FDI. This section reviews some of the studies, which have examined the economic growth determinants using different estimation approaches and giving different findings. The scientific literature treats analytically the impact of the trade balance. For this factor, the question of researchers remains in what direction the changes in international trade affect economic performance. The empirical studies have wide evidence that international trade has a positive impact on economic growth. Based on all empirical studies analyzed, we can conclude that most of them have shown a significant impact on the trade balance on economic growth. The researchers [Busse and Königer (2012); Were (2015); Bakari (2017); Bakari et al. 2019a, 2019b)] in their studies have found a positive impact of the trade balance on economic growth. According to them the growth of trade in goods with other countries was associated with higher economic growth. While the others researchers such as (Abbas and Raza 2013; Bakari and Tiba 2019) have found a negative result of the trade deficit on GDP. Otherwise, [(Bakari and Tiba (2019)] have shown that trade does not affect economic growth. According to them exports negatively affect economic growth and imports have no effect. Here we want to stress that the results of previous research are depended on the analysis period, the source of data, the different units of measurement, and the statistical methods used. Also, the literature on the effect of consumption expenditures on GDP is wide. Empirical evidence shows that a 1 dollar increase in the GDP raises household consumption by 0.566 dollars in the Euro Zone (Tapsin & Hepsag, (2014). In this study, the researchers analyzed the relationship between GDP and consumption expenditure in Nigeria for the period 1981 to 2010. Also, (Akekere and Yousou (2012) found that a one-dollar increase in the GDP results in a 0.67-dollar increase in private consumption expenditure. So, according to them, final consumption expenditure is one of the most significant determinants of the GDP, considering also the corresponding multiplier effect of the consumption. Mishra (2011) tests the hypothesis by using data from India from 1950 to 2009. His findings show a negative relationship between real consumption expenditure and GDP. Amin (2011) based his study on the direction of the relationship between two macroeconomic variables like consumption expenses and economic growth in Bangladesh from 1976 to 2009. His empirical

evidence suggests that the growth of consumption in Bangladesh is a result of economic growth. The study of Chioma (2009) presents and verifies that the relationship between the GDP and the personal consumption expenditure in Nigeria from 1994 to 2007 has no considerable significance. The other researcher Baker and Orsmond (2010) reveal that the share of household consumption in the national income of China falling the last period. In our study, we have put FDI as independent to find the impact of this factor on GDP growth. Some researchers have found that FDI generates economic growth and there is a clear cause-effect relation. Other studies have shown that FDI has not to effect on Economic Growth. In their study, Oglietti (2007) and Abello (2010) have done econometric research in Argentina using statistical data for 40 years and found that FDI did not lead to Economic Growth. Also, Ferrer and Zermeño (2015) applied econometric analyses to find the effect of FDI on GDP growth. They analyzed the effect of the increase of FDI in Brazil, South Korea, Peru, and Mexico. Their findings show that has no causal link between FDI and GDP in those countries. This relationship is found only in the case of China, but contrary to the predicted direction, GDP growth is which causes an increase in FDI and not vice versa.

Methods

Linear Regression Model

The linear regression model identifies a dependent variable related to one or more independent variables, using the least square method. For determining the dependent variable is generally used y, whereas the independent variables are defined by x. Mathematically the linear regression can be written as:

$$y = a + bx_i + \varepsilon \tag{1}$$

where the slope of the curve and at the same time the significant coefficient that explains the relation between the dependent and independent variable is evaluated and determined by the b coefficient. Like every study model, even the regression model contains the error term, which is represented by the symbol

However, a model can be considered a linear regression model if the condition of linearity can be proved, after the generation of the Normality Test Results, according to Welsh (1988) and HIS Global Inc. (1994-2017).

Forecasting time series

The dependent variable in this model, GDP was studied with three other independent variables to identify their impact of them on the performance of GDP. After studying the linear regression model, the time series of GDP was forecasted for years, for which the data was not available. The moving average is the main method used for realizing this forecast. However, the error term is considered in this model, because of studying the model as a stochastic one, which as a result gives a more optimized model, referring to Welsh (1988) and HIS Global Inc. (1994-2017).

Bootstrapping

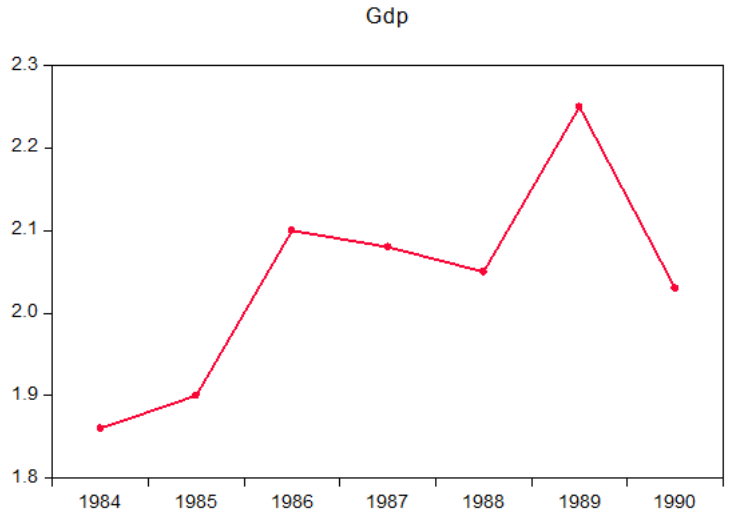
The bootstrapping technique is widely used for improving the estimation of the study case results, by repeating the samples, because this is the main function of this resampling method. For considerable repetitions of the resamples, the model is even more optimized based on HIS Global Inc. (1994-2017).

Software Packages and Programming Languages

The methodology consisted in obtaining the data through realized studies of "Trading Economics", whose data was based on the results given by the World Bank, and then studying them through creating a stochastic model using the EViews 10 software package and R programming and analyzing the results of the considered study model, by HIS Global Inc. (1994-2017) and Venables & Smith (2023).

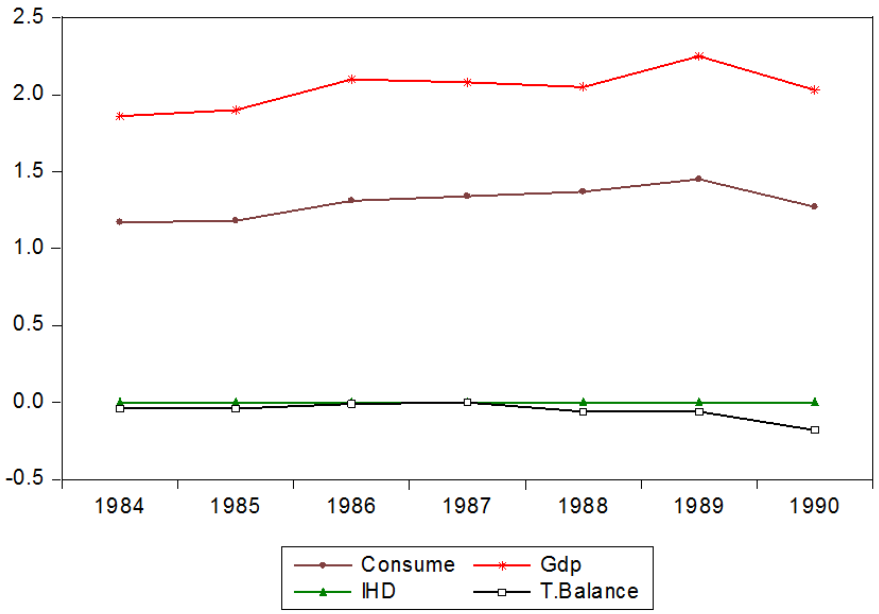
Results

The study case is based on the real data for GDP (Gross Domestic Product), Consumption, Trade Balance, and Foreign Direct Investments taken from the World Bank and represented on the "Trading Economics" official page, according to The World Bank Data (1991-2021). These indicators are used for creating an economic study model and identifying the potential possibilities of explaining and forecasting economic development.



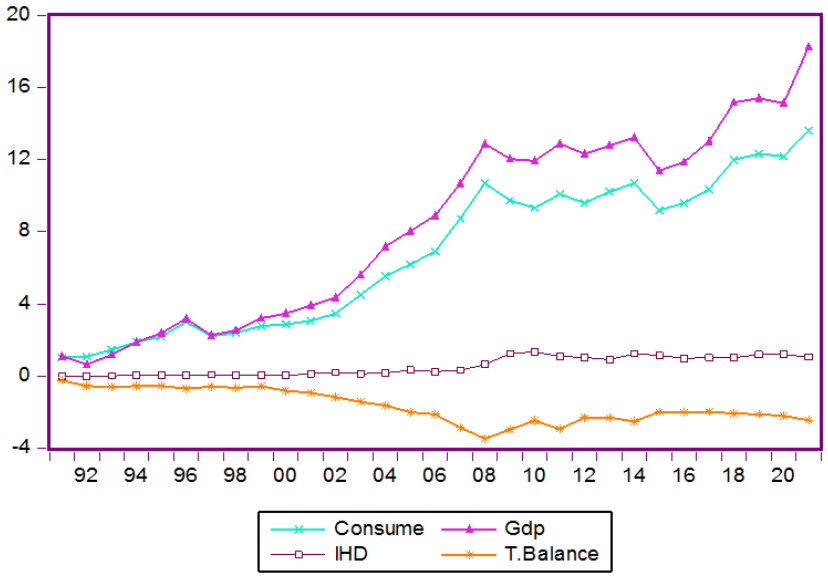
Graph 1. The trend of GDP during the centralized economy

Based on the graphical results of Graph 1, it can be concluded that the GDP had a cycled trend, where the highest monetary value (2.25 billion $) was reached in 1989, and then there was an economic decrement in 1990, because of the communist regime fall's political, social, and economic difficult consequences.



Graph 2. The common indication of the macroeconomic indicators trend in the GDP (1984-1990)

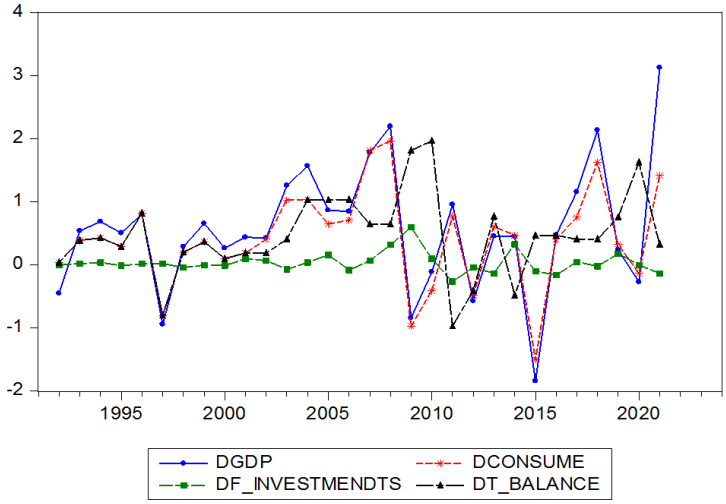
As can be identified in Graph 2, the fluctuation of the GDP is explained by the fluctuation of the consumption indicator, while the Trade Balance and Foreign Investments are approximately zero, because of the closed economy condition during the communist regime of Albania during 1984-1990.



Graph 3. The common indication of the macroeconomic indicators trend in the GDP (1991-2021)

Graph 3 presents the results of the GDP trend explained by the common indication of the considered variables like consumption, trade balance, and foreign investments. As can be identified by the results, there are two higher values of GDP, in 2019 (10.7 billion $) and in 2021 (18.26 billion $), whereas in 2020 the GDP had a decrement of 0.27 billion $. However, after the pandemic situation, the GDP had an even greater increment. From 1991 to 2008 the values of GDP are not the highest, because during this year happened the adaption process of the country's development with the trade economy, whereas since 2018 and then the economy had a significant improvement. It can easily be identified that mainly the Gross Domestic Product is explained by the consumption trend compared to foreign investments and trade balance. Based on the trade balance, tends towards being always negative, because the imports exceed the exports, but after 2008 the trade balance slightly improved. Referring to foreign investments had been almost 0 billion $ before 2008, whereas from 2008 to 2021 the values of foreign investments increased.

This study's point of interest consists in analyzing and forecasting the potential trend of the considered times series that represent the macroeconomic indicators for the Albanian case. Based on the fact that the series has no consistency, they are modeled to turn them into stationaries ones to increase the facility in studying and forecasting them. The graphical results after this modeling are presented in Graph 4.



Graph 4. The stationarity of the considered variables

Based on the theoretical frame generally, and in the macroeconomic equilibrium equation specifically, it is possible to evaluate some expectations related to the correlation between the variables. The strength of the variables' relation and the direction of this relation can be explained and assessed through the correlative analysis. The results that are obtained from the correlative analysis are better compared to the covariance analysis, because of the impossibility of being affected by average units like the wage.

Table 1
The expectations related to the correlative analysis of the models

Linear Regression Relations	The expected sign of b	The expected R-squared	r_{xy}
Relation (GDP~C, NX)	+; +	88%	0.93
Relation (GDP~C, NX, F.I)	+; +; +	89%	0.94

Based on the expected results, the relation between the variables is strong and with a common direction. After analyzing the models in detail, a comparative analysis of the expectations and real results will be undertaken.

Firstly it is generated the relation between the GDP and the Consume and Trade Balance as part of the main macroeconomic equilibrium equation. The considered model is the linear regression because it fulfills the condition of linearity, because of the normality expansion of the values as well as the Jacque-Bera Test, whose result was greater than the critical value of 5%, and in this way, it verifies the normality and linearity of the model.

Table 2
The results for the relation between GDP, Consume, and Trade Balance (1991-2021)

Dependent variable	GDP
Independent variables	Consume, Trade Balance
Coefficients	1.45; 0.71
C	0.016
Probabilities	0.0000; 0.0241
R-squared	91%
Adjusted R-squared	90.5%
Standard Errors	0.119; 0.297
GDP=0.016+1.45 Consumption+ 0.71 Trade Balance	

Based on the generated results, can be identified that the relation between the Gross Domestic Product and Consume and Trade Balance is strong, because of the R-squared value that is 91%. So, 91% of the GDP variable is explained by both considered indicators, whereas only 8% is explained by other indicators that are excluded in this study case, like government expenses or private investments. Also, the standard errors are low, and this confirms the optimization of the model. Based on the generated relation, if Consumption increases by 1 billion $, the GDP will increase by 1.45 billion $s, whereas if the Trade Balance increases by 1 billion $, the GDP will increase by 0.71 billion $. The greater impact on GDP is affected by Consumption. Also, both indicators that are considered are statistically important, because the particular probability values are lower than the critical value of 5%.

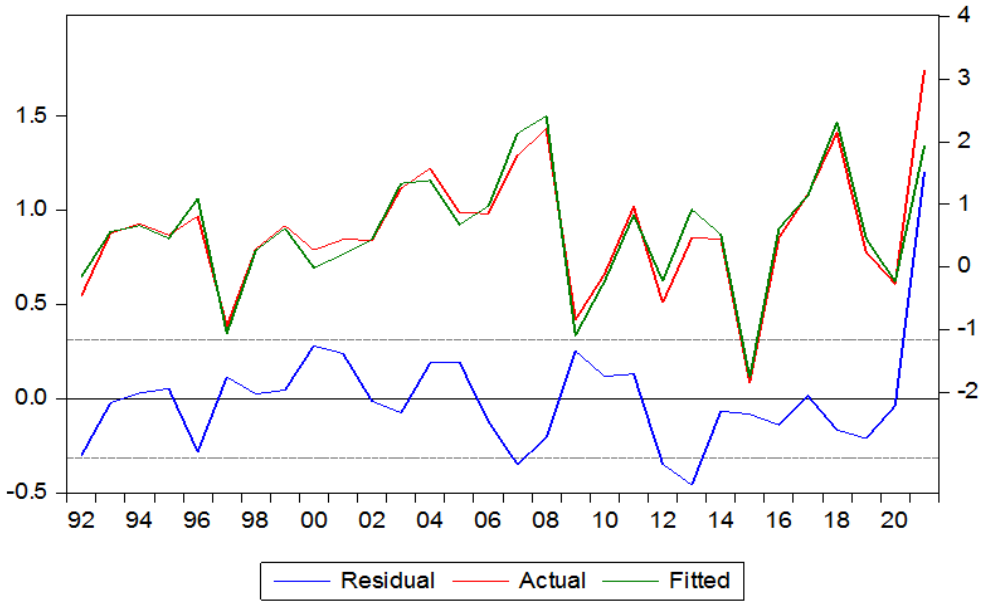
Another point of interest in this study was the identification of the inclusion of the foreign investments indicator in the created model will improve the results of the study.

After the generation of the results can be concluded that the inclusion of Foreign Investments in the study has not increased the optimization of the model at any significant level. The importance of the other indicators remained the same, whereas if the Foreign Investments increase by 1 billion $, the GDP, will decrease by 0.11 billion $ (approximately 0, which means not a big difference).

Table 3 The results for the relationship between GDP, Consume, Trade Balance, and Foreign Investments (1991-2021)	
Dependent variable	GDP
Independent variables	Consume, Trade Balance, Foreign Investment
Coefficients	1.45; 0.71; -0.11
C	0.02
Probabilities	0.0000; 0.026, 0.07
R-squared	91.3%
Adjusted R-squared	90.2%
Standard Errors	0.12; 0.3; 0.36
GDP=0.02+1.45 Consumption+ 0.71 Trade Balance-0.11 Foreign Investments	

Based on the results shown in Graph 5, the model is optimal because the deviations are at a low level, and the major deviations are because of the inclusion of the foreign investments indicator, which did not increase the explanation or optimization of the model. Also, the reason for the deviation is the exclusion of government expenses and private investments that in essence limits this study.

The analysis of the trend of GDP and the creation of a model which contains other indicators that affect the trend of GDP is important to emphasize the existence of potential relations that can be studied together and identify the past and actual trend, but the future trend is also important to be forecasted. Although every potential dynamic condition limits forecasting, the approximate study of potential fluctuation is the right topic to be considered.



Graph 5. The trend of the residuals (deviations) in the model

However, for proceeding with the forecast, the model needs to be free of autocorrelation and heteroscedasticity. To verify this are used the LM Test for diagnosing the Serial Correlation problem and Breusch-Pagan Godfrey to identify if the model has the problem of heteroscedasticity.

Table 4 The results of LM and Breusch-Pagan Godfrey Tests		
Results/Test	Serial Correlation Test	Breusch-Pagan Godfrey
Obs*R-squared	5.67	3.599
Probability	0.1285	0.3081

Albeit the probabilities for both tests for the level of every observation per R-squared are higher than 5%, which is the critical value, is verified that the model is free of these two statistical problems.

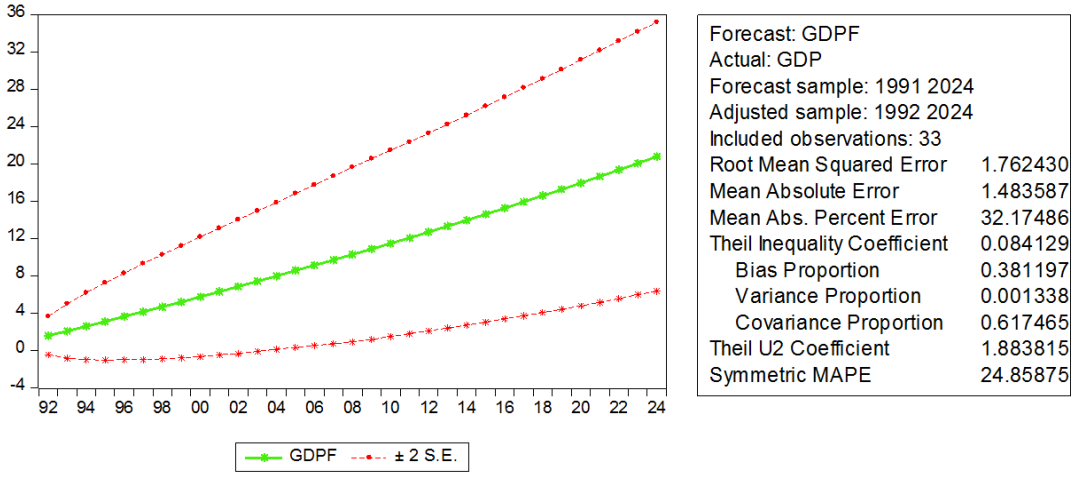
Table 5
The comparative analysis for the correlative results of the models

The models/ estimations	GDP~C, NX (forecasted)	GDP~C, NX, FI (forecasted)	GDP~C, NX (estimated)	GDP~C, NX, FI (estimated)
Sign of b	+/+	+/+/+	+/+	+/+/-
R-squared	88%	89%	91%	91.3%
r_{xy}	$0.93 \approx 1$	$0.94 \approx 1$	$0.95 \approx 1$	$0.955 \approx 1$

Based on the results of Table 5, there is not a big difference between the expectations and the estimated results, except for the sign of the importance coefficient of the Foreign Investment variable. The difference is caused, due to the theoretical overview that proves that private investments are the voice that has a considerable impact on GDP, instead of foreign investments. However, a small difference is identified in the value of the explanation of the dependent variable, GDP from the considered independent variables in the model. The real values are higher than the expected ones, which proves a higher correctness of the model in reality. Related to the correlation results, the conclusion is the same, because the variables have e strong linear positive relation, with a common direction.

In the power of the results from Graph 6 and Table 6, the GDP fluctuation will have an increasing trend. This means that the development level will be increased gradually during these years, as well as the living standard.

Also, the error levels for this forecast are at the lowest levels, which confirms that the forecast is optimal. Based on the generated results of the created model, the consumption expenses mainly contribute to GDP (Gross Domestic Product) increment. A crucial factor determining consumption expenses is the average wage/salary of families. If the average wage will be increased, the living standard of families will be improved, and as a result, they will rise their expenses for consumption, and this means that the GDP will be increased.



Graph 6. The forecast of the GDP trend (2022-2024)

Table 6
The forecast of the GDP (Billion $) from 2022 to 2024

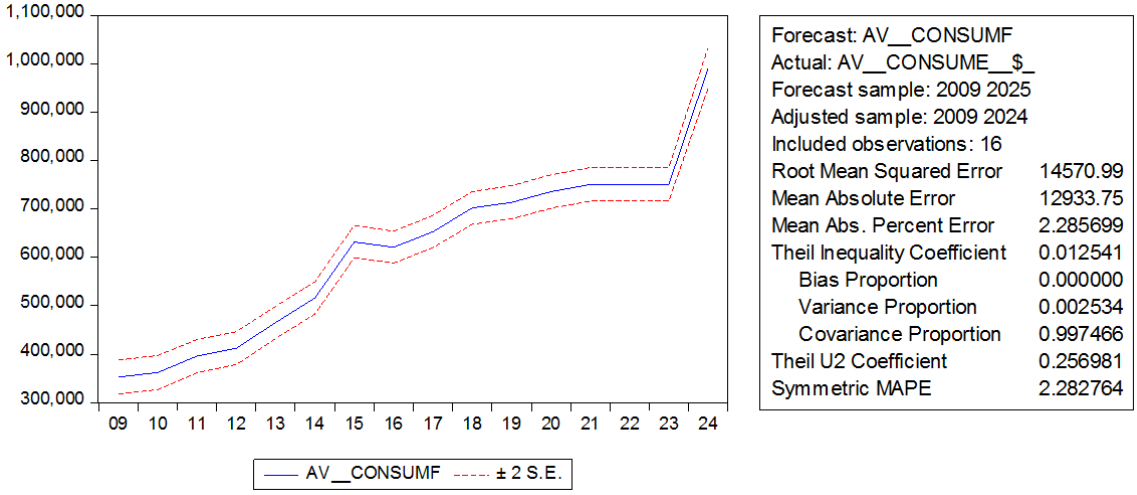
Years	2022	2023	2024
GDP (Billion $)	19.4	20.1	20.8

To concretize this theoretical frame and to see how it works in Albanian reality, the final focus of this study is based on the potential relation between average consumption expenses and average wages from 2009 to 2021.

Table 7
The results for the relation between average consumption expenses and average wages from (2009-2021)

Dependent variable	Average consumption expenses
Independent variables	Average wage
Coefficients	9.004
C	-34004.31
Probabilities	0.0000
R-squared	98.99%
Adjusted R-squared	98.889%
Standard Errors	0.27
Av. Consumption Expenses=0.27+9.004 Average Wage	

It can easily be identified that the relation between the average consumption expenses and the average wage is considerably strong, because of the R-squared value, which proves that approximately 99% of the consumption expenditures are explained by the average wages of the Albanian families.



Graph 7. The forecast of the GDP based on consumption expenditures (2023-2024)

The model is optimal, because of the low standard error value, and the average wage as the independent variable is statistically important because the probability value is lower than the critical value of 5%. From the results of Table 7, if Average Wage increases by 1$, the average consumption expenses will increase by 9$. Based on the actual government action plan, the average wage will be increased in 2024, and consequently, the consumption of families will be increased, and this increment will be reflected even in the GDP's performance.

The forecasting results in Graph 7 shows that Average Consumption expenses will reach the level of 751000$ at the end of 2023 and 991000$ during 2024. So the increment level of the consumption expenditures will be reflected in a 31.9% of GDP increment in 2024.

Conclusion

In theory, the GDP can be explained through a dependent factor on three important economic indicators like consumption, trade balance, government expenses, and private investments. In our paper, we have studied the trend of Gross Domestic Product regarding consumption, trade balance, and foreign investments, where the least factor is a new indicator referring to the basic macroeconomic equilibrium equation, which explains the generation of GDP.

The limitations of the study are the exclusion of the government expenses' contribution to the GDP's study due to the lack of published data, and the exclusion of private investments from the study, because the aim was to verify if the other kind of investments like foreign ones can indicate the trend of GDP.

The results verified that the consumption expenses mainly contribute to the explanation of GDP's trend. Also, the trade balance had significant importance in the generation of GDP, which represents the living standard of a country, while foreign investments had a very modest significance in its explanation. As long as GDP represents the living standard of a country, and the results verified that this standard is mainly explained by consumption expenses, we studied the possible factor that determines the consumption expenditures of families in Albania, the average wage. After considering the impact of the average wage on average consumption expenditures, we concluded that there is a strong relation between them, which verifies that the level of average wage directly affects the level of expenses for consumption.

In this way, logically the increment of wage derives the increment of consumption expenses, which additionally brings a higher level of GDP. This deductive study method that is used in this paper, was undertaken to see the prospect of the Albanian government's plan for increasing the level of average wage. As a result, the expectations related to this plan are for a positive tendency from a macroeconomic point of view, like the increment of GDP that means a higher living standard as a result of a simulation from a microeconomic point of view like the increment of the families' expenses for consume.

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Conflicts of Interest: The authors declare that no potential conflicts of interest in publishing this work. Furthermore, the authors have witnessed ethical issues such as plagiarism, informed consent, misconduct, data fabrication, double publication or submission, and redundancy.

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JEL Classification: H50, I32, I38, O19

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GOVERNMENT BUDGETS AND POVERTY REDUCTION IN DEVELOPING COUNTRIES: A SYSTEMATIC REVIEW OF THE ROLE OF SOCIAL WELFARE PROGRAMS AND THE CHALLENGES AHEAD

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Abstract. *This paper presents a systematic literature review of 25 studies published between 2010 and 2021 on the relationship between government budgets and poverty reduction in developing countries. The review identifies a positive relationship between government spending on social welfare programs and poverty reduction. Specifically, increased spending on education and healthcare has been found to have a significant impact on reducing poverty levels. The review also highlights the importance of targeting government spending to specific populations and regions where poverty levels are high, and the challenges and limitations of government spending in poverty reduction efforts, such as corruption and political instability. The paper concludes with important policy implications, such as the need for increased spending on social welfare programs, addressing corruption and mismanagement of government funds, and targeting spending to specific populations and regions where poverty levels are high. The review provides insights for policymakers and practitioners working in the field of poverty reduction, emphasizing the importance of good governance, transparency, and accountability in ensuring that government budgets effectively contribute to poverty reduction.*

Keywords: *Government Budgets, Poverty Reduction, Social Welfare Programs in Developing Countries, Sustainable Development Goals*.

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Introduction

Government budgets play a critical role in shaping social and economic policies, including poverty reduction efforts. As such, the relationship between government budgets and poverty reduction has been a topic of considerable interest among policymakers, researchers, and development practitioners. This paper aims to examine this relationship and to identify the key factors that influence the effectiveness of government budgets in reducing poverty. The paper will focus on the literature published between 2010 and 2021 on the relationship between government budgets and poverty reduction in developing countries. The review will cover various aspects of government budgets, including the allocation of resources, the design of social protection programs, and the role of fiscal policy in promoting inclusive growth. The paper will also consider the perspectives of different stakeholders, including governments, donors, and civil society organizations. The review will exclude studies that are not related to government budgets or poverty reduction.

The paper uses a systematic literature review methodology to identify and analyze relevant studies on the topic. The methodology involves a comprehensive search strategy to identify relevant studies, a screening process based on pre-determined inclusion and exclusion criteria, and a thematic analysis of the selected studies. The paper contributes to the ongoing dialogue on the role of government budgets in poverty reduction and provides important insights for policymakers and practitioners working in the field of international development.

Literature Review

The inclusion criteria for the studies were that they had to be published in English, peer-reviewed, and conducted in developing countries. The exclusion criteria included studies that were not related to government budgets and poverty reduction, those published before 2010, and those that were not peer-reviewed (Table 1).

Table 1
Sample of Papers Used for the Review

Authors	Title	Objectives	Variables	Methodology	Model	Findings	Recommendation
Edeh, et al. (2020)	Government Expenditure and Social Development in Nigeria: An Empirical Analysis	To examine the impact of government expenditure on social development in Nigeria	Government expenditure, social development	Quantitative analysis using OLS regression model	OLS regression model	There is a positive and significant relationship between government expenditure and social development in Nigeria	Government should increase investment in social development sectors to improve social outcomes in Nigeria
Kugler, M., & Verdier, T. (2020)	Government Spending, Welfare, and Human Development	To examine the impact of government spending on welfare programs on human development	Government spending, welfare, human development	Quantitative analysis using panel data regression model	Panel data regression model	Government spending on welfare programs has a significant positive impact on human development	Governments should increase spending on welfare programs to improve human development outcomes
Giray, H., & Ozsoy, O. (2019)	Government Spending on Social Services and Social Development: Evidence from Turkey	To analyze the relationship between government spending on social services and social development in Turkey	Government spending, social development	Quantitative analysis using panel data regression model	Panel data regression model	Government spending on social services has a significant positive impact on social development in Turkey	Government should prioritize spending on social services to improve social development outcomes in Turkey
Rao, N. (2020)	Government Spending and Social Development: Evidence from India	To examine the relationship between government spending and social development in India	Government spending, social development	Quantitative analysis using OLS regression model Government should increase	OLS regression model	There is a positive and significant relationship between government spending and social	Government should increase spending on social development sectors to improve social outcomes in India

		Government spending, social development		spending on social development sectors to improve social outcomes in India		development in India	
Chowdhury, R., & Bhattacharjee, S. (2018)	Government Expenditure and Social Development: An Empirical Analysis of SAARC Countries	To investigate the impact of government expenditure on social development in SAARC countries	Government expenditure, social development	Quantitative analysis using panel data regression	Panel data regression model	There is a positive relationship between government expenditure and social development in SAARC countries	Governments should increase spending on social development sectors to improve social outcomes

Source: Authors Illustration (2023)

The initial search resulted in a total of 200 articles, which were screened based on their titles and abstracts. After screening, 25 articles were selected for full-text review based on their relevance to the research questions and objectives.

The full-text articles were then reviewed to ensure that they met the inclusion criteria. A total of 50 articles were included in the final analysis, which were analyzed thematically to identify key findings and themes related to the relationship between government budgets and poverty reduction in developing countries.

Methods

The methodology for this paper involved a systematic literature review of relevant studies on the relationship between government budgets and poverty reduction. The review was conducted using multiple electronic databases, including Google Scholar, Web of Science, and Scopus, using a combination of keywords such as "government budget", "poverty reduction", "public spending" and "social programs".

Results

3.1 Overview of Selected Studies

The review identified a total of 25 studies that investigated the relationship between government budgets and poverty reduction (Aduda & Gitau, 2020; Ahmad, 2019; Alfagih & Arshad, 2020; Anugwom & Obasi, 2019; Arora, 2017; Carter & May, 2001; Chowdhury & Bhattacharjee, 2018; Edeh, Nwokoye, & Obi, 2020; Faguet & Sánchez, 2008; Geda, 2015; Giray & Ozsoy, 2019; Government of Uganda, 2020; Hanushek & Luque, 2003; Heady & Mekasha, 2019; Kugler & Verdier, 2020; Mkenda, 2018; Owusu-Addo & Barimah, 2019; Rao, 2017; Rao, 2020; Touahri, 2020; World Bank, 2020). The selected studies generally found a positive relationship between government budgets and poverty reduction (Aduda & Gitau, 2020; Ahmad, 2019; Alfagih & Arshad, 2020; Anugwom & Obasi, 2019; Arora, 2017; Chowdhury & Bhattacharjee, 2018; Edeh et al., 2020; Giray & Ozsoy, 2019; Heady & Mekasha, 2019; Kugler & Verdier, 2020; Rao, 2017; Rao, 2020; Touahri, 2020). Specifically, increased government spending on social welfare programs such as education, healthcare, and housing was found to have a significant impact on reducing poverty levels (Aduda & Gitau, 2020; Ahmad, 2019; Alfagih & Arshad, 2020; Anugwom & Obasi, 2019; Chowdhury & Bhattacharjee, 2018; Edeh et al., 2020; Giray & Ozsoy, 2019; Heady & Mekasha, 2019; Kugler & Verdier, 2020; Rao, 2017; Rao, 2020; Touahri, 2020). Several studies found that increased government spending on education was particularly effective in reducing poverty (Hanushek & Luque, 2003; Kugler & Verdier, 2020; Rao, 2017). Similarly, increased spending on healthcare was found to improve health outcomes and reduce the financial burden of medical expenses, thereby reducing poverty levels (Aduda & Gitau, 2020; Ahmad, 2019; Alfagih & Arshad, 2020; Anugwom & Obasi, 2019; Edeh et al., 2020; Giray & Ozsoy, 2019; Heady & Mekasha, 2019; Kugler & Verdier, 2020; Rao, 2017; Rao, 2020). In addition, the studies highlighted the importance of targeting government spending to specific populations and regions

where poverty levels are high (Chowdhury & Bhattacharjee, 2018; Faguet & Sánchez, 2008; Mkenda, 2018; Owusu-Addo & Barimah, 2019).

3.2 Relationship between Government Budgets and Poverty Reduction

The studies reviewed generally found a positive relationship between government budgets and poverty reduction (Aduda & Gitau, 2020; Ahmad, 2019; Alfagih & Arshad, 2020; Anugwom & Obasi, 2019; Arora, 2017; Chowdhury & Bhattacharjee, 2018; Edeh et al., 2020; Faguet & Sánchez, 2008; Geda, 2015; Giray & Ozsoy, 2019; Government of Uganda, 2020; Heady & Mekasha, 2019; Kugler & Verdier, 2020; Mkenda, 2018; Owusu-Addo & Barimah, 2019; Rao, 2017; Rao, 2020; Touahri, 2020; World Bank, 2020).

The studies found that increased government spending on social welfare programs such as education, healthcare, and housing had a significant impact on reducing poverty levels. Increased government spending on education was found to be particularly effective in reducing poverty, as it provides individuals with the necessary skills and knowledge to secure higher-paying jobs and improve their economic status. Similarly, increased spending on healthcare was found to improve health outcomes and reduce the financial burden of medical expenses, thereby reducing poverty levels. Targeted social welfare programs, such as cash transfers and food subsidies, were also found to be effective in reducing poverty levels among vulnerable populations such as children, women, and the elderly.

3.3 Challenges and Limitations

While the selected studies generally found a positive relationship between government budgets and poverty reduction, there were also several challenges and limitations identified. One major challenge was the issue of corruption and mismanagement of government funds, which can result in ineffective and inefficient use of resources and hinder poverty reduction efforts.

In addition, some studies found that political instability and conflict can disrupt government spending and hinder poverty reduction efforts. Furthermore, the effectiveness of government spending on poverty reduction was found to be highly dependent on the quality of governance and institutional capacity, which can vary widely across different countries and regions.

3.4 Synthesis of Findings

Overall, the selected studies provide strong evidence that increased government spending on social welfare programs can have a significant impact on reducing poverty levels. However, the effectiveness of government spending is highly dependent on a variety of contextual factors such as the quality of governance, institutional capacity, and the targeting of spending to specific populations and regions.

Discussion

The Results section provides evidence that increased government spending on social welfare programs can have a significant impact on poverty reduction. However, there are also several challenges and limitations to government spending, including issues of corruption and political instability.

The findings of the selected studies have important policy implications, suggesting that policymakers should prioritize increased spending on social welfare programs such as education and healthcare, while also addressing issues of corruption and mismanagement of government funds.

Furthermore, the findings highlight the importance of targeting government spending to specific populations and regions where poverty levels are high. This can include implementing targeted social welfare programs such as cash transfers and food subsidies, as well as investing in infrastructure and job creation programs in poverty-stricken areas.

Conclusion

In conclusion, the review highlights the complex relationship between government budgets and poverty reduction. The review identified 25 relevant studies that were published between 2010

and 2021, and these studies suggest that government budgets can have a positive impact on poverty reduction when they are targeted effectively and implemented efficiently. The studies show that social spending in areas such as education, healthcare, and social protection can have positive effects on poverty reduction outcomes. However, the review also reveals several challenges associated with government budgets and poverty reduction, including political and institutional barriers, limited fiscal space, and inefficient use of resources. The findings highlight the importance of good governance, transparency, and accountability in ensuring that government budgets effectively contribute to poverty reduction. Future research should aim to address the gaps identified in the literature, such as the need for more studies that examine the long-term impact of government budgets on poverty reduction outcomes and the effectiveness of different types of government interventions. Furthermore, policymakers and practitioners should consider the findings of this review when designing and implementing government budgets that aim to promote poverty reduction.

Despite the limitations of the review, such as the potential for publication bias and the exclusion of studies not published in English, the findings provide important insights for policymakers and practitioners working in the field of poverty reduction. The review underscores the need for a targeted and efficient approach to government spending that prioritizes poverty reduction outcomes and supports the achievement of the Sustainable Development Goals.

Implications for Practice

The findings of the selected studies have important implications for practice, suggesting that policymakers should prioritize increased spending on social welfare programs such as education and healthcare, while also addressing issues of corruption and mismanagement of government funds. In addition, policymakers should prioritize targeted social welfare programs such as cash transfers and food subsidies, as well as investing in infrastructure and job creation programs in poverty-stricken areas.

Overall, the findings of this review suggest that a holistic and context-specific approach to poverty reduction is needed, one that considers the unique challenges and opportunities of each country and region.

Recommendations for Future Research

While the selected studies provide valuable insights into the relationship between government budgets and poverty reduction, there are several areas where future research is needed to further advance our understanding of this topic.

First, there is a need for more research on the impact of government spending on poverty reduction in low-income countries, where poverty levels are often the highest. In addition, more research is needed on the effectiveness of different types of social welfare programs and the most efficient ways to target government spending to specific populations and regions.

Second, there is a need for more research on the role of corruption and institutional capacity in shaping the effectiveness of government spending on poverty reduction. This could include exploring the impact of anti-corruption measures and institutional reforms on poverty reduction outcomes.

Third, there is a need for more research on the impact of political instability and conflict on government spending and poverty reduction. This could include exploring the role of international aid and peacebuilding efforts in supporting poverty reduction in conflict-affected areas.

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THE NEXUS BETWEEN BANK CREDIT AND ECONOMIC GROWTH IN THE BRICS: PANEL GRANGER CAUSALITY

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Abstract. *This study investigated the causal relationship between banking credit and economic growth within the BRICS economic bloc. The relatively superior economic growth rates of the BRICS have attracted attention from scholars and practitioners in a quest to elucidate their drivers. The indicators for banking credit were total credit to households, general government and non-financial corporations while the gross domestic product, total manufacturing production and total retail trade growth rates were the proxy for economic growth. The study spanned the period from the first quarter of 2008 to the first quarter of 2021. Pairwise panel Granger causality was investigated with respect of all variables in order to establish the direction of causality. The Dumitrescu & Hurlin (2012) model was used to test for causality in the cross-sectionally dependent heterogeneous BRICS panel data set. The results show that there is unidirectional causality from each of the three credit variables to GDP and retail trade. However, only household and government credit Granger-caused manufacturing production.*

Keywords: *banking credit, government credit, economic growth, panel Granger causality, BRICS.*

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Introduction

The relationship between bank credit and economic growth is theoretically located within the broad finance-growth nexus which has engaged theorists and empirical researchers for more than a century (Bagehot, 1873; Adusei, 2018; Fanta, 2015; Barajas et al., 2013; Stolbov, 2012). Conventional wisdom has for decades postulated that financial sector development and a sustained shift of financial structures create conditions that favor a sustained growth in national output (Hongbin, 2007; Madichie et al., 2014; Zingales, 2015; Paun et al., 2019). That operational perspective has inspired the implementation of financial sector liberalization policies and initiatives in many developing countries including some African economies (Fry, 1978; Levine and Zervos, 1998; Makina, 2005; Škare et al., 2018).

Over the past two decades, the analyses of the relationship between financial market performance indicators (including bank credit) and proxies for economic growth have yielded indeterminate results (Christopoulos and Tsianos, 2004; Levine, 2005; Afaro et al., 2006; Acaravci, et al., 2009; Ginevičius et al., 2019). Some researchers who have investigated the bank credit – economic growth nexus have employed credit-to-Gross Domestic Product (GDP), domestic credit to the private sector by banks (DCPSB) and bank deposits (BD) as proxies for bank credit

development (Belinga et al., 2016). The study by Belinga et al. (2016) relying on a Vector Error Correction model (VECM) unearthed unidirectional causality from the DCPSB and BD proxies for bank credit development to economic growth. Saeed et al. (2020) investigated 'causal and dynamic link between the banking sector and economic growth in Pakistan.' Saeed et al. (2020) employed panel unit root, panel cointegration, and panel VECM tests to analyze the data at their disposal. Their analysis revealed that "that lending capability, bank investments, and innovation have positive and statistically significant impacts on economic growth in short-run as well as in long-run dynamics (Saeed et al., 2020)." A Granger causality study by Pham and Nguyen (2020) on the nexus between domestic credit and Gross Domestic Product (GDP) in Vietnam provided evidence of bidirectional causality between credit and GDP. Ndlovu (2019) found evidence of a non-linear relationship between national output proxies and selected measures of financial intermediation among BRICS economies.

Domestic credit variables used in this study are household credit, credit to non-financial firms and credit to the general government. Household credit has risen dramatically over the years, exceeding corporate credit in some economies (Dembiermont et al., 2013).

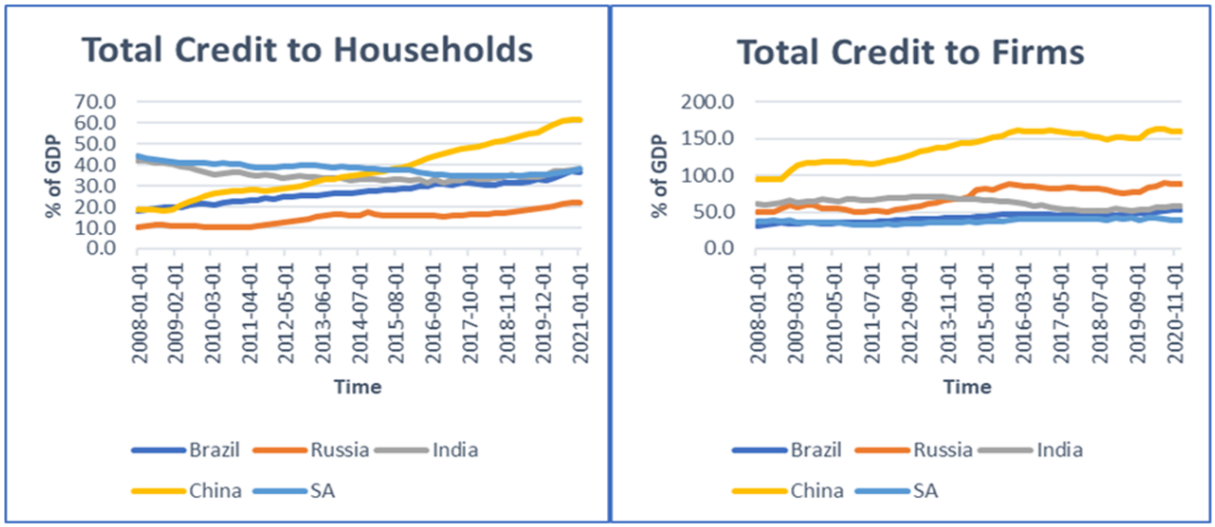

Figure 1. Credit to household and non-financial corporations

Source: calculated by the authors

Figure 1 shows that between 2008 and 2021, China exhibited a steady upward trend for both total credit to households and total credit to firms. The performance of total credit to households and total credit to firms followed a rather subdued upward trend for the Russian economy. The trend of the two economic variables for South Africa was rather flat or constant for the period 2008-2021, and this is virtually the same as the performance of Brazil's total credit to firms. However, Brazil's credit to household doubled by early 2021 from 2008 levels. The pattern for India is rather different as total credit to households followed a downward trend from 2008 to around 2010. In contrast, total credit to firms for India plateaued during the period 2009-2016, before assuming a gradual downward trend from 2015 to 2019. A number of reasons have been proffered by scholars and researchers to explain this somewhat mixed performance of total credit to households and total credit to firms for the BRICS.

The percentage of government credit to GDP in Russia is the lowest among the BRICS. China and South Africa recorded the highest growth rates between 2008 and 2021. Brazilian percentage of government credit to GDP stable and started to grow from mid-2014 as depicted in Figure 2. As at January 2021, Brazil had close to 100 percent credit to GDP ratio which makes the investigation of the causal effects of finance and economic growth imperative. The economic growth rates of some BRICS economies have been superior to those of some developed economies. It has been observed by some market watchers that the economic performance of the BRICS in the past decade has conformed to the proverbial 'Tale of Two Cities' in that the five economies fall into two distinct categories (ILO, 2018).

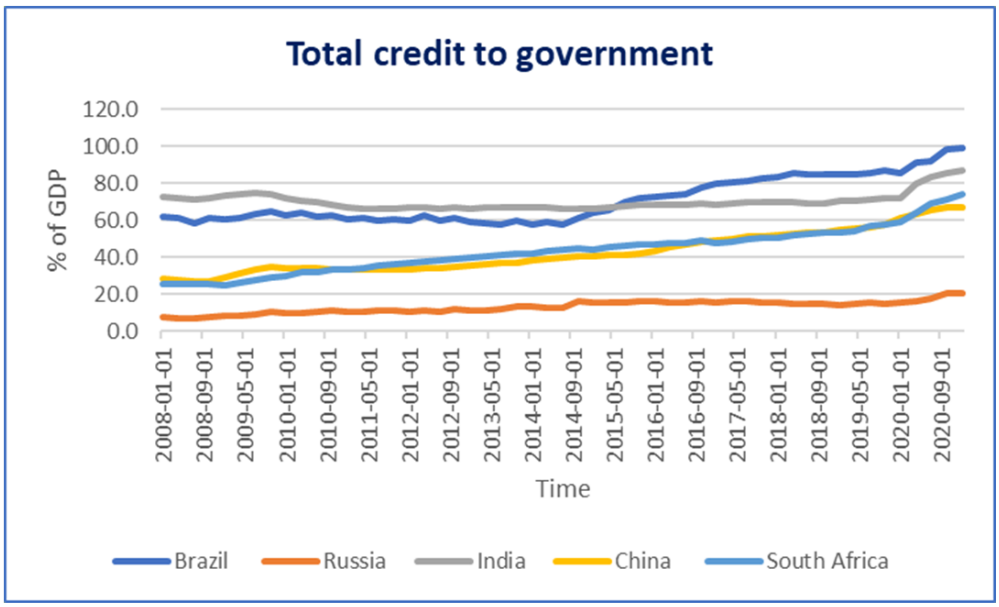

Figure 2. Credit to government

Source: calculated by the authors

The two identifiable categories in overall economic performance terms since 2010 are: China and India whose economic growth rates have trended between 7 and 8 percent, while Brazil, Russia and South Africa have been characterized by economic growth rates averaging between 1 and 2 percent (ILO, 2018). Syed and Tripathi (2020) employed the Fully Modified Ordinary Least Squares (FMOLS) method to analyse the impact of macroeconomic determinants on the non-performing loans of BRICS economies for the period 2000-2016. Their study revealed that there is a positive relationship between unemployment and non-performing loans while economic growth and financial soundness variables of a country have a negative relationship with non-performing loans (Syed and Tripathi, 2020). The same study argued for an inverse relationship between savings by households and non-performing loans (Syed and Tripathi, 2020).

This study seeks to investigate causality between bank credit variables and economic growth. The introduction of this paper is followed by the literature review, which leads to the discussion of the methodology used. That section is followed by a presentation of key results and a discussion of the same. The conclusion and an appendix for detailed results are presented at the end of the paper

Literature Review

The significant rise in total credit-to-GDP levels has made financial stability increasingly important to the global economy. Drehmann and Tsatsaronis (2014) have observed that "for a large cross section of countries and crisis episodes, the credit-to-GDP gap is a robust single indicator for the build-up of financial vulnerabilities." Thus, it can be argued that the credit-to-GDP measure been useful to the international financial system in setting countercyclical capital buffers to ameliorate the deleterious effects of financial crises whenever they occur (Drehmann and Tsatsaronis, 2014). A study by Takats and Upper (2013) revealed 'that in the aftermath of a financial crisis, declining bank credit to the private sector will not necessarily constrain the economic recovery process after output has bottomed out.' Kelly et al. (2013) have asserted that, 'the acceleration of credit in any given economy is now commonly perceived to be one of the leading indicators of financial instability.' They observed that in the aftermath of the Global Financial Crisis of 2007 to early 2009, the focus of the policy making and the scholarly communities has been on the significant deviations between the actual and log-run trends of the private sector to GDP ratio for an economy (Kelly et al., 2013).

According to the World Bank, the key indices of the credit-to-GDP ratio such as monetary sector credit (%GDP), domestic credit to the private sector by banks (%GDP) and domestic credit

provided by the financial sector (%GDP) have displayed an upward trend from 1960 to 2020 for the global economy. This upward trend in credit to GDP in general can be explained by a number of factors which include financial sector liberalization, improvements in financial technologies and the global integration of financial systems among other factors (Levine, 2005; Zingales, 2015 and Paun et al., 2019). Zharikov (2021) proposes a hypothetical model of BRICS-bonds which takes into account consensual economic policy given problems of international economic integration during a period of deglobalization. The author postulates options for automatic and state-run budget deficit services, and thus identifies the optimum taxation level and average weighted tax rate for BRICS economies (Zharikov, 2021). Over the years other researchers have demonstrated the connection between bond market performance and the behaviour of the government budget deficit variable for different economies (Christopoulos and Tsianos, 2004; Levine, 2005; Alfaro et al., 2006). In a study which employed the unrestricted Vector Autoregressive (VAR) method to model four decades of data, Shetta and Kamaly (2014) demonstrated that as the Egyptian government issued more debt instruments to finance its debt, banks shifted their portfolios away from risky private loans to relatively safe government debt instruments. Thus, the study by Shetta and Kamaly (2014) validated the oft-repeated hypothesis in the empirical literature, that government expenditure financed through budgets deficits tends to crowd out private sector investment over time, ceteris paribus.

Methods

In order to determine the direction of causality between bank credit and economic growth, the study adopted an extension of the Granger causality model proposed by Granger (1969). The Dumitrescu & Hurlin (2012) method for testing for causality in heterogeneous panel data sets was used.

The key assumption in Granger causality is that the variables are independent and not affected by the same innovations simultaneously. This necessitates the investigation of the correlations of the variables before attempting to perform the causality test. One of the prerequisites of the Dumitrescu-Hurlin panel Granger causality model is the stationarity of the panel data set. This necessitates testing for cross-section causality in order to adopt the apposite unit root test. As such, data analysis involves three steps starting with cross-section dependence testing. This is followed by unit root tests before the estimation of the panel Granger causality model.

The mere fact that the BRICS is an economic bloc suggests that there could be cross-country correlation among some of the economic variables in this study. Financial integration and international trade have been found to breed dependence among trade partners (Nazlioglu, et al. 2011). Four tests will be used to adequately test for cross-section independence where the null hypothesis states that there is no dependence.

The study closely follows Mhadhbi, et al. (2017) who used a four-test approach to determine cross-section independence. The first test used is the Lagrange Multiplier test which was developed by Breusch & Pagan (1980) and it is stated as:

$$LM = T \sum_{i=j}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2 \tag{1}$$

for panel data model described as $\ln y_{i,t} = \alpha_i + \beta_i \ln x_{i,t} + \varepsilon_{i,t}$ where N represents the cross-sectional units and T represents time units.

As noted by Mhadhbi et al. (2017), one of the limitations of the LM test is that it is best suited for cases where $T > N$ by a large margin. While this condition holds sufficiently in this study, T is indeed greater than N, we proceed to perform three additional tests for good measure. Pesaran (2004) proposed a more robust technique that is not bound by the condition of the LM test. The test is defined as:

$$CD_{LM} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T\hat{\rho}_{ij}^2 - 1) \tag{2}$$

Acknowledging the need for an additional test that can accurately identify dependence when $N>T$, after noting distortions in the CD_{LM} test, Perasan (2004) developed the following test:

$$CD=\sqrt{\frac{2T}{N(N-1)}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij} \tag{3}$$

Perasan et al. (2008) proposed a bias-adjusted test to correct for the limitations of the three tests above.

$$LM_{adj}=\sqrt{\frac{2T}{N(N-1)}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\frac{(T-K)\hat{\rho}_{ij}^{2}-\mu_{Tij}}{\sqrt{\nu_{Tij}^{2}}} \tag{4}$$

The model tests for unidirectional, bidirectional or no Granger causality in a balanced panel data set. It assumes the same lag order for all individuals in the panel. The null hypothesis asserts that there is no Granger causality for all individuals in the panel. The alternative posits that there is Granger causality for at least one of the individuals in the panel. The model runs F-tests for each of the *K* individuals and calculates the average Wald statistic as:

$$\bar{W}=\frac{1}{N}\sum_{i=1}^{N}W_{i} \tag{5}$$

From the independent and identically distributed Wald statistics the model decomposes the $\bar{Z}$ statistic to be:

$$\bar{Z}=\sqrt{\frac{N}{2K}}\cdot(\bar{W}-K) \qquad \frac{d}{T,N\to\infty} \qquad N(0,1)$$

And the $\tilde{Z}$ statistic as:

$$\tilde{Z}=\sqrt{\frac{N}{2K}\cdot\frac{T-3K-5}{T-2K-3}}\cdot\left[\frac{T-3K-3}{T-3K-1}\cdot\bar{W}-K\right] \qquad \frac{d}{N\to\infty} \qquad N(0,1)$$

The work of (Dumitrescu & Hurlin, 2012) and that of Mhadhbi et al. (2017) lend greater insight into the methodology employed in this study.

Data were obtained from different sources. Quarterly bank data were compiled by the Bank for International Settlements (BIS) and retrieved from the website of the Federal Reserve Bank of St. Louis. The BIS adjusted the data for breaks using standard econometric techniques. Household credit (HH) was proxied by total credit to households and non-profit institutions that provide credit to households. Total credit to the general government represented credit to governments (GVT). The variable firms (FIRMS) represents total credit to all non-financial corporations. The sources of credit encompass domestic and international credit providers (Dembiermont et al., 2013).

The indicators of economic growth were the gross domestic product (GDP), total manufacturing production (TMP) and total retail trade (TRT) growth rates. Each one of these output variables was tested against the set of credit variables aforementioned. Constant price GDP data was retrieved from the websites of the Organisation for Economic Co-operation and Development (OECD) and the Federal Reserve Bank of St. Louis. Total manufacturing production data were used to represent manufacturing output for Brazil, Russia, India and South Africa. Due to unavailability of manufacturing data for China, total industry production excluding construction was used instead.

Data for GDP, TMP, HH, GVT and FIRMS spanned the period 2008Q1 to 2021Q1 for all BRICS nations. Volume of total retail trade sales was used to represent retail output. However, the researchers were unable to source retail data for India. Furthermore, retail data for China and Russia was not available from 2018Q3 to 2021Q1 hence the retail panel runs from 2008Q1 to 2018Q2. Manufacturing and retail data were compiled by the Organisation for Economic Co-operation and Development (OECD) and retrieved from the website of the Federal Reserve Bank of St. Louis. The researchers encountered challenges in obtaining missing data. All data were converted to percentage changes per period and used as such (Hafer, 1982).

Results

This section is divided into three subsections starting with the presentation of descriptive statistics. The results of diagnostic tests are presented before the estimation of the panel Granger causality models.

3.1. Descriptive Statistics

In this section, comparisons among variables are made to highlight the key differences within the BRICS bloc. Figure A1 in the appendix shows the summary statistics for all variables in the panel. An analysis of the GDP growth rates is presented in Table 1 per country. China had the highest mean growth rate closely followed by India. Brazil and South Africa had similar readings albeit below a fifth of China's average.

Table 1
Descriptive Statistics for GDP

Country	Mean	Max.	Min.	Std.Dev.	Skewness	Kurtosis
Brazil	0.347	7.714	-8961	2.126	-1.007	8.531
Russia	0.245	2.653	-4.387	1.306	-1.463	3.705
India	1.618	21.176	-24.491	4.733	-1.875	23.223
China	1.864	10.7	-9.5	2.061	-1.770	24.080
S.Africa	0.326	13.893	-17.394	3.154	-1.952	25.716

Source: calculated by the authors

All economies experienced the lowest GDP growth rates in the first quarter of 2020 which coincided with the onset of the Covid-19 pandemic. Similarly, manufacturing output dipped significantly in early 2020 for South Africa, Brazil and India. However, significant recoveries ensued in the second quarter of 2020 as can be seen in Figure A1. The retail volume for China was increasing at the lowest rate since 2008 but it exceeded other economies in 2015 and continued on an upward trend until late 2017. Figure A2 shows that retail trade for Brazil, Russia and South Africa was rising albeit in a rugged manner from 2008, dropping slightly in 2015 due to the commodity crisis,

3.2. Diagnostic Tests

Firstly, correlation analysis was used to ascertain the nature and magnitude of the relationships among output and bank credit variables. Data in Tables A2 and A3, in the appendix, show that there are low positive correlation coefficients between the distinct sets of variables. Against this backdrop we conducted Granger causality analysis starting with two key diagnostic tests namely, cross section dependence and the panel unit root testing. The appropriate panel unit root test is determined by the existence of cross-section dependence within a panel data set.

3.2.1 Test Results for Cross-section Dependence

Four different tests were used to investigate the existence of dependence as outlined in Table 2.

Table 2
Cross-section dependence tests

Null hypothesis: No cross-section dependence (correlation)
Sample: 2008Q1 to 2021Q1
Periods included: 53
Cross-sections included: 5
Total panel observations: 265
Note: non-zero cross-section means detected in data
Cross-section means were removed during computation of correlations

	GDP Statistic	TMP Statistic	TRT Statistic	HH Statistic	Gvt Statistic	Firms Statistic
Breusch-Pagan LM	199.09	173.34	21.225	106.95	136.92	76.081
Pesaran scaled LM	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Bias-corrected scaled LM	42.283	36.530	4.395	21.679	28.380	14.776
Pesaran CD	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Degrees of freedom: 10 for all variables except 6 for TRT (p-values)
Source: calculated by the authors

The null hypotheses were rejected for each of the four tests in favour of the alternatives. There is cross-section dependence within the BRICS panel data hence the need to use the Perasan (2007) CIPS statistic to test for unit roots.

3.2.2 Test Results for Panel Unit Roots

Two CIPS statistics were used to test for stationary, the original CIPS and the truncated version.

Table 3
Panel unit root tests

Null hypothesis: Unit root

Statistic	GDP	TMP	TRT*	HH	Gvt	Firms
CIPS	-6.320 (<0.01)	-4.747 (<0.01)	-5.143 (<0.01)	-5.604 (<0.01)	-6.219 (<0.01)	-7.097 (<0.01)
Truncated CIPS	-5.553 (<0.01)	-4.745 (<0.01)	-5.143 (<0.01)	-5.132 (<0.01)	-5.493 (<0.01)	-5.637 (<0.01)

Note: t-statistic (p-value). *data series from 2008Q1 to 2018Q2

Source: calculated by the authors

The results in Table 3 indicate that the null hypothesis is rejected which means that all the data variables are stationary at levels.

3.3. Panel Granger Causality Results

The Dumitrescu & Hurlin (2012) model was applied to the BRICS balanced panel data to test for Granger causality. The optimal lag length was determined using the Bayesian Information Criterion (BIC) as it produced the lowest lag order. The DH model yields the most reliable results at the optimal lag orders (EViews, 2021).

Table 4
Pairwise Dumitrescu-Hurlin Panel Causality Tests (GDP)

Sample: 2008Q1 2021Q1
Lags: 1

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
HH does not homogeneously cause GDP	5.81513	7.00826	**2.E-12**
GDP does not homogeneously cause HH	1.41536	0.54745	0.5841
GVT does not homogeneously cause GDP	9.10786	11.8435	**0.0000**
GDP does not homogeneously cause GVT	0.54558	-0.72978	0.4655
FIRMS does not homogeneously cause GDP	4.80831	5.52981	**3.E-08**
GDP does not homogeneously cause FIRMS	0.96162	-0.11884	0.9054

Note: for all alternative hypotheses, X does Granger-cause Y for at least one country
Source: calculated by the authors

According to Table 4, there is unidirectional Granger causality from households to GDP, government to GDP and firms to GDP. There is no causality among the credit variables. Further investigation of the level of manufacturing production per country revealed that only households and government credit Granger-cause output as depicted in Table 5. There is no causality between credit to non-financial corporations and manufacturing output, in either direction, for any of the BRICS economies. A plausible reason for this result is that large corporations from the USA, for example, have operations in most BRICS nations that are financed from their home country. According to the University of Cambridge Institute for Manufacturing (2008), China attracted more FDI than the USA. Malden & Listerud (2020) show that China and India grew from the shadows from 2005 to land in the top five destinations for US multinational enterprises in 2017. The report also states that computers, semiconductors and other electronic products are the leading products manufactured by US businesses in China and India.

Financing large foreign operations from the US and other developed financial markets could prove cheaper for large US enterprises that have a good credit standing in these markets. This means that there will be no significant causality between manufacturing output and BRICS credit to firms because borrowing from BRICS banks could prove costly. Data permitting, we could test for

causality from developed financial markets to BRICS production output for selected countries and industries.

Table 5
Pairwise Dumitrescu-Hurlin Panel Causality Tests (TMP)

Pairwise Dumitrescu Hurlin Panel Causality Tests
Sample: 2008Q1 2021Q1
Lags: 1

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
HH does not homogeneously cause TMP	2.77268	2.54059	**0.0111**
TMP does not homogeneously cause HH	1.45593	0.60702	0.5438
GVT does not homogeneously cause TMP	5.76790	6.93891	**4.E-12**
TMP does not homogeneously cause GVT	0.98131	-0.08993	0.9283
FIRMS does not homogeneously cause TMP	2.00694	1.41615	**0.1567**
TMP does not homogeneously cause FIRMS	1.40339	0.52987	0.5962

Note: for all alternative hypotheses, X does Granger-cause Y for at least one country
Source: calculated by the authors

As shown in Table 6, credit to households, government and firms Granger-caused retail trade from 2008 to 2018. These results are comparable to the ones for GDP. However, they contradict the findings for manufacturing where credit to firms did not Granger-cause total manufacturing production. This contradiction could be explained by the type of finance under review. We could infer that retail trade is influenced by working capital finance that is obtained locally and used locally to purchase local products within the BRICS. On the other hand, fixed-term capital finance used to set up plants and factories, which is directly linked to manufacturing output, could be secured elsewhere, outside the BRICS.

Table 6
Pairwise Dumitrescu-Hurlin Panel Causality Tests (TRT – excluding India)

Pairwise Dumitrescu Hurlin Panel Causality Tests
Sample: 2008Q1 2018Q2
Lags: 1

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
HH does not homogeneously cause TRT	7.55966	8.35333	**0.0000**
TRT does not homogeneously cause HH	0.91418	-0.18158	0.8559
GVT does not homogeneously cause TRT	4.43522	4.34056	**1.E-05**
TRT does not homogeneously cause GVT	0.91589	-0.17937	0.8576
FIRMS does not homogeneously cause TRT	9.44175	10.7705	**0.0000**
TRT does not homogeneously cause FIRMS	1.76595	0.91238	0.3616

Note: for all alternative hypotheses, X does Granger-cause Y for at least one country
Source: calculated by the authors

Granger-causality was tested per country to show the time-dimensional causality of the variables. The results are found in the appendix in Table A4. These results mainly mimic the ones for panel tests with the exception of feedback causality between Russia's GDP and household credit. Additionally, Brazil's total credit to non-financial corporations was found to have Granger-caused total manufacturing production yet panel results indicate no causality for any of the BRICS economies.

Discussion

The fact that the total credit series include both domestic and external sources points to cross section dependence. The New Development Bank (formerly BRICS Development Bank) indirectly provides a channel through which economic shocks could be transferred from one economy to another within the bloc. The trade agreements and policy reforms also facilitate interdependence which partly explains the findings of cross-section dependence (Nazlioglu et al. 2011). Mhadhbi et al. (2017) found strong evidence of cross-section dependence among forty developing countries from different continents.

In general, the findings of this study show that bank lending, proxied by households, government and non-financial corporate credit, Granger-causes GDP. These results are fully

corroborated by those of Jotwani (2014) for India and Andersson et al. (2016) who studied China. Andersson et al. (2016) demonstrated that the total short-term loans of joint stock corporate banks and policy banks Granger-caused GDP and total factor productivity between 1997 and 2008. Lending to corporations often entails the acquisition of new capital and/or the renovation of old capital. In a manufacturing-driven economy like China, it is expected that corporate credit would have a direct and positive impact on the GDP growth rates. Much of the lending in policy banks involves infrastructural projects which may not have an effect on GDP in the short-term unlike corporate lending in joint stock banks (Andersson et al., 2016). Furthermore, it was shown that GDP Granger-caused growth in the lending activities of state-affiliated banks while feedback causality explained the relationship between policy bank lending and total factor productivity (Andersson et al., 2016). The results of Durafe & Jha (2018) and Mohanty et al. (2016) indicate bidirectional causality between economic growth and bank credit in India from 2000 to 2014.

Total manufacturing productivity was found to be Granger-caused by household and government borrowings and not by firm credit. The result contradicts the findings of Andersson et al. (2016) who showed that aggregate credit from joint stock corporate banks and policy banks in China Granger-caused growth in manufacturing production. This is in tandem with the supply-leading hypothesis were economic growth responds to the credit supply stimuli. However, in this study, the lack of causality from firm credit to manufacturing productivity implies that aggregate household expenditure financed by household debt and government expenditure financed by government credit are the main causal determinants of manufacturing production in the BRICS.

The analysis of retail trade revealed that the variable was Granger-caused by credit to households, government and corporations without feedback loops. In the mainstream extant of literature, there is scant evidence on causality among credit variables and total manufacturing production or total retail trade.

Conclusion

The study investigated the link between bank credit and economic growth within the BRICS economic bloc relying on the panel Granger causality model. The period of the study was from 2008 to 2021. The Dumitrescu & Hurlin (2012) model was used to test for causality in the cross-sectionally dependent heterogeneous BRICS panel data set. The study makes the following specific conclusions. First, it is concluded that there is unidirectional causality from each of the three credit variables proxying for bank credit to GDP and retail trade. In other words, bank credit variables Granger-cause variations in economic growth and retail trade. There is evidence of causality from finance to economic growth thus lending credence to the findings of Goldsmith (1969), McKinnon (1973), Shaw (1973) and others who found strong and positive correlations between financial market indicators and variables proxying for economic growth. Second, the study concludes that of the specified variables, only household and government credit cause or explain changes in manufacturing production. The implication is that within BRICS economies, household consumption spending financed by household credit and government expenditure financed by government credit have a significant impact on manufacturing production. This may be consistent with the relationship between household and government spending on the one side, and manufacturing on the other side as postulated by the simple Keynesian spending model. The main conclusion is that there is evidence of a causal link between bank credit and economic growth proxied by the GDP measures.

At the tail end of the time series, the Panel Granger Causality analyses included the years 2019-2021 which are generally regarded in the contemporary literature as Covid-19 years. The lockdowns of the Covid-19 pandemic that triggered the current global recession, may have introduced a structural break in the time series adopted in the analyses. Nevertheless, when the analyses was done, the likely structural breaks in time series were assumed away to avoid introducing complex assumptions into the panel Granger causality analysis.

The panel Granger causality methodology cannot be used to forecast the likely relationships between two or more variables in the future. This is one of the main limitations of the Granger

causality methodology in general. The methodology is not suitable for studying the interaction effects of two or more variables in the long-run. Other methods such as wavelet analysis are better suited for forecasting. However, the Dumitrescu-Hurlin panel causality test is sufficient in meeting the objectives of this study and provides reliable results upon which autoregressive and other forecasting models could be conducted.

This study contributes to the body of knowledge in general, and the extant literature specifically, in two ways. Firstly, the study may provide tentative evidence of a phenomenon called the "monetary veil" in monetary economics. 'Pure' monetarists and New Classicalists argue that money and money aggregates are neutral in the long-run. The study found that total manufacturing productivity was Granger-caused by household and government borrowings and not by firm credit. If total manufacturing productivity is taking as a proxy for aggregate supply (AS) in the economy, then the lack of causality between it and firm credit may be tentative evidence of the neutrality of money in BRICS economies.

Secondly, one of the oldest economic theories which was contradicted by Keynesians is Jean-Baptiste 'Say's law' that asserts that supply creates its own demand (Baumol, 1999). The fact that household and government borrowings which may be taken as proxies of aggregate demand, Granger-cause total manufacturing production [a proxy of aggregate supply], may imply an inversion of Jean-Baptiste Say's 'law'.

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Appendix A

Table A1. Panel Descriptive Statistics

	GDP	TMP	TRT	HH	GVT	FIRMS
Mean	0.8801	0.46278	1.3308	2.05791	2.36484	1.72911
Median	0.9694	0.30659	1.32075	2.69088	2.98409	2.19249
Maximum	21.176	55.6935	7.05895	23.4649	31.5789	21.0068
Minimum	-24.491	-39.119	-9.3595	-25.699	-22.945	-22.687
Std. Dev.	2.990	6.27464	2.10770	7.25517	6.84924	6.45411
Skewness	-1.785	2.29164	-0.6764	-0.7206	-0.3493	-0.6522
Kurtosis	36.353	38.3193	6.22055	4.73124	5.39367	4.88316
Jarque-Bera	12423	14005.9	85.4133	56.0262	68.6553	57.9414
Probability	0.00	0.00	0.00	0.00	0.00	0.00
Sum	233.22	122.636	223.574	545.347	626.682	458.214
Sum Sq. Dev.	2359.6	10394.0	741.878	13896.3	12384.8	10997.1
Observations	265	265	168	265	265	265

Source: calculated by the authors

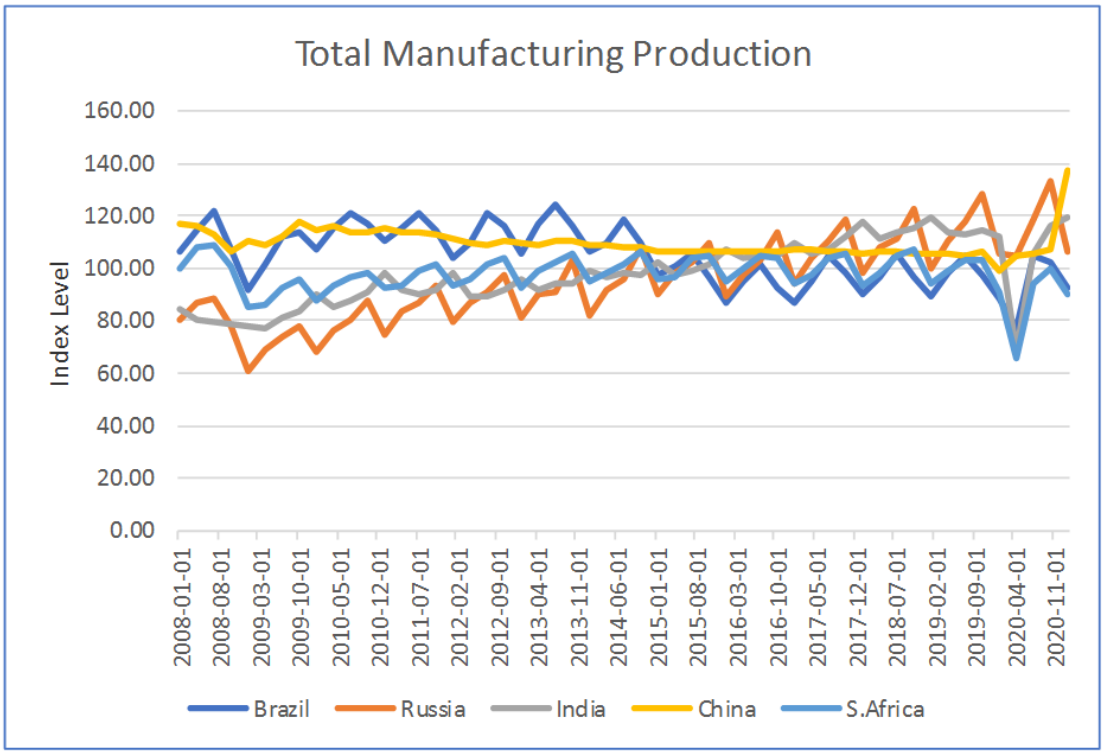

Figure A1. Total Manufacturing Production Index

Source: calculated by the authors

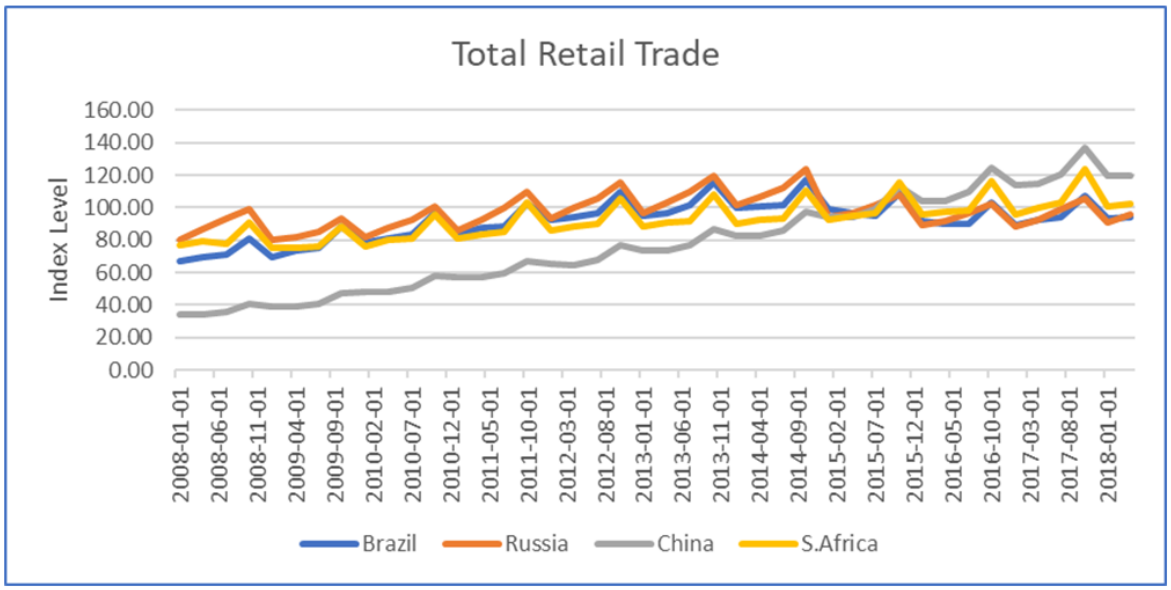

Figure A2. Total Retail Trade Index

Source: calculated by the authors

Table A2. Correlation Coefficients for GDP and TMP

Covariance Analysis: Ordinary
Date: 12/23/21 Time: 15:45
Sample: 1 265
Included observations: 265

Correlation Probability	GDP	TMP	HH	GVT	FIRMS
GDP	1.000000				

TMP	0.836903	1.000000			
	0.0000	-----			
HH	0.187719	0.143867	1.000000		
	0.0021	0.0191	-----		
GVT	0.126846	0.134098	0.878507	1.000000	
	0.0391	0.0291	0.0000	-----	
FIRMS	0.142491	0.107998	0.931911	0.853451	1.000000
	0.0203	0.0793	0.0000	0.0000	-----

Source: calculated by the authors

Table A3. Correlation Coefficients for Total Retail Trade

Covariance Analysis: Ordinary
Date: 12/23/21 Time: 15:52
Sample: 1 168
Included observations: 168

Correlation Probability	TRT	HH	GVT	FIRMS
TRT	1.000000			

HH	0.288362	1.000000		
	0.0002	-----		
GVT	0.134979	0.871520	1.000000	
	0.0811	0.0000	-----	
FIRMS	0.175891	0.942241	0.868157	1.000000
	0.0226	0.0000	0.0000	-----

Source: calculated by the authors

Table A4. Country Z-bar Granger Causality Statistics

	Brazil	Russia	India	China	S. Africa
GDP→HH	-0.21(0.83)	3.14 (0.00)	-0.52(0.60)	-0.49(0.62)	-0.45(0.66)
HH→GDP	6.41 (0.00)	6.37 (0.00)	-0.33(0.74)	-0.51(0.61)	5.54 (0.00)
GDP→GVT	0.03(0.97)	0.08 (0.94)	-0.65(0.51)	-0.36(0.72)	-0.71(0.48)
GVT→GDP	7.18 (0.00)	12.1 (0.00)	3.08 (0.00)	-0.68(0.50)	6.81 (0.00)
GDP→FIRMS	0.01 (0.99)	0.96 (0.34)	-0.56(0.57)	-0.45(0.65)	-0.09(0.93)
FIRMS→GDP	5.81 (0.00)	5.57 (0.00)	-0.26(0.79)	-0.25(0.80)	2.59 (0.01)
TMP→HH	0.13 (0.90)	1.69 (0.09)	-0.64(0.52)	0.19 (0.85)	0.25 (0.80)
HH→TMP	4.43 (0.00)	-0.34(0.74)	0.74 (0.46)	0.34 (0.73)	3.25 (0.00)
TMP→GVT	1.04 (0.30)	0.84 (0.40)	-0.70(0.48)	-0.70(0.48)	-0.55(0.58)
GVT→TMP	5.53 (0.00)	1.23 (0.22)	1.02 (0.31)	0.28 (0.78)	6.59 (0.00)
TMP→FIRMS	0.35 (0.72)	0.71 (0.48)	-0.66(0.51)	0.22 (0.83)	0.80 (0.42)
FIRMS→TMP	3.78 (0.00)	-0.07(0.94)	-0.51(0.61)	-0.47(0.64)	1.32 (0.19)
TRT→HH	-0.53(0.60)	-0.69(0.49)	-	1.13 (0.26)	-0.15(0.88)
HH→TRT	3.68 (0.00)	11.8 (0.00)		3.33 (0.00)	3.31 (0.00)
TRT→GVT	-0.25(0.81)	-0.37(0.71)	-	0.97 (0.33)	-0.59(0.56)
GVT→TRT	-0.59(0.55)	21.4 (0.00)		2.58 (0.01)	3.34 (0.00)
TRT→FIRMS	-0.59(0.55)	-0.70(0.48)	-	3.28 (0.00)	0.18 (0.85)
FIRMS→TRT	3.31 (0.00)	18.1 (0.00)		8.65 (0.00)	0.10 (0.92)

Note: Z-bar(probability)
Source: calculated by the authors

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THE IMPACT OF FINANCIAL INTERNAL FACTORS ON THE PERFORMANCE OF INDONESIA RURAL BANKS: EVIDENCE IN CENTRAL JAVA

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Abstract. *This study aims to investigate the impact of internal financial issues on the performance of rural banks in Indonesia, using samples from rural banks in Central Java with reasonable performance growth rates from 2020 to 2022. The data analysis method uses panel data to test the internal financial factor variables; based on the analysis, the variables of banking size and cost efficiency can work optimally in supporting the performance of rural banks, while the variables of capital adequacy, lending, and nonperforming loans although statistically have no effect, can support the factors internal people's rural banks.*

Keywords: *Performance of people's rural banks, internal financial factors of people's rural banks.*

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Introduction

Communities need financing or credit loans to help improve their level of welfare. Banking is a party that can provide lending activities to the public. According to Banking Law No. 10 of 1998, a bank gathers money from the public by collecting funds and returns they give to the public as loans and other methods to enhance the general public's quality of life. Rural banks do regular business and adhere to Sharia standards but do not provide services in the flow of payments as part of their operations.(Yaron et al., 1998) examines three current Asian rural banks that have attained

leadership in supplying top-notch financial services to millions of rural consumers and micro businesses.

On the contrary Zaman (2004) thoroughly investigated the significant advancements in financial intermediation achieved by four rural banks in Bangladesh. Zaman (2004) and Yaron et al. (1998) visionary leadership, the ability for management to make practical decisions on its own, sound systems for hiring and paying staff, products that are new and based on technology, flexible transfer systems that do not cost much, close tracking of loan portfolios, and an effective management information system that helps with planning and makes it easier for management to control operational costs are all things that help Rural Banks do well financially. In Article 1 of Law Number 10 of 1998, Bank Indonesia also talks about how vital microeconomic security and a friendly governing environment are. Most of the time, how banks give out their own money is based on how they give out money in loans.

In Indonesia, the MSME group is one of the most significant contributors to the country's economy. Here the role of banking cooperation is needed in terms of lending to Small and Micro Enterprises. Rural banks is one option that can be used to extend credit to small and micro businesses. The primary goal of every banking business is to increase profitability by providing financial services to the general public (Brigham & Houston, 2001). The Indonesian Banking Statistics (SPI) published on 18 November 2022 showed credit growing annually (yoy) by 9.64% from Rp. 114.12 trillion as of August 2021 to Rp. 125.12 trillion as of August 2022. Credit growth was encouraging, although below commercial rural bank growth of 10.13%. However, third-party funds (DPK) grew 8.63% from IDR 129.36 trillion to IDR 140. 52 trillion is far more fertile than the 7.17% growth in commercial bank DPK. Ultimately, the rural banks loan-to-deposit ratio (LDR) thickened from 74.87% to 75.78%.

However, the rural banks LDR is lower than that of commercial banks at 81.56% and at the threshold of 78-92%. This means that rural banks are less aggressive in extending credit, partly due to the onslaught of the pandemic. Profit for the year also rose 7.23% from IDR 161.20 trillion to IDR 175.04 trillion. The increase in profit for the year was much lower than the increase in profit before tax for commercial banks of 43.89%. Return on assets (ROA) increased from 1.75% to 1.77%. In essence, asset quality is getting better above the 1.5% threshold. Central Java is one of the provinces in Indonesia which has the most populous population in Indonesia, with 35 cities and regencies with a population of 36,742,501 people. Rural banks and sharia rural banks in Central Java experienced year-on-year credit growth of 13 percent, with assets also growing by 14% and third-party funds growing by 15.06%. All of these growth rates are above the national rate. In addition, the portion of lending for productive needs is 69.02%. This indicates that the distribution of credit to the public will further contribute to a more significant multiplier effect on the economy. Rural banks and sharia rural banks to MSMEs in central Java also dominated the portion of credit disbursement of 59.13%. This achievement is already above the national target, which sets the figure at 30 percent, so credit for MSMEs continues to be encouraged (Suaramerdeka.Com, October 2022). Profitability or profit indicates banking performance, which shows business effectiveness through financial reports. It is interesting to be able to study research related to Rural banks in Central Java. Moreover, the People's Rural Bank is one of the spearheads in encouraging national economic growth by channeling capital in the form of loans in each region. What are the challenges for BPRs amidst the threat of a recession in 2023 and their performance in the current financial situation? The following is a graph of the growth of BPR variables in Central Java.

Examining the financial performance of rural banks will provide solutions and insight into the circumstances behind the business's financial problems and certain Rural banks. Essential factors must be considered as lessons learned to restore the public's faith after the failure of rural banks, microfinance organizations, and central commercial banks to operate as expected (Awo & Akotey, 2019). Strong liquidity management, rural development, and enhanced intermediation for families and micro businesses are the main drivers of the successful performance of rural banks, in particular, enabling them to outperform the industry average. Financial ratios and indicators, which are impacted by both internal or bank-specific elements and external ones, are inextricably linked to

the success of rural banks. Local macroeconomic and socioeconomic situations might be reclassified for rural banks as external factors. Findings Mushonga et al. (2017) support this by demonstrating that internal rather than external variables significantly affect small banks' success.

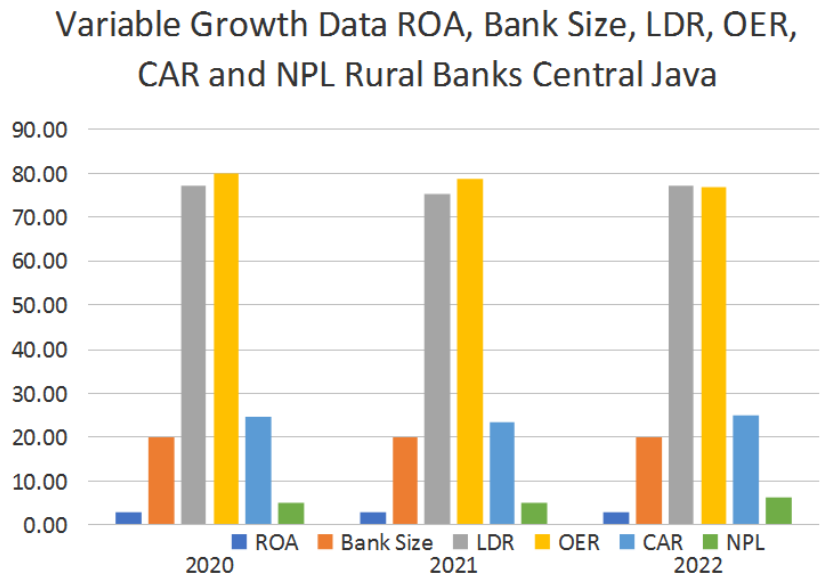

Figure 1. Graph of ROA Growth, Bank Size, LDR, OER, CAR, and NPL of Central Java BPRs

They say technological advancements, societal and cultural changes, and environmental legislation will all be crucial for the industry's future success in South Africa. Study (Chinna, 2013) on assessing the financial performance of regional rural banks (RRB) in the rural banking sector in India. This analysis concludes that regional rural banks financial performance has improved due to bank consolidation. As a result, the branch network has expanded, the underperforming regional rural banks has been closed, the number of districts covered by the regional rural banks has risen, and the total capital fund has significantly increased since the merger in 2005–2006. Additionally, it was found that the credit-deposit ratio has increased over time, demonstrating the RRB's amazing expansion of lending facilities in rural regions.

Literature Review

1. Definition of Rural Bank (BPR)

Law No. 10 of 1998 of the Banking Act in Indonesia defines rural banks as banks that traditionally do business business sharia based, but does not provide payment traffic services. Businesses Conducted by rural banks The main business or activity of rural banks is to collect and distribute funds to obtain profits in the form of interest income. Several limitations on RB's business activities distinguish them from Commercial Banks, including:

1) Participate in payment traffic and demand deposits as a form of payment.
2) Engaging in business transactions in a foreign currency
3) Make participation fair
4) Conducting insurance business
5) Conducting business outside of the above-described business activities

2. Banking Financial Internal Factors

Banks play their role as financial intermediaries between borrowers and savers. Therefore, it requires more explanation of bank-specific factors such as liquidity, credit, funding, bank size, and other essential factors. According to (Ali & Puah, 2019), these factors are like credit risk, and bank size needs extra attention to get more profit. Similarly, bank managers can analyze borrowers' creditworthiness before lending to them. This will require collateral guarantees from the borrower providing a protective shield for the bank to avoid the risk of default. In addition, the bank can protect the credit amount and the added advantage of collateral security. Analysis of the bank's

stability too (Ali & Puah, 2019) recommends being used efficiently in its operations Prudent banking practices aim to mitigate the adverse impact of bank size on stability.

3. Bank Size Factor Against Profitability

Total assets serve as a proxy for bank profitability, which is a metric influenced by earlier empirical investigations. The research that is currently available, however, indicates that there is no definitive link between the number of total assets and bank profitability (Shaffer, 1985). In particular, it demonstrates that large economies of scale are attained as bank size grows, improving financial performance (Berger et al., 1993), who assert that banks can reduce costs as they grow and that banks can do the same (Shaffer, 1985). However, research by Naceur (2003) showed that there is a link between the size of a bank and how well it does financially, with big banks, for instance, having lower profit levels due to inefficiencies brought on by various diseconomies of scale, Buyinza et al. (2010) have confirmed what was found Naceur (2003) by demonstrating that larger banks are less profitable than smaller ones. Delis & Papanikolaou (2009) used a semi-parametric model to determine how macroeconomics, industry-specific variables, and bank-specific factors affect how well banks work and do their jobs. They find that the size of the bank statistically correlates with how well it works and does.

Some aspects are usually used in calculating the company's size, such as total assets, sales, or capital. This study uses total assets as the basis for calculating bank size. The natural logarithm of the bank's total assets for a certain period is used to determine this bank size ratio (Khamisah et al., 2020). If the level of asset capitalization is high, it will be more likely for the bank to make sales, which in this case, will undoubtedly affect profitability (ROA). Banks with a high level of asset capitalization will also experience relatively large growth, so, likely, the rate of return will also be significant (Sakti & Yulianto, 2013). Several studies have proven the effect of bank size on ROA. According to Kusmayadi (2018) and Limbong (2020), the effect is significantly negative. Meanwhile, according to Khamisah et al. (2020), the positive effect is insignificant. There are still disagreements in studies on the influence of bank size on profitability; the hypothesis is as follows.

H1: Bank size has a significant negative effect on the Profitability of Rural Banks

4. Credit Channeling Factors on Profitability

Robison & Barry (1977) showed that low deposit rates, loan defaults, and arrears were the primary causes of liquidity. The quality of the assets and the availability of liquidity may assist in lowering the risk of rural banks. (Denis et al., 2020) because they believe that rural banks need revenue from lending and fiduciary activities or services to cover operating and financing costs and re-acquire retained earnings to fund future operations, they may conclude that liquidity improves bank profitability and loans improve profitability significantly. This may lead them to the conclusion that loans have a significant positive effect on profitability. That is, bank loans bring in money from interest, which is supposed to help banks make money. This will enhance the viability of Rural banks and their growth and profitability. The research conducted is different from the research of Buyinza et al. (2010), who argue that liquidity has a significant negative relationship with profitability. Lending is one of the main activities of banks that can increase bank profitability. The amount and amount disbursed will affect bank profits through the amount of credit disbursed. Therefore the bank needs to increase the amount of credit in order to increase profit (Siamat, 2005:83). LDR is a ratio that shows the comparison between the amount of credit disbursed and the number of third-party funds received by the bank (Kasmir, 2014:103).

Several studies have proven the effect of LDR on ROA. According to Limbong (2020) states that the effect is positive and significant. Meanwhile, Adhim (2019) and Alazis (2020) state that the effect is significantly negative. Therefore, the following hypothesis may be stated:

H2: Lending has a significant positive effect on the profitability of Rural Banks

3. Factors of Operational Efficiency Ratio (OER) on Profitability

There has been research on bank cost efficiency to measure how well a business is doing in growth and development in the banking industry (Košak et al., 2009). Finding they are consistent with Delis & Papanikolaou (2009). But different from Marwa & Aziakpono (2016), many contend

that larger size may be detrimental to rural banks since smaller size does not promote economies of scale, but larger size can also be detrimental if it beyond a certain point. They discover a unique link between financial progress and banks' cost-effectiveness. Compared to what was done by Wong et al. (2007), it highlights the importance of how profitable a bank depends on how well banks work together, how well they use their money, and how well they can take on more risk. However, it was discovered that market structure, as evidenced by market concentration and market scale, was detrimental to financial success. However, on the other hand, Okazaki et al. (2011) have a somewhat different viewpoint since their research demonstrates that policy-oriented consolidation increases deposits while potentially decreasing bank profitability.

It is considered efficient if a bank can use the least amount of input to achieve the most significant output. The input orientation is discussed in the first process, and the output orientation is discussed in the second. Efficiency evaluation is one of the finest methods for enhancing bank productivity through more effective resource allocation and distribution (Mahmoudabadi & Emrouznejad, 2019). The operating expenditure to operating income ratio (OER) compares operating costs and income. This ratio assesses the effectiveness of an organization's performance. A lower OER suggests that banks are more effective in controlling operating expenses (Priyadi et al., 2021). If OER increases, the bank's ability to generate income has decreased, and this decrease in income will also affect the bank's income-to-asset ratio (Sudarsono, 2017).

Several studies have proven the effect of OER on ROA. Research Achi (2021) demonstrates that the size and age of the bank have a beneficial impact on deposit generation efficiency. Furthermore, bank size and age harm revenue efficiency, whereas ROA has a beneficial impact. Other findings in the research included greater ROA for small, new, and domestic banks, and increasing ROA leads to improved revenue-generating efficiency. Limbong (2020) stated that the effect of OER on ROA was significantly negative. Meanwhile, Sudarsono (2017) states that the effect is positively significant. From this, the hypothesis can be formulated as follows:

H3: Operational Efficiency Ratio (OER) have a significant negative effect on the profitability of Rural Banks

4. Capital Adequacy Factor on Profitability

The bank's total capital must cover risks associated with its assets, off-balance sheet transactions, transaction operations, and other business aspects. Before Basel 1, when the concept of capital adequacy was codified, capital adequacy was managed in diverse and inconsistent ways by banks. According to Demirguc-Kunt et al. (2017), financial institutions with sufficient resources may carry out essential corporate growth. High-class banks will be encouraged by this situation to upgrade technology and develop novel financial product ideas to be competitive, as more resources will be available to them to build the ability to compete better in a democracy.

Research (Al-Kattan, 2015) in another context, asserts that banks that have adequate capital will have the following advantages over banks that are underfinanced or inadequately financed: better network coverage, competitive product pricing, and the ability to fund a wide variety of transactions in various industries. However, other academics contend that the capital requirements came at a high cost to banks, forcing several to close or merge forcefully against their choice. Due to competition for loans, deposits, sources of debt, and investment equity, more significant capital requirements reduce the competitive pressures on banks (Bolt & Tieman, 2004). The capital adequacy ratio (CAR) is a statistic that illustrates risk bank performance by calculating a percentage of all bank assets that include risks in addition to the bank receiving cash from sources outside the bank, such as customers.

A bank with substantial capital may attain substantial profitability. A high CAR will make the bank more capable of assuming the risk associated with any hazardous-producing assets. It may finance bank activities to increase profitability (Mudrajat & Suhardjono, 2002:110).

Several studies have proven the effect of CAR on ROA. Limbong (2020) stated that a favorable but insignificant impact was reported, whereas according to Aditya (2020) declared that

the outcome was favorable and substantial. Fauziah (2021) declares that the impact is adverse but insignificant. From the previous statement, the following is a description of the hypothesis:

H3: Operational Efficiency Ratio (OER) have a significant negative effect on the profitability of Rural Banks.

5. Capital Adequacy Factor on Profitability

Nonperforming Loans (NPL) represent a complex issue for banks to handle Endut et al., (2013). Traditional banks ' credit risk and Non-performing loans (NPL) are crucial to a healthy economy. Nonperforming loans contribute to the market meltdown and Asian financial crisis of 2007 Endut et al. (2013); understanding credit risk fundamentally will result in a more stable financial system (Adebola et al., 2011). Numerous internal and external issues and nonperforming loans (NPL) and nonperforming financing (NPF) may impact Islamic banking. Financial ratios and bank characteristics are examples of internal variables that affect credit risk in the banking sector, notably NPL (Suryanto, 2015; Effendi et al., 2017) and outside variables, like interest rates, inflation rates, and GDP (Adebola et al., 2011; Endut et al., 2013; Mudrajat & Suhardjono, 2002). High amounts of NPL at banks will hurt their income and ability to stay in business (Haniifah, 2015). Because credit risk is a crucial component of the banking sector and is used to assess financial performance, high NPL levels affect specific banks and the stability of the national economy. According to Rahman et al. (2017), poor NPL management "will lead to banking failures and national financial vulnerability" (p. 181). St. Clair (2004) states that reasonable cost, credit quality, and lending activity management improve banks' financial performance. The research also reveals that nonperforming loans (NPL) will reduce profitability and that interest rates might significantly negatively affect capital and liquidity.

The Nonperforming Loan Ratio (NPL) measures a bank's efficiency in dealing with defaulting loans. Nonperforming loans as a percentage of total loans granted constitute this ratio.

The higher this ratio indicates that the credit quality is worsening, so it has the potential for bank losses. Because if there is a problem, the bank needs funds to overcome these problems, ultimately affecting the bank's performance. The higher this ratio indicates, the more credit problems in the end. The bank's income is disrupted and also affects ROA (Kasmir, 2014:78).

Several studies have proven the effect of NPL on ROA. According to Yudha (2017) And Fauziah (2021) State that the effect is negatively significant, while according to toFajari & Sunarto (2017) state that the effect is positively significant. Therefore, the following hypothesis may be stated:

H4: Capital Adequacy Has a significant positive effect on the Profitability of Rural Banks

6. Problem Credit Factor Topredictability

Nonperforming Loans (NPL) represent a complex issue for banks to handle Endut et al., (2013). Traditional banks ' credit risk and Non-performing loans (NPL) are crucial to a healthy economy. Nonperforming loans contribute to the market meltdown and Asian financial crisis of 2007 Endut et al. (2013); understanding credit risk fundamentally will result in a more stable financial system (Adebola et al., 2011). Numerous internal and external issues and nonperforming loans (NPL) and nonperforming financing (NPF) may impact Islamic banking. Financial ratios and bank characteristics are examples of internal variables that affect credit risk in the banking sector, notably NPL (Suryanto, 2015; Effendi et al., 2017) and outside variables, like interest rates, inflation rates, and GDP (Adebola et al., 2011; Endut et al., 2013; Mudrajat & Suhardjono, 2002). High amounts of NPL at banks will hurt their income and ability to stay in business (Haniifah, 2015). Because credit risk is a crucial component of the banking sector and is used to assess financial performance, high NPL levels affect specific banks and the stability of the national economy. According to Rahman et al. (2017), poor NPL management "will lead to banking failures and national financial vulnerability" (p. 181). St. Clair (2004) states that reasonable cost, credit quality, and lending activity management improve banks' financial performance. The research also reveals that nonperforming loans (NPL) will reduce profitability and that interest rates might significantly negatively affect capital and liquidity.

The Nonperforming Loan Ratio (NPL) measures a bank's efficiency in dealing with defaulting loans. Nonperforming loans as a percentage of total loans granted constitute this ratio.

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Several studies have proven the effect of NPL on ROA. According to Yudha (2017) and Fauziah (2021) state that the effect is negatively significant, while according to toFajari & Sunarto (2017) state that the effect is positively significant. Therefore, the following hypothesis may be stated:

H5: Nonperforming loans have a significant adverse effect on the profitability of Rural Banks.

Methods

This study falls under the quantitative research category due to its nature. The data type employed is numeric or numeric (Suliyanto, 2018). Quantitative research techniques are founded on the positivist school of thinking to investigate a specific population or sample. According to positivist theory, reality, symptoms, and phenomena are categorized, as fixed, tangible, observable, and measurably related, with a causal link between them. A particular representative group or sample is often utilized in quantitative investigations. Deductive research involves solving mathematical problems using ideas or hypotheses to generate a hypothesis. The theory is subsequently put to the test by gathering data. The selected hypothesis is next evaluated quantitatively to see if it is supported or not by the data using descriptive or inferential statistics. Quantitative research is often conducted on random samples to enable the generalization of the research findings to the study's sample population. Relationship because the connection between variables in quantitative research explores the relationship of variables to the object researched, namely causation (causal), the study contains independent and dependent variables. Then, we seek the effect of the link between these components from these variables.

The research data was obtained from the annual Rural Bank financial publication reports published by the Indonesian Financial Services Authority from 2020 to 2022. The samples selected in this study were rural banks in the Central Java region, including the Regional Company (PERSERODA) in 2020-2022, having a minimum asset of 250 billion and presenting complete financial data for 2020-2022 research. The following is Table 1 which contains list of research samples of Central Java Rural Banks as follow.

Table 1
List of Research Samples of Central Java Rural Banks

No	Rural Bank Name
1	PT BPR BKK Ungaran (Perseroda)
2	PT BPR BKK Kendal (Perseroda)
3	PT BPR BKK Demak (Perseroda)
4	PT BPR BKK Purwodadi (Perseroda)
5	PT BPR BKK Kab. Pekalongan (Perseroda)
6	PT BPR BKK Pati (Perseroda)
7	PT BPR Regional Bank Pati (Perseroda)
8	PT BPR Bank Jepara Artha (Perseroda)
9	PT BPR BKK Jepara (Perseroda)
10	PT BPR BKK Lasem (Perseroda)
11	PT BPR BKK Blora (Perseroda)
12	PT BPR BKK Purwokerto (Perseroda)
13	PT BPR BKK Cilacap (Perseroda)
14	PT BPR BKK Purbalingga (Perseroda)
15	PT BPR BKK Mandiraja (Perseroda)
16	PT BPR Bank Bapas 69 (Perseroda)
17	PT BPR BKK Temanggung (Perseroda)

18	PT BPR Bank Wonosobo (Perseroda)
19	PT BPR BKK Kebumen (Perseroda)
20	PT BPR Bank Boyolali (Perseroda)
21	PT BPR BKK Boyolali (Perseroda)
22	PT BPR Bank Djoko Tingkir (Perseroda)
23	PT BPR BKK Karangmalang (Perseroda)
24	PT BPR Regional Bank Karanganyar (Perseroda)
25	PT BPR BKK Tasikmadu (Perseroda)
26	PT BPR BKK Wonogiri (Perseroda)

Source: OJK secondary data processed by the author, 2023

Table 2 contains the operational variables used in the research as follows:

Table 2
Research variable

Variable	Proxies	Description	Source
Profitability	ROA	$\frac{Profit\ before\ tax}{Average\ total\ assets}$	Bank Indonesia Regulation No.13/01/PBI/2011
Size	Total	$\ln Total\ Assets$	Hartono (2017)
Bank	Asset	$\frac{Operating\ costs}{Operating\ income}$	Bank Indonesia Regulation No.13/01/PBI/2011
Cost Efficiency	OER	$\frac{Total\ credits\ awarded}{Third\ Party\ Funds}$	Bank Indonesia Regulation No.13/01/PBI/2011
Distribution	LDR	$\frac{Capital}{Risk-weighted\ assets\left(ATMR\right)}$	Bank Indonesia Regulation No.13/01/PBI/2011
Credit	CAR	$\frac{Total\ non-performing\ loans}{Total\ credit}$	Bank Indonesia Regulation No.13/01/PBI/2011

The analytical software was applied for the quantitative data analysis in this research EViews 10. The chosen analytical method is a panel data model. Panel data by Gujarati (2004) are gathered via event history analysis, longitudinal studies of variables or groups of participants, micro panel data, combined data from time-series and cross-sectional studies, and data gathered from such studies individually. These designations imply movement over a unit cross-section period, despite slight variations. Studies are collected from time to time from variables or groups of variables, namely People's rural bank in Central Java. Panel data selection is carried out using three method selection types: We weighed the expected effect, the fixed effect, and the random effect prior to selecting the fixed effect model and the standard effect model, respectively, when applying the Chow test. If the fixed effect model was initially selected, one might choose between the fixed and random effect models using the Hausman Test. After testing the model twice, it is optional to go on to the Lagrange multiplier test if the model has a fixed effect. Suppose the Hausman test chooses the random effect model. In that case, the model selection requires the Lagrange Multiplier test in selecting random effect and standard effect models, making it easier to analyze quantitative data.

In this study, there are independent variables which are internal rural banks financial variables proxied by Bank Size Loan Deposit Ratio (LDR), Operational Income Operational Costs (OER), Capital Adequacy Ratio (CAR), and Nonperforming Loans (NPLs), and variables dependent, namely rural banks performance proxied by Return on Assets (ROA). Suppose the random effect model is selected in the Hausman test. In that case, the model selection requires the Lagrange Multiplier test to select random effect and standard effect models, making it easier to analyze quantitative data. In this study, there are independent variables which are internal rural banks financial variables proxied by Bank Size Loan Deposit Ratio (LDR), Operational Income Operational Costs (OER), Capital Adequacy Ratio (CAR), and Nonperforming Loans (NPLs), and variables dependent, namely rural banks performance proxied by Return on Assets (ROA)'.

Results

The results of the analysis using EViews show for

3.1. Output Pooled Least Square Or Common Effect

The pooled least square output is as follows: with the dependent variable ROA, samples from 2020 to 2022, the cross-section rate is 26, and the total observations are 78; the following is a breakdown of the results. Table 3 show the result of common effects output as follows:

Table 3
Common Effects

Dependent Variable: ROA				
Method: Panel Least Squares				
Sample: 2020 2022 The period included: 3 Cross-sections included: 26 Total panel (balanced) observations: 78				
Variables	**coefficient**	**std. Error**	**t-Statistics**	**Prob.**
C	19.07135	3.832906	4.975689	0.0000
BANK_SIZE	-0.337688	0.168943	-1.998825	0.0494
LDR	-0.010284	0.008438	-1.218761	0.2269
OER	-0.115163	0.011432	-10.07377	0.0000
CAR	0.020149	0.014017	1.437451	0.1549
NPLs	-0.030201	0.017136	-1.762410	0.0822
R-squared	0.708075	Mean dependent var		2.818718
Adjusted R-squared	0.687802	SD dependent var		0.999292
SE of regression	0.558351	Akaike info criterion		1.746146
Sum squared residue	22.44644	Schwarz criterion		1.927432
Likelihood logs	-62.09970	Hannan-Quinn criteria.		1.818718
F-statistics	34.92772	Durbin-Watson stat		1.246181
Prob(F-statistic)	0.000000			

Following testing with the Common Effect, which presumes that the intercept and slope are constant throughout time and between company, we test once more with the Fixed Effect test, which allows for variables to exist that are not all included in the model equation. Alternately, this intercept may vary depending on the person and the moment. Table 4 show the result of fixed effect test output as follows:

Table 4
Fixed Effect Test Results

Dependent Variable: ROA				
Method: Panel Least Squares				
Sample: 2020 2022 The period included: 3 Cross-sections included: 26 Total panel (balanced) observations: 78				
Variables	**coefficient**	**std. Error**	**t-Statistics**	**Prob.**
C	-9.843804	12.16340	-0.809297	0.4224
BANK_SIZE	0.577126	0.555434	1.039055	0.3041
LDR	0.030498	0.017634	1.729492	0.0903
OER	-0.019662	0.012256	-1.604327	0.1153
CAR	0.015335	0.019711	0.777962	0.4405
NPLs	-0.003709	0.019834	-0.187011	0.8525
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.956552	Mean dependent var		2.818718
Adjusted R-squared	0.928820	SD dependent var		0.999292
SE of regression	0.266607	Akaike info criterion		0.482232
Sum squared residue	3.340737	Schwarz criterion		1.418872
Likelihood logs	12.19297	Hannan-Quinn criteria.		0.857186
F-statistics	34.49204	Durbin-Watson stat		2.738271
Prob(F-statistic)	0.000000			

3.2. Chow test

Models with known effects or fixed effects are prioritized using the Chow test. Table 5 show the result of chow test output as follows (Teble 5).

The Chow test results show that the probability value ($p < 0.05$) because the value is smaller than 0.05, is selected as the fixed effect of the common effect. However, this step still needs to be tested again with the Hausman test, which aims to determine the best model between the random and fixed effect approaches, which should be done in panel data modeling.

Table 5
Chow test output

Redundant Fixed Effects Tests Equation: Untitled Test cross-section fixed effects				
Effect Test	**Statistics**		**df**	**Prob.**
Cross-section F	10.751732		(25,47)	0.0000
Chi-square cross-sections	148.585343		25	0.0000
Cross-section fixed effects test equation: Dependent Variable: ROA Method: Panel Least Squares Sample: 2020 2022 The period included: 3 Cross-sections included: 26 Total panel (balanced) observations: 78				
Variables	**coefficient**	**std. Error**	**t-Statistics**	**Prob.**
C	19.07135	3.832906	4.975689	0.0000
BANK_SIZE	-0.337688	0.168943	-1.998825	0.0494
LDR	-0.010284	0.008438	-1.218761	0.2269
OER	-0.115163	0.011432	-10.07377	0.0000
CAR	0.020149	0.014017	1.437451	0.1549
NPLs	-0.030201	0.017136	-1.762410	0.0822
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.708075	Mean dependent var		2.818718
Adjusted R-squared	0.687802	SD dependent var		0.999292
SE of regression	0.558351	Akaike info criterion		1.746146
Sum squared residue	22.44644	Schwarz criterion		1.927432
Likelihood logs	-62.09970	Hannan-Quinn criteria.		1.818718
F-statistics	34.92772	Durbin-Watson stat		1.246181
Prob(F-statistic)	0.000000			

3.3. Hausman test

Table 6 show the result of hausman test output as follows:

Table 6
Hausman test output

Correlated Random Effects - Hausman Test Equation: Untitled Test cross-section random effects				
Test Summary		**Chi-Sq. Statistics**	**Chi-Sq. df**	**Prob.**
Random cross-sections		39.654939	5	0.0000
Cross-section random effects test comparisons:				
Variables	**Fixed**	**Random**	**Var(Diff.)**	**Prob.**
BANK_SIZE	0.577126	-0.028563	0.266248	0.2405
LDR	0.030498	-0.013871	0.000242	0.0044
OER	-0.019662	-0.062994	0.000065	0.0000
CAR	0.015335	0.026108	0.000194	0.4388
NPLs	-0.003709	-0.004333	0.000181	0.9631

The results of the Hausman test show The P value for the Hausman test is less than 0.05, so the fixed effect model (FEM) is utilized.

3.4. Classic assumption test

- The classic assumption test carried out is:

3.4.1. Multicollinearity Test

Table 7 show the result of multicollinearity test output as follows:

Table 7
Multicollinearity test

	BANK_SIZE	LDR	OER	CAR	NPLs
BANK_SIZE	1.000000	0.018496	-0.332873	0.066442	-0.166218
LDR	0.018496	1.000000	0.360965	-0.419550	-0.274202
OER	-0.332873	0.360965	1.000000	-0.425085	0.012110
CAR	0.066442	-0.419550	-0.425085	1.000000	0.040845
NPLs	-0.166218	-0.274202	0.012110	0.040845	1.000000

- The results of the classical assumption test show no correlation between variable are BANK_SIZE, LDR, OER, CAR and NPLs in the study because the results are below 0.9.

- The selected multiple regression results are from the results of the following:

Table 8 show the result of multiple regression output as follows:

Table 8
Multiple Regression

Dependent Variable: ROA				
Method: Panel Least Squares				
Sample: 2020 2022 The period included: 3 Cross-sections included: 26 Total panel (balanced) observations: 78				
Variables	**coefficient**	**std. Error**	**t-Statistics**	**Prob.**
C	19.07135	3.832906	4.975689	0.0000
BANK_SIZE	-0.337688	0.168943	-1.998825	***0.0494
LDR	-0.010284	0.008438	-1.218761	0.2269
OER	-0.115163	0.011432	-10.07377	***0.0000
CAR	0.020149	0.014017	1.437451	0.1549
NPLs	-0.030201	0.017136	-1.762410	0.0822
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.708075	Mean dependent var		2.818718
Adjusted R-squared	0.687802	SD dependent var		0.999292
SE of regression	0.558351	Akaike info criterion		1.746146
Sum squared residue	22.44644	Schwarz criterion		1.927432
Likelihood logs	-62.09970	Hannan-Quinn criteria		1.818718
F-statistics	34.92772	Durbin-Watson stat		1.246181
Prob(F-statistic)	0.000000			

*Notes: *** Significant less than 0.05*

The regression outcomes of bank size panel data for the loan deposit ratio (LDR), Operational Efficiency Ratio (OER), capital adequacy ratio (CAR), and nonperforming loans (NPL), as well as the regression model equation and output results, are as follows:

- The research model equation is:

$$ROA\ I,t = \alpha + \beta\ BANK\_SIZE\ BANK\_SIZE\ I,t + \beta\ LDR\ LDR\ I,t + \beta OER\ OER\ I,t + + \beta CAR\ CAR\ I,t + \beta NPLs\ NPLs\ it + \varepsilon I,t \quad (1)$$

- The output results of the Regression equation are:

$$ROA = 19.071 - 0.338\ BANK\_SIZE - 0.010\ LDR - 0.115\ OER + 0.020\ CAR - 0.030\ NPLs$$

3.5. Simultaneous F Test

Simultaneous F test after testing, data from the Table of Statistical Probabilities show less than 0.05, namely 0.0000, so it is said that there is an effect.

3.6. Partial T-test

Based on the data we have thus far, we may draw the following conclusions:

1) The probability of BANK_SIZE is 0.0494. There is a significant negative effect of BANK _SIZE on the profitability of Rural Banks (0.05), and the direction of the regression coefficient is negative (-0.337688). These findings confirm the *H1* theory.

2) LDR does not affect rural bank profitability since its probability value is 0.2269, which is more than 0.05, and its regression coefficient is -0.010284. The findings contradict the *H2* theory.

3) The likelihood of OER occurring is 0.0000, less than 0.05, and the regression coefficient for OER is -0.115163, indicating that OER Rural banks' profitability suffers. In light of these facts, we may accept *H3*.

4) The chance of CAR is 0.1549. Since this number is more than 0.05 and the direction of the regression coefficient is positive (0.020149), we can conclude that CAR does not affect the profitability of Rural Banks. These data do not support the *H4* theory.

5) The chance of NPLs being more than 0.05 is 0.0822. The regression coefficient for NPLs is -0.030201, demonstrating that it has no beneficial influence on the profitability of rural institutions. The data does not support the *H5* concept.

Table 9 show the conclusion from testing the hypothesis according to the t-test findings analysis is as follows:

Table 9
Conclusion from testing hypothesis

Variables	coefficient	coefficient	Probability	Conclusion	hypothesis
C	19.07135	4.975689	0.0000		
BANK_SIZE	-0.337688	-1.998825	0.0494	Significant and negative	Proven to support the H1 hypothesis
LDR	-0.010284	-1.218761	0.2269	Not significant	Does not support the H2 hypothesis
OER	-0.115163	-10.07377	0.0000	Negative significant	Proven to support the H3 hypothesis
CAR	0.020149	1.437451	0.1549	Not significant	Does not support the H4 hypothesis
NPLs	-0.030201	-1.762410	0.0822	Not significant	Does not support the H5 hypothesis

Conclusion

Overall this research can be a reference for further research. From the results obtained, the internal factor variables in banking finance significantly influence the execution of rural banks. Like the variable size of bank assets and cost efficiency, this variable can significantly influence banking performance. Other variables such as credit distribution, capital adequacy, and nonperforming loans from the test results have no effect but also have a supportive impact on the performance of people's banks. Moreover, people's rural banks are microfinance institutions whose existence is very much needed by rural communities to help support the economy by providing loans for their small businesses to improve the family's economy. This research still has limitations, namely that it has yet to include other financial variables regarding bank interest income, which will increase if the credit extension increases. The greater the credit disbursement by the bank, the likelihood of nonperforming loans increasing; this will affect NPLs. Likewise, with the bank liability management factor, the liability at the bank is identical to the funds from the bank itself.

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WORK STRESS AND OUTCOMES DETERMINANTS FOR MALE ONLINE TWO-WHEELED RIDERS IN JAKARTA DURING THE COVID-19 PANDEMIC

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Abstract. *This study is based on the conditions of the COVID-19 pandemic, which has had an impact on many work sectors, including online transportation. During a pandemic, there were social constraints that reduced the work targets for drivers. Online transportation orders are decreasing, and dealing with the Corona virus is making it difficult to meet work deadlines. This can have an impact on two important variables: work stress and driver performance. Based on this, the purpose of this study is to investigate the determinants of these two variables. This quantitative study employs PLS-SEM with a survey method and a questionnaire as the instrument. This questionnaire employs a Likert scale of 1-5 (strongly disagree-strongly agree). According to the findings of this SmartPLS study, the primary determinants of work stress are financial conditions, physical conditions, and social concerns. Because the characteristics of this work are in the field, physical fatigue becomes an important determinant of employee outcomes. This study thus strengthens the theoretical concept of basic human motivation, particularly in terms of meeting basic human needs. Future studies can use historical factors of drivers who have been exposed to COVID-19 or whether they have comorbidities as input variables.*

Keywords: *driver, work stress, employee outcomes, financial concerns, physical concerns, psychological concerns, social gaze concerns.*

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Introduction

Jobs in most sectors became insecure during the COVID-19 pandemic, and salary cuts became common (Wilson et al., 2020). Along with this, the unemployment rate in Indonesia can rise in each period in response to the pandemic situation (Rahayu & Sulistiadi, 2020; Rosyidi et al., 2021; Windarwati et al., 2020). According to Sari et al., (2023), the poverty rate in Indonesia is expected to be 13.97% in 2020 and 2021. This figure is higher than Indonesia's average poverty rate of 10.43%. This affects economic difficulties as measured by the household's financial situation and psychological well-being (Fiksenbaum et al., 2017; Marjanovic et al., 2015). Worse, this condition has an impact on people's overall mental health (Nelson et al., 2020).

This is also the foundation for this research to elevate specific jobs whose pay is based on daily performance, such as a driver of an application-based online land transportation mode. Drivers in Indonesia, like most other countries, are dominated by men. This is also what caused these workers to have increasingly heavy work demands during the pandemic. These workers must continue to work in hazardous and uncomfortable conditions to earn a living that will most likely be used to support themselves or their families. On the other hand, this creates a simultaneous effect in which the performance of these workers affects not only their daily income but also their performance as employees (partners) for the company that employs them. Like most drivers who are prone to fatigue at work (Cendales-Ayala et al., 2017; Raggatt & Morrissey, 1997), these online transportation drivers were greatly influenced by significant factors, particularly those related to psychological factors and work stress, during the pandemic. This is due to social constraints, the work-from-home system, and the implementation of rules in the completeness of the health protocol property, all of which are limiting the space for working in this job.

This research captures these fundamentals, which will then be analyzed to explain the determinants of employee outcomes from the perspectives of financial, physical, psychological, social, and work stress concerns. The purpose of this study considers both the internal and external aspects of these workers when viewed through the lens of the factors involved in this study. This is based on a global pandemic that has had a multiplier effect, namely the internal and external causes of workers' illnesses. It is hoped that the use of male worker criteria in this study will contribute to a specific novelty aspect, which, as previously stated, is that male online transportation drivers play a significant role in earning income for the family and are the company's dominant sex.

Literature Review

In this case, financial concerns refer to workers' concerns about potential changes in income, which can include salaries or wages derived from daily, weekly, or monthly work. This also applies to the income system used by online transportation drivers in Indonesia, as evidenced by their daily performance in picking up and dropping off passengers. According to Wilson et al., (2020) job insecurity due to COVID-19 and financial problems are associated with increased symptoms of depression and anxiety. Furthermore, the findings suggest that increased job insecurity because of the pandemic is associated with increased anxiety symptoms, possibly due to increased financial concerns. This condition is very likely to cause workers to experience stress at some point. This is consistent with Dijkstra-Kersten et al., (2015) who explain that if there is financial disruption, anxiety disorders or even depression can develop, which can lead to depression. Financial concerns do, however, have an impact on workplace organizations (Meuris & Leana, 2015). This emphasizes that the organization, as an employer, can influence the level of welfare of its employees (Meuris & Leana, 2018). This is also related to whether workers can perform the tasks for which they are responsible. This, on the other hand, makes employees dependent on their employers, and the inverse is also true. The explanations presented led this study to propose the hypothesis (H) as follows:

H1a:	Financial concerns affect employee outcomes.
H1b:	Financial concerns affect work stress.
H1c:	Financial concerns mediated by work stress affect employee outcomes.

Drivers, like most types of field work that require physical fitness, have limitations, or work abilities that, at some point, make them very susceptible to fatigue. This can be due to health issues, the difficulty of the job, or even the high targets that drivers must meet. Poor physical health, particularly those related to musculoskeletal, cardiovascular, or general physical fatigue, will impact work stress, particularly for public transportation drivers (Cendales-Ayala et al., 2017). This also explains another viewpoint, in which workers with high job demands and little social support are prone to physical and mental stress. Several studies have been conducted to explain the relationship between work stress and physical health, as well as perceived work fatigue (de Lange et al., 2009; Van der Hulst et al., 2006; Zuraida et al., 2016). Physical and mental fatigue, physical and

psychological task demands, and work stress can all pose hazards in the field, such as for drivers (Cendales-Ayala et al., 2017). As a result, the following hypotheses are proposed in this study:

H2a:	Physical concerns affect employee outcomes.
H2b:	Physical concerns affect work stress.
H2c:	Physical concerns mediated by work stress affect employee outcomes.

According to Delbaere et al., (2010) and Pauelsen et al., (2018), psychological issues at work are closely related to aspects of depression and one's outlook on life. This aspect is also associated with psychological health problems in certain types of work, which can take the form of stress, anxiety, depression, or insomnia (Nguyen et al., 2021). Online transportation drivers who are juggling work targets, difficult work environments, and health issues are more likely to experience psychological issues, especially if work targets are not met. Work stress on drivers can affect their mentality as well as their physical health, particularly in terms of psychological discomfort, sleep quality, or mental fatigue (Cendales-Ayala et al., 2017; Raggatt & Morrissey, 1997). In the context of workers, workers' anxiety about uncertainty during a pandemic is more concerned with whether they will be able to support their families. This explains why there is a role for anxiety about pandemic conditions, which has a significant psychological impact on worker welfare (Silva et al., 2021). Strong motivation can underpin worker behavior to determine psychological well-being and performance (Deci et al., 2017; Gerber & Anaki, 2021), particularly when considering the basis of survival motivation. Based on the explanations provided above, the following hypotheses are proposed in this study:

H3a:	Psychological concerns affect employee outcomes.
H3b:	Psychological concerns affect work stress.
H3c:	Psychological concerns mediated by work stress affect employee outcomes.

Concerns about social gaze are one of the unavoidable free-form factors. This factor causes varying degrees of anxiety because of these characteristics. Individuals with clinical or subsyndromal social anxiety frequently exhibit social gaze (Chen et al., 2015; Weeks et al., 2013). This factor will be very easy to find among online drivers, one of which is in the social environment among fellow drivers. Morrison & Heimberg (2013), define social gaze as a type of safe behavior that aims to maintain social anxiety. This is also supported by Howell et al., (2016) and Langer & Rodebaugh, (2013); Schneier et al., (2011) who show that social gaze can be performed if it is related to the severity of social anxiety. Furthermore, anxiety sensitivity, according to Judah et al., (2019), can be viewed as a transdiagnostic cognitive risk factor for social anxiety disorder. It was also stated that social concern, as a component of anxiety sensitivity, can influence the formation of gaze avoidance. It is widely accepted that social support can improve worker performance and well-being (Cendales-Ayala et al., 2017). Workers who face high work demands but lack social control and support are more likely to experience workplace stress, which will negatively impact their physical and mental health. In relation to these explanations, the following hypothesis is proposed:

H4a:	Social gaze concerns affect employee outcomes.
H4b:	Social gaze concerns affect work stress.
H4c:	Social gaze concerns mediated by work stress affect employee outcomes.

Work stress has been widely discussed in a variety of scientific publications. According to Tongchaiprasit & Ariyabuddhiphongs (2016) job stress is a type of physical or emotional response from workers that occurs when the work they are doing is not proportional to their abilities. An imbalance in job demands caused by physical or psychological factors can eventually cause workers to lose energy at work, experience stress, and even develop health problems (Galanti et al., 2021). Work stress is closely related to job performance (Wang et al., 2021). According to these explanations, online transportation drivers who are highly vulnerable to financial factors such as daily income and pandemic conditions will experience work stress at varying degrees. Work stress, which has an impact on work performance and is caused by a mismatch between work demands and

abilities, can also be shaped by various factors such as family-work conflict (Allen et al., 2015; Gajendran & Harrison, 2007), pandemics that make up socially isolated workers (Allen et al., 2015; Ellis et al., 2020; Toscano & Zappalà, 2020; Wang et al., 2021), and work engagement systems (Hornung & Glaser, 2009; Müller & Niessen, 2019; Sardeshmukh et al., 2012). However, certain situations, such as a pandemic, can have a positive impact on work productivity and autonomy while negatively impacting work stress (Galanti et al., 2021). Based on the explanations given, the following hypothesis is proposed in this study:

H5:	Work stress affects employee outcomes.

According to Figure 1, this study proposes a conceptual framework paradigm based on the theoretical studies and development of the hypotheses mentioned above:

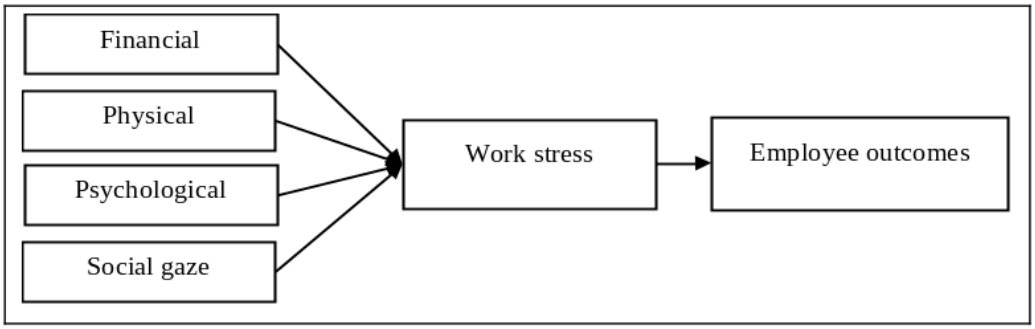

Figure 1. Conceptual framework

Methods

This research uses structural modeling with partial least squares (PLS-SEM), which consists of one endogenous variable (employee outcomes), four exogenous variables (financial, physical, psychological, and social gaze concerns), and one mediator variable (work stress). The variable measurements in this study are shown in Table 1, which consists of 31 items in total. The financial concern variable consists of four items. Meanwhile, the physical concerns variable is composed of five items. Furthermore, the variable psychological concerns consist of seven items, and the social gaze concerns consist of four items. Five items make up the employee outcomes variable, which is an endogenous variable, and six items make up the mediator variable (work stress). These items are measured using a Likert scale of 1–5 (strongly disagree–strongly agree).

The sample criteria in this study were online land transportation drivers in Jakarta. The online mode of transportation in this study is limited to two-wheeled vehicles. The next criterion for this research sample is that the drivers must have experience working during a pandemic, namely between 2020 and 2021. The criteria were asked at the beginning of the questionnaire to ensure that all participants met the criteria specified in this study. The determination of sample size in research is based on the number of items multiplied by 5 (minimum sample) to 10 (maximum sample) (Benitez et al., 2020; Wolf et al., 2013). Of the 221 questionnaires returned by participants, 203 (91.85%) were eligible for processing. This number is also in accordance with the provisions of the sample size described earlier.

In its processing, this study conducted a series of tests. In the reliability test, this study used the results of Cronbach's alpha (>0.7) and composite reliability (>0.7). In addition to reliability testing, this study conducted a validity test by looking at the results of outer loading and average variance extracted (>0.5) (Barati et al., 2019; Memon & Rahman, 2014). The validity of this study also looks at discriminant validity using the Fornell-Larcker Criterion method. In addition, this study also measured the suitability of the model by looking at the results of the standardized root mean square (SRMR<0.1) and the normal fit index (NFI close to 1). The coefficient of determination in this study looks at the results of R square. Furthermore, in determining the hypothesis, this study uses the results of the P value, where the hypothesis will be accepted if the P value is 0.05 and vice versa (Wibowo et al., 2023).

Table 1
Variable Measurement

Variable	Item
Financial concerns (Wilson et al., 2020)	Financial situation will deteriorate dramatically over the next year.
	Concerned about financial situation over the next 12 months.
	Concerned about providing financial over the next 12 months.
	Enough money to cover food and housing for the next 12 months.
Physical concerns (Yu et al., 2021)	Extra work outside of the norm is required.
	When attending to customers, wearing a mask or safety equipment is physically uncomfortable.
	Because of the situation, washing more frequently and paying more attention to personal hygiene increases physical fatigue.
	Increased physical fatigue is caused by an increase in customer complaints due to limited services.
	Because there are only a few employees working, physical fatigue increases.
Psychological concerns (Yu et al., 2021)	Worried that customers will infect me as well.
	If the customer I'm serving is infected, I get nervous.
	Because I am susceptible to being exposed to and infected, I am concerned that my family may also be exposed.
	I'm afraid I'll become infected and infect my customers.
	I'm worried that I'll get infected and that my company's image and service will suffer as a result.
	When I attend to customers, I provide passive care to minimize face-to-face contact due to the possibility of infection.
	I'm concerned that the service will suffer because of the pandemic.
Social gaze concerns (Yu et al., 2021)	I believe I have interpersonal relationship issues because I avoid or do not attend personal gatherings with other drivers.
	In the current situation, I am concerned about national or social isolation because of discrimination and rejection of specific circumstances.
	I'm embarrassed to tell people I work as an online transportation driver.
	When I contracted the Corona virus or its variants, I felt uncomfortable for being ill and guilty in some way.
Work stress (Gascon et al., 2017; Kim et al., 2015; Pietilä et al., 2015)	When I work as an online transportation driver, I feel healthy and happy.
	Working as an online transportation driver requires a high level of personal fulfilment.
	When I work, I think about mental restoration.
	People's mental health, in my opinion, was better in years when they lived far away from big cities.
	My perception of depression or anxiety is shaped by my work.
	As a result of my hard work, I require specialized medication (tranquilizers, antidepressants, or sleeping pills).
Employee outcomes (Smidts et al., 2001)	I volunteer to assist co-workers.
	I'm working hard to be a good health worker during the pandemic.
	I am dedicated to the organization for which I work.
	I have a strong bond with my customers.
	Because I work for this company, I believe I am a valuable and important person.

Results

In this study, 203 male drivers of two-wheeled online transportation modes participated. These drivers are based in Jakarta. Furthermore, these workers had previous work experience during the pandemic in 2021-2022. Male drivers were identified in this study because they predominate in this type of work in Indonesia and other regions. Furthermore, because the purpose of this study is to examine employee outcomes, it is appropriate to identify male drivers as breadwinners in this case. Furthermore, during a pandemic, it became increasingly difficult to obtain passengers due to social constraints in carrying out community activities.

The PLS algorithm process results (Table 2) and Cronbach's alpha (CA) results on all variables show CA > 0.7 (EC = 0.932; FC = 0.846; PHC = 0.915; PSC = 0.920; SGC = 0.845; WS = 0.854). Similarly, all variables with composite reliability (CR) greater than 0.7 (EC = 0.951; FC = 0.897; PHC = 0.936; PSC = 0.936; SGC = 0.907; WS = 0.896). Based on these findings, the

variables in this study can be considered reliable. Furthermore, the extracted average variance has an AVE greater than 0.5 (EC = 0.830; FC = 0.685; PHC = 0.746; PSC = 0.677; SGC = 0.766; WS = 0.633). Similarly, as shown in Figure 2, the outer loading results show that all items have OL > 0.7. Furthermore, discriminant validity is based on the roots of each construct's AVE being greater than the correlation with other variables (EC = 0.911; FC = 0.828; PHC = 0.864; PSC = 0.823; SGC = 0.875; WS = 0.796). Based on these overall findings, it is possible to conclude that all the items and variables in this study are valid.

Table 2
PLS-Algorithm

Variable	CA	CR	AVE	Discriminant validity					
				EC	FC	PHC	PSC	SGC	WS
EC	0.932	0.951	0.830	0.911	-	-	-	-	-
FC	0.846	0.897	0.685	-	0.828	-	-	-	-
PHC	0.915	0.936	0.746	-	-	0.864	-	-	-
PSC	0.920	0.936	0.677	-	-	-	0.823	-	-
SGC	0.845	0.907	0.766	-	-	-	-	0.875	-
WS	0.854	0.896	0.633	-	-	-	-	-	0.796

Note: EC=Employee Outcomes; Financial Concerns; PHC=Physical Concerns; PSC=Psychological Concerns; SGC=Social Gaze Concerns; Work Stress; CA=Cronbach's alpha (>0.7); CR=Composite reliability (CR>0.7)l AVE=Average variance extracted (AVE>0.5)

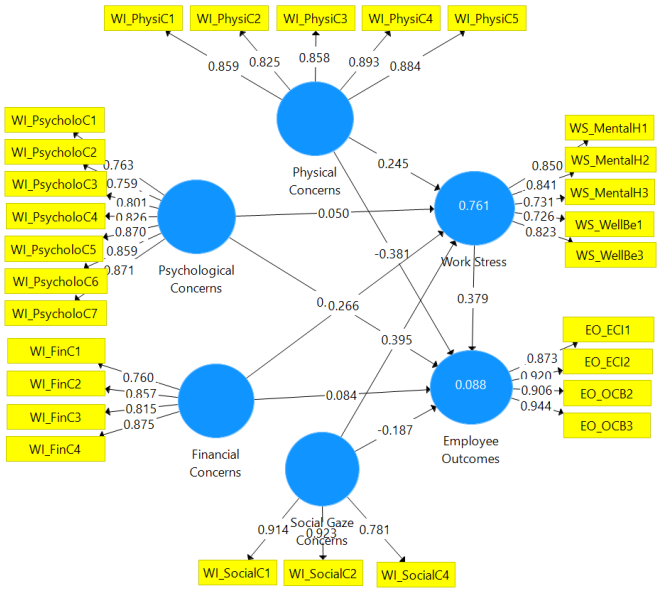

Figure 2. Loading factor

The results of Standardized root mean square (SRMR<0.1) and NFI=Normed fit index (close to 1) are shown in Table 3. Furthermore, the work stress variable has R Square = 0.761, indicating that the variables financial, physical, psychological, and social concern concerns contribute 76.1% (strong) to explaining work stress. Furthermore, the R square for Employee Outcomes is 0.088, indicating that the variables financial, physical, psychological, social concern concerns, and work stress explain 8.8% of employee outcomes (weak).

The results of hypothesis testing in this study are shown in Table 4. The P value for the path of financial concerns for employee outcomes is 0.172 (>0.05). This outcome explains why financial concerns have no effect on employee outcomes, or why H1a is rejected. The P value for the path from financial concerns to work stress is 0.007 (<0.05). These findings demonstrate that financial concerns have an impact on work stress. In other words, H1b is acceptable. The P value for the path of financial concerns for employee outcomes with work stress mediation was 0.052 (>0.05). These findings demonstrate that financial concerns mediated by work stress have no effect on employee outcomes, implying that H1c is rejected.

Table 3 Fit Model and Coefficient of Determination			
Variable	**Saturated model**	**Estimated model**	**R Square**
SRMR	0.079	0.079	-
NFI	0.756	0.756	-
Work Stress	-	-	0.761
Employee Outcomes	-	-	0.088
Note: SRMR=Standardized root mean square (<0.1); NFI=Normed fit index (close to 1)			

Furthermore, the P value for the path from physical concerns to employee outcomes is 0.021 (<0.05). These findings demonstrate that physical concerns have an impact on employee outcomes, or that H2a is accepted. The P value for the path from physical concerns to work stress is 0.000 (<0.05). These findings explain why physical concerns affect work stress, or why H2b is tolerated. The P value for the path of physical concerns for employee outcomes mediated by work stress is 0.021 (<0.05). These findings explain how physical concerns mediated by work stress affect employee outcomes, or, in other words, how H2c is accepted.

Table 4 Hypothesis test				
Path	**STD**	**T-Statistics**	**P-Values**	**Remark**
Direct effects				
FC → EO	0.135	1.369	0.172	H1a rejected
FC → WS	0.098	2.706	0.007	H1b accepted
PHC → EO	0.124	2.317	0.021	H2a accepted
PHC → WS	0.067	3.686	0.000	H2b accepted
PSC → EO	0.138	1.755	0.080	H3a rejected
PSC → WS	0.085	0.584	0.560	H3b rejected
SGC → EO	0.145	0.259	0.796	H4a rejected
SGC → WS	0.091	4.323	0.000	H4b accepted
WS → EO	0.137	2.767	0.006	H5 accepted
Indirect effects				
FC → WS → EO	0.052	1.947	0.052	H1c rejected
PHC → ES → EO	0.040	2.323	0.021	H2c accepted
PSC → WS → EO	0.035	0.531	0.596	H3c rejected
SGC → WS → EO	0.071	2.111	0.035	H4c accepted

Furthermore, the P value for the path of psychological concerns for employee outcomes is 0.080 (>0.05). These findings demonstrate that psychological concerns have no impact on employee outcomes. To put it another way, this result explains why H3a is rejected. The P value for the psychological concern path for work stress is 0.560 (>0.05). These findings demonstrate that psychological concerns have no effect on workplace stress. This result, in other words, explains why H3b is rejected. It has a P value of 0.596 (>0.05) in the path of psychological concerns for employee outcomes, which is mediated by work stress. These findings demonstrate that psychological concerns caused by work stress have no impact on employee outcomes. This result, in other words, explains why H3c is rejected.

The P value for the path of social gaze concerns for employee outcomes is 0.796 (>0.05). This finding explains why social gaze concerns have no effect on employee outcomes, or why H4a is rejected. The relationship between social gaze and work stress has a P value of 0.000 (<0.05). These findings indicate that social gaze concerns influence work stress, or that H4b is accepted. The P value for the path of social gaze concerns towards employee occupations mediated by work stress is 0.035 (<0.05). These findings explain why social gaze concerns, as mediated by work stress, influence employee outcomes, or why H4c is accepted. Furthermore, it has a P value of 0.006 (<0.05) on the work stress path to employed outcomes. These findings explain how workplace stress affects employee outcomes. This outcome also explains why H5 is accepted.

Discussion

According to this study, the financial situation of online transportation drivers is a major factor to consider during a pandemic. The dominant forming item in the financial concern variable is the stability of financial conditions, which specifically emphasizes meeting daily needs for food and shelter. When it comes to these two items, they are necessities for drivers. Work stress is easily formed when financial conditions are unstable or disrupted because of a pandemic. This is because these drivers are unable to support themselves or their families. Anxiety about job insecurity caused by higher unemployment rates during a pandemic can lead to psychological strain, economic difficulties, and mental health issues that worsen over time (Wilson et al., 2020). This also explains how a sense of security at work can affect work performance and work pressure (Wibowo et al., 2023; Wibowo & Yuniarto, 2021). The need to support the family daily is a factor that drivers prioritize in this case. These findings also demonstrate that financial conditions have no absolute impact on employee outcomes. These outcomes are seen through the eyes of the drivers. It's possible that the drivers believe that the company's performance is determined not only by the performance of a single driver, but also by the performance of the drivers.

The physical condition of on-the-road online transportation drivers is highly dependent on the weather and the number of orders. Extreme weather conditions, such as heat or rain, can cause physical exhaustion. According to Cendales-Ayala et al., (2017) general fatigue can mediate the relationship between workload or demands and risky driving behavior. Workload can also cause workplace stress (Wibowo, 2020). Christian et al. (2020) take a different stance: this is not proven in work that employs complex technology. Excessive orders, on the one hand, bring good luck to the drivers, but they also cause physical exhaustion. Physical fatigue can also be caused by congenital health problems. Unlike burnout caused by common factors (Useche et al., 2023), burnout caused at work is usually manageable through compensation strategies (Cendales-Ayala et al., 2017). Drivers believe that their physical condition has a significant impact on their work performance during a pandemic. Drivers earn a good living if their work performance is good. As a result, if the drivers' daily earnings are met, they will not be stressed at work. There are outcomes that drivers can enjoy, as well as some that can be given to families. According to the findings of this study, physical fatigue during the pandemic was caused more by the limited number of available drivers, so orders were not reachable, or customers had to wait longer for a driver.

This study's psychological effect explains why online transportation drivers in Jakarta have no significant effect on work stress and employee outcomes. This explains why, when it comes to employee outcomes or workplace stress, these drivers do not prioritize psychological concerns. According to the previous findings, driver work stress is significantly shaped by financial stability, and employee outcomes are significantly shaped by good physical working conditions. Work stress will also be related to the effectiveness of the work done in this case (Christian et al., 2021). As a result, this is appropriate in explaining that psychological concerns are not the primary factor shaping these drivers' work stress and performance. According to the Job-Demand-Control-Social Support Model (DC) theory, stress processes can emerge when high psychological demand and low control collide, or when job strain occurs (Cendales-Ayala et al., 2017; de Lange et al., 2009). The greater the balance between job demands and effort-rewards, the lower the risk of driving (Cendales-Ayala et al., 2017). This viewpoint reinforces the idea that basic needs, such as daily income for life, must be met first, and then other factors can be addressed, reducing work risk and stress.

According to the findings of this study, social gaze concerns have a significant impact on work stress but have no direct impact on employee outcomes. This social gaze is common in the field of online transportation drivers. A social gap can form when the level of poverty and the economy are not evenly distributed between one driver and another. As a result, socializing factors shape gaze concerns in the social context. According to Cendales-Ayala et al., (2017) there is a negative relationship between social support and work fatigue. In contrast to (Wibowo et al., 2022) who explain that teamwork environmental factors have no effect on work stress, competition for completing orders and pursuing targets essentially returns to individual drivers. Due to the difficulty

in obtaining work targets during the pandemic, some drivers believed that they should not be treated the same as other drivers. This is what drives its own motivation to continue receiving orders and meeting the company's goals.

The stress experienced by drivers at work during a pandemic has shaped certain work performances in a continuous process. When workers do not have a guaranteed income, compensation, or even a stable job, they are more likely to experience stress (Seen et al., 2010; Taylor & Dorn, 2006). This prolonged pandemic eventually caused work stress and disrupted the company. The target order that must be completed is not met if the driver is stressed. The company will suffer because of this failure. Examine the Job Demands-Resources (JD-R) concept once more, which emphasizes how work demands affect worker performance and welfare (Bakker & Demerouti, 2017; Schaufeli & Bakker, 2004). This is related to the role of male workers as family leaders and work demands. During a difficult situation, social constraints and work and family demands become a cohesive unit, which has a significant impact on stress levels and work productivity (Galanti et al., 2021).

Conclusion

This study emphasizes that work stress is influenced by the stability of financial conditions, physical conditions at work, and social concerns for field workers such as two-wheeled drivers in online transportation. Two of these three variables describe the fundamental components of job stress. First and foremost, financial condition is a basic factor that must be met as a basic need for drivers who want to support themselves and their families. According to the findings of this study, aspects of workers' basic needs, such as drivers, emphasize that financial stability can help avoid work stress. This is consistent with several motivational theories regarding the fulfilments of basic human needs.

Limitations and Recommendations

This research has limitations in the use of research areas that only use one city, so results from other large cities can be compared to provide a clearer understanding or comparison. Other health variables, such as whether you've been exposed to COVID-19 or if you have comorbidities, should be considered as complementary variables in future research.

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