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*Hubert Gabrisch**

IN THE MAELSTROM OF CRISES: THE EUROPEAN UNION AND THE 'ZEITENWENDE'

ABSTRACT: *This essay aims to promote discussion on fundamental reforms of the European Union (EU). Its thesis is that the global turning point triggered by multiple crises affects the entirety of the EU architecture and that reforms can therefore not be limited to piecemeal reforms in individual areas. Methodologically, the essay takes an ideology-critical approach with what is commonly referred to as "neoliberalism" at its centre. As a result, the essay draws a Union that gains its own sovereignty through democratic reforms in decision-making.*

KEY WORDS: *European Union, neoliberalism, ordoliberalism, globalisation, reform*

Harry Clarke's illustration of a Maelstrom from 1919 for E. A. Poe's short story (1978 [1841]). https://en.wikipedia.org/wiki/File:Maelstrom-Clarke.jpg

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1. INTRODUCTION: A FATEFUL MOMENT

In Edgar Allen Poe's 1841 short story "A Descent into the Maelstrom", a fisherman tells the narrator how he once got caught in a huge whirlpool near Lofoten, Norway, which engulfed his boat and crew but from which he himself escaped. For the natural spectacle of a Maelstrom, thousands of smaller and overlapping whirlpools can combine in a rough sea to form a huge whirlpool, sometimes a mile in diameter, from which there is usually no way out. I link this story to the current situation of the European Union, which is plagued by many successive and overlapping crises of political, economic and pandemic origin, all of which combine to create a major crisis, what one German commentator called a "fateful moment", that is, a moment of greatest danger. After Russia 's unlawful military intervention in Ukraine, a turning point in history (called *Zeitenwende* in German) has become manifest. But a historical turning point is not a political concept. It is an event to which politics does react or does not react - with potentially disastrous consequences in the latter case.

No specific branch of empirical science can provide a comprehensive answer how to react, at least empirical economics with its models that usually work with long statistical time series, preferably without breaks, which are not available. The current situation is reminiscent of the collapse of the Soviet system at the end of the 1980s because of a military defeat (Afghanistan), economic and social crises, and its failed attempts to reform the system. What followed was the political and economic transformation from a socialist economy with authoritarian rule into a market economy with democratic rule. At the beginning, too, there were no economic model calculations, but rather essay-like grasping of what was now necessary. As researchers in the field of comparative economic systems, we drew conclusions for the upcoming transformation from the critique of the ideology behind the Soviet-style centrally administered economy - which, however, were often inspired by likewise ideological patterns, including the upcoming neoliberal spirit of the time (*Zeitgeist*). And it is a similar thing today: multiple crises are reality, and they are thus crises of the neoliberal *Zeitgeist* that has created this reality since the 1980s. From a critique of this ideology behind the EU architecture, its policies and vulnerability to global crises, it is necessary to gain insight into the contents of the new transformation or, if you will, fundamental reform. Therefore, the specific form of my considerations is also an essay that intends to promote and enliven the public discourse on such reforms of the EU.

My essay begins with reflections on the character of a turning point in time, namely the view that "things can no longer go on like this" (section II). Then, section III identifies the embedding of the Union in the neoliberal *Zeitgeist* as a cornerstone of its institutional reality. The section starts with a definition of the term 'neoliberal' and completes with the description of the EU as a hybrid and therefore, reformable system. Section IV discusses two options of fundamental reform: the widespread belief in a downsizing or even dissolution of the Union and, the other one, the withdrawal or at least reduction of neoliberal elements in the Union's architecture. I will conclude that the second alternative would be the more favourable solution reconciling a liberal democracy with a civilised open capitalism. Section V will address substantial reforms that would help to achieve the preferred second option, equip the Union with external and internal sovereignty and make it more capable to act and, thus, more resilient against crises of the neoliberal global order. Section VI concludes with a call for alternatives.

2. MISFORTUNES NEVER COME ALONE

The aim of using the term *Zeitenwende* (a historic turning point) in contemporary political speeches since February 2022 is to raise the public awareness for the start of a new era, forced by multiple crises in the EU and generally in the "West". A pattern example for such a turning point was the collapse of the socialist system in China since 1979, in Eastern Europe 1989, and with the latter the collapse of the bi-polar World. The trigger was the combination of a long-lasting and unsolvable economic crisis of the centrally planned economies with the inability of the military-industrial complex of the Soviet Union to meet the challenges of the NATO double-track decision 1979, and her military defeat in Afghanistan. It followed the well-known fundamental systemic transformation of the former socialist world, which I have put in the perspective of Karl Polanyi's Great Transformation (Polanyi 2001 [1944]) in an earlier essay (Gabrisch, 2020). Economic and social progress in form of liberal capitalism achieved a triumphant victory and was spreading over the rest of the world. It was the program of a global order organised under unique rules of property, freedom of contract, and free trade (known as the Washington Consensus), sheltered by a unique jurisdiction promoted by the World Trade Organization (WTO) and other international institutions. After deregulations and liberalisations, the contemporary world

economy consists of a closed-meshed web of transport, information, communication, commodity, service, and capital networks that intersect in global cities with multinational companies and financial firms, notably banks and shadow banks. This web is intended to serve the division of labour and the efficient use of all productive factors, but it also constitutes the alleys through which the causes of all modern crises – a virus, political sanctions, financial crashes, fake news, and the climate disasters not to be forgotten – proliferate and may unify to a maelstrom in particularly exposed regions. The interdependent world economy of our times resembles a vessel, whose builders are convinced that it is unsinkable only when it is constructed without bulkheads. The EU is such a vessel.

Seen from the perspective of an economist: The problem is a "network failure", which emerged as a specific theme in the aftermath of the financial crisis 2007-2008. Originally, this literature sought to show that the removal of constraints on capital markets would create complete global financial networks, increase connectivity between their nodes and reduce the risk of network failure (see the seminal work of Allen & Gale, 2001). However, triggered by various contagious financial crises, most notably the 2007-2008 global financial crisis, a large corpus in the financial network literature shows that increasing connectivity can also increase the likelihood of failure, cluster formation and systemic risk (for a selection: Bone & Suckling, 2004; Battiston et al., 2012; Pierucci & Ventura 2012). This conclusion about the pitfalls of the increasing interconnectedness of events also applies to other areas of human society, e.g. increased virus contagion and infection due to the massive increase in intercontinental individual transport. The most striking example is the transformation of a covid epidemic into a pandemic in spring 2020. In addition, Moreno et al. (2021) were among the first to find systematic empirical evidence of a link between the financial crises, the subsequent budget cuts in the health sector in some countries, and the relatively high infection and death rates in these countries during the COVID-19 pandemic.

Francis Fukuyama interpreted the world-wide victory of capitalism to be the "end of history" (Fukuyama, 1992). The phrase recalls Hegel's history of philosophy, where a process of thesis-antithesis and synthesis achieves everlasting progress. Hegel saw a "last synthesis" possible, in which fundamental contradictions would

no longer exist, but – seen from Fukuyama's perspective – only shortcomings in the implementation of the sole remaining capitalistic system. Behind the vision of one remaining capitalist system, we find the idea of a global liberal and progressive order in the Hegelian sense. However, the political shock waves of *9/11* were the first challenge to the capitalist victory. It changed the real world in a way that cannot be understood as the result of mere "regional" shortcomings of the basically same system. Behind the blow was the confrontation of a utopian model of the world with the reality of different socio-cultural structures manifested in norms and rules, some of which were rooted in religious fundamentalism and clan structures. They were not perceived by the political leaders of victorious capitalism as a typical counter-movement of society in the sense of Karl Polanyi (1944) and thus, the possible beginning of a new historical turning point.[1] The "West" reacted with a sequence of military responses. Besides the military confrontation with radical Islamism, new tensions built up with other regions, mainly with the revenge seeking, but now unrestrictedly capitalistic Russia, and China seeking a new role as an imperialist player.

Being confronted with multiple crises has been the history of the EU since the common currency was introduced in 1999.[2] It is not only important where and how the crises are caused; the vulnerability of each region in these global networks is also crucial. Again, disasters never come alone, and the management of one crisis may provoke the next one: the enormous increase of public indebtedness may trigger higher inflation, which may not be reversed by the central bank's monetary policy without a harsh recession. Political tensions among EU-member states may also arise due to special national ways of some member states to get rid of burdens that hit all countries (for example Germany's two hundred billion Euro program against the fall-out from the gas war). Indeed, after many piecemeal reform attempts ("things can no longer go on like this") Europe is waiting for fundamental reforms of its architecture and politics.

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1 Counter- or double-movement means that the social and economic devastations of a utopian project provoke the self-protection of society. Polanyi's (1944) great work analysed the traditional liberal era from 1839-1929, where liberalism meant the 'dis-embeddedness'of the economy from society.

2 I will follow the unprecise, but wide-spread notation that the Maastricht Treaty 1992 have established the EU. Actually, it was the Lisbon Treaty of 2009 with some revisions of the Maastricht Treaties 1992.

3. BETWEEN THE NEOLIBERAL ZEITGEIST AND PRAGMATISM: THE HYBRID CHARACTER OF THE EU

If we are to recognise the need for fundamental reform, we must first take a closer look at what I have tentatively called the "neoliberal" model, which not only lies behind the tightly meshed global web, but also acts as a blueprint for the "EU ship without bulkheads". This is a necessary step to encounter *prima-facie* objections against possible simplistic and prejudiced uses of the term "neoliberal", the latter so often met in the literature even by prominent writers (e. g. Stiglitz, 2002, or Rothschild, 2009). Handbooks usually look at academic theories from different perspectives, but do not filter out uniform and comprehensive definitions. This is also true for recent handbooks in our case, like the *Handbook of Neoliberalism* (Springer et al., 2016) or the *SAGE Handbook of Neoliberalism* (Cahill et al., 2018). Neoliberalism appears more as a thought collective i.e. a community of researchers working collectively on the production or elaboration of knowledge using a common framework of cultural habits and knowledge acquisition.

The term 'neoliberalism' was first used at the Colloque Lippmann in Paris 1937 as an attempt to preserve the basic ideas of the traditional liberalism without the *laissez faire* attitude of the state in this era.[3] The missing clear definition is the reason that the arbitrary usage of the attribute "neoliberal" became a political fighting term applicable to almost everything imaginable. Understandably, neoliberalism became less and less a self-designation of its proponents from different branches of the neoliberal thought collective (Freiberg School of Ordoliberalism, Geneva School, Public Choice, New Political Economy, Institutional Economics, Chicago school, and Hayek- who held a separate position), but rather an attribution by its critics.

My understanding of neoliberalism follows the latest and comprehensive works by Steven Crouch (2011 and 2017), Quinn Slobodian (2018) and Thomas Bierbricher (2021). Slobodian's method takes the individual perspective of the most important contributors to the Colloque Lippmann, of the members of the later Mont-Pèlerin Society and their influential successors in international

[3] Louis Rougier proposed the term "neoliberal" for the new doctrine (Audier & Reinhoudt, 2019: 252). On Hayek's initiative, the Mont-Pèlerin-Society (MPS) was founded 1947 in Switzerland (see Butler, n. d.).

organisations. Slobodian attempts to obtain a picture on neoliberalism from their innumerable publications, speeches, and letters. Bierbricher investigates the statements of neoliberal authors from the perspective of science theory and investigates the neoliberal understanding of democracy. He concludes that the political theory of neoliberalism is normative with metaphysical and even religious features[4] despite some authors (for example, Milton Friedman) relating to methodological individualism as a way to obtain value-free judgements. Dold and Krieger (2019) reach a similar judgement with respect to the normative commitment of German ordoliberalism to liberal values.

This suggests that neoliberalism is rather a political strategy , integrating law and the theory of the state than a way of focussing on the traditional economic issues of supply and demand in commodity and financial markets. In fact, pure economic issues, for example, in neoclassical or macroeconomic theories, were neither discussed at the Colloque Lippmann nor on the meetings of the Mont-Pèlerin Society. The most important neoliberal schools assume neoclassical theory as their premise and apply its methods to non-economic and political fields. For example, public choice theory models the behaviour of political agents based on the *homo oeconomicus* assumption of neoclassical theory. One exception is the Chicago school of economics founded by Friedman and Stigler, which attempts to prove the existence of competitive market equilibria even with only few giant corporations with the help of mathematical methods. To that extent, neoclassical economics is not incompatible with neoliberalism, although Hayek was critical of neoclassical theory: The excessive use of a mathematical determination of equilibrium, as in physics, would send the theory of the market into the background. For him, competition is a process of discovery, and in equilibrium there is nothing to discover (Hayek, 1969).

The political-economic agenda of neoliberalism has changed over time, but has always circled around its central goal of creating an interdependent global economy with a single set of rules that should apply to all nations – the so-called rule-based liberal order, or, as Slobodan phrases it, *ordoglobalism*. The global economic law should act as a shield protecting private property, freedom of contract, and free trade against the uncertain behaviour of national policies in former colonies and the challenges of democratic movements, in particular

4 For example, Rüstow 1960.

labour movements. The single set of rules is thought to be enforced by global *governance*, whose protagonists are no longer only the national *governments*, but all stakeholders like the World Trade Organization (WTO), the International Monetary Fund (IMF), the World Bank, the G7 and G20, the competition policy of the EU, and big multinational corporations. Since the neoliberal concept circles around the global protection of property rights and the freedom of contract, it becomes automatically attractive for the profit interests of global investors, in particular financial corporations.

The first generation of leading neoliberal authors of Austrian and German origin found their ideal in the Habsburg empire and the colonial era – the former perished 1918, the latter after 1945.The Habsburg empire was characterised by free trade and services, and free movements of labour and capital, and a common currency; we know them as the "four freedoms" and the Euro in the EU, and the lack of democratic participation rights for the broad masses. In the colonial era, the global order consisted of the political imperium and the economic dominium. Neoliberals of the second generation in the 1950s and 1960s found their contemporary ideal in the British Crown Colony Hongkong with free prices and capital movements, but without democratic rights (the typical imperium-dominium order). Interestingly, these were also attributes of China's capitalist transformation since the Deng Hsiao Ping reforms after 1979, which introduced a merciless competition for jobs without granting political freedoms. Without claiming that China's communists followed neoliberal ideas at least some of the time,[5] one can generally conclude that neoliberals exhibit an instrumental understanding of democracy: it can be tolerated when it prevents political instability violating property rights; otherwise, it should be restricted, suspended or even removed. The phrase the 'strong state', often met in neoliberal statements, describes a state that is sovereign enough to impose a state of emergency (following a phrase of the German state law theoretician Carl Schmitt).[6] On the scene appears the well-meaning dictator and the sympathy Hayek expressed for the Chilean coup, saying he preferred a liberal dictator against a non-liberal democracy. This verdict reveals the substance of Hayek's understanding of the word "liberal", exclusively signifying the economic freedoms of capital owners.

5 See Isabella Weber's (2017) discussion of the issue.

6 Following the study by Renato Christi (1998) on authoritarian liberalism; Carl Schmitt appears as the bridge between dictatorship and liberalism.

His comment reveals that neoliberalism does not necessarily include the values of a liberal democracy (fundamental human rights, electoral democracy based on the one-man-one-vote principle, checks and balances), but does necessarily include private ownership, the right to contract, and free trade. Instead of majoritarian democracy, neoliberals talk about "consumer democracy" or prefer, where it can be enforced, voting rights weighted according to income or wealth, for example in South Africa after the fall of apartheid.

A central role in the neoliberal understanding of society is played by the relation between the public and the private sphere. In Hannah Arendt's (1998 [1958]) political theory, the political sphere is intrinsically tied to the public sphere. In contrast, Hayek's famous postulation of a 'dethronement of politics' (Hayek 2021: 484-508) [7] or as Madra and Adaman (2018) put it "depoliticisation through economisation", means an increasing non-public sphere for securing free and open markets, the epitome of the private. It is an amazing demand, considering that neoliberals permanently develop models and political programs. The neoliberals' ideal arrangement is a double-government: an invisible, preferably supra-national, one responsible for preserving the rule-based private-economy, and a visible one for national public affairs such as defence, culture, education and sports. In contrast to the *laissez-faire* liberalism of the 19th century, neoliberalism does not aim at the 'dis-embeddedness' of the economy from society and the roll-back of the state as Karl Polanyi once concluded (Polanyi, 1944). In their search for national and global institutions that protect the private economy, neoliberals see a constructive role for the state – an approach Slobodian (2018) names 'mantling' the economy.

The publications and speeches of Mises, Robbins, and Hayek about the architecture of a (non-public) supra-national federation, some of which were written in the 1930s and 1940s, appear as guides to the European integration process from the 1957 Treaty of Rome to the 1992 Maastricht Treaties, the 2009 Lisbon Treaty and, in particular, the construction of the European Monetary Union since 1999. They consist of two keystones of the neoliberal agenda. The first one is the idea of multi-level governance, aiming at the implementation of feedback mechanisms between the international and the national systems.

[7] For an extensive presentation of Hayek's understanding of democracy see Zamorano Gonzalez 2014.

Influential German ordoliberals in the 1960s and 1970s substantiated the general principle for the EU, arguing for the absolute precedence of European Union law over member state law. The highest governance level – the EU Commission and the European Court of Justice - act as the sentinels of the system; and each citizen can apply to the court when the lower levels do not obey the binding EU law. Because the EU commission is not legitimised through general elections like the national governments of the member states, it comes close to the neoliberal concept of an unpolitical and secretly acting governance body. A recent example substantiating the non-public governance role of the Commission is provided by its negotiations about the Transatlantic Trade and Investment Partnership (TTIP) agreement with the United States. The negotiated contract was to be passed by the European Council but was not made available for reading by the European Parliament nor the national parliaments. The agreement finally failed due to severe protests.

The second keystone is the principle of *dethroned politics*. This principle is embodied in the transfer of national political competences to technocratic EU institutions. The monetary union provides the most extreme example of such a dethronement. In contrast to traditional central banks in all countries around the world - which work under some surveillance of and in cooperation with the legislature and the treasury because they are part of the government - the ECB is her own sovereign. The Euro is *fiat money*, but under the strong control of the ECB, which is completely detached from any commitment to cooperate with the fiscal government democratically controlled by the legislature. Such a construction involves the subordination of parts of national fiscal policies, which means to depoliticise them likewise. New Political Economy (NPE), a branch of Neoliberalism, claims that in a democracy, politicians in their attempt to win elections always tend to spend more than they can take in revenues. The persistent trend to create budget deficits and public debt through excessive expenditure would not appear under a government run by an independent elite, committed only to the public interest, or alternatively by the prohibition of deficits (Buchanan & Wagner, 1977). NPE found fertile grounds among economists in the EU, mainly among ordoliberals in Germany. They argued that unrestricted fiscal deficits in some member states would lead to higher interest rates for all and thus counteract the policy of the ECB. Fiscal policy should be subordinated to the monetary government by deficit and debt rules, as in the EU's "Stability and

Growth Pact" which was implemented from 1997, complemented and sharpened by the "Six Pack" of 2011 and the "Fiscal Compact" of 2012 – replacing the traditional Golden Rule of national fiscal policies, whereby a government must only borrow in order to invest. Their echoes are found in more than two hundred fiscal expenditure and deficit rules, including investment by general and local governments, even being incorporated in the national constitutions of some countries.[8]

All these neoliberal elements in the EU architecture nourish the critics' verdict that the EU is a neoliberal project that cannot be reformed but only dissolved. However, the EU treaties did not establish a purely neoliberal order. Primarily, they merely constituted a *regional* integration group, which separates the domestic economy from the single global order desired by the neoliberals via a customs union and an internal market, which imposes substantial barriers to external competitors. The degree of openness remains, with few although important exceptions,[9] a political decision of the European Council, and hence of the member states.

The fact of being a regional integration group effectuated a split in the neoliberal movement. The constructivist wing (among others, Hayek and the German ordoliberals) assumed the Treaties of Rome and the following ones could work as a gateway for imposing a purely neoliberal order inside the group of countries and separating it from the nationalism of new states after decolonisation. The universalist wing (among others, Haberler, Röpke, and influential officers in the GATT-secretariat and the WTO) rejected the Treaties of Rome, because in their eyes they impeded the creation of a multi-level global governance order. Still

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8 An overview on more than 250 entries is provided by the EU Fiscal Rules Database 2021: https://economy-finance.ec.europa.eu/publications/fiscal-rules-database_en; accessed 19th October 2022.

9 One of these exceptions is the prohibition of any restriction on capital movements between a member state and third countries (according to article 66 of the Treaty on the Functioning of the Union). The ban made the EU finance industry a major player in globalisation. Foreign direct investment not only contributed to steady surpluses in the trade balance of capital exporting countries, but also to the emergence of global production chains between the EU and developing countries. Interruptions of these chains due to financial crises (2007-2008) or pandemics (since 2020) belong to the risks and side effects and can only be avoided by the abolition of the restrictive article in the Treaty.

today, there is a permanent (although low profile) conflict between the WTO and several regional integration groups that hope to overcome structural underdevelopment and poverty. The conflict revolves around art. 45 of the GATT and WTO, which stipulates an equal playing field via the most favoured nations clause, whose enforcement is always threatened by regional integration.

Actually, the constructivist hopes did not materialise. Regional integration, separated from the outside world, paved the way for what Karl Polanyi named "regional planning" as the alternative to liberalism (Polanyi, 1945).[10] Factually, the European Union is a hybrid order, and the various reforms since the Single European Act of 1986 emphasise this: on the one side the introduction of the common currency, restrictions on fiscal policy, and the Single Market, on the other side the implementing of structural and regional policies with transfer payments from richer to poorer members and regions, completely in dissonance with the neoliberal understanding of a well-functioning free market, not to mention the Common Agricultural Policy - the oldest interventionist device in the EU - which many critics blame as a form of centrally planned economy. In a regional integration group with internal free trade, public support for investment has comparable effects on productivity as the infant-industry tariffs proposed by the 19th century German economist Friedrich List.

4. DOWNSIZING, DISSOLUTION, OR DEMOCRATISATION?

We may ask whether a softening or even the removal of neoliberal elements would make the Union more resilient against the severe crises that proliferate through the closed-meshed global web mentioned above. When the financial crisis (Great Recession) 2008-2009 morphed into the Euro debt crisis up to 2012, European policies initially responded by strengthening the neoliberal elements, above all the tightening of the fiscal rules followed by fiscal retrenchment in many countries, among others in the health system. But political leaders and economists recognised rather quickly that such "reforms" do not suffice and cannot compensate for the lack of cross-border risk sharing mechanisms; rather they

[10] In 1945, the term 'neoliberal' was not yet a widely used label, and he directed his attack against a revival of liberalism, and unfortunately, he praised Stalin's Soviet Union as a pattern for regional planning.

revealed themselves to be a serious obstacle to growth.[11] In contrast to a rising sympathy among economists for a public fiscal risk sharing capacity,[12] the Commission and the Council decided for the neoliberal solution of strengthening private risk sharing via the removal of all existing restrictions on private cross-border financial flows, mantled by the banking and a capital markets union.

Hybrid or not hybrid - some observers see the downsizing of the Union as the only way to make the capitalist and democratic system more crisis-proof. The fiercest critic of the EU as a neoliberal project is Wolfgang Streeck. In his book *Zwischen Globalismus und Demokratie* (Between Globalism and Democracy) he finds globalism to be stuck on its way to a "world internal policy" without a government (Streeck, 2021). According to him, unification from above would be possible only under the absolute command of a bureaucracy that would be bound to fail due to the ever-growing complexity of the global system. A further transfer of rights to a Hayekian super-state EU would be impossible since national sovereignty is jealously guarded. No political leader would give up the nation state and her sovereignty, rather they would regain sovereignty. Every member state has a veto-right if her sovereignty status is at stake – which not only blocks the implementation of more technocratic governance, but also, the other way round, impels reforms towards a democratic union. Streeck believes in a reconciliation of capitalism and democracy only through a 'downward breakthrough', that means the downsizing of the Union to 'peaceful-friendly' small and medium-scale nation states (Streeck, 2021: 439). His vision turns out to be a romantic illusion with predictably disastrous economic and political consequences.

The first step of downsizing the Union would be the dissolution of the monetary union. The specific literature discussed such an option after the Euro debt crisis has broken out (Greek exit, a split into Northern and Southern Euro areas), and overwhelmingly rejected it due to the high economic risks in the shape of currency turbulences with unknown result. In addition, empirical research revealed that the monetary policy of small countries often followed the central

[11] With an average annual growth rate of 0.5% , economic growth in the Euro area stagnated, despite historically low interest rates and the massive bond purchase programs of the ECB.

[12] Public risk sharing may include various solutions – from a European unemployment scheme over a central investment or other fund until a regular treasury with the use of debt instruments.

bank policy of a large country (say Germany). Apart from this subject-specific problem, there might be serious effects in the long-run, of which I find three of particular relevance.

The first problem for small and medium-scale nation states in Europe are the increasing worldwide tensions and regional wars. Many tensions are understood as geopolitics. However, behind them there are factors that reach far beyond geographic circumstances. One factor is the growing conflict between democracy and authoritarian rule. Another one overseen by EU opponents like Streeck is the increasing struggle for raw materials and food. This is a motivation behind a fast-growing super-state like China to build up combined political and military power far beyond her own borders. In the case of Russia's war against Ukraine, one cannot dismiss the suspicion that one aim is the conquest of fertile land for the provision of her own population, and – as a net exporter – ability to determine the world market price for wheat. Struggle for arable land and resources is often the cause of domestic conflicts in poor countries, when a ruling clan or ethnic group responds to worsening climatic conditions, ecological devastation or increasing demand for rare-earth metals, and starts the expulsion of a rival group. On a more general level, all these international tensions reflect the responses of distinct cultures with different social norms to neoliberal levelling, a phenomenon that Karl Polanyi observed to be the cause of counter-movements in the traditional liberal era (Polanyi, 1944). To that extent, implementing a utopian project like a universal global capitalist order may lead to the self-destruction of that order. Unfortunately, then and now counter-movements hail a return to the small and medium-scale nation state, which may not convert into a peaceful-friendly neighbour to other similar nation states.

A second argument against downsizing the EU borrows from Carl Christian von Weizsäcker (2017), who pointed out that in the today's world no democratic nation can be isolated from information about the living conditions in the rest of the world. A democracy can only survive when its leadership makes a credible promise to all its citizens and classes to ensure a welfare higher or at least at the same level as in non-democratic regimes . If this promise is not credible, because autocracies like China generate a higher growth rate compared to the EU, internal violent conflicts may break out, threatening the state monopoly of power. Economists know that the contribution of foreign trade to the general welfare

depends on the size of a country – the smaller the country the higher this contribution is. A small and medium-scale nation state, thrown back to its own resources, will find it difficult to make a credible promise of fast economic growth. To that extent, the idea of a reconciliation of democracy and capitalism in small and medium-sized nation states appears as an absurd and, indeed, even a romantic idyll. One might expect the opposite: a collapse of state order – the failed state – or a shift towards dictatorship including a renewed enforcement of the state monopoly of power.

Finally, one should not neglect the fact that some transnational corporations are large enough to generate turnover and profits that outperform the economic output of many small nation states. Even though they are not large, they are sometimes able to play national governments off against each other because they are based in different jurisdictions. If such a state does not want to isolate itself completely from the outside world, like North Korea, these companies would be able to impose their will upon it. In contrast, the EU offers sufficient countervailing power, even when completely open, to obtain concessions on taxation and in other areas.

5. WHAT HAS BEEN DONE AND WHAT REMAINS TO BE DONE

A global turning point in history, which goes beyond pure security arrangements, normally gives birth to a new global order. Undoubtedly, the EU has to find its place in the approaching new order. A Union protecting its welfare and democracy needs an appropriate level of external and internal sovereignty. The ongoing era of change requires substantial reforms that can be reached only through some revisions in the EU Treaties.

I conclude from my analysis of the hybrid character of the Union that a *re-enthronement of policy* should be the first and foremost reform undertaken, aiming at transparency and democratic control of EU decisions, replacing mere technocratic coordination in those policy fields that should belong to the Union's future competences. Historical experience has shown that the transparency of technocratic bodies is a function of democratic control; when it is missed, bureaucracy tends to operate in secret. The neoliberal idea, within which less democracy and less transparency support a better policy, has proved to be an

illusion in history not at least because of the expanded corruption and nepotism of autocratic regimes.[13]

The EU – except the detached ECB - is not a sovereign body in itself like a nation state. The European Council and the Councils of Ministers are the highest and final authority to policies, although legally they represent national interests. The Commission executes their decisions, while the European Parliament does not possess the legislative initiative a nation-state parliament has. Even more, voting rights in the Councils are weighted, and a veto of one national government can still block many substantial decisions in EU affairs. More democratic reforms should equip the Union with what French president Emmanuelle Macron probably had in mind when he proposed the creation of a new "European Sovereignty" without clarifying what he meant. Actually, more sovereignty makes the Union stronger in the systemic rivalry with autocratic regimes on both political and economic levels and in dealing with fallouts from global crises. Democratic changes would elevate the European Parliament to a body possessing the usual rights of a parliament, here with respect to European affairs such as external economic relations, the internal economy, or parts of defense and security policies. Such a true parliament should be equipped with the hitherto lacking legislative initiative and an exclusive budget right, the latter still being shared with the European Council. Democratic control ought also include the positive right to appoint the Commission,[14] the directorate of the ECB, and the wide abolition of the veto right of member countries in the affairs that the Commission and the Parliament are authorised to decide.

Whether solid reforms will be possible, depends on the common supportive awareness of European citizens. Most Europeans still dream the European dream:

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[13] The corruption index of Transparency International shows a correlation between states with authoritarian regimes and the degree of corruption. As Günter Lambertz (1990) noted, a dictator also has to provide his fellow combatants with favourable positions. In addition, a dictatorship suffers from the permanent threat of an overthrow if it does not fulfill the welfare expectations of the population. Therefore, they tend to drift into increasing repression. Branko Milanović (2019) argued, using the example of China, how an authoritarian regime gives birth to endemic corruption that might lead to its failure. In contrast to the authoritarian state, transparency in a democratic regime helps to disclose and to prosecute corruption, and thus contains it.

[14] And not only rejecting proposals of the European Council.

they feel European. The summer 2022 Standard Eurobarometer survey showed increased citizen confidence in the EU following the Russian attack on Ukraine, Macron's repeat victory in the French presidential election, and the Brexit hangover in the UK. The democratic ideal is proving increasingly attractive – not only in Europe, but also in countries with an authoritarian regime. The momentum for a *Zeitenwende* seems to exist.

The *Conference on the Future of Europe* launched by the European Commission and relying on the broad participation of citizens could have made such a contribution to awareness. However, the problem with this kind of mass participation is the consolidation of the broad diversity of individual citizens' proposals, and to obtain a consistent and practicable reform concept. Unfortunately, the commission chose a way of filtering the proposals according to its given technocratic competences. Its focus is merely on more transparency followed by a list of improvements, but it ignores the demands for democratic control that have been raised for many years and that were also requested by the participants of the conference (European Commission, 2022). In the Commission's concept, these issues dropped out, because the European Council, not the Commission, is responsible for the necessary Treaty changes.

This obvious failure comes to light not only with respect to the demands for more democratic decision-making and control, but also for more economic sovereignty. A change in the treaties is necessary especially with regard to the redesign of the monetary and fiscal architecture. It would replace the neoliberal philosophy of European reform policy, according to which a deepening of private financial and capital market integration and stricter control of national fiscal policies are sufficient to protect the monetary union from economic crises. The necessary reforms would have to come from two sides: a redefinition of the ECB's independence would focus only on its operational business, while the definition of its objectives and the appointment of key members of the Executive Board would be legitimised by Parliament and thus by the European electorate. But the other side would be even more important: the ECB, like all major central banks, would need a strong fiscal partner to coordinate monetary and fiscal policy. What would be needed, as is often suggested, would be a kind of European finance minister with an adequate budget that could also be financed by loans. However, this would

also require the abolition of Article 123 of the Treaty on the Functioning of the Union, which prohibits any credit financing of the budget.

There are more obstacles on the way to a political and democratic Union. One that is difficult to get rid of is the veto right of every national government that applies even in attempting its abolition. Obviously, the solution of this and other problems is even trickier with more member countries. Hence, the debate on substantial reforms of the Union is connected with the revival of the dilemma between *enlargement* and *deepening*. Two options for solving this dilemma seem possible. The first one is a temporary disintegration of the Union through the voluntary exit of countries that do not conform with the values and policies of the Union.[15] In my perception, Brexit improved the chances for reforms, and it goes without saying that the Union's capacity to act uniquely has improved. The second option is to focus fundamental reforms on the existing monetary union and on those countries that contractually commit to adopting the common currency within a fixed period of, say, three or five years.

6. CONCLUDING REMARKS: THERE ARE ALTERNATIVES

The question discussed in the literature, whether neoliberalism can survive its crises and can renew itself (cf. Biebricher, 2021: 326ff, Crouch, 2011) is relevant. The hope for survival and renewal is of course subject to the fallacy of the TINA principle ("There is no Alternative"), with which many politicians, economists, technocrats and publicists have defended neoliberal policies since the outbreak of the multiple crises since 2008. The actually important, interesting and overarching question is therefore what alternatives there are to a neoliberal world of global levelling up or down of institutions, social norms, standards and policies.

Among the possible options, the essay has discarded both a return to political small-stateism and a flight into unlimited globalisation. What probably remains is a pragmatic middle position, which I would call *regional integration*; nations

[15] The reader should not mix a temporary disintegration with the dissolution of the Union discussed in the former section. An exit of countries may improve the chances for deepening and more sovereignty of the Union, dissolution, however, means the return of sovereign rights to nation states.

that feel culturally, historically and socially connected can join together to form larger spaces. Should this be the case for the EU, then nothing stands in the way of further integration along the lines described above, and thus the emergence of external sovereignty. As a currently hybrid system, the Union offers sufficient starting points for such reforms. Its relations with other large areas - states as well as communities of states, the latter with varying degrees of integration - would take into account not only economic efficiency, but also security of supply, environmental protection and respect for human rights as equally important criteria. Promoting this discussion was one of the aims of this essay mentioned in the introduction.

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*Mladen Stamenković**

WHERE DID ALL THE PAPERS GO? A BIBLIOMETRIC OVERVIEW OF PUBLICATIONS IN ECONOMICS FROM SERBIA

ABSTRACT: *In this paper, we provide a bibliometric overview of publications in economics by authors with affiliations from Serbia. We use the Web of Science database, analyse all the articles published from 1996 onwards, and provide an overview of publications, journals targeted, trends, and the effects of collaboration. We identify the main topics of interest of the published papers. To do this, we use bibliographic mapping and provide the most common terms used in the titles and abstracts of the papers, grouped in clusters. Using these clusters, we present the main interests and focus of the papers in the dataset. The robustness of the conclusions is obtained by extending the analysis to another citation database, the SCImago Journal Rank.*

KEY WORDS: *bibliometric analysis, economics, Serbia, bibliometric network*

JEL CLASSIFICATION: A10, A11

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1. INTRODUCTION

The history of publishing in top-level international journals in economics by authors from Serbia has its roots in history. The period until the 1980s saw the topics of socialist economies or Yugoslavia's development as those of interest in most prestigious economics journals. The big five, the top five most prestigious economic journals, where a single publication virtually guarantees gaining tenure at top-level universities, was no exception. Out of these five, we note publications in three of them, the Journal of Political Economy (Vučković, 1963), the American Economic Review (Horvat, 1971), and the Quarterly Journal of Economics (Vanek & Jovičić, 1975). The fact that the authors from this region mostly focused on writing in Serbo-Croatian only emphasizes this achievement. Often, works published in Serbo-Croatian were translated for publication in English-language journals. This period marked publications in Eastern European Economics (Čobeljić, 1963; Gluščević et al., 1972; Horvat, 1972), a journal attracting the attention of our authors in the last couple of years as well, and in several other respectable journals as well (Horvat, 1974; Mihailović, 1972).

Tracking the work of authors from an earlier period in detail is problematic on a macro level due to the lack of metadata available. Institutional affiliations are often missing, and the authors only provide the cities or countries from which they came without any additional details.

With technological development, modern bibliometric tools have emerged in the library and information science fields, allowing more precise and coherent analysis of the publications. Bibliometric analysis represents a powerful and insightful tool for evaluating scientific outputs, regardless of the field of research, such as operations research (Liao et al., 2019; Tang et al., 2018), business (Castillo-Vergara et al., 2018) or economics (Bahoo et al., 2021; Bonilla et al., 2015). There are also respected journals devoted solely to reviews, such as the Journal of Economic Surveys (see Laušev, 2014, a paper devoted to this region). Apart from the use of bibliometrics as a tool to evaluate a new research field or country/regional perspective, this type of analysis can also be used to access individuals, institutions, or even journals (Wang et al., 2020).

The aim of the paper is to show the main topics of interest of authors with an affiliation from Serbia in their publications in the field of economics using

bibliometric analysis. In this paper, we use the most relevant research database in Serbia, Journal Citation Reports (JCR) – Web of Science, i.e., Web of Science: Social Science Citation Index (WOS: SSCI). With 3400 journals across 58 social science disciplines, this list represents a natural foundation as all Serbian rulebooks on research excellence are based on journal impact factors (JIF) presented in the Web of Science.

The remainder of the paper is organised in the following way. The second section presents an overview of the papers used in the analysis. We provide an overview of the dataset, the chronology of publications, and journal selection. The discussion on topics of interest for researchers from Serbia is unveiled in the third section. The fourth section is devoted to the robustness of findings as we use another citation database to validate the results. The paper ends with concluding remarks.

2. AN OVERVIEW OF THE SOCIAL SCIENCE CITATION INDEX PUBLICATIONS

We focused only on articles published in WoS: SSCI. The query consisted of selecting articles with Serbia as an affiliation country of any author, and we selected journals in the Web of Science category economics. The data available for the WoS: SSCI dates from 1996, and the search yielded 715 results[1].

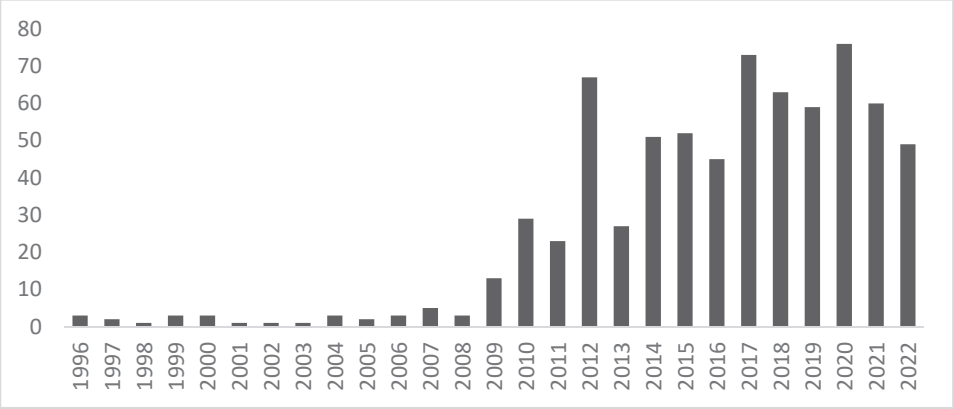
The distribution of annual publications is presented in Figure 1. In 1996, the first year the data was available, there were three papers, and a similar annual dynamic was noted for more than a decade. The end of the 1990s was marked by the same group of authors and their publications (P. Petrović et al., 1999; P. Petrović & Mladenović, 2000; P. Petrović & Vujošević, 2000). Interestingly enough, even though the beginning of the first decade of the 21st century did not bring many papers, one paper was published in one of the most reputable journals in economics (DeMarzo & Urošević, 2006), becoming the second publication from Serbia in the Journal of Political Economy.[2] The first significant surge of papers came in 2009 and 2010, with 13 and 29 papers published, respectively, which can

[1] An additional query used the term Yugoslavia. Serbia yielded 707 results, with 8 more for Yugoslavia. We excluded one retracted text from the database.

[2] Here it is worth also stating the comment in the same journal in 1959 (Horvat & Rasčović, 1959), although the location given is Manchester, England, without any affiliation.

be explained by the fact that the journal Panoeconomicus was listed in the WoS: SSCI in 2010, as well as several other journals from the regions, such as Zbornik radova Ekonomskog fakulteta u Rijeci and Economic Research-Ekonomska istraživanja in 2009. As these journals were more interested in topics related to Central and Eastern Europe, it made it possible for more research on these topics to be published, mostly in Panoeconomicus. During these two years, 13 papers by authors from Serbia were published. The most cited paper[3] from this period has 66 citations and was published in Ecological Economics (Bojković et al., 2010), and represents an interesting combination of academic fields. In this case, the paper is based on outranking methods and operations research, and we will discuss the link between the published papers and other fields afterwards.

Figure 1. The yearly number of publications from Serbia in WoS: SSCI from 1996 onwards.



As stated, the increase in publications is attributable to the introduction of journals from the wider region and institutional pressure with the introduction of WoS: SCIe/SSCI journal lists in Serbian rulebooks. Table 1 shows the journals researchers from Serbia utilised the most, as well as the countries of the publishers. The table consists of all the journals with at least 15 papers in the overall period.

[3] Measured by the citations in the WoS collection.

Apart from the positive fact that the number of papers rose significantly, one negative consequence of Serbian rulebooks is the lack of incentive for the authors to target higher-ranked journals. The reason is that all journals with a JIF are ranked at the same level in the tenure track criteria for the social sciences. The history of publications in top journals, even the best ones, such as the Journal of Political Economy, clearly shows the potential of researchers from this region. The need for a discussion on quality and structural changes in the rulebooks, especially for the universities aiming for excellence, is evident.

Table 1. The list of journals publishing the most papers from Serbia, 1996-2022.

Journal	Country	Papers
Economic Research-Ekonomska istraživanja[4]	Croatia	69
Panoeconomicus	Serbia	61
Inzinerine Ekonomika-Engineering Economics	Lithuania	48
Custos E Agronegocio Online	Brazil	40
Amfiteatru Economic	Romania	33
Actual Problems of Economics	Ukraine	29
Zbornik radova Ekonomskog fakulteta u Rijeci-Proceedings of Rijeka Faculty of Economics	Croatia	26
Technological and Economic Development of Economy	Lithuania	20
E & M Ekonomie a Management	Czechia	18
Journal of Business Economics and Management	Lithuania	17
Acta Oeconomica	Hungary	16
Economic Computation and Economic Cybernetics Studies and Research	Romania	16
Ekonomicky Casopis	Slovakia	15

2.1 Collaboration

And what about the affiliations of the authors? Most papers have authors from the University of Belgrade (276 records in the search) or the University of Novi

[4] Now published by Taylor & Francis, with the editor-in-chief still from Croatia and clear devotion to this region within its scope: "special attention given to experiences of the transition from socialism to market economies in Eastern Europe".

Sad (222), followed by the University of Kragujevac (65), the University of Niš (40), and the Institute of Economic Sciences (33).

We measured international collaboration by counting the papers with authors from Serbia and from at least one other country. In the whole database, out of 715 papers, we have 194 papers, or slightly above 27%, that have been published as part of international collaboration. Many of these papers likely came about as a product of funded projects, such as the Horizon programme. An interesting question for future work would be to evaluate the exact impact of these projects on research output. Regarding institutional work within the country, we found 55 papers signed by authors from at least two institutions[5].

The database does not include information on faculties within the university. The reason is simple: the specific organisational structure of the universities in Serbia. Furthermore, authors often do not include the faculty but specify the name the university as their affiliation. For illustrative purposes, we examined all the publications specifying the University of Belgrade and connected the authors to their corresponding faculties. In Table 2, we present the faculties with the most papers in the field of economics during the observed period. Interestingly, out of all the papers from the University of Belgrade, oughly 5%, were a collaboration between researchers from different faculties within the university.

Table 2. The number of papers in economics per faculty at the University of Belgrade, 1996-2022.

Faculty	Papers
Faculty of Economics and Business	94
Faculty of Organisational Sciences	58
Faculty of Transport & Traffic Engn.	56
Technical Faculty in Bor	22
Faculty of Philosophy	9
Faculty of Law	8

[5] Here, we checked only universities and institutes. The non-adacemic affiliations were neglected.

Apart from the expected top position of the Faculty of Economics and Business, the large number of papers from technical faculties, such as the Faculty of Transport and Traffic Engineering, might come as a surprise. There are two reasons for this fact. The first one is of a technical and institutional nature. Technical faculties have stricter rules regarding the requirements for tenure track positions at the university, unlike social science faculties, which have introduced several relaxations to the set of requirements, such as additional lists of journals for the evaluation of research excellence. The second reason lies with the list of journals within the Web of Science category economics and the link with other fields.

2.2 The link with other fields

Every journal and book covered by the Web of Science core collection is assigned to at least one of the 250 subject categories. Journals often take a multidisciplinary route and papers are listed in several categories, economics being one of these, which explains the existence of many technical faculties and researchers in the list.

Transport Policy is an excellent example of such a multidisciplinary journal. With a JIF2 of 6.173 (in 2021), it is ranked 39th in the category of economics and sixth in transportation. The same holds for the journal Transportation Research Part A - Policy and Practice. They naturally attract researchers from engineering schools and joint projects between schools (Milenković et al., 2019; Ristić et al., 2022; Stojadinović et al., 2019).

For the author of this paper, for example, the significant number of papers using the methods from operations research and management science have drawn attention (Bojković et al., 2010; Pamučar et al., 2022; Radojičić et al., 2018; Simić et al., 2022; Ulutaş et al., 2021). As expected, the strongest link is with the journals listed in the areas of business, then business and finance (151 records jointly), and management (64 records) as these fields are naturally intertwined the most. The field of agricultural economics is just behind, with 56 records with the majority of them coming from the University of Novi Sad (Kastratović, 2019; Živkov et al., 2020; Živkov, Joksimović, et al., 2021).

3. THE TOPICS

One of this paper's main ideas is to focus on the topics of authors from Serbia. What were the main topics and themes covered in the papers? We use VOSViewer, an open-source software developed for creating, visualising, and exploring scientific bibliometric maps (van Eck & Waltman, 2014; Waltman et al., 2010). The output is a two-dimensional map in which the frequency of occurrence of a particular term is defined by label size, and the distance between two terms can be interpreted as an indication of the relatedness of these terms based on the number of co-occurrences of the terms in the corpus file (Castillo-Vergara et al., 2018). The construction of a map is based on a co-occurrence matrix. To fully understand the VOS mapping technique and the construction of clusters, the reader can visit the official VOSViewer website[6], where a full reference list of publications is available.

First, we evaluated only the titles from the dataset and searched for the connections and networks between the words used there, as presented in Figure 2. Out of 1966 terms from the titles, we selected the ones appearing at least five times. As the figure indicates, the most used words of Serbian authors are *country* and *market*. The obtained mapping consists of six clusters representing grouped topics of interest based on the words used in the titles.

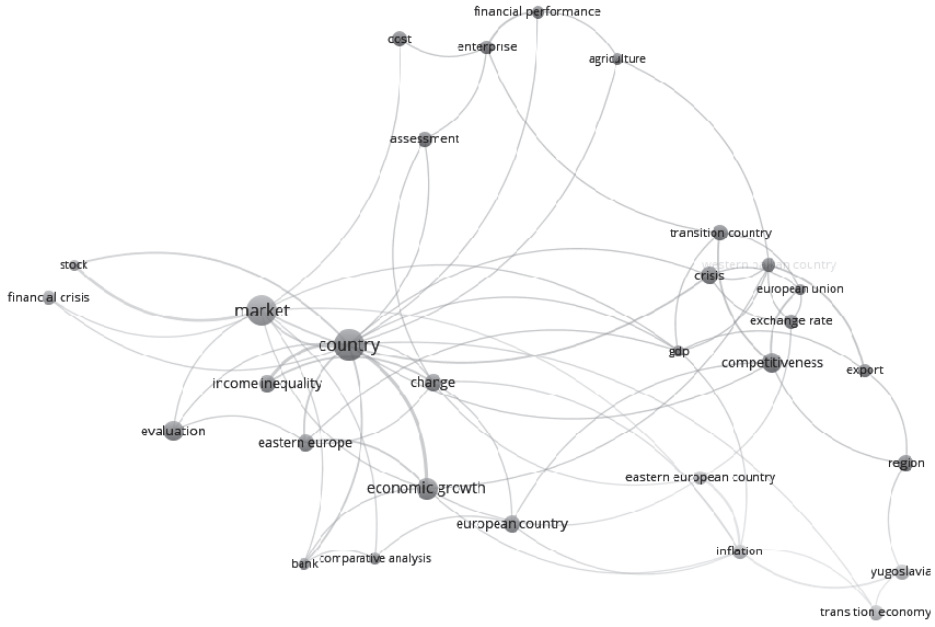
The first cluster connected to the word "country" consists of *income inequality* and *economic growth*, with *Eastern Europe* in the cluster. Such a question raised significant attention from Serbian authors precisely focusing on these aspects from the broader perspective of the CEE and SEE regions, but not exclusively on them (Avlijaš, 2020). The research focus on export and exchange in the transition countries and the whole Western Balkan region is another interesting strain of research.

As expected, there is a cluster related to financial markets with several strong groups of authors dealing with this issue in economics journals and related fields (Božović, 2021b, 2021c; Grbić, 2021; Nedeljković & Savić, 2022; Njegić et al., 2018). Here it is worth noting that there are many papers in other JCR-WoS categories by prominent authors (Drenovak et al., 2014, 2021; Ranković et al.,

[6] https://www.vosviewer.com/

2014, 2016). This raises interest in extending this research in the near future, using broader categories in the dataset and including the whole research area of economics and business.

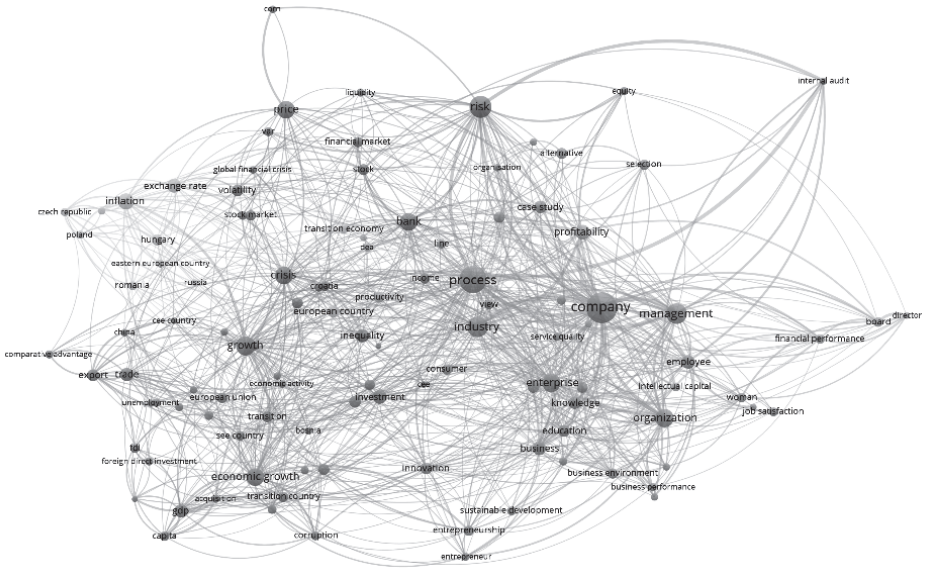
Figure 2. Mapping of the words used in titles.



To provide a better understanding, we applied the same idea not only to the titles, but also to the titles and abstracts. This search yielded 13379 terms for the evaluation, and we set 15 occurrences of the word as the minimum threshold. Figure 3 represents the most relevant terms connected in a map and split into seven different clusters.[7]

[7] Full-size images for all figures are available at https://doi.org/10.7910/DVN/9KVMPF.

Figure 3. Mapping of the words used in titles and abstracts.



We attempt to name the clusters and give a tentative categorisation of topics of interest for the authors from Serbia. The taxonomy presented in this paper seeks to categorise all the terms used in titles and abstracts. It is clear that different interpretations of the clusters are possible. Still, the results represent a foundation for future debate to categorise the topics. Table 3 presents a breakdown of all the terms into seven clusters obtained from the VOSViewer.

Table 3. Categorisation of the topics of interest for the authors from Serbia.

Cluster	Name
I (red)	Macroeconomic performance
II (yellow)	Comparative studies
III (blue)	Financial markets
IV (purple)	Process management
V (green)	Business management
VI (light blue)	Corporate governance
VII (orange)	Productivity analysis

The main terms in cluster I are (economic) growth, GDP, exports, and trade. Further, following the terms from the cluster, these main topics were connected to concepts such as investment, European Union, transition country, corruption, comparative advantage, and economic development. In terms of methodology, we can note that the term panel is present in this cluster. A search based on the information from this cluster can yield several interesting representatives of this category (Arsić et al., 2021; Kastratović, 2019, 2020; Nedić et al., 2020; Obradović & Lojanica, 2017).

We designated cluster II as the one dealing with the topics related to comparative studies, as the main terms in this cluster are Central and Eastern European countries, such as Slovakia, Poland, the Czech Republic, and Romania. Two terms connected with them in the cluster are inflation and exchange rate. This again emphasises that the clusters should be considered as a guideline and macro overview of the topics; it is far from a crisp categorisation, and fuzziness in these categories cannot be avoided. Representatives of this cluster can easily be put in some other category as well (Jakšić et al., 2018; Kostić et al., 2016; Krstić, 2021; Rajković et al., 2020).

Unlike the second cluster, the third cluster is quite specific with terms such as bank, crisis, financial market, risk, price, volatility, stock, and liquidity. Naming representatives of this group can lead to an extensive list, as this group is one of the most popular topics from our authors (Božović, 2021b; García et al., 2007; Nedeljković & Savić, 2022; Njegić et al., 2018).

We should note the existence of one potential outlier in the third cluster, the terms income inequality together with inequality. A connection with such words in the cluster as crisis exists (Perugini et al., 2019), but this topic deserves special attention. The research on (income) inequality is one topic where the Serbian research community has had success on a global level, especially if we count the work of Branko Milanović. Significant contributions on this topic by authors with affiliations to Serbia are present as well (Josifidis et al., 2017, 2018; Josifidis & Supić, 2019; Krstić, 2021; Perugini & Vladisavljević, 2019, 2021; Ranđelović & Vladisavljević, 2020).

The fourth cluster, coined process management, is the first that fully pinpoints the connection between economics and business, and emphasises the need for a

deeper look into the entire research area "business and economics". The leading term here is process, followed by some technical terms which indicate methods used in the papers in this cluster – case study and decision-making process (Radosavljević, 2014; Radošević et al., 2013; Simeunović et al., 2020; Stošić & Dalton, 2020). The link is even more apparent in cluster V, business management. The terms company, management, industry, enterprise, organisation, business, innovation, entrepreneurship, and consumer create one of the most consistent clusters (Bobera & Leković, 2018; Džunić et al., 2018; Govindan et al., 2019; Jeraj et al., 2015; Karabašević et al., 2018; Lazarević et al., 2020; Stanković et al., 2021; Stojković et al., 2021).

The last two clusters are the smallest, consisting only of six and three terms, respectively. Corporate governance consists of the terms profitability, financial performance, board, director, and intellectual capital (Kavalić et al., 2021; Rađen & Stanišić, 2017; Stančić et al., 2014). The final cluster is fully connected to the application of Data Envelopment Analysis (DEA) in the field of economics (Martinović & Savić, 2019; Radojičić et al., 2018).

4. EXTENDING THE SCOPE: SCIMAGO JOURNAL RANK PUBLICATIONS

Including papers from the SCImago Journal Rank (SJR) came as a natural response to obtain a richer dataset on research activities and to check the consistency of the results. The rulebooks and Serbian legislation on criteria for tenure track routes included the SCImago Journal Rank as another important list of journals on top of the Web of Science SCIe and SSCI lists.

After a data refinement, we found 1269 results using this database. The problem we encountered here is similar to that of the WOS: SSCI database and the lack of data from the earlier period. The SJR database consists of several entries before 1996, so the works on preference and choice published in Theory and Decision (Kron & Milovanović, 1975), Pavle Petrović and his work in the Cambridge Journal of Economics (P. Petrović, 1987) and in the Journal of Comparative Economics (P. Petrović, 1988), as well as the work of Stevan Hadživuković (Hadživuković, 1989) get an honourable mention. This period is marked by the work of Branko Milanović as an author with a Serbian affiliation (Milanović, 1982, 1987), but also authors who spent careers in Yugoslavia and later Serbia (Marsenić, 1986; Stojanović, 1984, 1986).

In addition to this historical perspective, SJR includes several journals not existent in the Web of Science search, including Economic Annals as the most significant journal overall as it contains 153 records in the dataset (e.g., Božović, 2021a; Brkić et al., 2021; Lebedinski & Vladisavljević, 2022; Luković et al., 2021; Nikolić & Nikolić, 2021; Savović, 2021).

The institutional ranking remained the same, with the University of Belgrade and the University of Novi Sad holdings top positions. It is worth noting that the most productive researcher according to the SJR database is Dejan Živkov with 43 records (e.g., Živkov et al, 2021; Živkov, Joksimović, et al., 2021; Živkov et al., 2020; Živkov, Manić et al, 2021).

Extending the search scope to SJR journals confirmed the results obtained from the VOSViewer mapping on the JCR-WoS data. The work published in impact factor journals is also present in the SJR-ranked journals. Thus, we note several fine works from Serbia on topics from the clusters presented above in SJR journals, ranging from macroeconomic performance (Saini & Muniyoor, 2021; Zhang et al., 2021), comparative studies (Radulović, 2020; Žarković Rakić et al., 2019), and financial markets (Božović et al., 2009; Cvijanović, 2019; Kudryavtsev, 2019) to DEA applications (Mitrović, 2015; M. Petrović et al., 2018).

5. CONCLUSIONS

In this paper, we adopted a bibliometric approach to analyse the papers in economics published by authors with affiliations to Serbia using Web of Science: Social Science Citation Index articles from the journals listed in the WoS category economics. The data obtained from the search yielded 715 results.

We show that most papers were published in the journals of publishers in CEE/SEE countries, with Economic Research-Ekonomska istraživanja and Panoeconomicus at the forefront. The chronology of the publications shows the impact of the introduction of WoS: SCIe/SSCI lists in Serbian rulebooks on publication dynamics. The number of publications was almost non-existent until the end of the first decade of the 21st century, when it began to grow. What is notable from this paper is that, although the second half of the 20th century had fewer publications, the ratings of the targeted journals were impeccable. This opens the way for one of manifold future research directions. The relevant policy

discussion from the Serbian perspective should be opened on the relevant citation database and its consistent use. Serbian rulebooks for social science research areas have many exemptions and ways to avoid publishing in relevant citation databases and are primarily focused on quantity, not quality. This has caused a lack of incentive to target top-quality journals, as the authors are incentivised not to publish in the best possible journals. All journals with any JIF are equally ranked as top-level journals. The logical consequence is that most targeted journals are in the lower half of the JIF ranking, without any incentive for the authors to target higher-ranked journals. Thus, the need for future focus on more relevant journal lists is of vital importance.

Without any doubt, there is a clear incentive and need for the journals in this area to raise their quality and try to be included in the WoS: SSCI or SJR lists and similar respectable journal lists such as the ABS Academic Journal Guide, as this will inevitably result in more manuscripts of better quality, leading to a better quality of the journals in the end. The editorial perspective for journals in CEE is clear: the focus on position in the WoS/SJR is significant in the region and a good position of the journal in WoS/SJR rankings consequently leads to better quality publications.

From an institutional perspective, another finding from this paper is the lack of cooperation within the universities. We used the University of Belgrade as a case study and showed the number of publications from each faculty within the university. Although there exist a significant number of publications from various schools, less than 5% of the publications were the product of collaboration between authors from different faculties within the university. On the other hand, cooperation with partner institutions abroad is significant. More than a quarter of the published papers resulted from international collaboration between authors from more than one country.

One of this paper's main contributions is its attempt to discover the most popular topics and themes covered in the papers published by authors with an affiliation to Serbia. We used bibliographic mapping of the terms used in the titles and abstracts of the papers. The result consists of seven different clusters, grouping the most used words. We used the clusters to describe the main areas of interest. Several topics stood out. Various macroeconomic issues and questions concerned

with economic growth, export, trade, investments, inflation, and exchange rates are very prominent in the analysis. The use of terms such as bank, crisis, and risk showed the importance of topics relating to financial markets. Aspects of business were also notable in the analysis. This proved that the connection between business and economics topics is closely intertwined. Future research should attempt to merge these interrelated topics, as we intend to analyse not only papers from economics, but focus on the whole research area of business and economics.

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RELIGIOUS AND SOCIAL GROUP DIVERSITY IN BORROWING AND SPENDING BEHAVIOUR: ANALYSIS OF SURVEY RESULTS FROM RURAL WEST BENGAL, INDIA

ABSTRACT: *India is a nation characterised by diversity in religion and caste. This paper attempts to determine whether diversity among religious and social groups has any impact on the borrowing and spending behaviour of households in West Bengal, India. We conduct a Fairlie decomposition analysis to evaluate the religious and caste differences in the socio-economic variables that mostly contribute to the disparity in institutional borrowing, use of institutional loans, and use of banking services using a household-level primary survey in two districts of West Bengal, India. The results of the decomposition analysis in terms of social group differences and religious group differences show that households belonging to the unreserved category and the Hindu population are more likely to hold savings bank accounts, make use of institutional borrowing, and use loans for production purposes than different reserved categories and the Muslim population, respectively. The gap between the reserved and unreserved populations and the Hindu and Muslim populations in terms of institutional borrowing and the use of loans for production purposes widens for regular wage earners and casual labourers in non-agriculture. To reduce the gap between social and religious groups, occupation categories play a major role. The implication is that wider access to financial services should be provided to all sections of the population.*

KEY WORDS: *religious diversity; caste diversity, borrowing behaviour, spending behaviour, Fairlie decomposition analysis; West Bengal.*

JEL CLASSIFICATION: C10, G21, G51, G53

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1. INTRODUCTION

India, one of the oldest civilisations in the world, is the land of various ethnic groups and characterised by multiculturalism. Being a secular country, India is an amalgamation of different cultures and religions. As Varshney (1983) pointed out, apart from the much-noted 2000-odd castes, there exist eight "major" religions and approximately 15 languages spoken in various dialects across the states and union territories of the country. After Independence, the Government of India designated some under-privileged ethnic groups as Scheduled Caste (SC), Scheduled Tribe (ST) in 1950 via article 341 and 342 under the Constitution of India (Ambagudia, 2011), and Other Backward Caste (OBC) in 1991 after the recommendations of Mandal Commission (Jangir, 2013). According to Deshpande (2002, 2015) there exists a multifaceted interstate disparity which includes religion, language, gender, and caste in India. In this paper, we will focus on religious diversity and caste, or social group, diversity in India and attempt to figure out whether these have any impact on borrowing and spending behaviour in India. More specifically, we will determine the borrowing and spending pattern of the population with respect to religion and social group/caste. This issue is important as in India the Muslim population is the second largest religious group after the Hindu population (Census of India, 2011) and the Scheduled Caste and Scheduled Tribe constitute almost 29% of the total population in India (SECC, 2011). Therefore, it is imperative to provide these sections of the population with formal financial services.

1.1 Religious Diversity

The religious diversity of Indian society is evident from the population share of the various religious groups as follows: Hinduism (80.5%), Islam (13.4%), Christianity (2.3%), Sikhism (1.9%), Buddhism (0.8%), Jainism (0.4%), and others (0.7%) (Census of India, 2011). According to the NSS 70th round survey, popularly known as the All India Debt and Investment Survey (AIDIS), only 34% of the Muslim population is involved in institutional borrowing. Since this is the second largest population group in India in terms of religion according to the Census of India, 2011, it is essential to make financial services available to this group. In this regard, Banerjee et al. (2010) mentioned certain rules regarding operations in the credit market for the Muslim population which might be the

cause of the low level of institutional borrowing[1]. The literature on Islamic finance points out that *Riba*, or interest, is forbidden in Islam (El-Gamal, 2000; Chapra, 2008; Uddin, 2015; Demirguc-Kunt et al., 2014). Uddin (2015) explained that Islamic finance is a completely rule-based financial system originating from the Holy Quran. According to Uddin, "Prohibition of Riba, Gharar and Maysir in financial transactions is the fundamental of Islamic finance which distinguishes it from conventional finance"[2]. Adhikari and Agrawal, (2016) found that religiosity is negatively associated with the risk-taking behaviour of financial institutions. Gyapong et al. (2021) examined how religious beliefs affect loan repayment performance across 770 microfinance institutions of 65 countries from 2008-2018 and found that religiosity does not enhance the loan repayment behaviour of women borrowers, but it lowers the loan size per borrower. Against this background, the first motivation of this paper is to identify financial behaviour, specifically access to banking facilities, borrowing behaviour, spending behaviour, etc., in terms of religion.

1.2 Social Group Diversity

In India, the traditional social system was constituted around the caste structures (Kothari, 1995). Article 341 of the Indian Constitution characterised certain under-privileged tribal and caste populations in India as Scheduled Castes (SC) and Scheduled Tribes (ST) (Dunn, 1993). Another section of the Indian population is termed Other Backward Class (OBC), consisting of those who are educationally or socially disadvantaged (Yadav, 2002; Nayar, 2007). OBC populations are entitled to certain benefits as they are disadvantaged but less deprived than those in the SCs and STs (Elder, 1996). Thus, Indian society is broadly categorised in four social groups, SC, ST, OBC, and General, where the General category includes most of the higher castes. Azam (2012) explained that exclusion of these deprived sections of the population from certain economic and social spheres has resulted in inequality in India. According to the NSS 70th round survey report (2014), the incidence of indebtedness (IOI) is highest among OBCs, both in rural (35.7%) and urban (26%) India. The SC population is the second highest in terms of IOI both in rural (30.9%) and urban (23.5%) India. In this

1 Institutional loan takes into account loans from formal financial institutions such as banks etc. and semi-formal institutions such as micro-finance institutions.

2 In Islamic finance, *Riba* means interest, *Gharar* means uncertainty, hazard, or risk,and *Maysir* means gambling (Uddin, 2015)

regard, the second motivation of the paper is to identify financial behaviour, specifically access to banking facilities, borrowing behaviour, spending behaviour etc., in respect to different social groups/castes in India.

2. BACKGROUND

The issues relating to access to credit among rural households have attracted the attention of researchers and policy makers. The dependence on moneylenders and rich landowners was a major drawback of the rural credit market in India (Shah et al., 2007). Satyasai (2002) also addressed the issue of dependency of rural households on moneylenders after analysing NSS 48th round survey data. Therefore, it is important to identify whether rural households use the formal financial services available to them and whether they choose to borrow from formal sources (for example, banks and semi-formal institutions such as micro-finance institutions). Ravi (2003) showed that the most common reason for rural households' borrowing is for consumption needs (which include the purchase of durable goods and loans taken for festivals and ceremonies) in Kerala and Uttar Pradesh, two states in India. Loans are also taken on a day-to-day basis for consumption. Ravi (2003) also established that the second most common reason for rural borrowing is to obtain agricultural inputs. Bell (1990) and Udry (1990) found that formal loans are taken for short-term consumption and working capital needs in rural Africa. Therefore, rural households have choices to make-whether to use loans for consumption or production purposes. Thus, another motivation of this study is to examine various aspects such as the use of banking services, institutional borrowing, and institutional loans for production purposes among religious and caste groups in rural India. More specifically, the paper will examine whether the religious and caste differences among rural households influence the disparity in institutional borrowing, the use of institutional, and, moreover, the use of banking services in rural India, while controlling for various socio-demographic and economic factors. This is the unique contribution of this paper, which to best of our knowledge has not been discussed in the existing literature. The analysis is based on a household-level survey that covers two districts of West Bengal, India.

The rest of the study is organised as follows. The following section outlines the data and methodology used in the study. Section4 presents the estimation results

along with discussions of the results. Section5 concludes with further discussion and potential issues.

3. METHODOLOGY

3.1 Data

The paper is based on a rural household survey of 1405 households in four villages of two districts, namely, North 24-Parganas and South 24-Parganas of West Bengal, India. The villages are Takipur and Sankchura in the North-24-Parganas district and Herobhanga and Chakchata in the South 24-Parganas district. These two districts of West Bengal account for the highest and second highest population in the state (excluding Kolkata). The duration of the survey was August 2015-July 2016. The survey design as well as the sampling method of this survey is described in Banerjee-Chatterjee et al. (2021). Of the1405 households, 65.7% are from South 24-Parganas and the remaining 34.3% are from the North 24-Parganas district.

Table I shows the descriptive statistics of use of financial services among the surveyed as well as the borrower households. It depicts that among the total surveyed households, 77.37% hold a savings bank account. Among the borrower households, 33.78% borrow from institutional sources, and 21.42% use their loans for production purposes, whereas 17.37% use them for consumption purposes. Table II and III describe the descriptive statistics of use of financial services (use an ATM card, hold a savings account, have a loan, institutional borrower, use loans for production purposes, use of loans for consumption purposes, etc.) across the social and religious groups, respectively. Table II and III also present the results of the sample proportion test of the uses of the above-mentioned financial services across the social and religious groups. Table II shows that the use of these financial services is proportionately higher for the reserved population than for the unreserved population at a one percent level of significance. Next, Table III shows that the use of these financial services is proportionately higher for the Muslim population than for the Hindu population among the surveyed households. This result signifies that the proportion of the use of the above-mentioned financial services significantly differs across the social and religious groups. Therefore, it is necessary to identify the religious and

caste differences in the use of banking services, institutional borrowing, and the use of institutional loans for production purposes.

Table I: Descriptive statistics of use of financial services across surveyed and borrower households (column-wise in percentages)

	Categories	Surveyed households(1)	Borrowers(2)
Use of ATM or debit card	No	80.71	72.66
	Yes	19.29	27.34
Savings account holding status	No	22.63	13.94
	Yes	77.37	86.06
Loan status	No	61.21	-
	Yes	38.79	-
Institutional borrowing status	No	87	66.24
	Yes	13	33.76
Use of loan for production purposes	No	78.58	73.21
	Yes	21.42	26.79
Use of loan for consumption purposes	No	82.63	78.17
	Yes	17.37	21.83
Total No. of Households		1405	545

Source: Primary Sample Survey

Table II: Descriptive statistics of use of financial services across social groups (in numbers)

	No. Of surveyed households	**No. of unreserved households**	**No. of reserved households**	**Sample proportion test(Z Value)**
Use of ATM Or debit card	271 (19.29)	62 (22.88)	209 (77.12)	3.26***
Savings account Holding status	1087 (77.37)	208 (19.14)	879 (80.86)	5.32***
Loan status	545 (38.79)	137 (25.14)	408 (74.86)	7.14***
Institutional borrowing Status among borrowers	184 (33.76)	57 (30.98)	127 (69.02)	5.78***
Use of loan for production purposes	301 (21.42)	59 (19.60)	242 (80.40)	1.75***
Use of loan for consumption purposes	244 (17.37)	48 (19.67)	196 (80.33)	1.57
Total no. Of households	1405	229	1176	

Source: Primary Sample Survey

Table III: Descriptive statistics of use of financial services across religions (in numbers)

	No. Of surveyed households	No. of Muslim households	No. of Hindu households	Sample proportion test(Z Value)
Use of ATM or debit card	271 (19.29)	87 (32.10)	184 (67.90)	4.57***
Savings account Holding Status	1087 (77.37)	426 (39.19)	661 (60.81)	7.38***
Loan status	545 (38.79)	187 (34.31)	358 (65.69)	6.11***
Institutional borrowing Status among borrowers	184 (33.76)	63 (34.24)	121 (65.76)	3.00***
Use of loan for production purposes	301 (21.42)	119 (39.53)	182 (60.47)	1.95**
Use of loan for consumption purposes	244 (17.37)	106 (43.44)	138 (56.56)	0.36
Total no. Of households	1405	625	780	

Source: Primary Sample Survey

To do this, firstly, we check the financial accessibility across the social and religious groups. We construct a Financial Accessibility Index (FAI) and compute the Gini coefficient as well as graph the Lorenz curve to review whether financial services are accessible or not across the social and religious groups. The calculation methodology to construct the Financial Accessibility Index (FAI) is given in Appendix 1. The Gini coefficient for the FAI is 0.23 and 0.25 for the Muslim and Hindu populations, respectively. The Gini coefficient for the FAI is 0.25 and 0.21 for the reserved and unreserved populations, respectively. Figures 1-4 show the Lorenz curve of the FAI for the Muslim, Hindu, unreserved, and reserved populations, respectively. They show that inequality in access to financial services exists across the social and religious groups. Among the religious groups, this inequality is more visible for the Hindu population than for its Muslim counterpart. Similarly, among the social groups, inequality in access to financial services is more apparent for the reserved population than for the unreserved population. It is thus clear that there is greater inequality in access to financial services and the use of financial services is proportionately higher for

the reserved and Muslim populations than for their counterparts. Therefore, it is imperative to identify the role of different socio-economic characteristics that contribute to this disparity.

Table IV shows the socio-economic and demographic profile of the surveyed as well as the borrower households. The majority of surveyed (33.88%) and borrowers (45.14%) have an educational level up to secondary level. The occupational status of the majority of the surveyed (38.72%) and the borrowers (35.06%) is casual labour in the non-agricultural sector. In the category caste of the principal earner, the OBC population accounts for the majority among both the surveyed (55.59%) and the borrowers (53.03%).The sample villages consist of only Hindu and Muslim populations. The annual income level of the principal earner has been categorised on the basis of a quartile distribution.

Table IV: Socio-economic and demographic profile across the surveyed and borrower households (column-wise in percentages)

	Categories	Surveyed households(1)	Borrowers(2)
Education of principal earner	Illiterate	27.62	9.72
	Up to primary	28.19	34.31
	Up to secondary	33.88	45.14
	Up to higher secondary	3.84	3.67
	Above higher secondary	6.47	7.16
Occupation categories of principal earner	Agricultural self employed	19.79	10.83
	Non-agricultural self-employed	21.78	32.11
	Regular wage salary	13.38	11.56
	Casual in agriculture	6.33	9.91
	Casual in non-agriculture	38.72	35.60
Caste of principal earner	General	16.30	25.14
	SC/ST	28.11	21.83
	OBC	55.59	53.03
Religion of principal earner	Hindu	55.52	65.69
	Muslim	44.48	34.31
Sex of earner principal	Male	91.96	94.68
	Female	8.04	5.32
Annual level income	Incomeclass1 (income≤₹37000)(first quartile point)	26.55	16.51
	Incomeclass2 (₹37000<income≤₹48000)(median value)	25.77	24.40
	Incomeclass3 (₹48000 <income ≤ ₹60000)(third quartile)	22.78	26.97
	Incomeclass4 (income> ₹ 60000)	24.84	32.11
Total no. of households		1405	545

Source: Primary Sample Survey

3.2 StudyVariables

3.2.1 OutcomeVariables

The following outcome variables are used in this study: (1) savings bank account holding status (SBPE) - used as a proxy of access to banking services; (2) institutional borrowing status (IBPE) - whether the principal earner borrows from institutional sources or not; (3) loan used for production purposes (PPPE)- this depicts whether the loan has been used for production purposes or not. All these variables are binary in nature.

3.2.2 Predictors

The predictor variables are based on the principal earners (PE): (1) occupation status (OCUPE) in five categories - self-employed in agriculture, self-employed in non-agriculture, regular wage earner, casual labour in agriculture, casual labour in non-agriculture; (2) Financial Literacy Index(FLI)[3]; (3) income class (IPE)-based on a quartile distribution; (4) age (APE); (5) sex (SPE) - a binary variable, 1 if male and 0 otherwise; (5) caste (CPE)-1 for SC, ST, and OBC and 0 otherwise; (6) religion (RPE)-Hindu and Muslim.

All the independent variables were tested for possible multi-collinearity.

3.3 Econometric Modelling

We will conduct a multivariate logistic regression analysis to assess the effect of independent factors on each of the binary outcome variables. We will also conduct a decomposition analysis to evaluate the religious and caste differences in the socio-economic variables that principally contribute to the disparity in institutional borrowing, the use of institutional loans, and the use of banking services in rural India. The Blinder-Oaxaca decomposition technique (Blinder, 1973; Oaxaca, 1973) is a commonly used technique in decomposition analysis (Karhina et al., 2019) that identifies the factors associated with the inter-group differences in the mean level of outcome (Bora et al., 2018). However, if the outcome variable is binary, then the Blinder-Oaxaca decomposition technique is inapplicable (Fairlie, 2005; Bora et al., 2018). Thus, we will use the Fairlie nonlinear decomposition technique, which is most appropriate technique to decompose the gap between social groups and religions in institutional

[3] The calculation is same as in Poddar et al. (2020)

borrowing, the use of institutional loans, and the use of banking services that can be attributed to different socio-economic factors. The decomposition method divides these differences into two parts: one part is the explained component and the other part is based on the differential effects of the characteristics of both the religious groups and the social groups (Fairlie, 1999, 2005; Karhina et al., 2019). For the decomposition analysis, we have combined SC, ST, and OBC in the social group predictor and termed it as "Reserved" and the other group (General) is referred to as "Unreserved". Religion has two categories, Hindu and Muslim.

3.3.1 Fairlie Decomposition (2005)

The gap between "Reserved" vs. "Unreserved" and Hindu vs. Muslim in mean value of the dependent variable Y (here, institutional borrowing, the use of institutional loans, the use of banking services)can be expressed in equations (1) and (2), respectively, as

$$\acute{Y}^{R} - \acute{Y}^{UR} = [(X^{R} - X^{UR})\,\hat{\beta}^{R}] + [X^{UR}\,(\hat{\beta}^{R} - \hat{\beta}^{UR})] \quad (1)$$

$$\acute{Y}^{H} - \acute{Y}^{M} = [(X^{H} - X^{M})\,\hat{\beta}^{H}] + [X^{M}\,(\hat{\beta}^{H} - \hat{\beta}^{M})] \quad (2)$$

where X^{i} and X^{j} in (1) and (2) are mean values of independent covariates, respectively, and $\hat{\beta}^{i}$ and $\hat{\beta}^{j}$ are vectors of the coefficient estimates for the dependent variable (i stands for R or H and j stands for UR or M).

Since the reserved (Hindu) sample is extremely large, a smaller number of random sub-samples, equal in total size to that of the unreserved (Muslim) sample, are drawn from the reserved (Hindu) sample and each of them matched o the unreserved (Muslim) sample and then separate decomposition of each sub-sample is calculated. Finally, the mean value of all these decomposition estimates is used as an approximate decomposition for the entire reserved (Hindu) sample. We have used 1000 replications of the decomposition and presented the average result. Increasing the number of replications improves the stability of the results.

However, before conducting the Fairlie non-linear decomposition technique, we need to carry out the chi-square test for categorical variables and t-test for continuous variables to examine the differences between reserved and unreserved and Hindu and Muslim in terms of the variables (Ghosh & Choudhury, 2019).

The results of both tests are given in the Appendix (Table A.I – A.VII). The results indicate that there exists a significant difference between reserved and unreserved respondents' age and also Hindu and Muslim respondents' age at the one per cent level of significance. Among the predictor variables, the Financial Literacy Index (FLI) is another continuous variable. The result of the t-test indicates that a difference in the FLI between Hindu and Muslim respondents exists at the one per cent level of significance. The results of the chi-square test for the association between social group and other explanatory variables (Table A.V) show that income level 4, regular wage earner, and casual labour in non-agricultural sector are significantly associated with social group at the one per cent level of significance. Again, the results of the chi-square test for the association between religious group and other explanatory variables (Table A.VI) show that all the occupation categories and all the income categories are significantly associated with religious group at the one per cent level of significance.

4. RESULTS AND DISCUSSION

We present the results of the binary logistic regression and the Fairlie decomposition analysis first for social group differences (Table V) and then for religion differences (Table VI). Only results with a one per cent level of significance will be reported here.

4.1 Results of Binary Logistic Regression for Social Group and Religious Differences

The results of the logistic regression show that the probability of holding a savings bank account and the use of loans for production purposes significantly decreases in the reserved category. The probability of institutional borrowing significantly decreases in the reserved category as well as in the Hindu population. The age of the principal earner significantly increases with an increase in the probability of holding a savings bank account and the use of loans for production purposes in both cases. Regular wage earners are more likely to hold a savings bank account. Financial literacy significantly increases the likelihood of holding a savings bank account. Surprisingly, financial literacy significantly decreases the probability of institutional borrowing.

4.2 Results of Fairlie Decomposition Analysis for Social Group Differences

A positive (negative) contribution of the covariate indicates that it widens (reduces) the gap between the reserved and the unreserved (Bora et al., 2018). Table V indicates a positive gap between the reserved and the unreserved population (0.16, 0.14, and 0.05 for the SBPE, IBPE, and PPPE, respectively) and it implies that the unreserved population is more likely to experience the occurrence of the outcome variables than its reserved counterpart. Now, having found this positive gap, we analyse the extent to which the predictors explain these results. Within the explained gap of the institutional borrowing status (IBPE), 42.86% and 28.57% can explained by the differences between the reserved and unreserved populations in the distribution of casual labour in the non-agricultural sector and regular wage earners, respectively. Respondents in the highest income group contribute 35.71% of the explained gap of IBPE. Respondents with a regular wage and casual labour in non-agriculture contribute 100% and 60% of the explained gap of PPPE, that is, loans used for production purposes. The unexplained gap might be due to the other factors that are not covered in our survey data.

Table V: Results of Fairlie non-linear decomposition for social group differences

	SBPE		***IBPE***		***PPPE***	
Response variable	Logistic results (coefficient)	Decomposition (coefficient)	Logistic results (coefficient)	Decomposition (coefficient)	Logistic results (coefficient)	Decomposition (coefficient)
Caste of principal earner (Reference category: Unreserved)	-1.05***	NA	-0.78***	NA	-.35***	NA
Sex of	0.11	.003	0.39	-.002	-.04	-.001
principal earner (SPE)						
Age of principal earner (APE)	0.30***	.002	.0008	-.02	.01***	.003
Agricultural_self employed	0.01	.01	12.8	-.06*** (-42.86%)	14.8	-.05***(-100%)
Non-agriculture- self-employed	0.97	-.003	14.6	-.03*** (-21.42%)	15.05	-.05***(-100%)

Regular wage	1.99***	Omitted	13.6	.04*** (28.57%)	14.45	.05*** (100%)
Casual in agriculture	-0.79	.00008	13.4	-.01*** (-7.14%)	15.00	-.01** (-20%)
Casual in non-agriculture	-0.90	-.01	12.7	.06*** (42.86%)	14.88	.03*** (60%)
Financial Literacy Index (FLI)	4.70***	-.007	-5.30***	-.00008	.71	-.002
Income class 1	.00005***	.01	.00006***	.006	8.08e-06	-.02
Income class 2	.00003***	.002	.00005***	-.02	-1.09e-06	-.006
Income class 3	.00002***	-.02	.00004***	.01	-3.80e-06	-.002
Income class 4	.0002***	-.005	.00003***	.05*** (35.71%)	3.27e-08	.005
Group (Unreserved)		0.91		.25		.26
Group (Reserved)		0.75		.11		.21
Difference		0.16		.14		.05
Explainedgap		-.01 (-6.25%)		.03 (27.27%)		-.05 (-100%)
Unexplained gap		0.17		0.11		1
Constant	-1.26		-17.04		-16.4	
Observations	1405	1405	1405	1405	1405	1405
LRchi2(10)	249.23		197.51		30.19	
Prob>chi2	0.00		0.00		0.00	

Source: Primary Sample Survey

Note: *** denotes one percent level of significance
** denotes five percent level of significance
* denotes ten percent level of significance

4.3 Results of Fairlie Decomposition Analysis for Religious Differences

As mentioned earlier, a positive contribution of the covariate indicates that it widens the gap between the Hindu and Muslim populations and a negative contribution indicates that it reduces the gap (Bora et al., 2018). Table IV indicates that the Hindu population are 17%, 5%, and 4% more likely to have a savings bank account, use institutional borrowing, and use loans for production purposes, respectively, than the Muslim population. Thus, it is evident that there is a disparity in the usage of financial instruments across religious groups. Now,

we analyse the extent to which the explanatory variables can explain these results. The gap in SBPE widens between the Hindu and Muslim populations for income class 2 (by11.76%), whereas the gap shrinks by 5.88% with the age of the principal earner (APE) and23.53% for financial knowledge measured by the Financial Literacy Index (FLI). Within the explained gap of IBPE, 60%, 80%, 200%, 40%, and 160% are explained by the differences between Hindu and Muslim population in the distribution of self-employed in non-agriculture, regular wage earners, casual labour in non-agriculture, and income class levels 3 and 4, respectively. Lastly, the religion differences with respect to loans used for production purposes (PPPE) could be mostly explained (22.5%) by age of the principal earner (17.5%), self-employed in agriculture (-375%), regular wage earners (175%), and casual labour in non-agriculture (-200%). Our results indicate that the gap between the Hindu and Muslim populations in using financial services does indeed widen or narrow depending on the respective response variables.

Table VI: Results of Fairlie non-linear decomposition for religious differences

	SBPE		***IBPE***		***PPPE***	
Response variable	Logistic results (coefficient)	Decomposition (coefficient)	Logistic results (coefficient)	Decomposition (coefficient)	Logistic results (coefficient)	Decomposition (coefficient)
Religion of principal earner (Reference category: Muslim)	.56***	NA	-.37**	NA	-.20	NA
Sex of principal earner (SPE) (Reference category:Female)	.09	-.00007	.43	.0001	-.03	-.001
Age of principal earner(APE)	.03***	-.01*** (-5.88%)	.001	-.003	.01***	.007*** (17.5%)
Agricultural _self employed	.17	-.007	12.6	-.15*** (-300%)	14.8	-.15*** (-375%)
Non-	.98	-.006	14.4	.03***	15.05	.001
agriculture self-employed				(60%)		

Regular wage	2.04***	-.01	13.4	.04*** (80%)	14.5	.07*** (175%)
Casual in agriculture	-.63	-.003	13.2	-.03*** (-60%)	15.04	.002
Casual in non-agriculture	-.04	.0003	12.4	.10*** (200%)	14.9	.08*** (200%)
Financial Literacy Index (FLI)	4.23***	-.04*** (-23.53%)	-5.78***	-.02*** (-40%)	.55	-.005
Income class 1	.00005***	-.004	.00006***	-.03*** (-60%)	7.75e-06	.003
Income class 2	.00004***	.02** (11.76%)	.00005***	-.03*** (-60%)	-6.15e-07	-.0001
Income class 3	.00003***	.0009	.00004***	.02*** (40%)	-3.09e-06	.002
Income class 4	.00003***	-.03	.00003***	.08*** (160%)	5.37e-07	-.002
Group (Hindu)		.85		.15		.23
Group (Muslim)		.68		.10		.19
Difference		.17		.05		.04
Explained Gap		.07 (41.18%)		.004 (8%)		.009 (22.5%)
Unexplained Gap		.10		.046		.031
Constant	-2.43		-17.7		-16.6	
Observations	1405	1405	1405	1405	1405	1405
LRchi2(10)	243.04		187.29		28.2	
Prob>chi2	0.00		0.00		0.00	

Source: Primary Sample Survey

Note: *** denotes one percent level of significance
** denotes five percent level of significance
* denotes ten percent level of significance

5. CONCLUSION AND POLICY IMPLICATIONS

This paper attempts to determine the disparity in the use of banking services, institutional borrowing, and institutional loans for production purposes by religious and caste groups in rural India. The results show that the probabilities of holding a savings bank account, using institutional borrowing, and using loans for production purposes significantly decrease for the population belonging to the reserved category. It has been shown that the reserved category (SC, ST, and OBC) constitutes almost 84% of the total population in the sample survey. Thus, it is alarming to view that this section of the population does not have access to formal financial services. The use of loans for production purposes also significantly decreases for this section of the population, which is also of concern from the policy point of view. All levels of income class significantly increase the probability of holding a savings bank account and using institutional borrowing, which is a good sign and we may conclude that income distribution does not play any role in gaining access to financial services.

In addition to identify the socio-economic determinants using a binary logistic model, we have also used the Fairlie non-linear decomposition analysis to quantify the contribution of different socio-economic predictors to explain the gap between the reserved and unreserved populations and the Hindu and Muslim populations in the status of holding a savings bank account, institutional borrowing, and using loans for production purposes. The results showed that the types of occupation of the principal earner remain an important determinant in both cases. The gap between the reserved and unreserved populations in institutional borrowing and the use of loans for production purposes widens for regular wage earners and casual labourers in non-agriculture. Similarly, the gap between the reserved and unreserved populations in institutional borrowing and the use of loans for production purposes narrows for the self-employed in agriculture and non-agriculture and also for casual labourers in agriculture. Surprisingly, the result also shows that the gap between the Hindu and Muslim populations in institutional borrowing and the use of loans for production purposes widens for regular wage earners and casual labourers in non-agriculture. This result is again a cause for concern as regular wage earners are those who have a continuous flow of income. Thus, access to financial services for all sections of the population is necessary for India to become self-reliant in financial aspects.

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FIGURES

Figure 1: Lorenz Curve of Financial Accessibility of Muslim Population

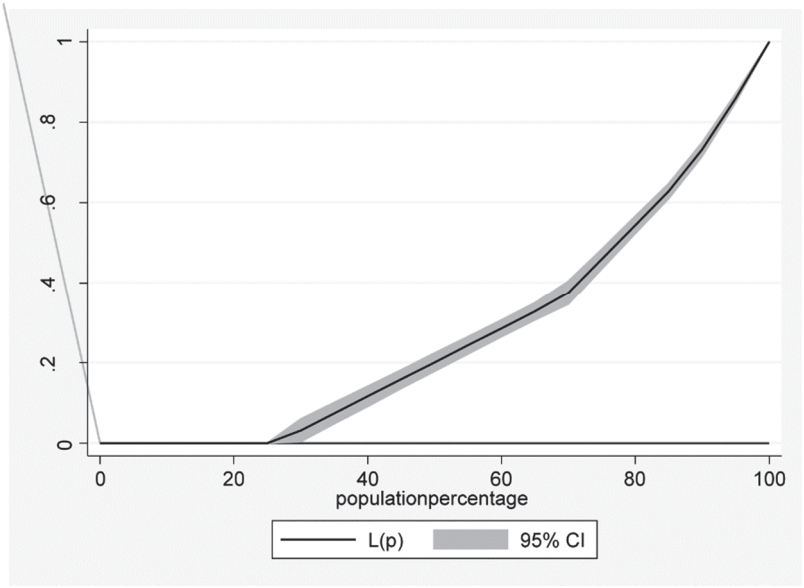


Figure 2: Lorenz Curve of Financial Accessibility of Hindu Population

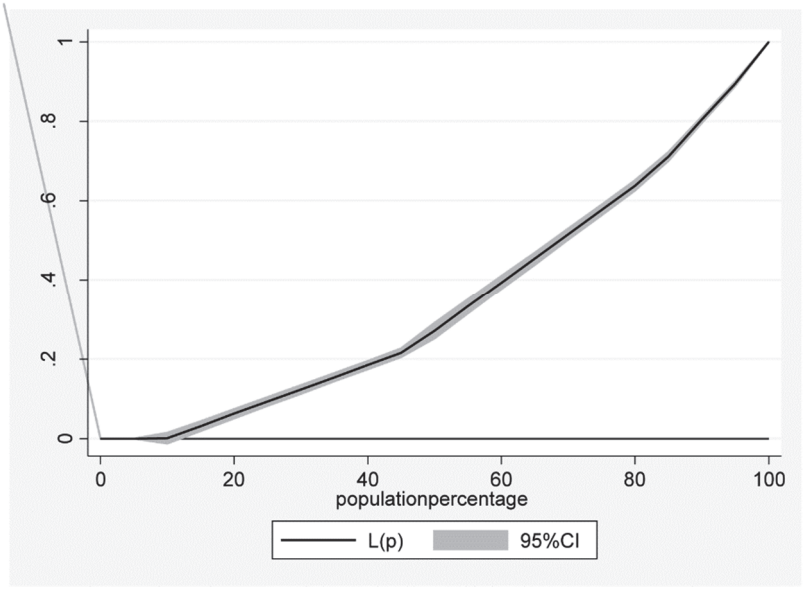


Figure 3: Lorenz Curve of Financial Accessibility of Unreserved Population

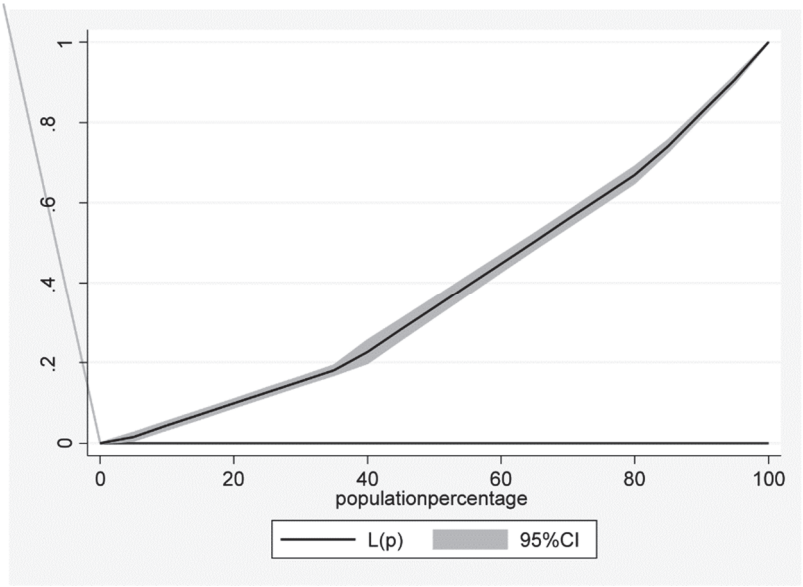
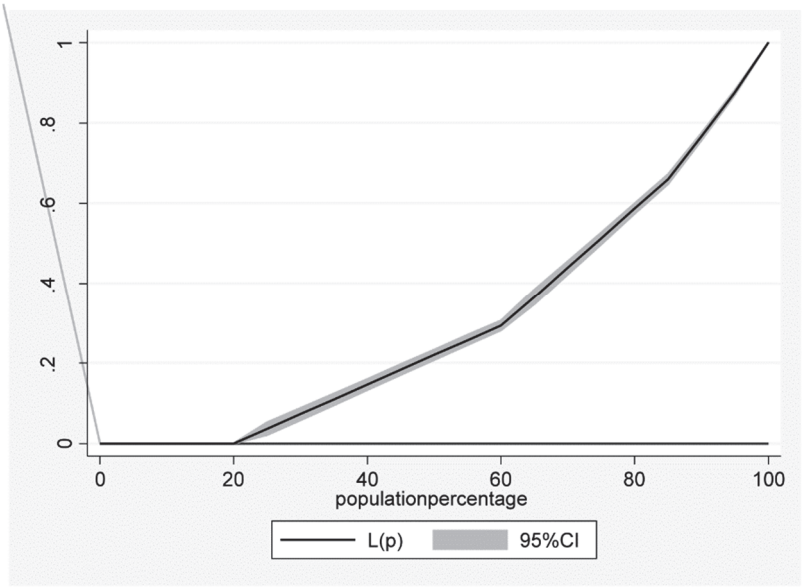


Figure 4: Lorenz Curve of Financial Accessibility of Reserved Population



APPENDIX

Calculation Methodology of Financial Accessibility Index (FAI)

FAI combines four dimensions.

1. Access to ATM card (AA)
2. Access to savings account(AS)
3. Access to Loan(AL)
4. Access to Deposit account like Employee Provident Fund etc. (AD)

At first, we calculate the Dimension Index for all the four dimensions where

$$DimensionIndex = \frac{ActualValue - MinimumValue}{MaximumValue - MinimumValue}$$

Now, FAI can be calculated by taking the weighted average of Dimension Indices with equal weights.

TABLES IN APPENDIX

Table A.I Statistical Significance of Social Group Differences in Principal Earner's Age

Group	Observations	Mean	Standard Error	Standard Deviation	[95% Conf. Interval]	
Unreserved	229	43.9	.87	13.1	42.2	45.6
Reserved	1,176	41.7	.37	12.6	41.0	42.4
Combined	1,405	42.06	.34	12.7	41.4	42.7
Difference		2.23	.94		.38	4.08
Diff = mean(0) - mean(1)				t = 2.37		
Ho: diff = 0				Welch's degrees of freedom = 316.4		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.99		Pr(|T| > |t|) = 0.02		Pr(T > t) = 0.00		

Source: Primary Sample Survey

Table A.II Statistical Significance of Social Group Differences in Principal Earner's Financial Literacy Index (FLI)

Group	**Observations**	**Mean**	**Standard Error**	**Standard Deviation**	**[95% Conf. Interval]**	
Unreserved	229	.08	.01	.17	.06	.10
Reserved	1,176	.09	.004	.15	.08	.10
Combined	1,405	.09	.004	.15		
Difference		-.008	.01		.03	.02
Diff = mean(0) - mean(1)				t = -0.6		
Ho: diff = 0				Welch's degrees of freedom = 303.1		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.25		Pr(|T| > |t|) = 0.50		Pr(T > t) = 0.75		

Source: Primary Sample Survey

Table A.III Statistical Significance of Religious Differences in Principal Earner's Age

Group	**Observations**	**Mean**	**Standard Error**	**Standard Deviation**	**[95% Conf. Interval]**	
Hindu	780	43.6	.45	12.5	42.7	44.5
Muslim	625	40.1	.51	12.8	39.2	41.2
Combined	1,405	42.06	.34	12.7	41.4	42.7
Difference		3.42	.68		2.08	4.75
Diff = mean(0) - mean(1)				t = 5.02		
Ho: diff = 0				Welch's degrees of freedom = 1321.5		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 1.00		Pr(|T| > |t|) = 0.00		Pr(T > t) = 0.00		

Source: Primary Sample Survey

Table A.IV Statistical Significance of Religious Differences in Principal Earner's Financial Literacy Index (FLI)

Group	Observations	Mean	Standard Error	Standard Deviation	[95% Conf. Interval]	
Hindu	780	.11	.006	.16	.10	.12
Muslim	625	.06	.005	.13	.05	.07
Combined	1,405	.09	.004	.15	.08	.10
Difference		.05	.008		.03	.06
Diff = mean(0) - mean(1)				t = 6.08		
Ho: diff = 0				Welch's degrees of freedom = 1403.33		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 1.00		Pr(|T| > |t|) = 0.00		Pr(T > t) = 0.00		

Source: Primary Sample Survey

Table A.V Chi-Square Test of Association between Social Group and Discrete Explanatory Variables

Explanatory Variables				
1. Income Class 1 (First Quartile Point)				
Social Group	**Income Class 1 Dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Unreserved	176	53	229	1.6257 Pr = 0.202
Reserved	856	320	1,176	
Total	1,032	373	1,405	
2. Income Class 2(Median Value)				
Social Group	**Income Class 2 Dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Unreserved	178	51	229	1.7466 Pr = 0.186
Reserved	865	311	1,176	
Total	1,043	362	1,405	
3. Income Class 3 (Third Quartile)				
Social Group	**Income Class 3 Dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Unreserved	172	57	229	0.6958 Pr = 0.404
Reserved	913	263	1,176	
Total	1,085	320	1,405	

4. Income Class 4				
Social Group	**Income Class 4 Dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Unreserved	161	68	229	3.4534 Pr = 0.06
Reserved	895	281	1,176	
Total	1,056	349	1,405	
5. Sex of Principal Earner				
Social Group	**Sex dummy**			
	Female	**Male**	**Total**	**Pearson chi2(1)**
Unreserved	16	213	229	0.4124 Pr = 0.52
Reserved	97	1,079	1,176	
Total	113	1,292	1,405	
6. Occupation of Principal Earner: Self-employment in Agriculture				
Social Group	**Self-employment in Agriculture dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Unreserved	184	45	229	0.0032 Pr = 0.95
Reserved	943	233	1,176	
Total	1,127	278	1,405	
7. Occupation of Principal Earner: Self-employment in Non-Agriculture				
Social Group	**Self-employment in Non-Agriculture dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Unreserved	181	48	229	0.1076 Pr = 0.743
Reserved	918	258	1,176	
Total	1,099	306	1,405	
8. Occupation of Principal Earner: Regular Wage Earners				
Social Group	**Regular Wage Earners dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Unreserved	171	58	229	33.6904 Pr = 0.000
Reserved	1,046	130	1,176	
Total	1,217	188	1,405	
9. Occupation of Principal Earner: Casual in Agriculture				
Social Group	**Casual in Agriculture dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Unreserved	220	9	229	2.6658 Pr = 0.103
Reserved	1,096	80	1,176	
Total	1,316	89	1,405	

10. Occupation of Principal Earner: Casual in Non-Agriculture				
Social Group	**Casual in Non-Agriculture dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Unreserved	162	67	229	8.0784 Pr = 0.00
Reserved	715	461	1,176	
Total	877	528	1,405	

Source: Primary Sample Survey

Table A.VII Chi-Square Test of Association between Religion and Discrete Explanatory Variables

Explanatory Variables				
1. Income Class 1 (First Quartile Point)				
Religion	**Income Class 1 Dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Hindu	551	229	780	7.1049 Pr = 0.00
Muslim	481	144	625	
Total	1,032	373	1405	
2. Income Class 2 (Median Value)				
Religion	**Income Class 2 Dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Hindu	601	179	780	7.2718 Pr = 0.00
Muslim	442	183	625	
Total	1,043	362	1405	
3. Income Class 3 (Third Quartile)				
Religion	**Income Class 3 Dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Hindu	622	158	780	6.3278 Pr = 0.01
Muslim	463	162	625	
Total	1085	320	1405	
4. Income Class 4				
Religion	**Income Class 4 Dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Hindu	567	213	780	5.7199 Pr = 0.01
Muslim	489	136	625	
Total	1056	349	1405	

5. Sex of Principal Earner				
Religion	**Sex dummy**			
	Female	**Male**	**Total**	**Pearson chi2(1)**
Hindu	68	712	780	1.0810 Pr = 0.30
Muslim	45	580	625	
Total	113	1292	1405	
6. Occupation of Principal Earner: Self-employment in Agriculture				
Religion	**Self-employment in Agriculture dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Hindu	667	113	780	31.0250 Pr = 0.000
Muslim	460	165	625	
Total	1127	278	1405	
7. Occupation of Principal Earner: Self-employment in Non-Agriculture				
Religion	**Self-employment in Non-Agriculture dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Hindu	582	198	780	13.3782 Pr = 0.000
Muslim	517	108	625	
Total	1099	306	1405	
8. Occupation of Principal Earner: Regular Wage Earners				
Religion	**Regular Wage Earners dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Hindu	634	146	780	43.0940 Pr = 0.000
Muslim	583	42	625	
Total	1217	188	1405	
9. Occupation of Principal Earner: Casual in Agriculture				
Religion	**Casual in Agriculture dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Hindu	740	40	780	4.3005 Pr = 0.04
Muslim	576	49	625	
Total	1316	89	1405	
10. Occupation of Principal Earner: Casual in Non-Agriculture				
Religion	**Casual in Non-Agriculture dummy**			
	0	**1**	**Total**	**Pearson chi2(1)**
Hindu	506	274	780	4.4937 Pr = 0.03
Muslim	371	254	625	
Total	877	528	1405	

Source: Primary Sample Survey

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MONETARY POLICY AND ECONOMIC GROWTH IN NIGERIA: EVIDENCE FROM BOUNDS AND BAYER-HANCK COINTEGRATION TECHNIQUES

ABSTRACT: *This paper contributes to the monetary policy-economic growth debate by investigating whether monetary policy stimulates economic growth in Nigeria. Using time series data from 1970 to 2018 and deploying the autoregressive distributed lag (ARDL) model, bounds and the Bayer-Hanck (2013) cointegration tests, evidence from the main and robustness checks show that (1) a significant long-run association exists, and (2) a percentage increase in the monetary policy rate results in 0.055 percentage decline in economic growth, on average, ceteris paribus. In other words, these findings confirm that a statistically significant inverse relation exists between monetary policy and economic growth in Nigeria. Trade openness also exerts asymmetric contemporaneous (0.094) and lag (-0.059) impacts on economic growth at the 1% and 5% significance levels, respectively. Similarly, the inflation rate contemporaneously reduces economic growth (-0.002) at the 1% significance level while its lag impacts are asymmetric and statistically significant at the 10% and 5% levels, respectively. Policy recommendations are discussed.*

KEY WORDS: *monetary policy, economic growth, interest rate*

JEL CLASSIFICATION: E50, E51, E52, E58, E59

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1. INTRODUCTION

Empirical studies on the monetary policy-growth nexus are becoming topical in Nigeria (see Folusu, 2020; Hussaini et al., 2020; Bashir & Sam-Siso, 2020, Titiloye & Ishola, 2020; see also Shobande, 2019; Ayodeji & Oluwole, 2018; Nwoko et al., 2016; Dingela & Khobai, 2017). This is linked to the need to manage economic shocks, shape macroeconomic fundamentals, and stimulate economic growth, particularly in the long and short term or, alternatively, permanent and transitory term in the case of shocks following repeated spates of economic downturn. However, a number of studies focused on the influences of money supply or monetary policy rate on economic growth (Baghebo & Stephen, 2014, Anowor et al., 2016 Ayodeji & Oluwole, 2018, Imandojemu & Nathaniel, 2018,).

Studies that included trade in the monetary policy-growth nexus proxied the concept using conventional trade measure such as export, import or, at best, balance of trade, specifically oil export in the Nigerian context (Imimole & Enoma, 2011; Ogbuagu & Ewubare, 2017; Onuoha, 2017; Igwemeka, 2016; Imandojemu & Nathaniel, 2018, Adeleye et al., 2018, Evans, 2021). These indicators, however, do not reflect the complex multidimensional nature of trade. As a result, the current study employs a broader measure of trade known as trade openness, which is the quotient of exports plus imports and GDP.

Trade openness reduces a country's financial and economic vulnerability. A substantial export ratio decreases the likelihood of sharp reversals of capital flows and economic growth. In contrast, Feldkirche & Siklos (2019) opined that trade openness is also capable of causing inflation and mitigating economic growth. Thus, the augmenting role of trade openness in this relationship cannot be overlooked. Otherwise, the monetary landscape of countries would be buffeted by inaccurate diagnoses and monetary policy prescriptions with respect to the fundamental factors determining or constraining economic growth.

This is particularly a truism in the Nigerian context following a series of trade liberalisation policies implemented since the 1980s (Saibu, 2021). This culminated in a trade value increase from a meagre ₦23862.90 in 1981 to ₦35,642,583.08 in 2020. Quite discernible is the incremental value of imports, which was ₦12,839.60 in 1981, ₦755,127.70 in 1995, and ₦21,905,499.46 in 2020. In fact, the country's imports exceeded exports in 1981, 1982, 1983, 1998, 2015,

2016, 2019, and 2020. A country that relies on imports must make relatively scarce foreign exchange available. This competes with other suitable applications of Nigeria's scarce foreign exchange, slowing economic growth. This connotes that monetary policy responses must thoroughly examine the augmenting role of trade to develop new methodological framework for genuine economic development and resilience to economic shocks.

The current study's goal is to examine the relationship between monetary policy and economic growth in Nigeria, taking into account broad-based trade development. This serves as a litmus test for evaluating the monetary policy stance of the Central Bank of Nigeria, especially in turning the tide of the recessionary trend bedevilling the country. In order to achieve this objective, bounds and the Bayer-Hanck cointegration techniques were applied to a monetary policy indicator dataset in Nigeria. The empirical estimation exposes the salient monetary factors contributing to economic growth in Nigeria. Against this backdrop, the rest of the paper is structured as follows: section 2 briefly provides a literature review, while section 3 presents the methodological framework. In section 4, the analysis of the empirical results is conducted, and section 5 concludes.

2. LITERATURE REVIEW

Monetary policy is a macroeconomic policy that uses monetary variables such as money supply and interest rates to regulate an economy in order to achieve macroeconomic goals such as price stability, full employment, external balance, economic growth and development. According to Amiri & Gang (2018), monetary policy deals with the discretionary control of monetary variables, such as money supply by the Central Bank, in order to achieve the set economic goals. Hence, monetary policy deals with the policy action by the government formulated to regulate the monetary sector of an economy. It involves the use of direct and indirect monetary instruments by the Central Bank to achieve macroeconomic goals. Amiri & Gang (2018) pointed out that there are three forms of monetary decisions. These are determining money supply, determining the interest rate, and determining the functions of the banking system and the credit market. According to Ufoeze et al., (2018), monetary policy is a significant instrument with which policy makers can maintain a stable domestic price level and exchange rate in an economy. This is considered a necessary condition to

ensure economic growth in a developing economy such as that of Nigeria. The monetary authority has the sole responsibility and authority for issuing coins and notes in the economy, and for regulating the rate of supply so as to ensure price stability. To perform this function, it has some specific instruments at its disposal. The monetary authority is therefore expected to reposition the economy by appropriately varying these monetary instruments, thereby influencing the cost of borrowing and the demand for money and, consequently, cushioning the liquidity impact of excessive money supply. However, there is a need for proper coordination of monetary policy and its fiscal counterpart to avoid conflicting objectives which can impede the transmission of the monetary mechanism. The transmission mechanism refers to the channels via which monetary policy affects the aggregate economy. The literature identifies the exchange rate, interest rate, and bank credit as the tripartite channels of monetary transmission (Evans, 2021).

According to monetarists, a change in the supply of money will have a direct effect on the aggregate economy. They assert that an expansionary open market operation by the central bank will increase the stock of money available to financial institutions. Hence, deposit money banks will have more reserves and be able to create credit. Invariably, the money supply in circulation will increase through the multiplier effect. On the other hand, a contractionary open market operation will cause financial institutions to buy securities from the central bank. This will help to reduce the money stock available to financial institutions and also reduce their ability to create credit. Hence, money supply will fall. Contrary to the view of the monetarists, the Keynesians maintain that transmission mechanisms are indirect. They posit that an incremental change in money stock induces financial activities that cause the interest rate to fall. This fall in the interest rate causes increases in aggregate investment and interest-sensitive consumption, with a resultant increase in output and the level of employment. Therefore, monetary policy affects economic growth indirectly.

Monetary policy can be used to stimulate economic growth during a period of economic recession, and it can also be used to curb the inflation rate. During a period of economic recession, an expansionary monetary policy will increase money supply, thereby triggering economic activities that induce growth. In an era of high-level inflation, a contractionary monetary policy drains excess liquidity from the economy and helps to secure stability in the general price level.

Ufoeze et al., (2018) describe economic growth as a sustained increase in the level of output and employment opportunities with the objective of enhancing the general welfare of the people in that economy. Economic growth is the basis for ensuring a sustained increase in the general welfare of citizens.

2.1 Theoretical Literature

The classical assertion holds that money supply has no impact on variables such as employment, output, and income. It posits that money supply is neutral in its impact on the economy. This assertion is based on the quantity theory of money (QTM). The QTM was first postulated by Adam Smith and David Hume in the 18th century. It was subsequently modified by Irvin Fisher in 1911 and also by Alfred Marshal (1882-1924) (Hussaini et al., 2020). The quantity theory of money states that price is directly proportional to money supply. The classical theory is based on the assumption of full employment and a constant income velocity of circulation of money, and that output in the long run is determined by non-monetary factors, most particularly by features of the labour force and working practices. Thus, income is assumed to be constant at the full employment level.

It is important to note that this theory assumes two things: first, that inflation is caused by an excess of aggregate demand over aggregate supply, and the cause of the excess demand is excessive money supply; second, that causation goes from the money supply to the price level. It should also be noted that this theory is of the demand-pull variety. There is, in addition, the Walrasian theory that states that relative prices respond to excess demand. Prices rise when demand exceeds supply at the prevailing prices. This inflation is characterised by an increase in consumer spending. This is also of the demand-pull variant, explaining inflation in terms of a shift in aggregate demand. On the other hand, monetarists believe that there exists a transmission mechanism that goes through a portfolio adjustment process. According to them, households and firms hold their wealth in the form of portfolio assets, which could be financial or non-financial.

Monetarists assert that any change in the supply of money will cause disequilibrium between the actual and desirable real cash balance with the public. For instance, if the supply of money is increased, it will force the cash balances with the public to increase as well. Consequently, people will be compelled to reduce their excess cash balances in the purchase of bonds, shares, goods, and

services (Hussaini et al., 2020). As money supply changes, people's spending patterns also change and this affects the relative price of assets.

This is referred to as the money supply liquidity effect. Monetarists also assert that there is a price expectation effect which is caused by the fact that inflation may be expected to continue indefinitely. The short-run liquidity effect causes a fall in interest rates and this leads to a rise in both the output and price expectation effects. However, this will discourage investment and then reduce output and employment. The Keynesian approach differs somewhat with an emphasis on the reason for holding money. Keynesian theory posits three motives for holding money. These are the precautionary motive, the transaction motive, and the speculative motive. According to the theory, the demands for money driven by transactionary and precautionary motives are determined by the level of income. The demand for money resulting from speculative motives is determined by the interest rate. As the interest rate decreases, the demand for money increases and vice versa. Hence, this provides a link between changes in the money supply and output in the economy (Hussaini et al., 2020). The Keynesians also point out that financial assets such as bonds are good substitutes. As such, a little variation in the interest rate will induce a rise in the price of bonds or securities. This will subsequently compel people to sell bonds and hold more money for speculative purposes.

2.2 Empirical Literature

This section reviews the existing literature as it relates to the effect of monetary policy on economic growth. Folusu (2020) employed the structural vector autoregressive (SVAR) model to analyse the impact of monetary policy on the real sector in the Nigeria economy. Monthly time series data were collected from 2006 to 2019. Empirical analysis showed that the monetary policy rate has a significant effect on the price level, output, and the exchange rate. Hussaini et al., (2020) analysed the impact of monetary policy tools on economic growth in Nigeria from 1986 to 2018 using the autoregressive distributed lag (ARDL) model. The results showed that, in the long run, money supply has a direct impact on economic growth while the current exchange rate has a negative impact on economic growth. However, a period lag of the exchange rate was found to have a direct impact on economic growth while, in the short run, money supply showed a positive relationship with economic growth.

Bashir & Sam-Siso (2020) also conducted a study on the relationship between monetary policy and economic growth in Nigeria. The study employed the ARDL approach and found that a low monetary policy rate and exchange rate depreciation induce economic growth. The study also found that an increase in broad money supply increases the rate of inflation and unemployment while reducing economic growth. Takon & Ita (2020) empirically evaluated the impact of monetary policy on price stability in Nigeria from 2007 to 2016 using the ordinary least squares (OLS) regression technique. Their findings indicated that money supply has a significant impact on the inflation rate, while the interest rate has an insignificant impact on the inflation rate. The exchange rate was also found to have a significant impact on inflation. As such, the study revealed that money supply significantly influences the inflation rate in Nigeria. Ufoeze et al., (2018) examined the impact of monetary policy on economic growth in Nigeria from 1986 to 2016, also using the OLS technique. Their results revealed that there exists a long-run relationship between monetary policy and economic growth. The study also found that the monetary policy rate, investment, and the interest rate do not have a statistically significant positive impact on economic growth. However, the Granger causality indicated that money supply Granger-causes economic growth. These results are similar to those of Titiloye & Ishola (2020), Shobande (2019), Ayodeji & Oluwole (2018), Nwoko et al., (2016), and Dingela & Khobai (2017). The efficacy of monetary policy in Nigeria was examined by Olusola and Adekunle (2017) using the data envelopment analysis (DEA) technique. The results indicated that monetary policy requires some adjustments before it can efficiently achieve desired growth in Nigeria.

Abille & Mpuure (2020) critically analysed the role of monetary policy on economic growth in Ghana from 1983 to 2017. Based on the ARDL bound test method, the results revealed that money supply has a significant and direct impact on economic growth in the long run, whereas in the short run, money supply has a significant but negative impact on economic growth. Amiri & Gang (2018) employed a time-varying parameter factor augmented VAR (TVP-FAVAR) technique in analysing the impact of monetary policy on economic growth in the United States of America from 1970 to 2016. The results showed that monetary variables have direct impact on economic growth in the long run.

On the dynamic relationship between monetary policy and economic growth in Malaysia from 1980 to 2015, Yien et al., (2017) used VAR Granger causality and found that the interest rate Granger-causes not only economic growth but also money supply, unemployment, and the inflation rate. As such, the study showed that a switch of monetary policy from monetary targeting to interest rate targeting would be a fruitful policy action. Denbel et al., (2016) employed trivariate Granger causality with a vector error correction model (VECM) to analyse the relationship between inflation, money supply, and economic growth. The study revealed a bidirectional relation between money supply and the inflation rate and a unidirectional relationship between economic growth and the inflation rate in the long run. In the short run, there existed a unidirectional relationship between money supply and the inflation rate. It was inferred from the analysis that money supply induces inflation in the Ethiopian economy.

An empirical review of econometric techniques in this context is critical of a number of issues, including possible multicollinearity, endogeneity, cross-correlation and serial correlation, orthogonality because of idiosyncratic shocks, among others. This research work fills a noticeable gap by employing an autoregressive distributed lag (ARDL) model as well as a bounds cointegration test and the Bayer-Hanck (2013) cointegration test to capture the dynamic nature of monetary policy with frequent changes in policy as against the methods that are often used in the related literature. Similarly, the results from these previous studies might be losing relevance due to several institutional changes, thus providing the justification to use the autoregressive distributed lag (ARDL) model and the above cointegration tests. Intrinsically, the reviewed empirical studies also showed no consensus in terms of results and influencers of the monetary policy-economic growth nexus. There are several explanations for such mixed outcomes. However, a more compelling explanation is that a number of studies failed to incorporate the role of external shocks in connection with trade openness. In addition, many of the studies deal with relatively stable periods of economic growth, and there are no significant studies on incorporating extended periods of business cycles, which should ideally be an attractive scholarly interest considering the pivotal role of monetary policy in rejuvenating economic growth.

3. DATA AND METHOD OF ANALYSIS

3.1 Data and a priori Expectations

This study uses annual time series data on six (6) variables. The dependent variable is per capita GDP (*PC*), which is the proxy for economic growth. The main explanatory variable is the monetary policy rate (*MPR*). The control variables are domestic credit to the private sector (*DCPS*), trade openness (*TRADE*), the inflation rate (*INFL*), and the official exchange rate (*EXCH*), included for robustness checks. The *MPR* is sourced from the Statistical Bulletin (2020) of the Central Bank of Nigeria (CBN) while the rest of the variables are obtained from World Development Indicators of the World Bank (2020). Time series data from 1970 to 2018 were used in the study. The 1970-2018 dataset is deemed suitable for this research because an irregular or unforeseen occurrence, like the COVID-19 global epidemic, could heavily impact projections by raising heterogeneities and unpredictability in the time series (Carriero et al., 2021). Additionally, due to complexities and intricacies responses of the pandemic in Nigeria, monetary policy was largely vague in terms of its instrument and target.

The *a priori* expectation is that a high interest rate restrains growth (De Gregorio & Guidotti, 1995; Fry, 1980; Roubini & Sala-i-Martin, 1992). Hence, a negative coefficient is expected. *DCPS* is required for investment and business expansion, which creates the demand for loans and aids economic growth (Adeleye et al., 2018). *TRADE* opens an economy for trade across borders, creating competitiveness and avenues for foreign investments, which in turn boosts economic growth. Significant findings from the literature (Calderon et al., 2004; Chang et al., 2009; Fetahi-Vehapi et al., 2016) reveal that open economies are more productive than countries which only produce for the domestic market. Since trade openness is a catalyst for productivity and growth, its impact is contingent on its weight in economic activity. A range of empirical studies (Dollar & Kraay, 2004; Frankel & Romer, 1999; Sachs & Warner, 1995) document that trade and economic growth exhibit a positive relationship. *INFL* is expected to have a positive relationship with growth as rising inflation causes the real rate of return to fall (Adeleye et al., 2019). The impact of *EXCH* on economic growth is ambiguous. Depreciation, which is export-supporting, creates an incentive for domestic production but may hamper foreign financial inflows strategic for growth of the capital markets and, in the long run, hamper economic growth. On

the other hand, currency appreciation promotes imports but may be unhealthy for local industries which are unable to compete with high-quality imported goods. Table 1 details the variables description and *a priori* expectations while Table 2 highlights the summary statistics and correlation analysis of the variables.

Table 1. Variables Description, Expectations, and Sources

Variables		Expected Sign	Source
GDP per capita (constant 2010 US$)	*PC*	N/A	World Bank (2020)
Monetary policy rate	*MPR*	-	CBN (2020)
Domestic credit to private sector (% of GDP)	*DCPS*	+	World Bank (2020)
Trade (% of GDP)	*TRADE*	+	World Bank (2020)
Inflation, consumer prices (annual %)	*INFL*	-	World Bank (2020)
Official exchange rate	*EXCH*	-/+	World Bank (2020)

Source: Authors' Compilations

Table 2. Descriptive Statistics and Correlation Matrix

Variable	*PC*	*MPR*	*DCPS*	*TRADE*	*INFL*	*EXCH*
Mean	1810.321	11.153	8.826	33.268	18.436	68.901
Std. Dev.	402.417	5.094	3.428	12.152	15.747	85.073
Minimum	1324.297	3.5	4.7	9.136	3.458	0.544
Maximum	2563.9	26	19.626	53.278	72.836	306.08
PC	1.000					
MPR	-0.383***	1.000				
DCPS	0.626***	0.049	1.000			
TRADE	0.303**	0.05	0.321**	1.000		
INFL	-0.361**	0.242*	-0.244*	0.01	1.000	
EXCH	0.595***	0.358**	0.689***	0.213	-0.255*	1.000

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. PC = GDP per capita; MPR = Monetary policy rate; DCPS = Domestic credit to the private sector; TRADE = Trade openness; INFL = Inflation rate; EXCH = Exchange rate.
Source: Authors' computations

The upper panel of Table 2 provides information on the variables' measure of central tendency while the correlation matrix shown in the lower panel reflects the observed associations between the variables. It reveals that *MPR* and *INFL* display a significant negative correlation with *PC* at the 1% and 5% levels, respectively, while the rest of the variables display significant positive correlation at the respective 1% or 5% levels. A cursory observation of the relationshops

shows that there is no exact linear dependence among them. However, the regression analysis will show their exact causal relationships.

3.2 Method of Analysis

This study is analysed within the autoregressive distributed lag (ARDL) model framework developed by Pesaran and Shin (1998) due to its advantages over other traditional single-equation methods, some of which are as follows. (1) the ARDL technique does not require all the variables under study to be integrated of the same order. In other words, the approach is employed when the underlying variables are integrated of order one, order zero, or mixed. (2) The approach is relatively more efficient when the sample size is small. (3) By applying the ARDL technique, long-run unbiased estimates of the model are obtained (Adeleye et al., 2020; Adeleye et al., 2018).

To investigate the impact of monetary policy on economic growth in Nigeria, this study modifies the methodological construct of Adeleye et al., (2018) and Adeleye (2020). The variables, with the exception of the inflation and exchange rates, are transformed into natural logarithms specifically to control for outliers, reduce "noise" in the model, and to establish elasticity relationships. Controlling for domestic credit, trade openness, and inflation, the unrestricted ARDL $(p, q, \dots, q)$ model that shows the relation between economic growth and monetary policy is expressed as:

$$\ln PC_t = \omega_{0i} + \sum_{i=1}^{p} \delta_i \ln PC_{t-i} + \sum_{i=0}^{q} \phi_i MPR_{t-i} + \sum_{i=0}^{q} \theta'_i \boldsymbol{Z}_{t-i} + e_t \qquad [1]$$

where $\ln PC$ is the natural logarithm of per capita GDP, the proxy for economic growth; MPR is the monetary policy rate; $\theta'_i \boldsymbol{Z}_t$ is the vector of control variables and their regression coefficients; the dependent and explanatory variables are allowed to be purely $I(0)$ or $I(1)$ or cointegrated; ω is the constant term; $\delta, \phi,$ are parameters; p, q are optimal lag orders; v_t is a white noise error term that is unobservable with zero mean.

3.2.1 Cointegration Techniques

The presence of cointegration is established using two methods to determine if a long-run association exists. The first is the Pesaran, Shin, and Smith (2001) bounds test for cointegration, which is mainly based on the joint *F*-statistic whose

asymptotic distribution is non-standard under the null hypothesis of no cointegration (i.e. $\phi_i = \theta_i = 0$) against the alternative hypothesis of a cointegrating relationship (i.e. $\phi_i \neq \theta_i \neq 0$). Under the bounds test, it is assumed that the model comprises both $I(0)$ and $I(1)$ variables and two levels of critical values are obtained.

The null hypothesis of no cointegration is rejected if the *F*-statistic is higher than the critical value of both the $I(0)$ and $I(1)$ regressors, and not rejected if otherwise (Adeleye et al., 2020). Given that previous tests have varying conclusions about the null hypothesis of no cointegration, the cointegration test recently developed by Bayer and Hanck (2013) provides more robust results by using the Fisher formulae to amalgamate the different individual test statistics premised on the Engle and Granger (1987), Johansen (1991), Boswijk (1995), and Banerjee et al. (1998) tests. The null hypothesis of no cointegration is rejected if the $EG - JOH - BO - BDM$ test statistic is higher than the critical value at the chosen level of statistical significance[1]. Both the bounds and Bayer-Hanck cointegration tests are deployed to ensure robustness of the outcomes.

3.2.2 Error Correction Model (ECM)

In the event of cointegration, the error correction representation of Equation [1] is specified to reflect the long-run relationships and short-run dynamics:

$$\Delta \ln PC_t = a_{01} + \eta(b_1 \ln PC_{t-i} - b_2 MPR_{t-i} - b_3 \ln DCPS_{t-i} - b_4 \ln TRADE_{t-i} - b_5 INFL_{t-i}) + \sum_{i=1}^{p} a_1 \Delta \ln PC_{t-i} + \sum_{i=0}^{q1} a_2 \Delta MPR_{t-i} + \sum_{i=0}^{q2} a_3 \Delta DCPS_{t-i} + \sum_{i=0}^{q3} a_4 \Delta \ln TRADE_{t-i} + \sum_{i=0}^{q4} a_5 \Delta INFL_{t-i} + v_t \quad [2]$$

where Δ is the difference operator; $\eta = 1 - \sum_{j=1}^{p} \delta_i$ is the speed of adjustment coefficient; the terms in ( ) represent the error correction term, *ECT*, which is the residual from the long-run equation; b_i are the long-run coefficients; a_i are the short-run dynamic coefficients of the model's adjustment long-run equilibrium; e_t is a white noise error term. Equation [2] states that $\Delta \ln PC$ depends on its lag, the differenced explanatory variables, and also on the equilibrium error term. If the last-mentioned is nonzero, then the model is out of equilibrium. Since η is

[1] The interested reader is referred to Bayerand Hanck (2013).

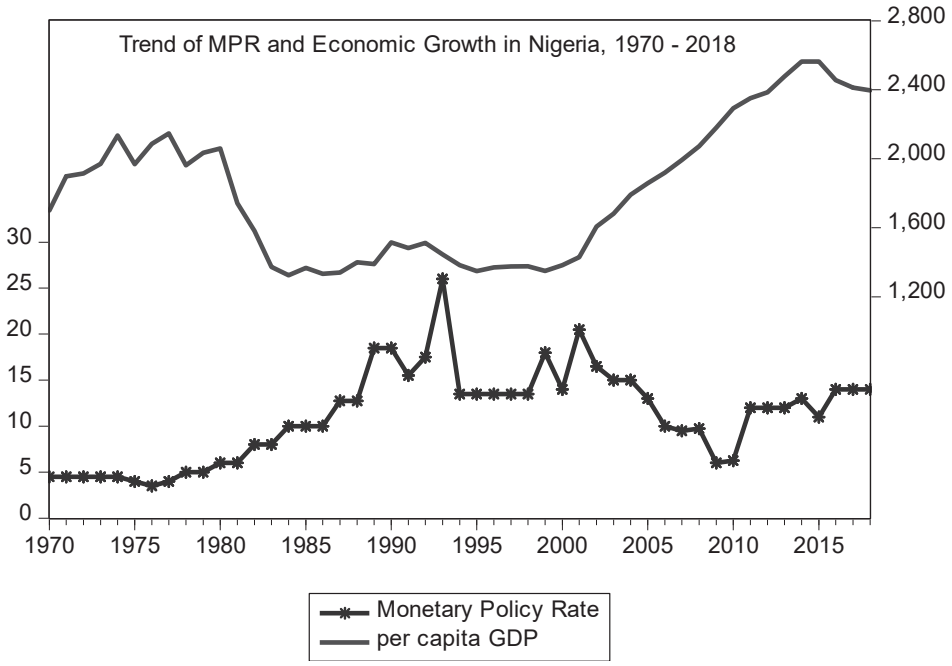
expected to be negative, its absolute value decides how quickly equilibrium is restored.

4. RESULTS AND DISCUSSIONS

4.1 Stationarity Tests

The empirical investigation of any analysis starts with the graphical illustration of the variables (Fig. 1) in order to visualise their time series properties as it is imperative that these variables be stationary in order to avoid obtaining spurious results. Graphical analysis reveals that both the monetary policy rate and per capita GDP are nonstationary, evidencing a unit root. Cursory examination shows an inverse relation between the two. Economic growth shows a declining trend as the MPR rises from 1975 to 1993 while growth picks up as the MPR falls from 1995 to 2018.

Figure 1. Trend of MPR and Economic Growth in Nigeria, 1970 - 2018



Source: Authors' Computations

Since visual examination is insufficient, all the variables used in the study are further subjected to scientific testing for the presence of a unit root using the augmented Dickey-Fuller and Phillips-Perron unit root tests. The results shown in Table 3 confirm that all the variables are stationary at first difference, except the inflation rate, which is stationary at level. This outcome justifies the application of the ARDL technique to the data.

Table 3. Unit Root Tests Results

Variables	Augmented Dickey-Fuller			Phillips-Perron		
	Level	1st Diff.	Decision	Level	1st Diff.	Decision
GDP per capita	-0.797	-3.643***	*I*(1)	-1.153	-5.474***	*I*(1)
Monetary Policy Rate	-1.877	-8.266***	*I*(1)	-1.774	-8.372***	*I*(1)
Domestic Credit	-2.356	-7.054***	*I*(1)	-2.222	-7.783***	*I*(1)
Trade Openness	-2.344	-7.354***	*I*(1)	-2.569	-7.335***	*I*(1)
Inflation Rate	-3.416**	-	*I*(0)	-3.250**	-	*I*(0)
Exchange Rate	-2.471	-4.667***	*I*(1)	-2.213	-4.674***	*I*(1)

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Estimations augmented with lag structures obtained from the Bayesian Information Criterion (BIC).

Source: Authors' computations

4.2 Unrestricted ARDL Model

Invoking the *ceteris paribus* interpretation, the results of the unrestricted ARDL model specified in Equation [1] are presented in Table 4 for the main and robustness models (with the inclusion of the exchange). The outcomes show that GDP per capita exhibits a statistically significant positive relation with itself at the 1% level. It increases by 0.94 per cent from a percentage point change in its one-period lag. The contemporaneous and one-period lag of MPR exert asymmetric effects on economic growth at the 10% and 1% significance levels, respectively. While the contemporaneous impact reduces growth by 0.055 per cent, its one-period lag increases growth by 0.070 per cent, on average. The contemporaneous impact aligns with expectations and confirms that increasing the MPR inhibits growth. To highlight this finding, the Central Bank of Nigeria periodically adjusts the MPR in a bid to stimulate activities in the real sector. This is because the MPR channels the course of other attendant interest rates in the economy. That is, a high MPR leads to high lending rates, which will disincentivise borrowing for investment, inhibiting manufacturing value-added, while the opposite occurs

when the MPR is reduced. A case in point is the reduction of the MPR by the CBN from 13.50% to 12.50% (Central Bank of Nigeria, 2020) to alleviate the financial burden caused by the outbreak of the coronavirus (COVID-19). It is expected that reducing the MPR, *ceteris paribus*, will have the multiplier effect of (i) dipping the lending rate, (ii) intensifying lending for more financial intermediation, and (iii) boosting greater financial inclusion, resulting in growth for the economy.

Table 4. Unrestricted ARDL Results (Dep. Variable: lnPC)

Variables	Main Model		Robustness	
	Coefficient	*t-Statistic*	*Coefficient*	*t-Statistic*
lnPC(-1)	0.940***	22.081	0.920***	13.598
lnMPR	-0.055*	-1.877	-0.059*	-2.003
lnMPR(-1)	0.070**	2.373	0.069**	2.045
lnDCPS	0.028	1.096	0.018	0.654
lnTRADE	0.094***	4.235	0.100***	4.265
lnTRADE(-1)	-0.00023	-0.008	-0.011	-0.393
lnTRADE(-2)	-0.059**	-2.699	-0.056**	-2.557
INFL	-0.002***	-3.413	-0.0016***	-3.075
INFL(-1)	0.001*	2.011	0.0011*	1.977
INFL(-2)	-0.0014**	-2.625	-0.0014**	-2.696
EXC			0.000	-0.458
EXC(-1)			-0.001	-0.857
EXC(-2)			0.001*	1.966
Constant	0.275	0.901	0.461	0.852
Observations	47		47	
R-squared	0.975		0.978	
F-statistic	138.11***		113.06***	
ARDL	(1,1,0,2,2)		(1, 1, 0, 2, 2, 2)	

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. PC = GDP per capita; MPR = Monetary policy rate; DCPS = Domestic credit to the private sector; TRADE = Trade openness; INFL = Inflation rate; EXCH = Exchange rate. Estimations augmented with White robust standard errors.
Source: Authors' computations

For the control variables, trade openness also exerts asymmetric contemporaneous (0.094) and lag (-0.059) impacts on economic growth at the 1% and 5% significance levels, respectively. Both outcomes align with *a priori*

expectations in the sense that economic growth responds positively to favourable trade conditions and negatively when those conditions are somewhat unfavourable. Similarly, the inflation rate contemporaneously reduces economic growth (-0.002) at the 1% significance level while its lag impacts are asymmetric and statistically significant at the 10% and 5% levels, respectively. Although the magnitudes of the coefficients are infinitesimal, they prove that managing the inflation rate will have a contributory influence on growth, but the opposite will occur if the inflation rate is left uncontrolled. The results of the main model are confirmed by those of the robustness model with the inclusion of the exchange rate. Most importantly, the role of monetary policy in boosting growth is sustained.

4.3 Cointegration Tests

Turning to the examination of the long-run association, the cointegration results presented in Table 5 show strong evidence that the variables have no tendency to drift apart over the long run. A close examination of the model shows that the observed *F*-statistic from the ARDL bounds test (4.16) is greater than the Pesaran, Shin, and Smith (2001) upper bound critical values at a 5 per cent level of significance (4.01). In addition, the Bayer-Hanck (2013) statistic produced from the combination of the Engle-Granger, Johansen maximum eigenvalue, Banerjee and Boswijk tests for both models (20.143) exceed the critical value at 5 per cent (12.794). Both comparisons indicate that the null hypotheses of no cointegration are rejected at the 5% level, respectively, as there are unique cointegrating relationships among the variables in the model. The *long-run forcing variables* are MPR, DCPS, TRADE, and INFL. This outcome indicates that these forcing variables move first when a common stochastic shock hits the system. The implication of the above finding is that economic growth follows changes in these indicators. Hence, this cointegration evidence justifies the examination of long- and short-run analyses using the error correction representation.

Table 5. Cointegration Test Results

Cointegration Hypotheses	*Statistics*
Bounds Test (F-stat)	4.16**
Bayer-Hanck Test (EG-J-Ba-Bo)	20.143***

Note: *** and ** indicate statistical significance at the 1% level; Pesaran, Shin, and Smith (2001) upper bound critical values at 5% = 4.01; Bayer-Hanck (2009) 5% critical values = 12.794; EG = Engle-Granger; J = Johansen; Ba = Banerjee; Bo = Boswijk.
Source: Authors' computations

4.3 Error Correction Representation

The results presented in Table 6 reveal that in the short run, a percentage point change in the MPR leads to a significant decline in growth by 0.055 per cent, on average, *ceteris paribus*. This negative relation is supported by the graphical depiction of Figure 1. In other words, to boost growth, the monetary authority must reduce the MPR for the reasons highlighted earlier. Furthermore, trade openness makes positive contemporaneous and one-period contributions to economic growth at the 1% per cent level marginally by an average of 0.094 and 0.059 per cent, respectively, *ceteris paribus*, while the impact of inflation on the economy is asymmetric in the short run.

Consistent with the earlier interpretation, a percentage point change in the inflation rate significantly reduces growth contemporaneously by 0.002 per cent, while its one-period lag significantly increases growth by 0.0014, on average, *ceteris paribus*. The adjustment mechanism shows that deviation from long-run equilibrium is corrected at an adjustment speed of 6.0 per cent. This indicates slow reversion to a long-run stable state. The robustness checks validate the results of the main analysis both in the magnitude of the coefficients and statistical significance.

Table 6. Error Correction Model Results (Dep. Variable: Δ(lnPC))

Variables	Main Model		Robustness	
	Coefficient	*t-Statistic*	*Coefficient*	*t-Statistic*
Constant	0.275***	4.879	0.461***	5.588
Δ(lnMPR)	-0.055**	-2.082	-0.059**	-2.313
Δ(lnTRADE)	0.094***	4.649	0.100***	4.997
Δ(lnTRADE(-1))	0.059***	3.084	0.056***	2.976
Δ(INFL)	-0.002***	-3.906	-0.002***	-4.016
Δ(INFL(-1))	0.0014***	3.016	0.001***	3.345
Δ(EXC)			0.000	-0.535
Δ(EXC(-1))			-0.0009**	-2.525
Adjustment Term	-0.060***	-4.808	-0.080***	-5.533
Observations	47		47	
R-squared	0.576		0.557	
F-statistic	9.069***		8.220***	
ARDL	(1,1,0,2,2)		(1, 1, 0, 2, 2, 2)	

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. PC = GDP per capita; MPR = Monetary policy rate; DCPS = Domestic credit to the private sector; TRADE = Trade openness; INFL = Inflation rate; EXCH = Exchange rate. Estimations augmented with White robust standard errors.
Source: Authors' computations

4.6 Diagnostic Tests

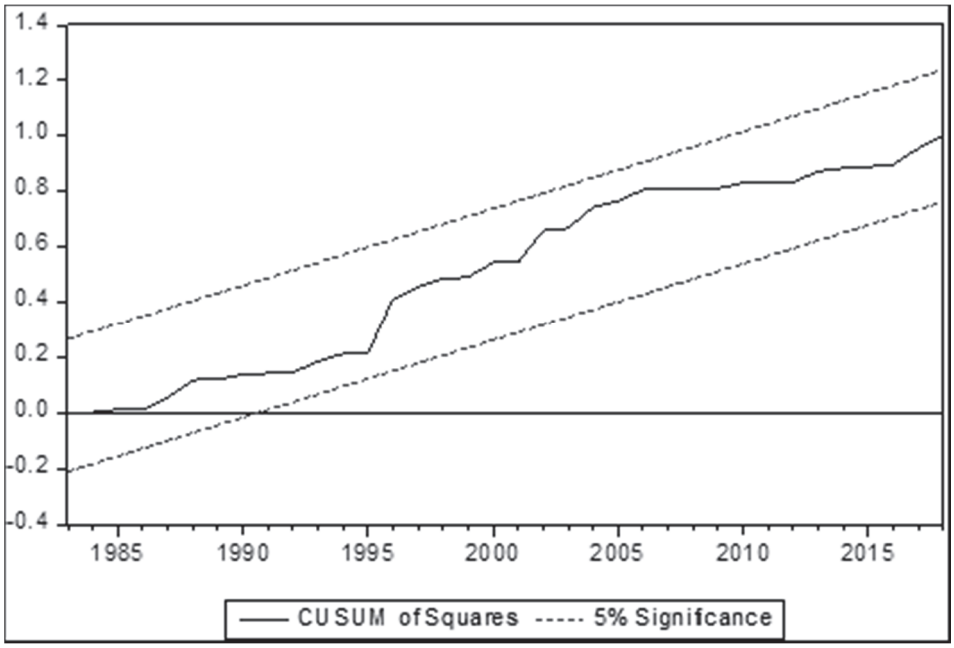
Lastly, some model diagnostics are performed to add credence to the empirical findings. Table 7 presents the diagnostics. There is no evidence of higher-order autocorrelation and heteroscedasticity in the model. With *p*-values above 0.05, the Jarque-Bera test shows that the data satisfies the requirement of a normal distribution. The cumulative sum of squared residuals (CUSUMQ) shown in Figure 2 indicates that the model is structurally stable.

Table 7. Diagnostic Tests Results

Specification	Main/Robustness	Conclusion
Breusch-Godfrey (serial correlation)	0.699/0.080	No higher-order autocorrelation
ARCH (heteroscedasticity)	0.852/0.899	No conditional heteroscedasticity
Jarque-Bera (normality)	0.538/0.533	Evidence of normality
CUSUMSQ	stable	Stability

Source: Authors' Computations

Figure 2. Plot of CUSUMSQ at 5% level of Significance



Source: Authors' computations

5. CONCLUSION AND POLICY RECOMMENDATIONS

The paper examined whether monetary policy stimulates economic growth in the Nigerian context. Annual data was sourced from 1970 to 2018 from the CBN Statistical Bulletin (2020) and World Development Indicators (2020). The study adopted the autoregressive distributed lag (ARDL) model, bounds and the Bayer-Hanck (2013) cointegration techniques. The empirical analysis from the main and robustness checks shows that (1) a significant long-run association exists and

(2) a percentage point change in the monetary policy rate results in a 0.055 and 0.059 percentage decline in economic growth, on average, *ceteris paribus*. This might be connected to the recent advocacy of rate reduction to spur private investment and invariably economic growth. It can be concluded that a statistically significant inverse relation exists between the monetary policy rate and economic growth in Nigeria.

Therefore, the monetary policy rate is an important policy instrument that can change output growth in Nigeria, thereby achieving economic development. In addition, trade openness makes positive contemporaneous and one-period contributions to economic growth at the 1% per cent level marginally, by an average of 0.094 and 0.059 per cent respectively, *ceteris paribus*. It attests to the fact that trade openness has the potential to influence shocks or stimulate economic growth. However, the impact of inflation on the economy is asymmetric in the short run.

The policy implications of this study are that the monetary authority (The Central Bank of Nigeria) should reduce the monetary policy rate to encourage economic agents, especially the real sector, with employment and wealth creation capacity. Furthermore, low-interest credit facilities can be made available for export-related trade activities. Credit facilitation bottlenecks should also be removed to encourage the real sector of the economy. The study also recommends more domestic credit stimulus with efficient monitoring in order to reach the target beneficiaries. This would ensure transparency and accountability in the disbursement of the funds.

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REMITTANCES-FINANCE-GROWTH TRILOGY: DO REMITTANCE AND FINANCIAL DEVELOPMENT COMPLEMENT OR SUBSTITUTE EACH OTHER TO AFFECT GROWTH IN NIGERIA?

ABSTRACT: *The study examines the absorptive role of financial development in the remittance-growth nexus in Nigeria between 1986-2017. In particular, the short-run, long-run, and causal links between remittances, financial development, and economic growth in Nigeria are investigated using an autoregressive distributed lag bounds test and vector error correction Granger causality. The result shows that financial development and remittances contribute positively to economic growth. Furthermore, findings from the moderating role suggest that financial development and remittances serve as substitutes to affect growth in the short run; however, financial development and remittances perform a complementary role in influencing economic growth in the long run. In addition, the causality tests indicate a one-way relationship from economic growth to financial development as well as bidirectional causality between remittances and financial development in the short run, while financial development and remittances Granger cause economic growth in the long run. The outcome of this study suggests there are time lags in the relationship between remittances, financial development, and economic growth in Nigeria. The implications of the findings are discussed.*

KEY WORDS: *remittances, financial development, economic growth, Nigeria*

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1. INTRODUCTION

The inflow of remittances in total international capital flows has increased over the last decade. Remittances have long been a key source of income for developing countries, according to Giuliano and Ruiz-Arranz (2005) and Islam and Alhamad (2022). Remittances to developing nations totalled $430 billion in 2014, $431.6 billion in 2015, and $554 billion in 2019, as reported by the World Bank (2020). The rise in remittance inflows to developing nations has piqued the interest of many scholars in recent years because of the role it can play in bridging the gap between financial development and economic growth (Sibindi, 2014). Remittances are seen as one of the ways of achieving Sustainable Development Goals (SDGs) in sub-Saharan Africa (SSA) when official development assistance (ODA) and foreign direct investments (FDIs) are not sufficient to produce the expected development in the region. According to Akanle et al. (2022), current efforts to alleviate poverty and develop financing strategies in the region focus on the role of remittances, given their relevance in achieving the SDGs goals 1-6, 7, 8, 10, 12, 13, and 17 in Africa.

In the 2030 Agenda for Sustainable Development, member states of the United Nations issued a call to eradicate global poverty, reduce economic inequality, and place the world on a more sustainable pathway. One of the ways to mobilise the required resources to achieve the 17 specific sustainable development goals is through safe migration (SDG 10). To ensure the free flow of remittances among countries, goal 10, by 2030 the cost of remittance transactions should be reduced to below 3% and remittance corridors with costs higher than 5% should be eliminated.

The impact of remittances on economic growth in Nigeria is tremendous as Nigeria is the greatest beneficiary of remittance inflows among sub-Saharan African nations with $23.8 billion in 2019, according to the World Bank (2020). In 2019, Nigeria received approximately half of all the remittances transferred to sub-Saharan Africa.

Empirical evidence on the nexus between remittances and their beneficial effect, especially on economic growth, has continued to generate mixed results, with some studies concluding that remittances inhibit growth (Chami et al., 2003; Karagoz, 2009; Kumar, 2012). Remittances could affect output level and the

unemployment rate through an increase in the inflation rate and appreciation of the exchange rate in real terms (Catrinescu et al, 2009; Mughal, 2013; Majeed, 2014). Furthermore, remittances could be channelled toward immediate consumption, instead of productive activities, thereby affecting long-term growth (Abduvaliev & Bustillo, 2020). This negative effect of remittance on growth outcomes has led researchers to search for absorptive capacity that could translate remittances to growth. Among such absorptive capacities is financial development.

The financial system has been recognised as a veritable channel for transforming the remittances into substantial deposits which could be used for productive investment (Aggarwal et al., 2011); it lowers the cost of sending remittances and also mobilises remittances to projects with the highest return, thus spurring economic growth (Guiliano & Ruiz-Arranz, 2005). In addition, remittances channelled through the financial sector can boost the financial sector's growth when the recipient of such remittances opens accounts with financial institutions. The financial sector, on the other hand, can assist the influx of remittances by acting as an intermediary between the sender and the recipient (Nyamongo & Misati, 2011; Levine, 2005).

This study, therefore, contributes to the literature by examining the absorptive capacity of financial development in translating remittances to growth in Nigeria. Specifically, the study investigates the moderating role of financial development in the remittance-growth nexus in Nigeria. Nigeria's case is particularly interesting because, as mentioned above, it is the largest recipient of remittances in sub-Saharan Africa (World Bank, 2020; Fonta et al., 2021; Kudaisi, Ojeyinka and Osinubi (2021) and is also characterised by a low level of financial development (Coulibaly, 2015). Knowing the relationship between financial development, remittances, and economic growth can help policymakers develop policies that will improve the financial sector's development while simultaneously increasing remittance inflows. Historically, most research favours panel or cross-sectional studies on a global scale, with country-specific studies receiving less attention. Furthermore, an approach that captures the time variation in the moderating effect is used. Since policy prescription differs with respect to time, autoregressive distributed lag (ARDL) and vector error correction Granger causality are used to investigate both the short and long-run relationship and

direction of causality between financial development, remittances, and economic growth in Nigeria.

The rest of this study is organised as follows. The second section is devoted to the theoretical background and review of the literature. The third section focuses on methodology. The results are presented in the fourth section, and the fifth section concludes the study.

2. THEORETICAL BACKGROUND AND EMPIRICAL LITERATURE REVIEW

2.1 Theoretical linkages between remittance and economic growth

Theoretically, remittances affect growth in two ways: directly and indirectly. The direct way is often classified into three categories in the literature. These channels are capital accumulation, labour force growth, and total factor productivity (Gapen et al., 2009). First, remittances increase the rate of capital accumulation. Remittance inflow increases physical and human capital and lowers the cost of obtaining capital in remittance-receiving countries. Remittances serve as an alternative source of finance for the household, thus relieving the household of financial constraints.

Furthermore, self-motivating migrants can also invest in their domestic economy, thus creating additional income-generating activities. Second, remittance affects labour force growth by substituting labour income with remittances and contributing to more time spent on leisure (Acosta et al., 2009). People in the labour force could limit their job search, labour effort, and investment in riskier projects, among others, due to the inflow of remittances. Thus, remittances negatively influence growth through the impact on the labour force growth rate. Third, the influx of remittances also affects the total factor productivity. When the remittance is used efficiently, especially in the case of a wise investment decision, the rate of total factor productivity will increase, and, ultimately, economic growth.

An indirect channel through which remittances influence growth includes an increase in the personal income of households. The increase in the inflow of remittances to households leads to an increase in the total income of the consumer. However, rational consumers will split their total income into two

parts, consumption and savings. This suggests that an increase in remittances boosts consumer savings in addition to consumption (Ahmad et al., 2019; Rahman et al., 2019). The increase in consumption will ultimately lead to an increase in the aggregate demand of consumers. In an effort to satisfy this, industrial firms will increase their productivity, resulting in an increase in economic growth. Thus, a rise in personal income via remittances causes an increase in overall consumer spending, which then spurs an increase in industrial production. On the other hand, the rise in savings brought on by an increase in remittances allows households to deposit their extra cash in financial institutions, which raises bank deposits. Once more, financial institutions or banking sectors utilise these deposits to create new credit in order to make money by adding interest. Furthermore, industrialists begin borrowing money from the banking sectors in order to expand their enterprises or build new plants. The financial sector is further improved by its capacity to increase the amount of funding available to the business community. Moreover, the increase in industrial productivity due to access to more funds contributes to economic growth.

In exploration of our research objective, we therefore have the following hypotheses:

Hypothesis 1: Remittances have a positive effect on economic growth in Nigeria

Hypothesis 2: Financial development enhances the effect of remittances on economic growth in Nigeria

2.2 Theoretical linkages between financial and economic growth

According to the literature, there are four major possible hypotheses regarding the link between financial development and economic growth. These comprise no causal relation, finance-led growth, growth-led finance, and interdependence or stage of development. Regarding the no causal hypothesis, Lucas (1988) emphasised a zero relationship between finance and economic growth. Graff (2000) indicated that this view supports a neo-classical world where zero transaction costs and perfect information exist. However, this hypothesis has been criticised by many economics scholars as they stated that there are no frictionless markets primarily based on informational and related arguments such as agency problems and transaction costs. The finance-led growth hypothesis can

be traced back to the work of Bagehot (1873), while the modern version of the hypothesis is credited to the works of McKinnon (1973) and Shaw (1973). The McKinnon-Shaw hypothesis holds that there is a positive relationship between finance and economic growth and that finance causes economic growth. Endogenous growth theory reached a similar conclusion to the McKinnon-Shaw hypothesis by explicitly modelling the services provided by financial intermediaries, such as risk-sharing and liquidity provision. Endogenous growth theory states that the growth rate of an economy can be enhanced not only by an increase in productivity growth but also by either an increase in the efficiency of capital accumulation or an increase in the savings rate. The growth-led finance hypothesis was pioneered by Robinson (1952), who stated that financial deepening is dependent on growth that occurs in the economy. This hypothesis suggests that causality is from economic growth to financial development. Increasing demand for financial services deepens the financial sector as the economy progresses (Calderón & Liu, 2002). Singh (1999) opines that when an economy expands, there is a rise in macroeconomic activities which in turn develops the financial sector. According to this hypothesis, financial development is endogenously determined by the real economy or its needs. This opinion is generally in line with the Coase theorem as well as new institutional economics. Then there is the hypothesis that suggests that there is no need for an argument between finance-led growth and growth-led finance hypotheses. This is referred to as the "stage of development" hypothesis which incorporates the supply-leading and demand-following hypotheses. It posits that the causal link between financial development and economic growth alternates as the economy develops. According to Patrick (1966), the supply-leading hypothesis holds in an economy in the early developmental stage, and as the economy grows, it fades away and the demand-following hypothesis prevails.

Based on the theoretical studies discussed above, we predict that:

Hypothesis 3: Financial development has a positive effect on economic growth in Nigeria.

2.3 Empirical literature review on remittance, financial development, and economic growth

This sub-section reviews both the time-series and panel studies that examined the joint effect of financial development and remittances on economic growth. Theoretically, remittances are meant to pass through the banking system before reaching families for expenditure in a well-functioning financial sector. As a result, financial development is expected to boost remittances' impact on economic growth. However, according to Peprah et al. (2019), there is no consensus on the combined effect of remittances and financial development on economic growth.

Starting with the time-series studies, Garba et al. (2020) investigated the role of the financial sector in the nexus between foreign remittances and economic growth in Nigeria over the period of 1981 to 2015. The study employed the two-stage least squares (2SLS) technique. Contrary to earlier studies, the study found that the joint effect of foreign remittances and financial development on economic growth is complementary when quantitative indicators of financial development are used, while foreign remittances and financial development act as substitutes in enhancing economic growth when qualitative financial development measure is used. Falade et al. (2021) used the VECM technique to examine the interaction of financial development and remittances on economic growth in Nigeria during the period 1986-2019. The study found that the interaction of migrants' remittances and financial development enhances economic growth. Still on Nigeria's economy, Olaniyan (2019), in an attempt to verify the previous findings that remittances alone are not sufficient to promote growth, investigated the direct effect of remittances on economic growth as well as the interactive effects of remittances and the financial sector development on economic growth in Nigeria for the period 1977-2017. The study found that remittances produced a negative effect on economic growth. However, the interaction of financial development with remittances promotes economic growth in Nigeria. The impact of financial sector expansion on boosting the impact of remittances in promoting economic growth in Pakistan was examined by Batool et al. (2022). To explore the nexus, the study used time series data for the years 1980 to 2020. The ARDL strategy was used in the study as an estimating technique. This research showed that remittances and financial development

complement each other in enhancing growth both in the long run and the short run.

In the context of panel studies, Mundaca (2009) used panel data to examine the interaction effect of remittances and financial development on economic growth for countries in Latin America and the Caribbean during the period from 1970 to 2002. The study found that remittances enhance growth more when financial markets are well developed. Giuliano and Ruiz-Arranz (2005) investigated the link between remittances and financial development, as well as its impact on growth. The study revealed that remittances serve as a substitute for financial development, as they contribute to economic growth in less financially developed countries. Nyamongo et al. (2012) investigated the role of remittances and financial development on economic growth in a panel of 36 countries in Africa over the period 1980-2009. The study found that remittances complement financial development to enhance economic growth. Similarly, Chowdhury (2016) used a panel of 33 developing nations that received the most remittances. The result showed that the interaction of remittances and financial development does not influence economic growth, implying that financial development is neither a substitute nor a complement to the remittance–growth nexus. Sobiech (2019) concluded that remittances have little impact on economic growth in a country with a well-developed financial sector. Further, the author submitted that remittances and financial development can be used interchangeably in the growth process. A study by Peprah et al. (2019) showed that the combined effect of financial development and remittances is greater than their individual effects, implying that they complement each other. In a panel of 20 sub-Saharan African countries, Olayungbo and Quadri's (2019) findings revealed that remittances and financial development contribute to economic growth in both the short and long term, while growth is harmed by the joint effect of remittances and financial development. Rehman and Hysa (2021) investigated the effect of financial development and remittances on economic growth across six Western Balkan countries (WBC) using panel data from 2000 to 2017. The study found that financial development and remittances contribute to economic growth across WBC individually. However, their interaction provides a significant and negative effect on economic growth. Similarly, in a panel of 15 Economic Community of West African States (ECOWAS) countries, Olaniyan, Ijaiya, and Kolapo (2022) investigated the association between remittances, financial sector development,

institutions, and economic growth over the period 2000–2017. The Two-Stage Least Squares Instrumental Variable (2SLS-IV) estimator was used for the estimation of the results. The study discovered that while the interaction of remittances and financial sector development improved growth in the ECOWAS sub-region, remittances produced significant negative effects on economic growth in the sub-region. Workers' remittance and its interacting with financial development and institutional quality on economic growth were explored by Ngoma, Ismail, and Law (2021). Pooled Mean Group (PMG) and partial Gram-Schmidt orthogonalization estimators were utilized in the investigation. The study's time frame was from 1984 to 2010 and a panel of 15 Asian nations. According to the findings, remittances contributed to economic growth while remittance and financial development work as complements to enhanced economic growth.

From the above review, it is evident that most of the studies that examine the interaction effect of financial development and remittances on economic growth are panel studies while studies focusing on single-country analysis are very limited. It is also evident that there is no consensus on the joint effect of financial development and remittances on economic growth among the existing studies. From among the few studies (e.g., Olaniyan, 2019; Garba et al., 2020; Falade et al., 2021) that examine this relationship in Nigeria, we observe that they did not investigate the direction of causality between the variables. Therefore, this study differs from previous studies by examining not only the joint effect of financial development and remittances on economic growth but also investigating the direction of causality between the variables. Moreover, we hypothesise that financial development moderates the negative effect of remittances on growth in Nigeria.

3. METHODOLOGY

The neoclassical Solow growth model serves as the theoretical foundation for this study. This model assumes that economic growth is a function of technology, capital, and labour. However, here Solow's model is modified to accommodate other factors that influence growth, such as remittances, financial development, among others. Following the model specification of Pradhan et al. (2008), Kumar (2012), Chowdhury (2016), and Cao and Kang (2020), our baseline model is stated thus

$$Gdp_t = f(Fin_t, Rem_t, Pop_t, Gcf_t, X_t) \quad (1)$$

where Gdp is economic growth, Fin is financial development, Rem is remittances, Pop is the population growth rate, Gcf is gross capital formation, and X is a set of other control variables which includes governance (GOV), inflation (INF), and government expenditure (GEX). All these variables are expressed logs except inflation which is in rate. In explicit terms, equation 1 is written as

$$Gdp_t = \alpha + \beta Fin_t + \eta Rem_t + \theta Pop_t + \gamma Gcf_t + \kappa X_t + \varepsilon_t \quad (2)$$

To examine the absorptive capacity of financial development in the link between remittances and growth, an interactive term is added to equation 2.

$$Gdp_t = \alpha + \beta Fin_t + \eta Rem_t + \pi(Fin * Rem) + \theta Pop_t + \gamma Gcf_t + \kappa X_t + \varepsilon_t \quad (3)$$

where Fin*Rem is the interactive term.

From equation 3, three parameters, namely $\beta, \eta, and\ \pi$, are important in this study. A positive significant effect of the interactive term (π) shows a complementarity between financial development and remittances in affecting economic growth. However, a negative significant value of the interactive term suggests substitutability between financial development and remittances in influencing economic growth. Further, an insignificant coefficient of the interactive term shows that neither financial development nor remittances complement or substitute each other in influencing growth. The significant values of η and π have some implications.

1. If $\eta > 0$ and $\pi < 0$, this means that remittances spur growth in countries with weak or poorly working financial institutions.
2. If $\eta < 0$ and $\theta > 0$, or $\eta > 0$ and $\theta > 0$, these signify that well-functioning financial institutions would channel remittances towards growth-enhancing activities.

Autoregressive distributed lag (ARDL) is employed as an estimation technique because it provides both the short- and long-run effects, resolves the problem of endogeneity and serial correlation (Pesaran et. al., 2001) usually encountered in the finance-growth literature, and provides a robust estimate irrespective of the

sample size (Harris & Sollis, 2003; Fabiyi & Dada, 2017). Furthermore, ARDL accommodates both I(0) and I(1) variables. Even in the presence of endogeneity, it remains robust to small sample size, model lag modifications, and provides unbiased results in the long-run model (Harris & Sollis, 2003). The ARDL specification of equation 3 is expressed as:

$$\begin{aligned} Gdp_t = \alpha + \sum_{j=1}^{o} \zeta_j \Delta Gdp_{t-j} + \sum_{j=0}^{p} \beta_j \Delta Fin_{t-j} + \sum_{j=0}^{q} \eta_j \Delta Rem_{t-j} \\ + \sum_{j=0}^{r} \pi_j \Delta (Fin * Rem)_{t-j} + \sum_{j=0}^{s} \theta_j \Delta Pop_{t-j} + \sum_{j=0}^{u} \gamma_j \Delta Gcf_{t-j} \\ + \sum_{j=0}^{v} \kappa_j \Delta X_{t-j} + \lambda_1 Gdp_{t-1} + \lambda_2 Fin_{t-1} + \lambda_3 Rem_{t-1} \\ + \lambda_4 (Fin * Rem)_{t-1} + \lambda_5 Pop_{t-1} + \lambda_6 Gcf_{t-1} + + \lambda_7 X_{t-1} \\ + \varepsilon_t \end{aligned} \tag{4}$$

where Δ represent the short-run variables, λ_j (j = 1, 2…,7) are the long-run variables, o, p, r, s, q, u, and v are the respective maximum lags, ε_t is the error term. The null hypothesis of no long-run cointegration ($\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq \lambda_7 \neq 0$) among the variables is examined against the alternative hypothesis of long-run cointegration ($\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = \lambda_7 = 0$). The above ARDL model only provides us with the short-and long-run estimate and not the direction of the causal relationship.

Granger causality tests can be used in the vector error correction framework once we have confirmed cointegration by means of the ARDL technique. The presence of cointegration in multivariate models suggests that Granger causation exists in both directions, or at least one direction, which may be tested using the Wald test under certain restrictions. Similarly to the ARDL, the VECM-based Granger causality provides the opportunity to check both the short-run and long-run causal relation. The VECM of equation 1 is stated in matrix form as:

$$\begin{vmatrix} Gdp_t \\ Fin_t \\ Rem_t \end{vmatrix} = \begin{vmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \end{vmatrix} + \sum_{j=1}^{p} \begin{vmatrix} \beta_{11j} & \beta_{12j} & \beta_{13j} & \beta_{14j} & \beta_{15j} & \beta_{16j} \\ \beta_{21j} & \beta_{22j} & \beta_{23j} & \beta_{24j} & \beta_{25j} & \beta_{26j} \\ \beta_{31j} & \beta_{32j} & \beta_{33j} & \beta_{34j} & \beta_{35j} & \beta_{36j} \end{vmatrix} \times \begin{vmatrix} \Delta Gdp_{t-p} \\ \Delta Fin_{t-p} \\ \Delta Rem_{t-p} \end{vmatrix} + \begin{vmatrix} \lambda_1 \\ \lambda_2 \\ \lambda_3 \end{vmatrix} ECT_{it-1} + \begin{vmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{vmatrix} \quad (5)$$

3.1 Data and data source

Annual data from 1986 to 2017 is used. Availability of the data on key importance variables defined the sample period.

The data were obtained from the World Development Indicators (2022) of world bank and IMF database. The description and measures of the variables are as follows. Economic growth (GDP) is measured by gross domestic product per capita (constant 2010 US$). Personal remittances (REM), as a percentage of GDP – includes employee compensation and personal transfers. Financial development (FIN) index is generated from a comprehensive measure of financial development that integrates all three areas of the financial sector, i.e. financial depth, access to financial services, and financial sector's efficiency. The value of the index ranges from 0 to 1, where 0 represents absolutely weak financial development and 1 suggests strong financial development. The data on financial development are extracted from the IMF database on the new broad-based measure of financial development proposed by Svirydzenka (2016). Gross Capital Formation (GCF) is measured as a percentage of GDP – outlays on additions to the economy's fixed assets as well as net changes in the level of inventories make up this category. Government Expenditure (GEX), as a percentage of GDP – government expenditure is the final government consumption expenditure. Inflation (INF) – this captures changes in the cost of obtaining a fixed basket of goods and services by the average consumer. Population Growth (POP) – this is the yearly population growth rate for year t, which is the exponential rate of population expansion from year t-1 to year t, represented as a percentage. Governance indicator (GOV) – the Polity2 index is used to measure political governance. Polity2 data are a revised version of the original Polity data. They assess the degree of democracy and authoritarianism and are scaled from -10 to

10. A score of 10 suggests a solid democratic system, whereas a score of -10 reveals a high level of autocracy. Polity2 index is from the polity iv dataset constructed by Marshall et al. (2018)

4. RESULT AND DISCUSSION

4.1 Descriptive statistics and correlation matrix

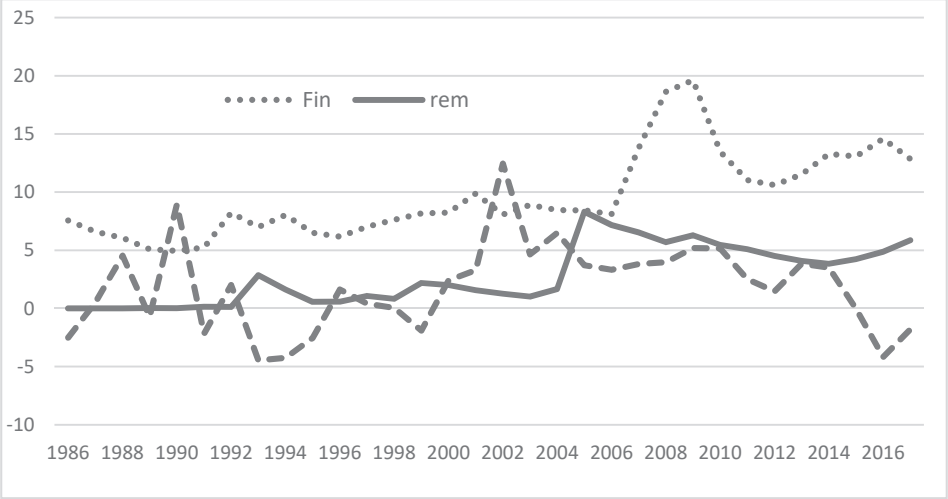
The descriptive statistics of the logarithmic transformation of the variables is reported in Table 1, while appendix A present the descriptive statistic of the series in their raw form. The results reveal that the series are distributed normally (the value of mean and median are very close). The normality of the series is equally supported by the Jarque-Bera statistic. The skewness statistic suggests that economic growth, financial development, inflation and government expenditure are positively skewed, while remittances, governance, gross capital formation and population, which are negatively skewed. Furthermore, the kurtosis statistic reveals that remittances, governance and inflation are leptokurtic, i.e. the values are greater than three, while economic growth, financial development, government expenditure, gross capital formation and population are platykurtic, i.e. the values are less than three. Apart from the descriptive statistics, the correlation matrix reveals the non-appearance of multicollinearity among the variables. The correlation among the variables ranges from -0.244 to 0.636. Thus, it can be concluded that the variables are moderately correlated. In addition, Figure 1 displays the trend of the core variables of this study (growth, remittances, and financial development). The trend analysis in Figure 1 suggests that economic growth in Nigeria oscillates in a zig-zag manner, with both positive and negative growth recorded. The trend of financial development and remittances have been increasing at an increasing rate.

Table 1: Descriptive Statistics and Correlation Matrix (Log Transformation of the Variables)

	GDP	FIN	REM	GOV	INF	GEX	GCF	POP
Mean	7.451	2.196	-0.078	1.094	20.195	1.037	3.368	0.948
Median	7.347	2.109	0.603	0.324	12.716	0.735	3.406	0.953
Maximum	7.844	2.977	2.118	3.127	72.836	2.246	4.006	0.986
Minimum	7.190	1.601	-5.322	-0.217	5.388	-0.093	2.702	0.912
Std. Dev.	0.242	0.359	2.272	2.158	18.517	0.821	0.444	0.027
Skewness	0.428	0.377	-1.245	-1.382	1.563	0.199	-0.231	-0.063
Kurtosis	1.548	2.452	3.277	3.821	4.051	1.471	1.650	1.484
Jarque-Bera	3.785	1.158	1.372	2.108	1.498	3.330	2.714	3.087
Probability	0.151	0.561	0.125	0.129	0.101	0.189	0.257	0.214
Observations	32	32	32	32	32	32	32	32
GDP	1							
FIN	0.393	1						
REM	0.636	0.494	1					
GOV	0.595	0.366	0.554	1				
INF	-0.407	-0.390	-0.271	-0.543	1			
GEX	0.171	0.629	0.616	0.525	-0.360	1		
GCF	-0.244	-0.335	-0.458	-0.659	0.396	-0.825	1	
POP	0.577	0.466	0.131	0.473	-0.347	0.329	-0.634	1

Note: *GDP is economic growth, FIN is financial development, REM is remittances, GOV is governance indicators, INF is inflation, GEX is government expenditure, GCF is gross capital formation, and POP is the population growth rate*

Figure 1: Trend of Financial development, Remittances, and Growth



4.2 Stationarity test results

Tables 2 and 3 present the unit root of the variables using Augmented Dickey-Fuller and Philip Peron unit root tests. The results suggest that the variables are a combination of I(0) and I(1) using both test statistics. The Zivot and Andrews unit root test, which accounts for structural breaks in the variables, was also used to confirm the results obtained from the traditional unit root tests. The finding from the structural breaks' unit root in Table 4 suggests that the series are stationary at level and first difference. Since the variables are stationary, and the explained variable in particular is stationary at the first difference, the ARDL adopted in this study is sufficient.

Table 2: ADF Unit Root Test

Variables	At Level			At First Difference			
	With Constant	With Constant & Trend	Without Constant & Trend	With Constant	With Constant & Trend	Without Constant & Trend	Status
GDP	-0.517	-1.692	1.263	-3.143**	-3.041*	-2.725***	I(1)
FIN	-1.189	-3.985**	0.318	-4.973***	-4.919***	-5.023***	I(1)
REM	-1.562	-2.710	-0.487	-5.712***	-5.608***	-5.704***	I(1)
GOV	-1.131	-2.404	-1.208	-3.881***	-3.807**	-3.661***	I(1)
INF	-4.302***	-2.554**	-0.784	-	-	-2.270**	I(0)
GEX	-1.135	-2.209	-0.394	-4.901***	-4.843***	-4.960***	I(1)
GCF	-1.309	-3.391*	-2.603**	-5.792***	-	-	I(0)
POP	-3.384**	-2.541	0.485	-	-3.321*	-2.017**	I(1)

****, **, * represent 1%, 5% and 10%, respectively*

Table 3: PP Unit Root Test

Variable	At Level			At First Difference			
	With Constant	With Constant & Trend	Without Constant & Trend	With Constant	With Constant & Trend	Without Constant & Trend	Status
GDP	-0.114	-1.555	2.062	-3.043**	-3.123*	-2.549**	I(1)
FIN	-1.593	-2.185	-0.020	-5.882***	-5.445***	-4.724***	I(1)
REM	-1.356	-2.747	-0.178	-7.975***	-7.727***	-6.026***	I(1)
GOV	-0.719	-1.924	-0.978	-3.832***	-3.754***	-3.712***	I(1)
INF	-2.754*	-3.245*	-1.409	-	-	-6.620***	I(0)
GEX	-1.321	-1.757	-0.558	-4.979***	-4.918***	-5.041***	I(1)
GCF	-1.682	-3.241*	-8.061***	-8.508***	-	-	I(0)
POP	-1.682	-3.241*	-8.061***	-8.509***	-	-	I(0)

****, **, * represent 1%, 5% and 10%, respectively*

Table 4: Zivot and Andrews Unit Root Test with Breakpoint

Variables	At Level		At First Difference		Status
	With Constant	Breakpoint	With Constant	Breakpoint	
GDP	-3.257	2001	-9.733***	2016	I(1)
FIN	-5.296***	2005			I(0)
REM	-9.208***	2004			I(0)
GOV	-7.039***	1998			I(0)
INF	-8.244***	1995			I(0)
GEX	-5.933***	2003			I(0)
GCF	-2.701	1999	-7.172***	2002	I(1)
POP	-4.826**	2001			I(0)

****, **, * represent 1%, 5% and 10%, respectively*

4.3 Cointegration test results

Furthermore, the long-run relationship is confirmed using the ARDL bound cointegration test. Table 5 establishes the existence of the long run relationship in the two models. Model 1 deals with the direct impact of remittances and financial development on economic growth, while model 2 examines the absorptive role of financial development in the remittance-growth nexus. Specifically, the F-statistic in each model is higher than the critical values at a 1% level of significance. Hence, the null hypothesis of no long-run cointegration between remittances, financial development, and economic growth is rejected.

Table 5: ARDL Bounds Test (H_0: No long-run relationship)

	ARDL Model Selected	F-Statistic	K
Model 1	(1,0,1,1,0,0,1)	4.119***	7
Model 2	(1,2,2,2,2,2,2,2)	25.683***	8

Critical Values	Model 1			Model 2		
	10%	2.03	3.13	10%	1.95	3.06
	5%	2.32	3.5	5%	2.22	3.39
	2.5%	2.6	3.84	2.5%	2.48	3.7
	1%	2.96	4.26	1%	2.79	4.1

****, **, * represent 1%, 5% and 10% respectively*

4.4 Long-run and short-run estimation

Since the presence of a long-run relationship between remittances, financial development, and economic growth in Nigeria has been obtained, the short and long-run estimates are reported in Table 6. Model 1 is the baseline model, whereas the interaction term of financial sector development and remittances is added to model 2. In model 1, financial development has a detrimental impact on economic growth, although its coefficient is insignificant. In model 2, however, the previous value of financial development (at lag one) contributes significantly to economic growth in Nigeria. Remittances have a significant positive influence on economic growth in model 2, while its effect is not significant in model 1. These findings imply both remittances and financial sector development spur growth in the short run when the moderating variable is involved. Specifically, remittances and financial development are catalysts of growth in Nigeria. In the long run, the impact of financial development on growth is insignificant. Remittances, on the other hand, has significant positive influences on economic growth in model 2. This result suggests that the level of financial development in Nigeria is still too low to bring about economic growth in the long run. The reasons for these results are not far-fetched. First, this suggests that financial institutions such as banks are just paying agents; remittances are not saved in the form of deposits, but rather cash is used for immediate consumption by the recipient. Most of the remittances are not used to create or maintain existing accounts, which reduces the extent to which remittances enter the financial system, thus having an adverse impact on deposits and the growth of the economy in the long run (Apanisile, 2021). Second, the location of financial institutions, especially the distance to them and their non-availability in rural areas, could also lead recipients of remittances to avoid patronising the banking system, thereby forcing recipients to use other means. Remittances could be used to expand the credit-base of banks if channelled through the financial institutions. Third, the adverse effect of the financial sector, in the long run, shows that there are lot of fees (such as administrative and maintenance charges) imposed by the banking system which make the recipients of remittances withdraw all their funds from the financial institution, having an adverse effect on credit expansion. Beck et al. (2006) also found that in most nations in sub-Saharan Africa, South Asia, and Latin America, maintaining a bank account involves high costs. The positive effect of remittances in the short run is reinforced by the findings of Giuliano and Ruiz-Arranz (2009), Yuan et al. (2016), Karikari et al. (2016), Olayungbo and

Quadri (2019), Cao and Kang (2020), and Saydaliyev et al. (2020), who suggested that nations with less developed financial systems benefit from the positive effect of remittances, while nations with the developed or moderate financial system do not reap the benefit of remittances. However, Gjini (2013) and Feeny et al. (2014) found a negative effect of remittances on growth.

To examine the absorptive role of financial development in the remittances-growth nexus, an interactive term of finance and remittance is added to model 2. The result shows that the current interactive term has an insignificant impact on growth, while the lag value has a significant negative influence on economic growth. This result implies that it requires a time lag for financial development to effectively mediate the link between remittances and growth in the short run. The negative sign of the interactive term in the short run suggests that financial development and remittance play a substitutability role in influencing economic growth. This result reveals that remittances could be used as a substitute for the ineffective financial sector. Remittances could help investors or entrepreneurs overcome the problem of collateral or the high cost of lending in the financial system, thus leading to self-financed investments (Abida & Sghaier, 2014; Sobiech, 2015). However, in the long run, the coefficient of the interactive term is positive, suggesting that financial development and remittances play a complementary role. This implies that in the long run, when the financial sector is well-functioning, it helps to channel remittances to profitable projects with high returns, which promotes economic growth (Giuliano & Ruiz-Arranz, 2009). As noted by Aggarwal et al. (2011) and Demirguc-Kunt et al. (2011), financial sector development performs a complementary role to remittances by facilitating the fast, safe, and cheaper transfer of remittances through the official channel, thus increasing the inflow of remittances. On the other hand, the large inflow of remittances increases banking breadth and depth, through rises in the number of bank branches, deposits, and accounts per capita. This complementarity role allows remittances to be channelled to productive activities, boosting economic activities in the long run.

The outcome of this study shows that both financial development and remittances are important components of long-term growth. The long-run finding further reveals that remittances are beneficial to long-term growth. In addition, strong financial sector development is needed to transform the growth

benefits of remittances in Nigeria. The substitution effect between the financial sector and remittances is supported by Ramirez (2013), Sobiech (2015, 2019), Olayungbo and Quadri (2019), and Cao and Kang (2020), while studies by Mundaca (2009), Nyamongo et al. (2012), Cooray (2012), Lartey (2013), Luqman and Haq (2016) and Olaniyan, Ijaiya, and Kolapo (2022), among others, affirms the complementarity role between financial sector and remittances. However, studies by Kumar (2012), Chowdhury (2016), and Bettin and Zazzaro (2012) found neither a substitution nor a complementarity role between financial sector development and remittances in influencing economic growth.

The effect of other variables included in the regression are as follows. Governance has a negative impact on economic growth in the short run, but insignificant positive influence in the long run. The negative effect of governance indicators on economic growth in Nigeria suggests that governance is weak in Nigeria. A similar result is also obtained by Dada and Fanowopo (2020). Furthermore, inflation also inhibits economic growth in Nigeria, both in the short run and the long run. Studies by Chami et al. (2005), Bettin and Zazzaro (2012), Bandura et. al. (2019), and Cao and Kang (2020) also established the negative effect of inflation in transition economies. Government expenditure has a significant positive effect on economic growth in the short run, while the positive influence is not significant in the long run. This result implies that the current level of government expenditure in Nigeria is not enough to drive the long-run economic growth. The outcome of the effect of government expenditure supports the findings of Akinyele and Dada (2022) but is at variance with the submissions of Jongwanich (2007), Acosta et al. (2008), and Bettin and Zazzaro (2012). Gross capital formation and population growth rate are growth enhancing in Nigeria. These findings suggest that physical capital and human capital (in terms of labour) are important factors contributing to economic growth. This outcome is supported by both theoretical and empirical studies (Mamingi & Perch, 2013; Olayungbo & Quadri, 2019; Cao & Kang, 2020). The diagnostic statistics of the models are of the right magnitude. The cointegration equation that measures the speed at which the model corrects its short-run disequilibrium indicates that the models return to their long-run equilibrium at a speed of 36.3% and 68.4% in models 1 and 2, respectively. Furthermore, the Breusch-Pagan-Godfrey heteroscedasticity test, the Jarque-Bera normality test, and CUMSUM and CUMSUM square in Figures 2 and 3 show that the models are free from

heteroscedasticity. Hence, the errors are normally distributed and the models are well specified.

Table 6: Short and Long-run Dynamics

Variables	Model 1 (1,0,1,1,0,0,1)	Model 2 (1,2,2,2,2,2,2,2)
D(FIN)	-0.524 (-0.087)	7.487 (0.047)
D(FIN(-1)		2.455*** (5.905)
D(REM)	-0.857 (-0.122)	0.725** (3.091)
D(REM(-1))		0.794** (3.947)
D(FIN*REM)		-1.790 (-1.514)
D(FIN*REM(-1))		-0.926*** (-5.295)
D(GOV)	-0.973* (-1.691)	-2.293** (-2.879)
D(GOV(-1)		-1.159* (-2.370)
D(INF)	-1.619** (-2.711)	-4.299*** (-6.003)
D(INF(-1)		0.812 (1.306)
D(GEX)	6.269 (0.767)	0.970** (3.142)
D(GEX(-1)		5.017** (3.823)
D(GCF)	0.881** (2.152)	0.975 (0.379)
D(GCF(-1)		0.245* (2.351)

D(POP)	0.560**	1.308**
	(2.711)	(3.453)
D(POP(-1)		1.555**
		(3.868)
CointEq(-1)*	-0.363***	-0.684**
	(-3.514)	(-4.338)
Long run Model		
FIN	-0.970	1.690
	(-0.087)	(1.261)
REM	-0.625	7.235**
	(-0.902)	(3.030)
FIN*REM		0.179**
		(4.293)
GOV	18.472	0.269
	(1.312)	(0.028)
INF	-1.894	-5.375*
	(-0.932)	(-2.241)
GEX	0.259	4.697
	(0.706)	(1.853)
GCF	0.940***	1.937**
	(3.484)	(3.106)
POP	0.176***	2.127***
	(4.964)	(5.919)
C	-0.691***	-1.156**
	(-3.214)	(-3.732)
Diagnostic Indicators		
Adjusted R-Sq	0.901	0.929
F-statistic	11.017***	31.837***
Normality Test/Jarque-Bera Test (P/V)	0.664	0.288
Heteroscedasticity test (BPG)/P-val	0.496	0.672

****, **, * represent 1%, 5% and 10%, respectively*

Figure 2: CUMSUM and CUSUM of Square for Model 1

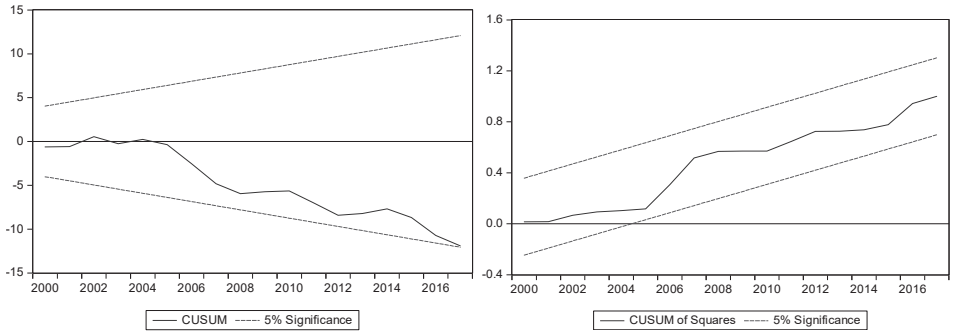
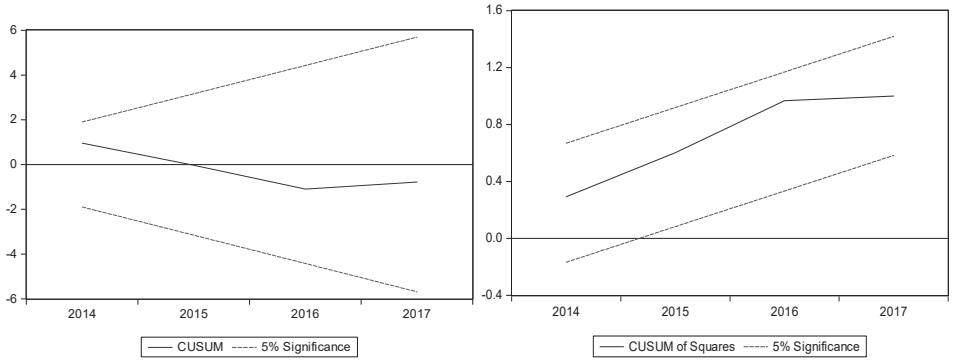


Figure 3: CUSUM and CUSUM of Square for Model 2



4.5 Sensitivity Analysis

A robustness check is performed on the ARDL estimates reported in Table 6 using two different cointegration techniques. A fully modified ordinary least square (FMOLS) and a canonical cointegrating regression (CCR) were used to confirm the long-run result obtained in Table 6. FMOLS addresses the problem of serial correlation and endogeneity that may occur due to the existence of a cointegration relationship. On the other hand, CCR removes the second-order bias from the ordinary least square estimator. The results of these two cointegration techniques are reported in Table 7. The outcomes of the cointegration regressions are reliable in the case of the long-run estimates of model 2 in ARDL.

Table 7: Robustness Check (Dependent Variable: Economic growth)

	Fully Modified Least Squares (FMOLS)	Canonical Cointegrating Regression (CCR)
Variable	Coefficient (t-Stat.)	Coefficient (t-Stat.)
FIN	-3.789*** (-2.781)	-2.340* (-2.025)
REM	-0.533 (-0.278)	-0.665 (-0.323)
FIN*REM	1.837* (1.821)	9.003** (2.925)
GOV	0.543* (-2.040)	1.653*** (4.111)
INF	-4.378** (-2.342)	0.805 (0.286)
GEX	8.429 (0.372)	0.248*** (4.855)
GCF	0.158*** (5.138)	3.640*** (3.038)
POP	0.982*** (6.936)	3.491* (1.771)
C	-1.235 (-1.687)	5.167*** (4.695)

****, **, * represent 1%, 5% and 10%, respectively*

4.6 Granger Causality Result

The fact that the variables are cointegrated shows that causality exists in at least one direction. Table 8 displays the results for both the short- and long-run Granger causality based on VECM. The F-test of the lagged independent variables yields the short-run causal effects, whereas the significance of the error correction term based on t-statistics yields the long-run causal effect. Starting with the short-run results, in the economic growth equation, financial development and remittances are insignificant. This suggests that financial development and remittance do not Granger cause economic growth in the short run. In the financial development equation, GDP is significant at 5% while remittance is significant at 1%. This indicates that GDP and remittances have a causal effect on

financial development in the short run. In the remittance's equation, GDP is not significant, which suggests that causality does not run from GDP to remittances. However, financial development is significant at 10% which shows a one-way relation from financial development to remittances. This is consistent with Motelle (2011) and Sibindi (2014), who found a unidirectional causality from financial development to remittances in Lesotho. It is also consistent with Bolarinwa and Akinbobola (2021), who established one-way directionality from financial development to remittances in South Africa and Egypt.

In the long run, two of the error correction terms have a negative sign while the remaining one has a positive sign. The speed of adjustment i.e. error correction term (ECT), with a coefficient of -0.005 and -0.013 in the growth and financial development equations suggests that the model returns to equilibrium after initial shocks, and takes about 0.5% and 1.3% annually, respectively, for the growth and financial models to return to equilibrium. However, the positively signed ECT in the case of the remittances model suggests an explosive convergence, and thus it cannot return to equilibrium. Furthermore, the long-run findings suggest that financial development and remittances Granger cause economic growth, suggesting that causality runs interactively through financial development and remittance to growth. In addition, economic growth and remittances Granger cause financial development in the long run. However, the positive significant coefficient of ECT_{t-1} in the remittance equation indicates that there is explosion and no causal relation from GDP and financial development to remittances.

The finding of a unidirectional causal relation from economic growth to financial development in the short run supports the demand-following hypothesis, while the long-run findings support the supply-leading hypothesis. Our finding also indicates bidirectional relations between financial development and remittance in the short run which is in line with Mbulawa, Chingoiro and Machera (2022) while there is no causal relationship between financial development and remittance in the long run.

Table 8: Granger Causality Results

F-test				
Dependent variable	Sources of Causation (independent variables)			
	Short run			Long run
	ΔGDP	ΔFIN	ΔREM	ECT_{t-1}
ΔGDP	-	1.002 (0.238)	0.495 (0.763)	-0.005** (0.048)
ΔFIN	2.625** (0.036)	-	5.279*** (0.002)	-0.013*** (0.008)
ΔREM	0.797 (0.552)	1.957* (0.058)	-	0.001** (0.038)

****, **, * represent 1%, 5% and 10%, respectively; ( ) is probability value*

5. CONCLUDING REMARKS

The main conclusion of this paper is that financial development moderates the nexus between remittances and growth in Nigeria. The interactive term of financial development and remittances has different influences on economic growth. Specifically, a substitution effect between financial development and remittances holds in the short run, while a complimentary effect holds in the long run. Some important policy implications can be drawn on the basis of the results of this study. First, the findings suggest a need for policy variations between the short- and long-run periods, since the roles that financial development and remittances play in relation to economic growth tend to differ. Policymakers, especially financial authorities, should take note of these differences. The substitutability between financial development and remittances in the short run suggests that policymakers should formulate policies that reinforce the efficiency of the financial sector. A well-developed and efficient financial sector will facilitate the transfer of remittances and thereby discourage the use of informal financial services. This will maximise the benefits of remittances for economic growth. Furthermore, in the long run, policymakers should pursue policies relating the financial development and remittances concurrently, since they complement each other to promote growth.

In addition, policymakers in the financial sector should review the cost of processing remittances and provide financial education to recipients of remittances, as the high cost of processing remittances and combined with a lack of financial education can promote the sending of remittances through informal channels. Also, policies that enable financial institutions to make pooled remittances available for short-run projects are needed. At the same time, the increase in remittance inflow implies that more people are migrating abroad to countries with better wage-earning opportunities, which has a negative impact on the domestic economy through brain drain and reduced government spending on welfare, among other negative effects. The government can break these cycles by creating a favourable investment environment and prioritising the welfare of the population. Remittances should be used in a judicious way. Spending remittances on imported goods and services might only enhance economic growth in the short run owing to a rise in aggregate demand and its multiplier effects. However, for the country to benefit from remittances in the long run, remittances should be channelled into new investments to boost the productive sectors. The provision of infrastructure, law and order, an investment-friendly environment, and security can boost such investments.

It is worth noting that this paper has contributed to the growth literature by unearthing the moderating role of financial development in the relationship between remittances and growth in Nigeria, which is the highest remittances-receiving country of sub-Saharan Africa. However, this study has some limitations. First, the study is limited to Nigeria and, second, some determinants of economic growth are excluded from the model due to the unavailability of the data or nature of the data set. Nevertheless, these deficiencies do not reduce the importance of the findings of the research. Future studies can complement this research by examining the nexus in a panel of developing countries and by including other determinants of economic growth.

APPENDIX A

Descriptive Statistics of the Raw Variables

	GDP	FIN	REM	GOV	INF	GEX	GCF	POP
Mean	1773.249	0.203	2.798	-0.094	20.195	3.874	31.769	2.581
Median	1552.949	0.193	1.835	4.000	12.716	2.086	30.156	2.594
Maximum	2550.470	0.291	8.312	7.000	72.836	9.448	54.951	2.681
Minimum	1325.824	0.153	0.005	-7.000	5.388	0.911	14.904	2.489
Std. Dev.	445.317	0.033	2.530	5.257	18.517	3.017	13.090	0.069
Skewness	0.561	0.729	0.515	-0.283	1.563	0.679	0.184	-0.044
Kurtosis	1.702	3.039	1.954	1.272	4.051	1.912	1.745	1.488
Jarque-Bera	3.922	2.834	2.874	4.409	4.498	4.039	2.279	3.058
Probability	0.141	0.242	0.238	0.110	0.111	0.133	0.320	0.217
Observations	32	32	32	32	32	32	32	32
GDP	1							
FD	0.722	1						
REM	0.743	0.723	1					
GOV	0.773	0.629	0.752	1				
INF	-0.399	-0.479	-0.347	-0.543	1			
GEX	0.635	0.428	0.611	0.682	-0.379	1		
GCF	-0.589	-0.713	-0.777	-0.585	0.382	-0.792	1	
POP	0.779	0.641	0.560	0.473	-0.346	0.795	-0.544	1

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*Suleyman Kasal**

ANALYSING THE ARMEY CURVE BASED ON THE FOURIER COINTEGRATION APPROACH FOR TURKEY

ABSTRACT: *One major theoretical and empirical issue that has dominated fiscal policy for many years concerns the optimal size of government. Armey (1995) believes that the relationship between government expenditure and economic growth is an inverted U-shape, arguing that there is an optimal point where government expenditures maximise economic growth. The primary objective of this study is to investigate the validity of the Armey curve for Turkey in the period 1998:Q1-2020:Q4 using the Fourier cointegration method. The study has found that the Armey curve is valid for Turkey. The evidence indicates that the optimal size of government in Turkey is equal to approximately 18.5% of GDP. This paper highlights that the notion that government expenditure increases economic growth should not be seen as the only policy option. A key policy priority should therefore be to design fiscal policies that take into account this non-linear relationship.*

KEY WORDS: *Armey curve, government expenditure, fiscal policy, Fourier cointegration method, Turkey.*

JEL CLASSIFICATION: H1, C32, E62

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1. INTRODUCTION

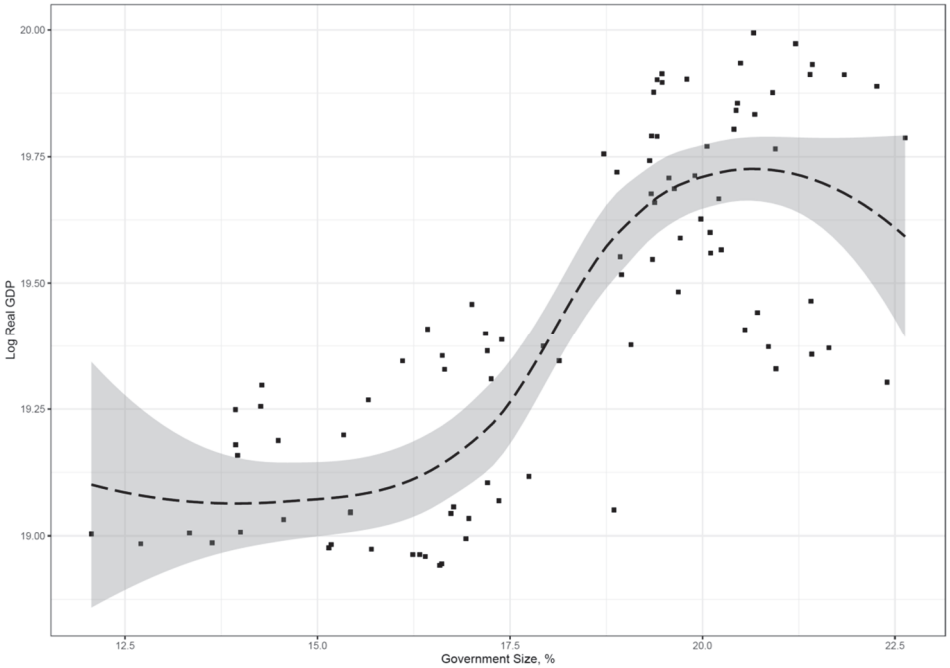
The question of the optimal size of government to maximise economic growth or GDP has a long history in economics. This issue is debated in terms of different economic approaches from year to year. One side argues that the optimal size of government is one that is as small as possible; the other side suggests that government intervention is essential for eliminating market failures and ensuring economic stability. The theory can be generally classified into two main approaches: 1) the nexus between the size of government and economic growth has a linear or monotonic structure, 2) there is no relationship between the two variables.

The Keynesian view argues that increasing demand through government spending is one of the most essential tools in recessionary times. However, Armey (1995) points out that government spending increases economic growth at first, but it has diminishing effects on economic growth beyond a threshold level. In the literature, the Armey Curve[1] is defined as an inverted U-shape. The relation between government size[2] and economic growth or real GDP is non-linear. Hence, there may be an optimal point where the size of government maximises economic growth or real GDP. The non-linearities may be essential to capture the relationship between the two variables.

[1] There are also studies in the literature expressing the Armey Curve as the "BARS Curve" (Barro-Armey-Rahn-Scully) due to the studies performed by Barro (1989), Rahn and Fox (1996), Scully (1996), Facchini and Melki (2013), Forte and Magazzino (2010)).

[2] In the literature, the size of government is represented by government expenditures or the share of government expenditures in GDP.

Figure 1: Government Size and GDP in Turkey, 1998: Q1-2020: Q4



Note: The dashed line represents a locally-weighted polynomial regression estimated as in Cleveland (1979). The grey line represents the confidence band at the 5% significance level. In this graph, government expenditures (excluding interest payments) represent the government size. The seasonality is removed from the variables.
Source: Data retrieved from the Central Bank of the Republic of Turkey (henceforth CBRT).

Figure 1 shows the relationship between government size and GDP for Turkey. There may be a non-linear relationship between the two variables. There is a rising trend in the relationship between government expenditures and GDP up to a certain level. Then, the positive relationship diminishes and turns negative beyond a certain point. What is striking in Figure 1 is the decrease in GDP beyond a specific government size. Figure 1 also reveals that high levels of government expenditure may give rise to low GDP. Therefore, this paper aims to estimate the optimal point at which the size of government maximises economic growth in Turkey. The empirical results obtained from our analysis can be useful in understanding what levels of government spending will boost economic growth. Unlike existing studies, we employ the recently developed Fourier cointegration approach. As far as is known, this is the first study to estimate the optimal size of

government with the methodology based on the Fourier cointegration approach. The structure of the paper is as follows: Sections 2 and 3 describe the theoretical background and the literature, respectively. Sections 4 presents the data and methodology. Section 5 provides the estimation results. Finally, the conclusion gives a brief summary and policy implications.

2. THE OPTIMAL SIZE OF GOVERNMENT: THEORETICAL BACKGROUND

The relationship between the optimal size of government and economic growth has been discussed both theoretically and empirically. This discussion began with the question; 'What is the role of government in the economy?' Research into the relationship has a long history. In his major work, Thomas Hobbes explained that life would be "nasty, brutish, and short-lived" without government and claimed that law and order provided by the government is a crucial factor of civilised life (cited in Gwartney et al., 1998, p. 3).

Economists have been arguing about the most suitable role and size of the government since the time of classical economics and laissez-faire in the 1800s (Tanzi & Schuknecht, 1998, p. 69). Classical economics suggests that the government should fulfill obligations such as security, justice, and diplomacy and should not intervene in the economy because the economy has an invisible hand. This therefore implies that the government must have a minimal role in the economy. This phenomenon was investigated for many years after the Great Depression. However, economists and academics believed that the invisible hand operated only until the 1930s.

In contrast to classical economics, Keynes sees many reasons for the government to intervene in the economy, for example recessions. In his famous critique of classical economics, Keynes offers an explanatory theory for government intervention, which gained momentum during the Keynesian revolution, especially through government expenditures. The level of government expenditures increased dramatically until the end of the 1960s. However, soon the increasing expenditures were strongly questioned due to deficits, inflation, and declining economic growth. Despite this, especially since the 2008 crisis, the debate on the role of government in ensuring economic growth and development in the economy has become prominent. The IMF (2015) claims that fiscal policy is an effective tool to support growth and employment, investment, and

productivity. These ideas provide important insights into the relation between the size of government and economic growth.

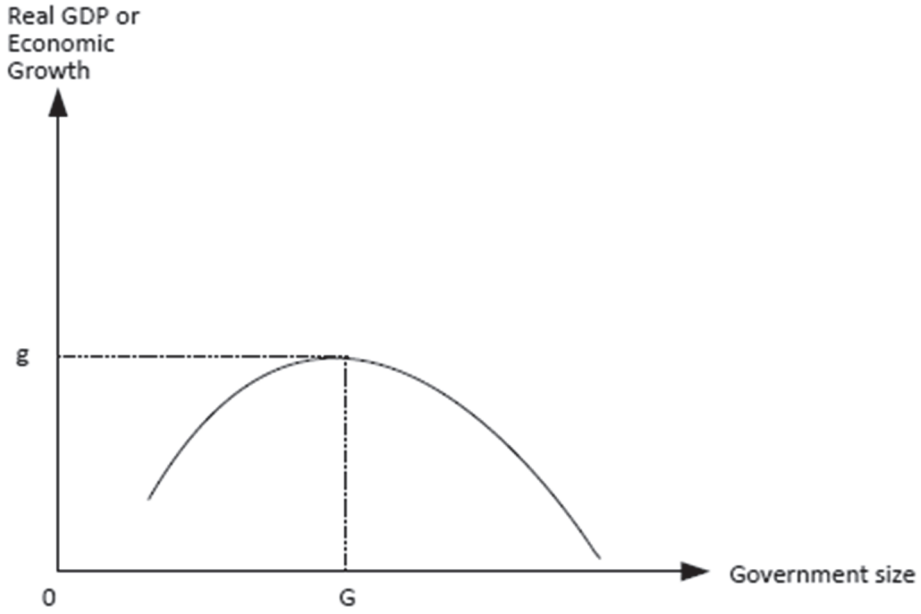
The relation between the size of government and economic growth has been studied using linear methods by many researchers. In Barro's (1990) famous study, which specifies endogenous growth models, the public policy model is used to describe how the size of the government affects economic growth (Durucan, 2022, p. 156). Several studies have found that if the size of a government (through government expenditures) increases, economic growth will increase, or vice versa. For instance, while neoclassical growth models suggest that the government has an impact on economic growth in the short term, the new endogenous growth models suggest that the government can directly or indirectly affect growth not only in the short term but also in the long term, e.g. by way of efficiency in resource use, the rate of factor build-up, and the pace of technological advance (El Husseiny, 2019, p. 273).

There is no consensus among authors as to whether the relationship between the two variables is positive or negative. The central question on this relationship is: What is the optimal government size (or government expenditure) that maximises economic growth? Armey (1995) investigated the differential impact of the size of government on economic growth. According to Armey, large government size would be ineffective in investing and promoting production for citizens; thus, economic growth would suffer as the fiscal pressure would be huge (Forte and Magazzino, 2010, p. 4). Dar and AmirKhalkhali (2002) argue that smaller size of government would potentially be more effective in providing legal, administrative, and governance infrastructure and eliminating market failures than larger size of government. According to Friedman, the average contribution of the government to national income is positive, but this contribution would become negative if the size of the government exceeds 15% of GDP (Mavrov, 2007, p. 56). Tanzi and Schuknecht (1998) argue that there may be a threshold level for the size of the government at approximately 30% of GDP. Moreover, the authors also note that this threshold level could differ from country to country and vary with the level of government efficiency and citizen's preferences. Gwartney et al. (1998) list three reasons for the negative effect of the larger size of government on economic growth: i) the externality on investment, ii) the

diminishing returns of government activities, iii) intervening in the wealth creation process.

The relationship between economic growth and government size mentioned below is depicted in Figure 2. This curve is known as the Armey curve. There is, however, an important point to make regarding this. In the original Armey curve, it is the general welfare of society that is on the vertical axis, while the growth of government is on the horizontal axis. Later, Vedder and Gallaway (1998) associated the general welfare of society with economic growth. Figure 2 depicts the current Armey curve with economic growth (Yuksel, 2019, p. 140).

Figure 2: Armey Curve



The Armey Curve, which resembles the Laffer curve, shows that when the size of government is lower (higher) than G, economic growth is positive (negative). A positive relationship is created by the government expenditures that enhance economic growth. Furthermore, according to welfare economics, market failures arising from public goods, information asymmetries, externalities, and monopolies are eliminated through government intervention, leading to more

efficient use of resources. (Pitlik & Schratzenstaller, 2011, p. 3). Nevertheless, when the size of government exceeds G, things begin to change. According to the Armey curve, which is based upon the law of diminishing returns, the additional expenditure is expected to decrease economic growth. In addition, within the framework of the Barro rule, it is evident that government expenditure is optimal at the point where the marginal efficiency is equal to 1 (Karras, 1997, p. 280). Therefore, the size of government at G is the optimal point for maximising economic growth (g). Figure 2 suggests there is a possible non-linear relationship between the two variables. Another important point, as shown in Figure 2, is that the size of government cannot be zero. As Vedder and Gallaway (1998) mention, where governments do not exist, there is anarchy and little wealth accumulated by economic activity.

3. LITERATURE

A considerable amount of literature has been published on the optimal size of government. Grossman (1987) estimated that the optimal point in the USA between 1929 and 1982 was $263 million, with this maximising private-sector output. Grossman also indicated that the level of US government expenditures in 1983 was well above the current level of US government expenditures. Scully (1994) investigated the optimal size of government for the USA with a different approach, obtaining a result between 21.5% and 22.9% of GDP. Scully (1996) analysed the optimal size of government for New Zealand between 1946 and 1994 and reported that it was 19.7% of GDP. Scully (1996) used the tax rate instead of government expenditures in the model, which is called the Scully approach in the literature. Karras (1996) estimated the optimal size of government for 118 countries, including Turkey, for the period 1960-1985 obtaining a figure of 23% of GDP for these countries.

Similarly, Karras (1997) measured the same for 20 European countries between 1950 and 1990, obtaining a value for the optimal size of government of 16% (±3) of GDP. Vedder and Gallaway (1998) found that the optimal size of government in the USA was 17.45% of GDP for the period 1947-1997. In their analyses, Vedder and Gallaway also investigated whether the Armey curve was valid for different government expenditures and concluded that this was not the case for health and military expenditures. Furthermore, Vedder and Gallaway concluded that the Armey curve was valid in Canada, Denmark, Italy, Sweden, and the UK,

and found that the optimal size of government in these countries was 21.3%, 26.1%, 22.2%, 19.4%, and 20.9% of GDP, respectively. Using threshold regression analysis, Chen and Lee (2005) estimated a value of 15.2% of GDP for the optimal size of government for Taiwan between 1979:Q1 and 2003:Q3 . Mavrov (2007) examined whether the Armey curve was valid in Bulgaria based on the period from 1990 to 2004 and found that the optimal size of government was 21.42% of GDP with the no intercept model and 28% of GDP with the intercept model. Chobanov and Mladenova (2009) found that the optimal size of government was 25% of GDP for OECD countries between 1970 and 2007. Forte and Magazzino (2010) measured the optimal size of government for EU countries from 1970 to 2009 with a result of 37% of GDP. Sa (2011) investigated the effects of the size of government on economic growth for 32 advanced and 51 developing countries between 1996 and 2006. Sa demonstrated that the greater the size of government, the more harmful it is for economic growth in the two groups of countries. Herath (2012) investigated whether the Armey curve was valid in Sri Lanka using the period from 1959 to 2009 as a basis and concluded that the optimal size of government was 27% of GDP. Facchini and Melki (2013) estimated that economic growth would be maximised for France when the optimal size of government was 30% of GDP. Nichitean et al. (2015), testing the validity of the Armey curve in Bulgaria, Croatia, Hungary, Romania, and Slovenia for the period 1992-2007, found that the optimal size of government for these countries was 28.12%, 33.96%, 33.58%, 29.46%, and 32.92% of GDP, respectively. Performing an analysis for Australia, Makin et al. (2019) concluded that the optimal size of government there was 31% of GDP. Mroczek et al. (2019) determined intervals of variables describing sizes of the government sector for EU countries. The authors found specific intervals of optimal values of these variables, i.e. the values of the variables that have a positive impact on the economy. Aydin and Esen (2019) investigated the validity of the Armey curve for 26 transition economies between 1993 and 2016 using the panel threshold analysis method. They concluded that government expenditures negatively affect economic growth above a certain threshold level. Jain et al. (2021) examined the validity of the Armey curve for selected emerging countries in the period between 2007 and 2016, basing the analysis on different types of government expenditures. They reached the conclusion that the optimal levels of government were 7.11%, 12.92%, and 24.31% for investment, consumption, and total government expenditures, respectively.

However, there has been little discussion about the optimal size of government for Turkey so far. Altunc and Aydin (2013) investigated the validity of the Armey curve in Turkey, Romania, and Bulgaria for the period between 1995 and 2011, estimating values of 25.2%, 20.4%, and 22.4% of GDP, respectively, for the optimal size of these three governments. Turan (2014) analysed the optimal size of government for Turkey using two different specifications for the periods 1950-2012, 1970-2012, and 1980-2012 and concluded that it was 9.1%, 17%, and 14.4% of GDP, respectively, for these periods. Iyidogan and Turan (2017) investigated the optimal size of government expenditures based on different types of government expenditures and obtained a non-linear relationship. The authors found an optimal rate of 3.9% of GDP for investment expenditures, 12.6% of GDP for consumption expenditures, and 16.9% of GDP for total government expenditures. Pamuk and Dundar (2016) used the Scully approach and found that the optimal size of government for Turkey was 23.5% of GDP in the period 1950-2006. Yuksel (2019) demonstrated the validity of the Armey curve for Turkey between 1981 and 2018, finding that the optimal size of government was 16% of GDP for this period. Durucan (2022) tested the validity of the BARS curve for Turkey in the period 1974-2016. The author concluded that an inverted U-shape is valid in Turkey for the relationship between government size and economic growth. Clearly, these studies altogether indicate that there may indeed be an optimal size of government for Turkey.

4. DATA, MODEL, AND METHODOLOGY

4.1. Data and Model

In this study, data on central government expenditures (excluding interest payments), GDP, and the openness of the economy were gathered from the CBRT. The data on the inflation rate were obtained from International Monetary Fund-International Financial Statistics database (IMF-IFS) for the period 1998:Q1-2020:Q4. To avoid simultaneity bias, we followed the study of Fatas and Mihov (2003). The authors argued that to reduce the simultaneity bias, they focused only on government expenditures as opposed to the budget deficit variable. Hence, we used the government expenditure variable to avoid simultaneity bias. The variables are seasonally adjusted using the TRAMO/SEATS except for the inflation rate. The variables; $govsize$, $govsize^2$ lng, $openness$ and inf represent the government expenditures (percentage of

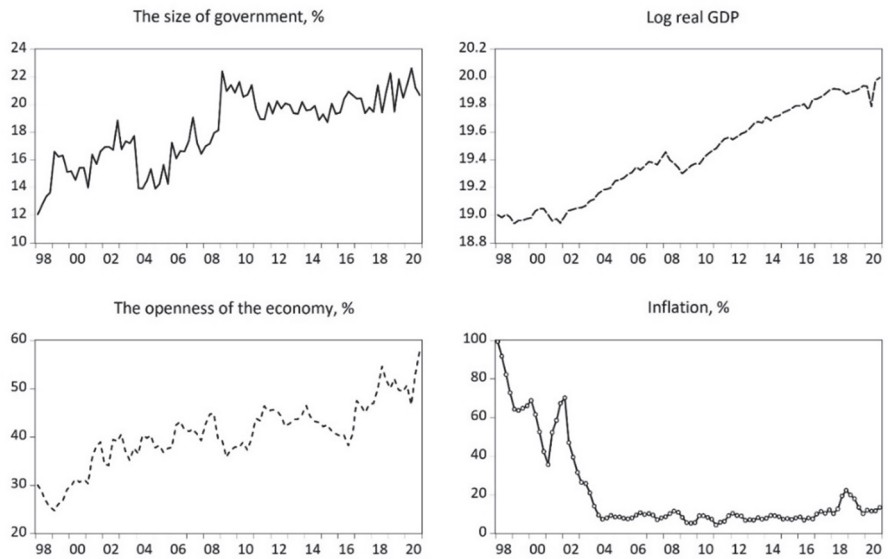
GDP), the square of government expenditures, the logarithm of real GDP, openness of the economy measured by the sum of exports and imports, and the inflation rate as the percentage change of the consumer price index, respectively. Table 1 shows descriptive statistics used in the analysis.

Table 1: Descriptive Statistics

	govsize	*lng*	*openness*	*inf*
Mean	18.20445	19.43595	40.47136	21.42946
Median	18.94003	19.39364	40.56429	10.02094
Max.	22.63173	19.99417	57.71935	99.27364
Min.	12.06366	18.94191	24.68503	4.344287
Std. Dev.	2.558149	0.329918	6.723526	23.12434
Skewness	-0.407827	0.040902	-0.206181	1.703355
Kurtosis	2.183543	1.681281	3.109543	4.675292
Jargue-Bera	5.105588	6.691894	0.697825	55.24704

Figure 3 presents a graph of variables between 1998:Q1 and 2020:Q4 for Turkey and illustrates some of the main characteristics of the variables. As can be seen, there is a clear increasing trend for *govsize* and *lng*.

Figure 3: Evolution of the variables



We consider the following model in the empirical application. The basic form of the quadratic equation is below:

$$lng = c_0 + \beta_1 govsize + \beta_2 (govsize)^2 \quad (1)$$

where lng is the logarithm of GDP, $govsize$ indicates the government size, which is measured by government expenditures as a percentage of GDP, and $govsize^2$ is the squared government expenditure (percentage of GDP). In equation (1), $\beta_1 > 0$; $\beta_2 < 0$. β_1 and β_2 coefficients represent the linear and non-linear effects of $govsize$ on lng. To estimate the optimal size of government, the first derivative is taken and set equal to zero (El Husseiny, 2019):

$$\frac{d(lng)}{d(govsize)} = \beta_1 + 2\beta_2 govsize = 0 \quad (2)$$

After that, we can find the optimal point for the size of government as follows:

$$govsize = \frac{-\beta_1}{2\beta_2} \quad (3)$$

Furthermore, the second derivative of equation (1) with respect to $govsize$ must be negative. The extended model to be estimated on the basis of equation (1) can be represented as follows:

$$lng_t = \beta_1 govsize_t + \beta_2 (govsize_t)^2 + \beta_3 openness_t + \beta_4 inf_t + \varepsilon_t \quad (4)$$

where ε_t is the error term with white noise. The coefficients estimated from equation (4) will be substituted in equation (3) to obtain the optimal size of government.

4.2. Methodology

For our analysis, we implemented a cointegration[3] test with Fourier functions as proposed by Tsong et al. (2016). This method has several attractive features. The

[3] Cointegration tests have been developed with the possibility of determining the existence of a relationship between linear combinations of variables. Differencing all nonstationary variables will imply a severe loss of information, invalid inferences, and non-optimal predictive performance (Guidolin and Pedio, 2018, p. 133).

Fourier term in the model enables us to approximate possible structural breaks in the deterministic components under the null and alternative hypotheses, as indicated by Tsong et al. (2016). A rejection of the null hypothesis of cointegration with breaks means no long-run equilibrium relation among the variables (Tsong et al., 2016, p. 1089). First, the following cointegration regression model is used by Tsong et al. (2016):

$$y_t = d_t + x_t'\beta + \varepsilon_t \tag{5}$$

where $\varepsilon_t = \gamma_t + v_{1t}$, $\gamma_t = \gamma_{t-1} + u_t$ with $\gamma_0 = 0$, and $x_t = x_{t-1} + v_{2t}$. u_t is an i.i.d process with zero mean and variance $\tilde{\sigma}^2$. y_t and x_t are I(1) processes. d_t is assumed to be $d_t = \sum_{i=0}^{m} \delta_i t^i + f_t$ with $m = 0$ or $m = 1$, and

$$f_t = \alpha_k \sin\left(\frac{2k\pi t}{T}\right) + \beta_k \cos\left(\frac{2k\pi t}{T}\right) \tag{6}$$

In this test, the null hypothesis of cointegration against alternative hypothesis of non-cointegration is represented as:

$$H_0: \sigma_u^2 = 0$$
$$H_1: \sigma_u^2 > 0 \tag{7}$$

Under the null hypothesis, and based on Tsong et al. (2016), the cointegration model is written as follows:

$$y_t = d_t = \sum_{i=0}^{m} \delta_i t^i + \alpha_k \sin\left(\frac{2k\pi t}{T}\right) + \beta_k \cos\left(\frac{2k\pi t}{T}\right) + x_t'\beta + v_{1t} \tag{8}$$

$\boldsymbol{CI_f^{m*}}$ is the KPSS-type cointegration statistic to test the null of cointegration with structural breaks and is as follows:

$$CI_f^{m*} = T^{-2}\hat{\omega}_1^{-2} \sum_{t=1}^{T} S_t^2 \tag{9}$$

where $S_t = \sum_{t=1}^{T} \hat{v}_{1t}$ is the partial sum of the ordinary least squares residuals from the equation with Fourier component. $\hat{\omega}_1^2$ indicates the consistent estimator of the long-term variance of v_{1t} (Gorus et al., 2019, p. 334).

5. ESTIMATION RESULTS

First, the Ng-Perron (2001) unit root test is chosen to determine the integration degree of the variables because it has high power gains and exact size performance. This test has been used extensively in the literature (Tsong et al., 2016, p. 1103). Furthermore, we choose the optimal lag using the Akaike Information Criterion (AIC) for these tests. The testing equation has an intercept and a time trend. The results are reported in Table 2.

As shown in Table 2, the null hypothesis of a unit root for the $govsize$, $govsize^2$, lng, $openness$, and inf variables cannot be rejected at the 5% significance level. Therefore, we conclude that the Ng-Perron unit root test indicates a unit root at the 5% significance level for these variables.

Table 2: The results of the $Ng - Perron$ Unit Root Test

Variables	$Ng - Perron$
$govsize$	11.082 (1)
$govsize^2$	-13.130 (1)
lng	-11.586 (0)
$openness$	-17.0489 (0)
inf	-2.82322 (9)

Notes: *The 5% critical value for the $Ng - Perron$ ($MZ_a - GLS$) unit root test is -17.30. The AIC is used to choose for lag order with the maximum lag set at 11. (…) indicates lag length.*

Since these variables have a unit root, we can turn to the cointegration test results. As shown in Table 3, according to Tsong et al.'s (2016) test (CI_f^{m*}), the null hypothesis of cointegration cannot be rejected at the 5% significance level. Table 3 reveals that there is a long-run equilibrium relationship between the variables. What is striking in Table 3 is the necessity for the Fourier component to model the deterministic term. As the calculated *F*-test is larger than the critical values, we reject the null hypothesis of no structural breaks.

Table 3: Cointegration Test Results

$\widehat{k}$	CI_f^{m*}	***F*-test**
2	0.024	30.140*

Notes: *$\widehat{k}$ indicates frequency number. CI_f^{m*} represents calculated values proposed by the Tsong et al. (2016) test. AIC chooses the optimal lags. The 5% critical value for CI_f^{m*} is 0.055. 4.019 is the critical value for the F-test at the 5% significance level. The critical values are retrieved from Tsong et al. (2016) p. 1091. * indicates the 5% significance level.*

Finally, we estimate bootstrapped long-run coefficients with dynamic ordinary least squares (DOLS). Table 4 column 2 shows the long-run coefficient estimations. Column 3 presents the bootstrapped 95% confidence intervals for the long-run coefficient estimations[4] calculated on the basis of 5000 replications using the percentile method.[5]

Table 4: Long-run coefficient estimations

	Coefficients	***(2.5%, 97.5%)***
$\boldsymbol{\beta_1}$	1.9447*** [0.1149]	(1.718, 2.175)
$\boldsymbol{\beta_2}$	-0.0526*** [0.003]	(-0.059, -0.044)
$\boldsymbol{\beta_3}$	0.0418*** [0.024]	(-0.0128, 0.0891)
$\boldsymbol{\beta_4}$	0.006** [0.001]	(-0.006, 0.0214)
$-\beta_1/2\beta_2$	~18.5%	-

Notes: *The lead is 4 and the lag is 4 based on AIC criterion. [..] represents bootstrap standard errors. (…, …) shows 95% bootstrap confidence intervals calculated on the basis of 5000 bootstrap replications. ***, **, * indicate 1%, 5%, and 10% significance levels, respectively.*

The coefficients are as expected and statistically significant, as shown in Table 4. We conclude that the Armey curve is valid in Turkey, as Table 4 indicates. Based on these estimations, we find that the optimal size of government in Turkey was

[4] The density curves of the bootstrap distribution with 95% bootstrap confidence intervals can be found in the appendix.

[5] For more information, see Davison and Hinkley (1997) p. 202.

approximately 18.5% of GDP[6,7]. This rate varied between 12% and 22.6% of GDP in the 1998-2020 period, with an average size of government equal to 18% of GDP. In 2020:Q4, the size of government was approximately 20% of GDP.

There are similarities between our results and previous studies. The estimation results are consistent with those of Pamuk and Dundar (2016). However, the findings of the current study are higher than Turan (2014), Iyidogan and Turan (2017), and Yuksel (2019), but lower than those of Altunc and Aydin (2013) and Durucan (2022). These differences can be explained partially by the government sector (general or central), the sample range, and different models. For instance, Durucan (2022) found a different optimal level for Turkey as a result of a different methodology and sample. Furthermore, we considered non-interest government expenditure rather than total government expenditure in our study. Because interest expenditure is not directly controlled by the government. However, these results are useful for thinking about policy implications. This combination of findings supports the direction of the relationship between the size of government and economic growth. To put it succinctly, increasing the size of government above the optimal point may have adverse effects on economic growth in Turkey.

Some of the issues emerging from these findings relate to specific policy directions. Therefore, it is necessary to revise current fiscal policy, especially raising government expenditure to increase economic growth. Policy makers need to abandon government expenditure-increasing policies. As Fatas and Mihov (2003) emphasised, restricting fiscal policy discretion can be important in boosting economic growth. Moreover, these findings imply that we should focus on providing government expenditure efficiency, strengthening the policy implications, and stimulating consumption and investment to increase economic growth instead of increasing the size of government in the economy.

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6 The optimal size of government can be calculated by substituting the estimated coefficients β_1 and β_2 in equation (3).

7 Additionally, we added the trigonometric terms to the DOLS equation. We concluded that the results did not change. These results are available upon request.

6. CONCLUSIONS

This paper set out to determine whether the Armey curve is valid for Turkey. First, we explained what the Armey curve is. Second, the optimal size of government in Turkey was estimated on the basis of a Fourier cointegration approach. This is the first study to estimate the optimal size of government based on this approach. The results of this study show that the Armey curve is indeed valid in Turkey and that the optimal size of government was 18.5% of GDP for Turkey in the period in question. They also indicate that increasing the size of government above the optimal size of government may have detrimental effects on economic growth (negative correlation).

These findings may help us to understand policy directions. Due to expansionary fiscal policies in Turkey, high government expenditure levels increase the budget deficits. Increasing budget deficits and debt ratios trigger economic crisis. Therefore, fiscal policies that provide fiscal discipline should be implemented in Turkey. In this framework, governments observe efficiency and productivity in government expenditures. In particular, it is critical to prevent the allocation of government resources to inefficient areas but rather to allocate resources to productive areas (such as investment). Therefore, establishing an effective government expenditure structure will have positive effects on the budget in the long run. This situation has positive effects, especially on economic growth. The stabilisation policies implemented after crisis periods in the past brought the level of government expenditures closer to the optimal level. Therefore, the Armey curve can be used as a policy tool and for policy design to determine the optimal government size for Turkey.

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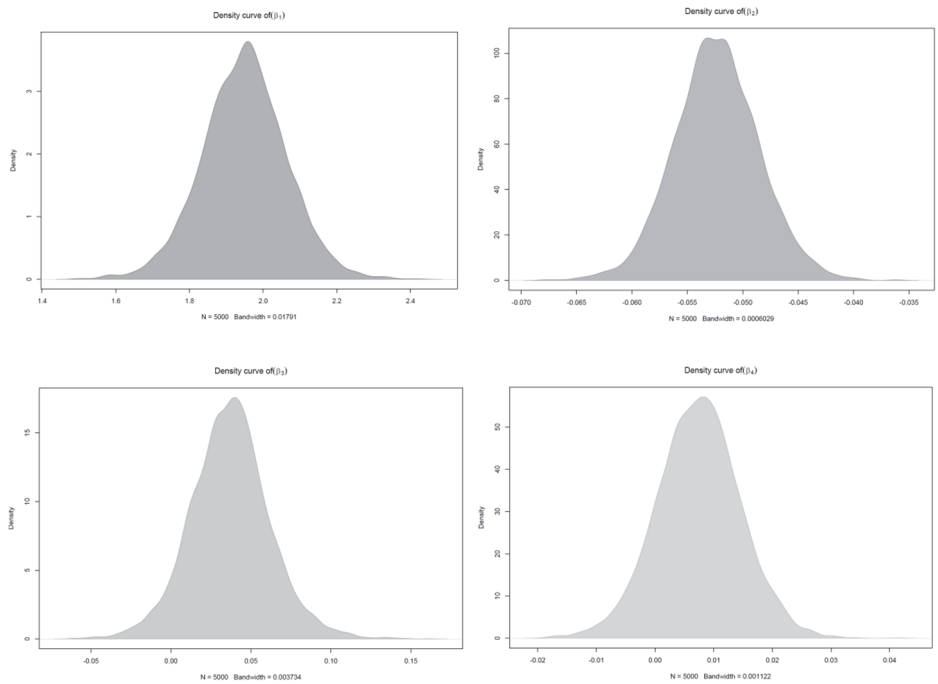
APPENDIX

Table Appendix-1. All Data

Variables	Definition	Source-Codes
The size of government (*govsize*)	The central government expenditures (excluding interest payments) as a percentage of GDP	CBRT-EDDS (TP.GSYIH26.HY.ZH)
Log Real GDP (*lng*)	Logarithmic GDP in chain linked volume by expenditure approach	CBRT-EDDS (TP.GSYIH26.HY.ZH)
The openness of the economy (*openness*)	The sum of the imports and exports divided by current GDP	CBRT EDDS (TP.ODANA6.Q02 and TP.ODANA6.Q03)
Inflation (*inf*)	Prices, consumer price index, all items, percentage change, corresponding period previous year, percent	IMF-IFS

Figure A.1. Density curve of bootstrap distribution



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As a rule, submitted articles should not exceed 8,000 words. All pages apart from the first one should be numbered. Subtitles should be concise, clearly marked in bold, and numbered (up to two levels of numbering). No other entries should be bolded. Formulae should be numbered on the right-hand side of the page. In case of long proofs, these should be inserted in a separate Appendix, following the References. Tables and Figures must not use colour, and should be in a format easy to edit, for instance they should take half a page (or a full page) within the indicated margins. They should be clearly labelled at the top, with a legend at the bottom, and should be logically ordered, using Arabic numerals. Sources of the data should be given below tables and figures.

Papers should follow APA style guidelines: https://apastyle.apa.org/style-grammar-guidelines/references/examples#textual-works. Some key points watch out for are as follows. Parenthetic references in the text and in footnotes should be listed by the author surname, with the year of publication in parentheses; in case of more than one author use an ampersand, for instance: (Atkinson, Picketty & Emmanuel, 2011). Narrative citations within the text should use "and" rather than ampersand, for instance: Djankov, Glaeser and La Porta (2003). Use an ampersand in the list of references. When citing works with one or two authors, include the author name(s) in every citation. For works with three or more authors, include the name of only the first author plus "et al." in every citation (even the first citation). Include all author names in the list of references. If the author is unknown, the first few words of the reference should be used; this is usually the title of the source. For example: (*A guide for economy*, 2019). Multiple works by the same author are sorted by date in ascending order; if the works are in the same year they should be ordered alphabetically by title and allocated a letter (a, b, c,…) after the date. Only reference the works that you have cited in your text. Within the text, avoid long strings of citations; cite only those works which are relevant to the text that they inform. Before submitting your paper, check that all references cited in the paper are included in the reference list at the end of the paper, and that all papers included in the reference list have been cited in the text.

References should be left aligned in alphabetical order in the reference list, according to the following formats:

• Article in journals

Author surname(s), initial(s). (Year). Article title. Journal, Volume number (issue or part number, optional), page numbers. DOI.

Rodrik, R., Subramanian, D., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of Economic Growth*, 9(2), 131-165.

https://DOI: 10.1023/B:JOEG.0000031425.72248.85.

• Books

Author surname, initial(s). (Year). *Title*. Publisher location: Publisher

De Grauwe, P. (2020) *Economics of Monetary Union* (13th ed.). Oxford: Oxford University Press.

• Edited Book

Author surname, initial(s). (Ed(s).). (Year). *Title*. Publisher location: Publisher

Baltagi, B.H. (Ed.). (2003). *A Companion to Theoretical Econometrics*. Oxford: Blackwell

• Book with several authors

When there are multiple authors, list them all, with the addition of ampersand (&) before the last surname. If there are more than seven authors, list the first six, then write three full stops (…), and at the end write the last author.

Acemoglu, D., & Robinson, J.A. (2006). *Economic Origins of Dictatorship and Democracy*. Cambridge: Cambridge University Press.

Baumol, W. J., Panzar, J. C., & Willig, R.W. (1982). *Contestable Markets and the Theory of Industry Structure*. New York: Harcourt, Brace, Jovanovich, Inc.

• Chapter in Book

Last name of the chapter author, initial(s). (Year). Chapter title. In editor initial(s), surname (Ed.). *Title* (ed., pp.). Publisher location: Publisher

McMillan J., & Woodruff C. (2003) The central role of entrepreneurs in transition economies. In G. S. Fields, & G. Pfefferman (Eds.). *Pathways Out of Poverty* (pp. 105-121). Dordrecht: Springer. https://doi.org/10.1007/978-94-010-0009-3_6.

• E-Book

Author surname, initial(s). (Year). *Title*. URL

Perry, R.B. (1909). *The Moral Economy*.

https://manybooks.net/book/137844/read#epubcfi(/6/2[id00000]!/4/2[id00000]/1:0)

• Technical Reports or Working Papers

Individual authors

Author surname, initial(s) or corporate name. (Year). *Title*. (Report or Working Paper No.). URL.

Cătuți, M., Kustova, I. and Egenhofer, C. (2020) *Delivering the European Green Deal for Southeast Europe: Do we need a regional approach?* (CEPS Research Report No.2020/1). https://www.ceps.eu/wp-content/uploads/2020/06/RR_2020-01_European-Green-Deal-for-South-Eastern-Europe.pdf.

Corporate authors

American Psychological Association, Task Force on the Interface Between Psychology and Global Climate Change. (2009). *Report of the APA Task Force on the Interface Between Psychology and Global Climate Change*.

http://www.apa.org/science/about/publications/climate-change.aspx

• Newspaper Articles

Author surname, initial(s). (Year, Month Day). Title. *Title of Newspaper*, p. or pp. URL*

*only include if the article is online.

Note: the date includes the year, month and date.

Smialek, J. (2020, May 2). Hotel Group Will Return Tens of Millions in Small Business Loans. *The New York Times*, pp. 10.

https://www.nytimes.com/2020/05/02/business/economy/ashford-hotels-virus-monty-bennett.html

• Website

Author surname, initial(s). (Year, month day). *Title*. URL

Mitchell, J.A. (2017, May 21). *How and when to reference*.

https://www.howandwhentoreference.com