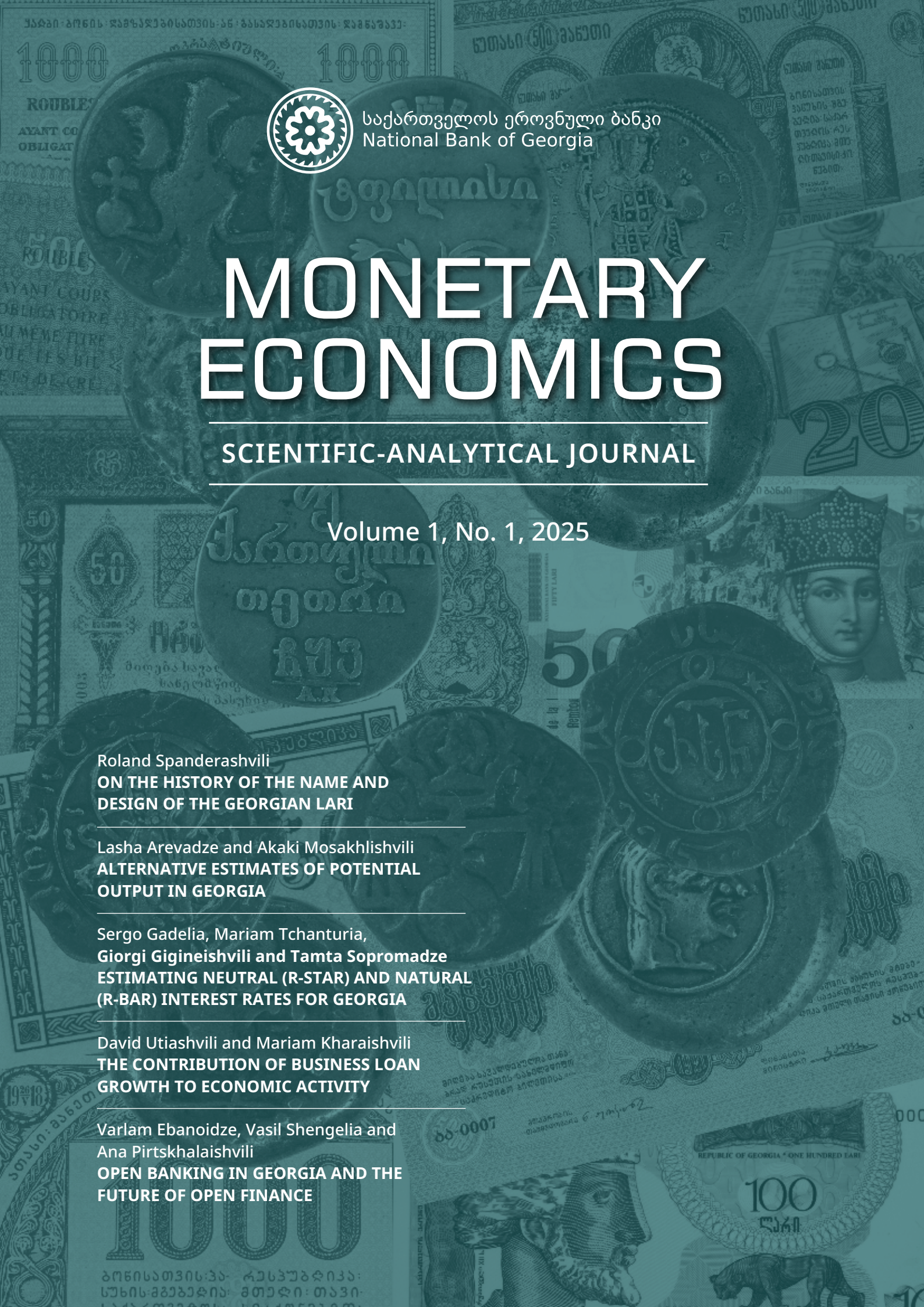

საქართველოს ეროვნული ბანკი
National Bank of Georgia

# MONETARY ECONOMICS

## SCIENTIFIC-ANALYTICAL JOURNAL

Volume 1, No. 1, 2025

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# FOREWORD

In 2025, we mark the 30th anniversary of the introduction of our national currency – the Georgian lari. For each of us, the lari is a symbol of freedom, unity, and national identity. It continues the dignified history of Georgian money that extends over 26 centuries, beginning with the Colchian Tetri and stands as clear evidence of Georgia's ancient civilization and rich economic past. At this historic moment, it is especially important for us to understand where we stand today and how we should move forward in a rapidly changing global economic landscape.

Today, the global economy is undergoing a large-scale transformation. Trade wars, inflationary expectations, geopolitical tensions, and the economic consequences of demographic changes are all significantly affecting international trade and finance, leading to the disruption of traditional supply chains and the reorientation of goods and capital flows. This has become particularly evident in the wake of regional geopolitical conflicts, which have led to the redirection of a significant portion of global cargo to the Middle Corridor – one of the key transportation routes connecting Europe and Asia. Recently, increasing financial flows have also started to move in this direction. Georgia, as a country with an open economy, naturally cannot remain on the sidelines of these processes – especially since it is one of the main participants in the Middle Corridor, alongside Azerbaijan and Kazakhstan.

Fully realizing the potential of the Middle Corridor greatly depends on the development of financial infrastructure along the route, which entails providing diverse and innovative financial services to accompany the large financial flows. Although Georgian banks and non-bank financial institutions are distinguished for their resilience, modern operational structures, and quality of corporate governance, we are well aware that we cannot tackle the ambitious goal of becoming a regional financial hub alone.

Close cooperation with neighboring countries and partners along the Middle Corridor is essential. This fact is underscored by the recent visits of a team from the National Bank of Georgia to countries in the region.

On the other hand, as a candidate state for EU membership, we continue to work toward deeper integration into the European and broader Western financial space. In this regard, Georgia's aspiration to join the Single Euro Payments Area (SEPA) deserves special mention. The National Bank of Georgia has already initiated the harmonization of our legislation with EU directives and regulations – an essential prerequisite for SEPA membership. SEPA membership will enhance trust in Georgia's financial sector, facilitate trade relations with the EU, and allow Georgian citizens to access simplified and lower-cost banking services. This is particularly important in light of the growing trend of remittances coming into Georgia from the EU.

Nevertheless, the decisive factor for Georgia's global economic positioning remains the country's economic dynamics and the resilience of its financial sector. Despite numerous external shocks and in-

ternal tensions, Georgia's economy has maintained high growth rates in recent years; inflation is close to the target level of 3%; and banks are characterized by healthy indicators of capital adequacy and liquidity. At the same time, we are fully aware that maintaining long-term macroeconomic stability requires continuous in-depth analysis of ongoing events and processes, and the development of approaches based on sound monetary policy – something that calls for broad involvement from economists.

I am pleased that the National Bank is celebrating the anniversary of the Georgian lari with the important launch of a renewed scientific-analytical journal. The public may remember the journal Banki, which was established 25 years ago at the initiative of the National Bank, and which was followed by *Economics and Banking*. From now on, a new-format journal titled *Monetary Economy* will be published in both Georgian and English. It will serve as an academic resource that will greatly support those interested in monetary policy, banking and the financial sector, financial technologies, and capital market development, including young scholars and researchers. I am confident that the journal will serve as a platform for engaging in interesting and in-depth dialogue. We hope that the renewed publication will contribute to both national and international economic discourse.

I wish the editorial board and authors of the journal every success.

Natia Turnava
Governor of the National Bank of Georgia

# EDITOR'S COLUMN

The launch of the new scientific-analytical journal *Monetary Economics* is a continuation of a tradition that began exactly 25 years ago at the National Bank of Georgia with the publication of the journal *Banki.* That journal was aimed at a wide readership interested in monetary and foreign exchange policy, as well as issues related to the development of the banking sector; however, the journal did not aspire for academic rigor and was not scholarly in nature. After a hiatus of several years, the National Bank resumed the publication of the journal, significantly altering its format and renaming it *Economics and Banking*. Unlike its predecessor, this version was more targeted towards professionals – monetary economists, financial regulation specialists, and bankers – and its authors were mainly employees of the National Bank.

This new journal, *Monetary Economics*, represents a further evolution. First, it will offer readers a greater range of topics. In addition to traditional subjects such as monetary policy, financial stability and supervision, banking, and payment systems, the journal will now include articles on economic growth and employment, budget deficits and public debt, the impacts of global and regional shocks, money and capital markets, asset (including real estate) pricing and profitability, and other related themes. Special attention will be given to the development of financial technologies and issues surrounding the issuance of central bank digital currencies.

Along with the expansion of topics, the circle of authors will also broaden. Besides employees of the National Bank, economists and researchers from the public, private, and academic sectors will be invited to contribute, including postgraduate students whose articles meet the journal's established standards. It should also be noted that all submitted papers will undergo a double-blind peer-review process, which is crucial for the journal's future inclusion in international scientific databases such as Scopus and Web of Science. This ambitious goal will be supported by the fact that the journal will be published in both Georgian and English, providing authors with the opportunity to present their work to an international audience.

Although the journal aims to meet high academic standards, the editorial board is committed to ensuring that the content of the published articles, particularly the research results and their discussions, remains accessible to a broad community of economists.

*Monetary Economics* will be published quarterly in an electronic format, although special issues may also be printed in connection with significant events. One such event is the 30th anniversary of Georgia's national currency, the Lari, which the first two issues of the journal will be dedicated to commemorating.

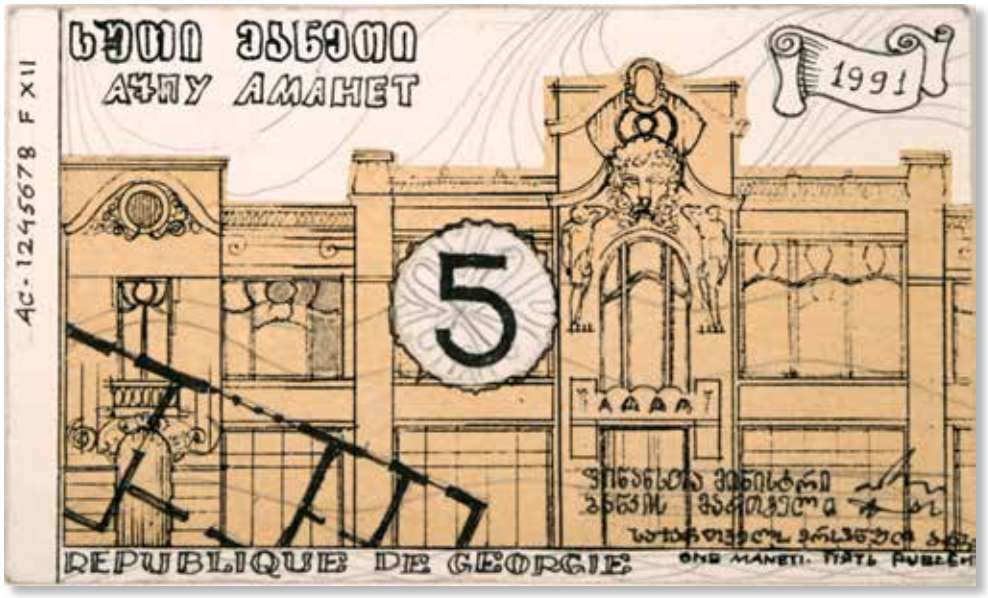
You are currently reading the first issue of the journal, which for now consists entirely of articles prepared by employees of the National Bank of Georgia. Starting with the next issue, which is scheduled for release in September this year, we will also be accepting articles from external authors. The journal follows detailed guidelines regarding article structure and referencing standards for submissions.

Professor Merab Kakulia

# CONTENT



*5000 Georgian Maneti. Sketch. 1991. Author: Mamuka Gongadze.*
*Preserved at the Money Museum of the National Bank of Georgia.*





*5 Georgian Maneti. Sketch. 1991. Author: Mamuka Gongadze.*
*Preserved at the Money Museum of the National Bank of Georgia.*

# ON THE HISTORY OF THE NAME AND DESIGN OF THE GEORGIAN LARI

BY ROLAND SPANDERASHVILI

## Abstract

This study examines the origins of the name and design of one of Georgia's most significant symbols of sovereignty: its national currency, the Lari. It explores the nationwide debates that unfolded in the early years of Georgia's independence over the naming and design of the country's banknotes and coins – a subject that captured widespread public attention. The paper also highlights the collaborative efforts among the Government of Georgia, the National Bank of Georgia, and members of creative and intellectual communities in shaping the modern design of the Lari, a design that proudly embodies Georgia's cultural heritage and national identity.

**Key words:** national currency, Lari, Tetri, Marchili, Georgian Money

## Introduction

In the autumn of 1988, Georgia's national liberation movement started to gain significant momentum. A turning point followed with the tragic events of 9 April 1989, which marked a critical step toward the country's eventual independence. On 28 October 1990, Georgia became the first republic within the Soviet Union to hold multi-party elections. National political forces secured the majority of seats in the newly elected Supreme Council of the Republic of Georgia. This was followed by a referendum on state independence held on 31 March 1991. As a result, on 9 April of that same year, the Supreme Council adopted the Act on the Restoration of the State Independence of Georgia.

Even before the official declaration of independence and the collapse of the Soviet Union, public debate had begun around introducing a national currency – a fundamental symbol of statehood. This topic drew active engagement from economists, financial experts, historians, philologists, and a wide range of public figures. The attitude of Georgian society at the time toward the creation of a national currency is vividly captured in a 1990 newspaper article by economist Shota Kistauri, titled "National Currency: Essence and Necessity". He wrote,

> Whoever sincerely wishes true independence for Georgia, its revival, and for the Georgian people to take their rightful place among modern civilized nations must, first and foremost, support the creation, issuance, and strengthening of Georgian money, as well as the enhancement of its authority both domestically and abroad. The first and most important step toward introducing a currency is to determine how many monetary aggregates the republic needs and to set the exchange rates between the national currency and the banknotes currently in circulation (Kistauri, 1990).

It is noteworthy that the idea of a Georgian currency was initially considered within the context of the

then-existing reality – specifically, the existence of the Soviet Union and its monetary system. This is clearly reflected in economist Nodar Bagrationi's 1990 article, "On the Issue of the Concept of National Currency". In response to the question of what the introduction of an independent currency would mean for Georgia on its path to sovereignty, Bagrationi wrote,

> "First, unlike the prolonged and uncertain process of stabilizing and restoring the exchange rate of the Ruble, a union-wide currency, the republic could, in the near future, establish a strong monetary unit of its own, which would support financial stability and economic growth. Amid the transition to a market economy, this would allow us to shield our economy from the negative influence of other republics' economies. What should be the relationship between our national currency and the national currencies of other republics? We believe that only the Georgian national currency should circulate within the republic, with the Ruble and other republics' banknotes exchanged at an established rate. When will it be possible to introduce our own currency into circulation? Can we say that we are ready today? I think not. Such a major state initiative requires specific economic and political prerequisites. Developing the concept of money circulation is, in itself, a critical part of broader research into the economic and political challenges of an independent Georgia" (Bagrationi, 1990).

In 1990, ahead of the Supreme Council elections, calls for the creation of a Georgian national currency following the achievement of the country's independence began to appear in publications of various political forces. One such call came from "Round Table – Free Georgia", the political union that would later come to power. In its electoral platform, the party emphasized that the introduction of a national currency was essential for establishing Georgia's independent monetary and credit system. According to the platform, the national currency should serve as a solid foundation for integrating the Georgian economy with those of industrially developed countries and should be used to account for the Gross National Product. The document also stressed that it would not be possible to introduce the national currency into circulation all at once; rather, a series of preparatory measures would need to be implemented within an independent state to ensure the creation of a stable national monetary system (Young Iverian, 1990).

## The Naming of the Georgian Currency

During this period, active discussions also began regarding possible names for the national currency. One of the first to raise this issue was the prominent Georgian economist Vladimer Papava. Under his leadership, in 1989, a group of authors (including G. Topuria, K. Nijaradze, R. Akhmeteli, and N. Terashvili, among others) published a model for an economically independent Georgia. The model envisioned the establishment of an issuing bank, which would be responsible for preparing the national currency, which they called the "Tetri", for circulation. To achieve this, a number of measures were to be implemented: the creation of a foreign exchange and precious metals reserve, the regulation of exchange operations, and other steps that would ultimately support the successful introduction of the "Tetri" into circulation (Papava et al., 1989).

This idea was later supported by historian Badri Beraia. In his article "The Soviet Ruble or the Georgian Tetri?" he provided a detailed explanation of the origin of the word "Tetri" as the name of a monetary unit, exploring its historical background, and discussing its significance as both a unit of account and a coinage denomination. Based on this analysis, the author endorsed "Tetri" as the name for Georgia's future national currency (Beraia, 1990).

In 1989, a concept for Georgia's economic independence was also published by a temporary sci-

entific collective formed under the auspices of the Rustaveli Society of Georgia, led by Roman Gotsiridze. The concept envisioned the issuance of a national currency under the name "Kartuli Fuli" (which translates as "Georgian Money"). At the initial stage, this monetary unit was to circulate alongside the Soviet Ruble (Rustaveli Society of Georgia, 1989).

In the autumn of 1990, historian Niko Javakhishvili published an article titled "What Should We Call Georgian Money?". In the introduction, he noted: "It is necessary to clarify once and for all what the future Georgian monetary units—both banknotes and coins—should be called. Adequate names must be found that the entire Georgian nation can approve of and support." Drawing on Georgia's numismatic and bonistic traditions, he proposed the name "Marchili", a term used during the First Republic in 1920. As a secondary option, he suggested "Karti", noting its parallels with other national currencies such as the French Frank, Latvian Lat, Lithuanian Litas, and Afghan afghani. As for coins, he proposed two options: "Kerma" and "Rvali" (Javakhishvili, 1990).

Prominent economist Vasil Chantladze also favored "Marchili" as the name for Georgian banknotes, while agreeing that the coins should be called "Tetri" (Chantladze, 1991). Similarly, Revaz Shengelia supported the use of "Marchili", emphasizing the term's compatibility with the Georgian language (Shengelia, 1991).

A particularly lively public discussion on the name of the future national currency took place in the 24 January 1991 issue of the Eri newspaper, which featured letters from citizens across the country. G. Gegechkori, from Batumi, wrote that if the Georgian banknotes were called "", then "Egri" (Egrisi) or "Kolkha" (Colchis) could be nice names for coins. Meanwhile, T. Chaduneli, a schoolteacher from the village of Kvishkheti in the Khashuri district, proposed naming the paper money "Kartuli" ("Georgian") and the coins "Iveria", or vice versa (Eri, 1991).

Of particular significance is the fact that, in the same issue of the Eri newspaper, a citizen named G. Gvilava from the village of Tamakoni, Martvili district, was the first to propose the name "Lari" for Georgia's future national currency. He favored "Mishkhali" for its smaller denominations (Eri, 1991).

In response to the earlier publications, historian Gocha Japaridze and philologist Zurab Sarjveladze published a joint letter in which they explored the etymology of Georgian monetary terms in detail. They suggested that a public discussion be held around potential names for banknotes and coins, listing "Maneti" and "Tetri", and "Rvali" and "Mtsulili" as possible combinations (Japaridze and Sarjveladze, 1991).

Amid these growing debates, discussions about the creation and naming of a national currency began within the Supreme Council of Georgia, even before the country formally declared independence. In a February 1991 interview with the press, Tariel Gelantia, Chairman of the Finance and Budget Commission, emphasized the necessity of establishing a national currency and creating an independent monetary and credit system in Georgia (Gelantia, 1991). After Georgia regained its independence, the debate about the name of the national currency intensified. One part of society advocated for retaining "Maneti" as the name for banknotes and "Tetri" for coins. Others proposed naming the banknotes "Tetri" and the coins "Kerma". It became increasingly clear that resolving the issue of naming the currency would take time and further consensus building (Jibuti, 2000).

The debate finally concluded on 7 August 1992, when the Government Commission for the Issuance of Georgian Currency made its official decision. The proposal presented by the commission suggested naming the national currency "Lari" and its fractional unit "Tetra". At the commission's meeting, linguist Levan Gvinjilia justified the appropriateness and relevance of the term "Lari"– a universal Georgian

word denoting property, treasure, or wealth – in relation to the phenomenon of money. Eventually, "Tetra" was replaced with "Tetri".

## Designing the National Currency

Following the declaration of independence, the introduction of a national currency – one of the most important symbols of sovereignty – became a matter of official discussion. In the Parliament of Georgia, the Finance and Budget Commission, chaired by Tariel Gelantia, and the Culture, Education and Science Commission, led by Teimuraz Koridze, were actively involved in the process.

Starting in May 1991, a Special Commission operating under the Supreme Council – comprising members of the legislative body as well as prominent economists, historians, and philologists – began deliberations not only on the name of the national currency but also on its artistic design and other key characteristics. The commission soon initiated consultations with various groups of artists and designers, including Elguja Amashukeli, Gia Bugadze, and Mamuka Gongadze. Over the course of this work, the visual themes for the future Georgian currency began to take shape, around which the artistic concept was to be developed. These themes included monuments to the country's cultural heritage, Georgian symbols, figures from Georgian mythology, historical personalities, writers, poets, public figures, and the ancient Georgian script. In addition to the Georgian language, the commission also considered it desirable to include inscriptions in Abkhaz on the banknotes (Gongadze, 2014).

On 2 August 1991, the Supreme Council of the Republic of Georgia adopted three key laws: "On the National Bank of Georgia", "On Monetary and Credit Regulation", and "On Banks and Banking Activities". The National Bank of Georgia was established based on the Republican Bank of the former USSR State Bank, and it took an active role in the creation of the national currency. In the autumn of the same year, a series of working meetings were held in Tbilisi with internationally recognized banknote printing companies, including the British firms De La Rue and Harrison & Sons Limited, as well as the French company Charles Oberthur. These discussions focused on both the design and technical parameters of the new currency and were attended by members of Parliament, the Government, the National Bank of Georgia, and the Special Commission.

In November 1991, during its first meeting with representatives from the International Monetary Fund (IMF), the National Bank of Georgia formally requested assistance in preparing for the introduction of the national currency. Plans were made to send Georgian designers to De La Rue in England in January 1992 to begin work on the currency's design and prototype. However, this visit was cancelled due to the outbreak of civil war in December 1991 and January 1992, which led to a forceful change of government. Around the same time, the Soviet Union officially dissolved, although the Soviet ruble continued to circulate temporarily across former Soviet republics, including in Georgia.

Amid these developments, the new Georgian government intensified its efforts to prepare for the introduction of a national currency. In January 1992, a Working Group on Monetary Reform was established under the leadership of Acting Prime Minister Tengiz Sigua. The group was tasked with drafting and submitting the necessary legislative and regulatory documents and included representatives from both the Government of Georgia and the National Bank of Georgia (Kakulia, 2012).

A separate Working Group on the Symbolism and Design of National Currency Notes was established, which commissioned the company Benefis, led by artist Nodar Malazonia, to develop the design of the national currency. An Art Council was formed within the company, composed of Roin Metreveli, Vasil Chantladze, Marika Lordkipanidze, Merab Kokochashvili, Mamia Malazonia, Nodar Lomouri, Otar Japaridze, Levan Gvinjilia, and Elguja Khinti-

bidze. The Art Council was directly responsible for reviewing the visual and artistic appearance of the currency notes.

From March 1992, coordination of the Working Group on the Symbolism and Design of National Currency Notes was assigned to Irakli Surguladze, Deputy to the Acting Prime Minister. During meetings held under his leadership, it was agreed that the portraits of King David the Builder, Queen Tamar, Shota Rustaveli, Ilia Chavchavadze, and Akaki Tsereteli would appear on the Georgian banknotes, along with imagery based on the themes of cultural heritage (Jibuti, 2000). By the end of March 1992, the first sketches of the Georgian banknotes were completed.

Soon after, by the decision of the Georgian government, cooperation with the French company Charles Oberthur was initiated to create and refine trial samples of the Georgian currency notes. To regulate design work, technical and normative issues, and other related matters, the Georgian government issued Decree No. 421 on 15 April 1992, establishing the Government Commission for the Issuance of Georgian Currency, which was headed by Acting Prime Minister Tengiz Sigua. The commission included five subcommittees, one of which was the Subcommittee for Determining and Establishing the Artistic Design of the Currency, led by Elguja Amashukeli (Central State Historical Archive of Georgia, Fund 600, Case 7161).

In May 1992, a delegation of artists and designers led by Nodar and Bachana Malazonia went to France where the initial banknote designs were created with technical support from the company Charles Oberthur. These initial drafts were presented to the Government Commission for the Issuance of Georgian Currency for review. The commission thoroughly examined the artistic and technical parameters of the sketches, provided feedback on the content and composition of the banknotes, and expressed a desire for greater unity in the composition as well as a refinement of certain symbols. The creative team took the feedback into account and continued working on perfecting the banknote designs. Additionally, following the recommendations of the aforementioned Art Council, new sketches were created featuring the images of Vakhtang Gorgasali and Zakaria Paliashvili (Malazonia, 2020).

In addition to the French company Charles Oberthur, the Georgian government and the National Bank of Georgia also received proposals regarding the printing of Lari banknotes from the British companies De La Rue and Harrison & Sons Limited, as well as from the German company Giesecke & Devrient. These companies offered to produce banknotes of various denominations and sizes, and to establish the necessary infrastructure for their circulation. However, it was ultimately decided to continue cooperation with Charles Oberthur.

On 16 October 1992, a meeting of the Art Council was held to discuss the denominations and thematic compositions of the Lari banknotes. Sketches of various denominations were presented for selection, each with two different compositions.

On 15 February 1993, by decree of the Prime Minister of the Republic of Georgia, the task of producing sketches for eight denominations of the national currency banknotes was once again assigned to artist Nodar Malazonia, in cooperation with the company Charles Oberthur. The responsibility for overseeing the development and printing of the Georgian Lari was entrusted to the National Bank of Georgia.

In parallel with this work, design activities for the Georgian "Tetri" coins were also underway. Specifically, Elguja Amashukeli created sketches for the obverse sides of the 1, 2, 5, 10, 20, and 50 tetri coins, featuring the denomination and prominent examples of Georgia's cultural and spiritual heritage. The reverse side of the coins, depicting the Borjgali (as a symbol of eternity) and the Tree of Life, was designed by Nodar and Bachana Malazonia.

From March to June 1993, during the visit of designers Nodar and Bachana Malazonia to the Charles

Oberthur company in France, mock-ups of banknotes in denominations of 1, 2, 5, 10, 50, 100, and 500 Lari were created. After a lengthy and detailed review at the National Bank, which personally involved the President of the National Bank, Nodar Javakhishvili, artistic and specific technical revisions were made to the designs, altering the visual and thematic elements of certain denominations. At the end of 1994, Nodar Malazonia once again traveled to France to oversee the final refinement and preparation of the revised sketches for printing, with the National Bank and its president continuing to supervise the entire process.

By 1995, the final design of the Lari banknotes was complete. The first batch was printed in the spring of 1995 and arrived in Poti from the French city of Rennes on 30 July. From there, the money was transported to the vaults of the National Bank under full security measures. The tetri coins had been minted earlier, in 1993, at the Paris Mint.

The design of Georgia's Lari banknotes and tetri coins serve as a kind of passport for the country, reflecting its sovereignty and cultural identity. These designs are deeply rooted in Georgia's centuries-old history and rich traditions in the fields of science, literature, music, and art.

On 16 September 1995, the Head of State of Georgia, Eduard Shevardnadze, issued Decree No. 363 "On the Introduction of the National Currency 'Lari' into Circulation". Based on this decree, two days later, two additional decrees, Nos. 16 and 17, were issued: "On the Introduction of the National Bank of Georgia's Banknotes 'Lari' and 'Tetri' into Circulation" and "On Additional Measures for the Conversion of Coupons into Lari". Starting from 25 September that same year, the national currency, the Lari, was put into circulation in the form of banknotes with denominations of 1, 2, 5, 10, 20, 50, and 100 Lari and coins with denominations of 1, 2, 5, 10, 20, and 50 tetri. Beginning on 2 October 1995, the Lari was declared the only legal tender throughout the entire territory of the country.

## Conclusion

The public discussion surrounding the naming of Georgia's national currency banknotes and coins, which engaged broad segments of Georgian society, yielded the desired outcome. "Lari", a universal Georgian word symbolizing property, treasure, and wealth, proved to be a natural fit for the concept of the national currency, both in meaning and in sound. Its subdivision, the "Tetri", with its centuries-old history and semantic depth, turned out to be an ideal match for the modern Georgian coin. Equally successful was the extensive effort devoted to the design of the national currency, which achieved its goal: Georgian banknotes and coins vividly reflect the cultural heritage and national identity of the Georgian people.

## References

Bagrationi, N. (1990). "On the Issue of the Concept of National Currency." *Ekonomisti [Economist],* No. 8 (in Georgian).

Beraia, B. (1990). Soviet Ruble or Georgian Tetri? *Saqme,* October 26 (in Georgian).

Central Historical Archive of Contemporary Georgia, Fund 600, Inventory 2, File 7161 (in Georgian, archival document).

Chantladze, V. (1991). On the Concept of Money. *Sakartvelos Respublika*, No. 23, February 2 (in Georgian).

Electoral Bloc "Round Table – Free Georgia". (1990). Political and Economic Platform – Economic Section. *Akhalgazrda Iverieli*, No. 113, October 18 (in Georgian).

Eri. (1991). What Should We Name Georgian Currency? *Eri,* No. 3, January 24 (in Georgian).

Gelantia, T. (1991). It is necessary to introduce Georgian currency. *Eri,* No. 7, February 13 (in Georgian).

Gongadze, M. (2014). On the History of Creating New Georgian Currency. *Herold*, No. 3 (in Georgian).

Japaridze, G. and Sarjveladze, Z. (1991). On the Naming of Georgian Currency. *Literaturuli Sakartvelo*, No. 10, March 8 (in Georgian).

Javakhishvili, N. (1990). What Should We Name Georgian Currency? *Sahalho Ganatleba*, No. 47, November 22 (in Georgian).

Javakhishvili, N. (2022). *History of Georgian Paper Money*. Tbilisi: Palitra L Publishing (in Georgian).

Jibuti, M. (2000). Little-Known Pages of the History of the Lari. *Banki*, No. 1 (in Georgian).

Kakulia, M. (2012). Development of the Monetary and Credit System. In: Asatiani, R. (ed.) *The Economy of Georgia*. Tbilisi: Publishing House Siaxle (in Georgian).

Kistauri, S. (1990). National Currency: Its Essence and Necessity. *Sakartvelos Respublika*, No. 27, June 24 (in Georgian).

Malazonia, N. (2020). *My TUBE, Nodar Malazonia's Art.* Tbilisi: Meridiani Publishing (in Georgian).

Papava, V., Topuria, G., Nijaradze, K., Akhmeteli, R., Terashvili, N. et al. (1989). "Conceptual-Normative Model of Economically Independent Georgia (EIG)." *Ekonomisti,* Nos. 11-12 (in Georgian).

National Bank of Georgia. (2001). *Money in Georgia.* Tbilisi: National Bank of Georgia (in Georgian).

Rustaveli Society of Georgia. (1989). *Concept of Economic Independence of the Georgian SSR*. Tbilisi: Rustaveli Society of Georgia.

Shengelia, R. (1991). Marchili - Georgian Currency. *Literaturuli Sakartvelo*, No. 5, February 1 (in Georgian).

# ALTERNATIVE ESTIMATES OF POTENTIAL OUTPUT IN GEORGIA

BY LASHA AREVADZE AND AKAKI MOSAKHLISHVILI

**Abstract**

This paper assesses Georgia's potential growth by leveraging different methodological approaches. Potential output is an unobservable variable; however, estimating the deviation of actual output from the potential level provides critical information for the implementation of monetary policy, as it offers insights into demand-side inflationary pressures to which monetary policy must respond. Although unobservable variables cannot be measured directly, they can be estimated through the use of models. Notably, different models offer distinct perspectives on potential growth. While model-based assessments of the cyclical position of the economy may yield divergent results, this does not imply the superiority of one model over another. Rather, each approach may provide complementary information that is valuable for policymakers. According to the assessment, potential growth accelerated in the aftermath of the COVID-19 pandemic, but has moderated since the beginning of 2024. Current estimates place it within the range of 7–7.5%, and it is expected to converge to its long-term level of around 5%.

**Key words:** potential output, productivity, economic growth, output gap.

## Introduction

Monetary policy affects prices through its influence on aggregate demand. Demand-side pressures can be assessed using the output gap, which is the percentage deviation of actual output from the potential level. Measuring the output gap requires an estimate of potential output, which is determined by long-term supply-side factors and is not subject to the direct influence of monetary policy instruments. The potential level of output is unobservable. This poses a key challenge for assessing the cyclical position of the economy and thus justifies the use of theoretical models for its estimation. The primary objective is to identify the level of output that would prevail in the absence of business cycle fluctuations– by definition, this is the potential output.

Structural models incorporating many variables enable the use of existing information to identify and assess the business cycle. In this study, we utilize estimates derived from different models, both production function-based models and macroeconomic model perspectives. These approaches emphasize different aspects for estimating potential output. The application and comparison of multiple models are essential to ensure the robustness of estimates. Furthermore, each estimate contributes to the narrative that is crucial for understanding potential output and, consequently, the cyclical position of the economy.

The production function approach represents a partial equilibrium approach to estimate potential GDP and allows for the decomposition of potential growth into contributing factors of production.

In contrast, structural dynamic stochastic general equilibrium (DSGE) models allow for the estimation of potential GDP through the interaction of multiple variables. For instance, inflation, which reflects both supply and demand shocks, potentially carries information about a business cycle driven by demand shocks. As such, information on inflation could help distinguish between demand shocks (which are cyclical and subject to monetary policy influence) and supply shocks (which are beyond the influence of monetary policy and are determined by long-term factors).

Moreover, structural models make it possible to conduct counterfactual analysis, allowing for the estimation of the so-called neutral level of output, which is the level that would prevail in the absence of nominal rigidities, such as price and wage stickiness. The existence and role of stickiness is particularly relevant for monetary policy implementation, as the need for intervention arises when prices deviate from their equilibrium level in the presence of short-term nominal rigidities. In the absence of such rigidities, prices would be at their equilibrium level, eliminating the need for policy intervention aimed at influencing price dynamics. Structural models also facilitate the estimation of the economy's efficient level of output, assuming the removal of not only nominal but also real rigidities.

As noted, counterfactual analysis can be used to estimate the level of output driven solely by long-term supply-side factors and unaffected by monetary policy. In such a setting, and absent of nominal frictions, the short-run supply curve (the Phillips curve) is vertical, and any demand-side shock, including a monetary policy shock, would lead to an immediate change in prices with no impact on output. Conditional on full-price flexibility, one can simulate the shocks identified within the "true" model (which includes nominal rigidities). This allows for the estimation of the level of output that would prevail if demand shocks had no effect. The deviation from this counterfactual level defines the output gap to which monetary policy should respond.

In this paper, we examine estimates of potential output using a variety of models, including the production function approach, and the structural and semi-structural models employed by the National Bank of Georgia. We explain the possible differences across models and their implications for the conduct of monetary policy. These estimates are critically important for policy implementation, as the pressure on prices from the demand side is determined by potential output and, consequently, the magnitude of the output gap, which can be influenced by monetary policy.

## Literature Review

Potential output can be assessed using different methods, ranging from simple univariate approaches – such as the Hodrick-Prescott (HP) filter – to multivariate approaches that estimate the values of unobservable variables based on trends identified through interactions among observed variables (Arsov and Watson, 2019). The latter category includes estimating potential GDP via production function analysis (Liqokeli, 2017) as well as macroeconomic modeling.

The National Bank of Georgia systematically evaluates potential output using both semi-structural (Tvalodze et al., 2016) and fully structural DSGE models (Arevadze et al., 2024). While the production function approach allows for the decomposition of long-run growth into its underlying drivers, a major limitation is that the estimation of potential output and the resulting gap occurs without incorporating information about inflation (Fueki et al., 2016). In contrast, structural models enable the assessment of potential output under different assumptions. From a monetary policymaking perspective, it is important to identify the output gap that results from nominal rigidities such as price and wage stickiness. Structural models allow for counterfactual analysis under the assumption that nominal frictions do not exist, and prices and wages adjust instantaneously (Vetlov et al., 2011). Deviations from this hypothetical level represent the demand-side pressure on prices, which monetary policy must respond to.

However, it is worth noting that potential output estimates consistent with flexible price and wage assumptions tend to exhibit high volatility, since they do not exclude the influence of real shocks that may affect output via real frictions. In contrast, a common approach attributes potential output solely to long-term technological growth shocks, excluding other shocks influencing the estimation, thereby resulting in a more stable series (Fueki et al., 2016).

One widely used method for estimating and decomposing potential output is the Cobb-Douglas production function approach. Despite various criticisms of this method, its relative simplicity has ensured its continued popularity. After applying a log-linear transformation, it also allows for the estimation of factor productivity. However, using the standard Cobb-Douglas specification may not be appropriate for economies in transition (Hajkova and Hurnik, 2007), as it assumes constant parameters, competitive factor markets, and fixed shares of capital and labor – assumptions that are often not valid in such economies and are not supported by empirical data.

Considering these concerns, Hajkova and Hurnik (2007) used an extended production function for analyzing the Czech economy and compared the results with the standard Cobb-Douglas specification. They found that during the transition period (1995–2005), estimates of potential output did not differ significantly between the two. This finding supports Liqokeli's (2017) argument for the appropriateness of applying the Cobb-Douglas production function for transition economies like Georgia. Similar approaches were taken by Epstein and Macchiarelli (2010) in estimating potential output for Poland.

In Georgia, the estimation of potential output and the output gap has long been a topic of discussion. According to Imnaishvili (2010), alternative approaches – such as the HP filter, Kalman filter, vector autoregression, and production function – yield qualitatively similar results; and the output gap estimated from these approaches aligns with inflation dynamics.

A report from the National Bank of Georgia (2012) estimated a marked slowdown in potential output post-2008. However, due to the global financial crisis and the August war, actual output declined even further, resulting in a negative output gap that gradually closed and approached zero by the end of 2010. According to the Monetary Policy Report from Q1 2025, potential growth surged after the pandemic but began to moderate from 2024 onward (National Bank of Georgia, 2025).

Among the key studies on estimation of potential output in Georgia is Liqokeli (2017), which clearly outlines the assessment methodology. The methodology used in this study largely builds on Liqokeli's work, with one key modification: instead of assuming a constant depreciation rate over time, we estimate it based on capital utilization. Specifically, using the method proposed by Shaikh and Moudud (2004), capital utilization is first estimated, then used to derive a functional relationship linking utilization to depreciation, from which depreciation rates are recalculated.[1]

Using a structural model to estimate potential output and the output gap shows improvements over simple univariate filtering methods. For instance, Alichi et al. (2017) demonstrate that structural model estimates are subject to fewer revisions of filtered values upon data updates compared to the HP filter. The advantages of using multifactor models for estimating potential output are also highlighted by Benes et al. (2010), as they incorporate more information, improving estimation quality over univariate approaches (Juillard et al., 2006). Structural and semi-structural DSGE models fall into this category and also support counterfactual analysis. For in-

1. It should be noted that Liqokeli (2017) also discusses the application of the method proposed by Shaikh and Moudud (2004). Ultimately, due to the relatively short time series available, the author opted to use a technique different from the cointegration approach for the estimation.

stance, Vetlov et al. (2011) estimate potential output in the euro area under flexible price assumptions. Their results show that while this gap is useful for medium-term inflation forecasting, some alternative indicators such as model-based marginal costs may perform better.

The reliability of model-based estimates depends on the model's structure, as emphasized by Alichi et al. (2017). Specifically, incorporating monetary policy improves estimation quality in standard multifactor models. According to Furlanetto et al. (2014), potential output estimates differ significantly depending on whether nominal frictions or financial frictions are considered. For example, with financial frictions incorporated, the output gap in the U.S. was systematically positive from the 1990s until the 2008 financial crisis, indicating that high credit activity mostly raised actual output without having a significant effect on potential. The authors conclude that under financial frictions, policymakers face tradeoffs between stabilizing inflation and the output gap. Monetary policy instruments alone are insufficient to close the gap between actual and potential output as caused by various economic frictions. Therefore, the output gap relevant for monetary policy is that driven by nominal rigidities. The study also notes that if potential output is not estimated using multifactor models, there may be uncertainty about how relevant the estimate is for decision making, particularly regarding the magnitude and direction of gaps.

Potential growth is not constant over time and can itself be influenced by economic cycles. For example, Oulton and Sebastiá-Barriel (2013) show that cyclical fluctuations can affect potential growth. Celik et al. (2023) find that in advanced economies, potential growth slowed by 1.2 percentage points after the global financial crisis, driven by lower investment and its effects on potential output. Prolonged recessions may also erode labor force skills and productivity (Benes et al., 2010; Oulton and Sebastiá-Barriel, 2013). COVID-19 negatively impacted long-term growth as well, mainly due to declines in labor force participation.

While the accuracy of short-term measurement is debatable[2], analyzing potential growth dynamics using historical data could still be insightful. Advanced economies have experienced slowing potential growth since the 1980s, a trend that was briefly reversed by the rapid technological advances of the 1990s and early 2000s. This trend became more pronounced after the financial crisis. Key drivers include aging populations and resulting labor shortages.[3] Although emerging and developing markets have also seen a moderation in their growth, the trend for such economies is less pronounced and more heterogeneous. For example, Celik et al. (2023) report that in the past decade, only 57% of emerging markets experienced a slowdown in potential growth, compared to 96% of advanced economies. Rapid investment drove accelerated growth in emerging markets during 2000–2010, while a slowdown was evident from 2015–2019, especially in China due to declining investment. Oil-exporting countries also saw moderation as oil prices fell in 2015–2016.

Accurately assessing productivity growth has become especially important recently. Determining post-pandemic potential growth is crucial for evaluating governments' debt sustainability, and long-term growth divergences between countries are increasingly apparent. For instance, productivity gap comparisons between the EU and the U.S. reveal long-standing differences largely attributed to total factor productivity and weaker capital investment in the EU (Guindos, 2024). In his recent report on competitiveness, Draghi (2024) underscores the productivity gap and outlines potential remedies.

2. However, for the decision maker, what matters most is obtaining a sufficiently accurate estimate for the current period.
3. As a result, growth has recently declined from 4% to 1% (Arsov and Watson, 2019).

At the global level, challenges to productivity growth include the pandemic's impact on labor quality and aging populations. Global fragmentation is viewed negatively in this regard, while AI technologies are seen as a potential driver of productivity acceleration (Igan, et al., 2024). Success will depend on countries' abilities to adapt to such innovations.

Estimating potential growth remains inherently challenging. For example, when using production functions, one must estimate labor force size, participation rates, and the non-inflationary level of employment (1-NAIRU). Capital stock measurement is even more complex due to limited data availability and reliance on assumptions that may be subject to debate. Nonetheless, various studies (e.g., Benes et al., 2010) show that multifactor model estimates are more robust when evaluated based on the extent of revisions upon data updates. Each method relies on specific assumptions and may yield different results, but this does not invalidate any single method. Rather, different estimates provide complementary insights relevant to policymakers. Accordingly, this paper employs multiple methods to assess the level and growth of potential output and discusses the possible sources of variation across estimates.

## Overview of the Models Used in Analysis

An important advantage of the production function approach is its ability to explain potential growth in terms of its fundamental driving forces: labor, capital, and labor productivity. However, a key limitation lies in the reliance on a specific functional form (e.g., Cobb-Douglas), which may not accurately capture real economic relationships. Additionally, unlike multifactor filtering approaches, this method does not incorporate variables that carry information about the cyclical position of the economy.

From a policymaker's perspective, it is crucial that the assessment of potential output – and, consequently, of the output gap – accounts for macroeconomic variables that reflect the economy's cyclical position. This makes the estimation of potential output via multifactor filters particularly valuable. Such approaches are generally more precise than the use of univariate filters (Celik, et al., 2023).

Since potential output is an unobservable variable estimated using models, its estimation is sensitive to a model's assumptions. Thus, employing multiple estimations is important to assess the robustness of the results. Moreover, any differences revealed in the estimation process can themselves provide valuable information. Accordingly, this study compares two main methodological approaches: the production function model and a multifactor approach based on structural models.

The first method estimates potential output using a Cobb-Douglas production function:

$$Y_t = A_t * K_t^{\alpha} * L_t^{\beta} \qquad (2.1)$$

where $Y_t$ is the aggregate output at time t, $L_t$ is total employment, $K_t$ represents the capital stock at the beginning of the period, and $A_t$ denotes the total factor productivity (TFP), captured as the residual. α and β are the elasticities of output with respect to capital and labor, respectively.

The function assumes diminishing marginal productivity ($\alpha, \beta < 1$) and constant returns to scale ($\alpha+\beta=1$). Among the inputs of the model, output and employment are observable, while capital stock is estimated using the perpetual inventory method[4]: $K_{t+1} = (1 - \delta) * K_t + I_t$ This equation implies that capital stock accumulates through investment but depreciates over time. Unlike traditional models that assume a constant depreciation rate (δ), this paper introduces time-varying depreciation based on capital utilization, $\delta(u_t)$.

4. For more detail refer to Berlemann and Wesselhöft (2012).

To estimate capital stock, gross fixed capital formation at constant prices is used. In the baseline, a steady state depreciation rate of 5% per annum is assumed: $\delta_{ss}$=5%.[5] However, depending on utilization $u_t$, depreciation may vary across periods. To construct the time-varying depreciation rate, which is later used to estimate the potential output, first the utilization rate is derived using:

$$logY_t = \gamma_0 + \gamma_1 t + \gamma_2 log\ K_t + \varepsilon_t \quad (2.2)$$

(Shaikh and Moudud, 2004). where $K_t$ is the capital stock estimated using the baseline model, and $\varepsilon_t$ is the random variable (disturbance term). Estimating this equation enables us to derive the predicted values for output $Y_t$*, and utilization is calculated as $u_t = Y_t / Y_t$*. In equilibrium, when $Y_t$=$Y_t$*, $u_t$=1. Over time, higher values indicate overutilization ($Y_t$>$Y_t$*) and higher depreciation. Since the depreciation rate is the increasing function of the utilization, the depreciation function is modeled as $\delta(u_t) = \delta_{ss} * u_t^{\varphi}$, where $\varphi$ is the sensitivity of depreciation with respect to the utilization. Based on this expression, the second-order Taylor polynomial around u=1 provides the final equation used in the analysis:

$$\delta(u_t) = \delta_{ss} * (1 + a_1 * (u_t - 1) + a_2 * (u_t - 1)^2) \quad (2.3)$$

where $a_1$=$a_2$=0.1. This formulation allows recalculation of capital stock using adjusted depreciation rates.

With capital stock $\widehat{K}_t$ re-estimated, potential output is derived using the production function and Kalman filtering ($\tilde{Y}_t = \tilde{A}_t * \tilde{K}_t^{\alpha} * \tilde{L}_t^{\beta}$), where $\tilde{x}$ corresponds to the trend value of variable x.

Although standard specifications assume constant elasticities α and β, recent literature suggests that factor income shares vary over time (Karabarbounis and Neiman, 2014; Piketty and Zucman, 2014), especially in response to structural economic changes (Novakova, 2020). Future research could explore the use of variable elasticities.

The second method employs structural and semi-structural models that incorporate multiple macroeconomic variables to estimate potential output. The National Bank of Georgia uses two models: GEMO, a semi-structural model (Tvalodze et al., 2016), and LEGO, a fully structural DSGE model (Arevadze et al., 2024). While both models share similar features, this section outlines the key equations shaping their structure.

A central behavioral equation is the intertemporal Euler equation, often interpreted as the IS (Investment-Savings) curve. It determines intertemporal consumption allocation by looking at the real interest rate gap (deviation from neutral rate):

$$\widehat{c_t} = \frac{h}{1+h}\widehat{c_{t-1}} + \frac{1}{1+h}E_t\widehat{c_{t+1}} - \frac{1}{\sigma}\frac{1-h}{1+h}(i_t - E_t\pi_{t+1} - r_t^{net}) + \frac{\gamma^z}{1+\gamma^z+h}\left(\frac{h}{1+\gamma^z}\widehat{\gamma_{t+1}^z} - \widehat{\gamma_t^z}\right) + \varepsilon_t^d \quad (2.4)$$

The current period consumption gap $\hat{c}_t$[6] depends on the lag and lead of the consumption gap, while it is negatively affected by the real interest rate gap (deviation of the real interest rate $r_t$ from its neutral level $r_t^{net}$):

$$\hat{r}_t = i_t - E_t\pi_{t+1} - r_t^{net} \quad (2.5)$$

In the IS equation, h, σ are structural parameters. h captures the degree of persistence with respect to the past consumption gap. Higher h implies the low-

5. A 5% depreciation rate is suggested by Liqokeli (2017).
6. The consumption gap relates to the percentage deviation relative to the potential consumption.

er reaction of consumption to the real interest rate change. $\sigma$ determines the direct effect of real interest rate change on consumption. $\gamma^z$ corresponds to the steady-state growth rate of the potential output, while $\hat{\gamma}_t^z$ denotes the deviation of potential growth from $\gamma^z$. The equation captures the fact that potential growth, which is not constant over time, may affect the consumption gap. This structure allows the model to reflect how agents respond to long-lasting productivity shocks. If a shock is expected to persist, actual consumption may increase stronger than its trend level today (frontloading), resulting in a positive consumption gap. On the other hand, as productivity shocks also affect the consumption trend, actual consumption may fall behind the trend, resulting in a negative consumption gap. Ultimately, the extent of either effect on consumption depends on how persistent the shock is.

In a simple closed-economy setup where investments in capital are absent, consumption and output gaps are equivalent[7]:

$$\hat{y}_t = \hat{c}_t \tag{2.6}$$

In the semi-structural GEMO model, the relationship between consumption and the real interest rate is similarly constructed; however, consumption is not modeled separately, and the IS curve is expressed in terms of the output gap only.

In both models, the IS curve characterizes the dynamics of consumption. The supply side is constructed based on a firm's optimal pricing decision given price rigidities. On the supply side, the model incorporates nominal rigidities, leading to a short-run Phillips curve describing how prices react to marginal costs:

$$\pi_t = \frac{1}{1+\beta}\pi_{t-1} + \frac{\beta}{1+\beta}E_t\pi_{t+1} + \frac{(1-\theta)(1-\beta\theta)}{\theta(1+\beta)}\ \widehat{mc}_t + \varepsilon_t^s \tag{2.7}$$

where:

$\pi_t$ : Inflation
$\widehat{mc}_t$ : Real marginal cost gap
$\beta$ : Discount factor
$\theta$ : Price stickiness

In simple models, where nominal frictions are limited to sticky prices, we can set

$$\widehat{mc}_t = \hat{y}_t. \tag{2.8}$$

Thus, a positive output gap leads to upward inflationary pressure. In turn, considering the IS curve and the real interest rate, an increase in expected inflation leads to a further reduction in the real interest rate, which further amplifies the positive output gap. This dynamic subsequently intensifies inflationary pressures. This feedback loop highlights the necessity for deploying an instrument capable of simultaneously stabilizing both output and inflation. This is precisely the role of monetary policy under an inflation-targeting regime: it operates by responding to deviations of inflation expectations from the target. Such a response must be sufficiently strong. Specifically, the reaction parameter must exceed one, so that, in response to a 1% expected increase in inflation, the nominal interest rate should rise by more than 1%, thereby increasing the real interest rate adequately. According to the IS curve, this increase in the real interest rate will reduce the output (consumption) gap and thereby ease inflationary pressures. This policy rule is commonly known as the Taylor Rule, and it is typically expressed as follows:

$$i_t = \delta_1 i_{t-1} + (1-\delta_1)\left(i_t^{net} + \delta_2(E_t\pi_{t+1} - \pi^{tar})\right) + \varepsilon_t^m \tag{2.9}$$

7. Assuming government spending as the demand shock.

Where $i_t^{net}$ net is the neutral nominal interest rate –that is, the level of the interest rate that would prevail in the absence of a need for either monetary policy tightening or loosening. The term $\varepsilon_t^m$ represents a monetary policy shock, defined as a deviation of the policy rate from the rule-based path set by the central bank.

According to this specification, the nominal interest rate responds endogenously to deviations of inflation from its target. This endogeneity is a defining feature of the approach: if the interest rate were set exogenously, the model would lack a mechanism to stabilize both inflation and the output gap. The endogenous interest rate, in conjunction with the Taylor Rule (where the coefficient on expected inflation deviations exceeds one), ensures stability both within the model and in real-world policy implementation.

To estimate potential output, the model leverages observable data. For instance, in the case of $\pi_t$, the observable counterpart is typically inflation measured by the Consumer Price Index (CPI). The output gap is an unobservable variable, although we do observe actual GDP. Therefore, an additional relationship must be introduced into the model to link the output gap to observable GDP data. For example, real GDP growth $\Delta y_t$ could be expressed as:

$$\Delta y_t = \Delta z_t + (\widehat{y}_t - \widehat{y}_{t-1}) \qquad (2.10)$$

Here, $\Delta z_t$ denotes potential growth, another unobservable variable, capturing changes in potential output, while $(\widehat{y}_t - \widehat{y}_{t-1})$ reflects the change in the output gap. Thus, economic growth can be decomposed into potential growth and changes in the output gap.

In turn, potential growth is modeled exogenously with the following autoregressive form:

$$\Delta z_t = \rho \Delta z_t + (1-\rho)\, \Delta z + \varepsilon_t^z \qquad (2.11)$$

where $\Delta z$ represents the long-run steady-state growth rate of potential output. Models used for policy analysis, such as the National Bank of Georgia's LEGO model, often include additional variables to enable a more detailed examination of economic shocks. One of the initial model extensions includes mechanisms for wage setting and labor market dynamics. These enrichments improve the model's empirical fit and enhance the identification of unobservable variables.

For example, if low inflation coincides with rapid wage growth, the model interprets this as a positive productivity shock – one that simultaneously raises wages and reduces inflationary pressure. Consequently, the data filtered through the model generates a shock, which, in turn, enables the estimation of $\Delta z_t$ (potential growth). Over the past two years, the combination of high economic activity and low inflation has been interpreted by the model as being the result of an ongoing positive productivity shock during this period.

## Discussion of Results

As outlined earlier, this study estimates potential growth using three different models. The models are applied for alternative assessments of potential growth under varying assumptions. For instance, the COVID-19 shock was not a typical economic shock and economic agents could not have anticipated it in the fourth quarter of 2019. However, when the Kalman filter is used, a two-sided filtering process is applied, meaning that at any given point in time, economic agents are assumed to have expectations about the future. These beliefs on future economic conditions influence the assessment of potential output. In anticipation of a future recession, potential growth may begin to decline even before the shock materializes. We address this issue in more detail below.

We also estimate potential growth under flexible price assumptions, which is especially relevant for monetary policy as it provides a benchmark for po-

tential output and the associated output gap that is not influenced by nominal frictions. Baseline potential growth estimates are generated using the production function model and the DSGE[8] model (see Figure 1).

**Figure 1. Estimation of Potential Growth (Baseline)**

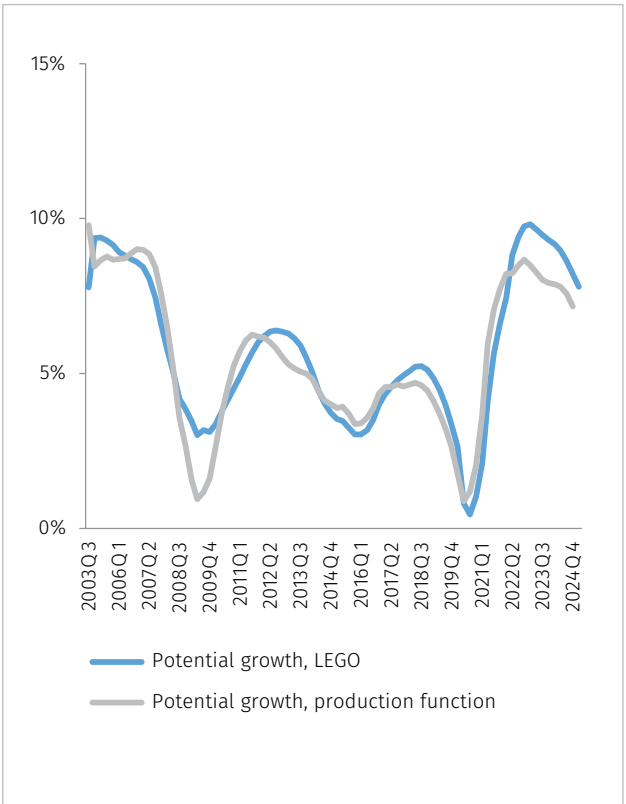
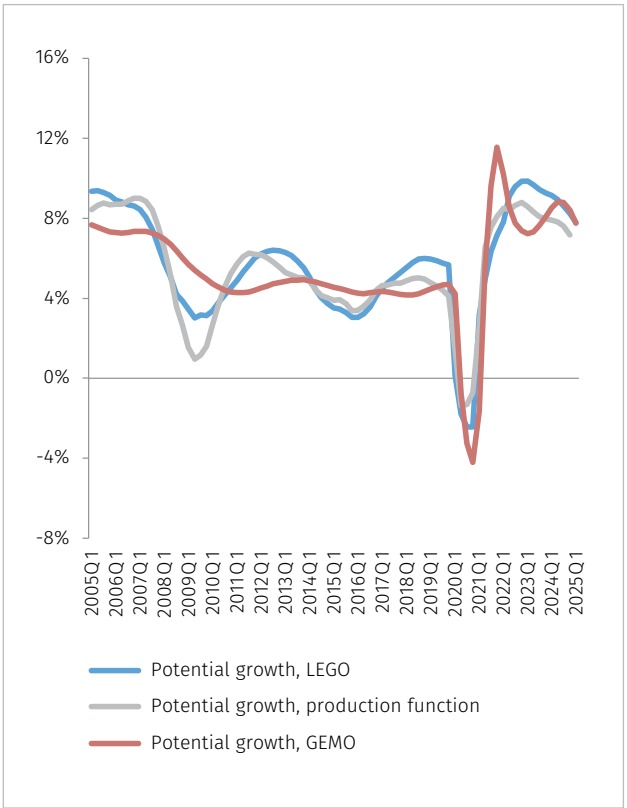



**Figure 2. Estimation of Potential Growth (Impact of COVID-19)**




*Source: National Bank of Georgia and Authors' calculations.*

Our assessment allows us to identify three distinct episodes of economic growth. In the period leading up to the 2008 recession, both models estimate relatively high potential growth. However, the production function model indicates a sharper decline in potential growth during the recession, primarily driven by a significant drop in productivity (see Figure 3). This discrepancy is particularly useful for analyzing what drives potential growth estimates in structural models.

The DSGE model incorporates a variety of variables, including inflation, to estimate the output gap and thus potential growth. After the 2008 recession, inflation remained low, which the model interprets as a strong negative demand shock, implying a negative output gap. As a result, the low inflation is consistent with a relatively higher level of potential growth.[9] Because the model derives its estimates based on relationships among several variables – especially inflation – the output gap produced may

8. A detailed description of the NBG's DSGE (LEGO) model and its calibration can be found at https://nbg.gov.ge/fm/wp/nbg-wp-2024-02.pdf.
9. Compared to the estimate derived from the production function approach.

be more informative for monetary policymakers, as it aligns with inflation data.

In contrast, the production function model provides important insights into the composition of potential growth. As shown in Figure 3, the primary drivers of growth before the 2008 recession were productivity and capital accumulation.

Following the recession and the 2008 Russia-Georgia war, potential growth declined and remained low throughout the following decade (at 4–4.5%), mainly due to weak productivity. During this period, estimates from both models were broadly aligned, as they were during the COVID-19 pandemic, when potential growth dropped sharply – again due largely to falling productivity.

Starting in early 2023, the DSGE model indicates a reacceleration of potential growth, which is consistent with high output and low inflation. This suggests that positive supply shocks outweighed any inflationary pressures from demand. Both models now show a moderation in potential growth, currently estimated at around 7.5%, which is expected to gradually converge to its long-term trend of 5%. Notably, in the post-COVID period, the contribution of employment to potential growth reached an unprecedented high, but this contribution is expected to diminish as the labor supply becomes increasingly constrained.

**Figure 3. Decomposition of Potential Growth (Production Function Approach)**

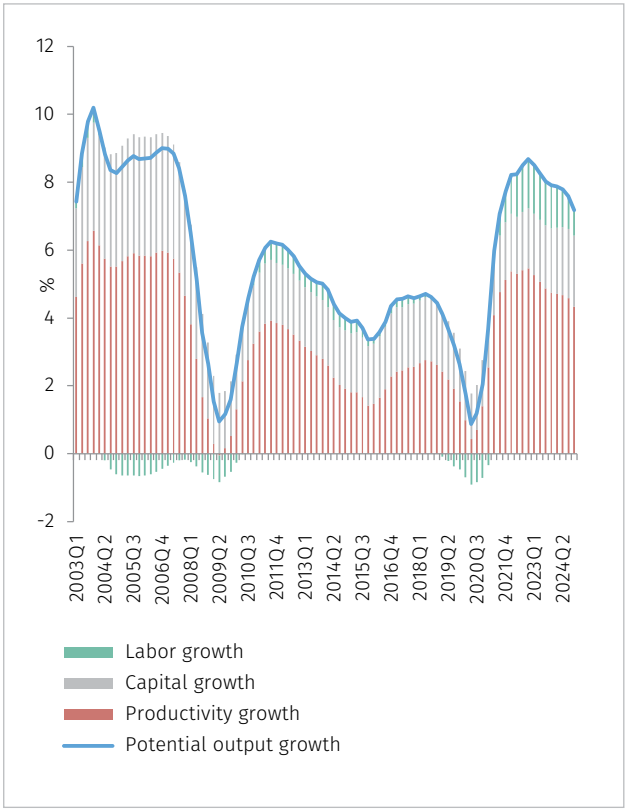
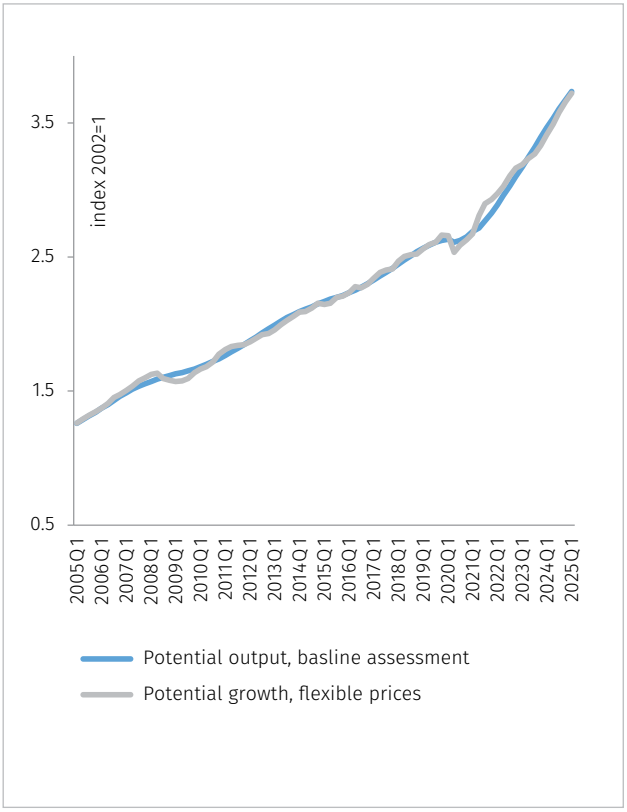



**Figure 4. Potential Output, Baseline and Flexible Price Estimation from the LEGO Model**




*Source: National Bank of Georgia and Authors' Calculations.*

A noteworthy observation in the baseline estimate is that potential growth began to decline well before the onset of the pandemic. As noted above, this results from the Kalman filter's use of future information to estimate current conditions – reflecting the assumption that agents form expectations based on future developments. While this assumption is theoretically valid, the COVID-19 episode was a shock that economic agents could not have plausibly anticipated even a quarter in advance, given its non-economic origins. Therefore, it is more accurate to use an approach that excludes the pandemic shock from assessments of potential growth prior to 2019.

To address this, we use the DSGE model to simulate potential growth based on data available up to 2019 and then re-estimate this starting from the first quarter of 2020. This allows us to capture structural breaks in potential growth more clearly (see Figure 2). As shown, potential growth experiences a sharp drop at the beginning of 2020, removing the pre-shock moderation of potential growth as estimated by the two-sided filter. In the National Bank's forecasting model (GEMO), this issue was addressed through expert judgment, adjusting potential growth estimates outside the model. These alternative estimates are also presented in Figure 2 alongside those from the production function model. However, even in this case, the pre-shock decline is not fully eliminated. The expert-based correction assumes that the decisions to close the economy in response to COVID-19 resulted in the temporary shutdown of production capacities and thus an immediate reduction in potential output.

One advantage of using a structural model is its ability to perform counterfactual analysis. In the real economy, nominal rigidities (e.g., sticky wages and prices) allow demand shocks to push output away from its potential level. Monetary policy responds to such gaps to prevent demand shocks from affecting inflation. Under flexible prices, however, demand shocks would immediately translate into price adjustments, while output would remain at its potential level, thereby rendering monetary policy interventions ineffective.

Thus, we use our structural model to estimate the potential level of output that would prevail under the realized shocks but in a hypothetical economy without nominal rigidities. The model with nominal frictions is our baseline model ("true model"), and we simulate the same shocks using a frictionless version ("flex-price model") in which prices are perfectly flexible. In this setting, demand shocks do not cause deviations from potential output but do immediately impact prices. The resulting potential output estimate corresponds to a level consistent with an economy where demand shocks do not affect output due to the absence of nominal rigidities. The difference between this level and actual output is the policy-relevant output gap, driven by temporary deviations due to nominal frictions.

This approach highlights the importance of estimating the gap that monetary policy can effectively target. According to our estimates (see Figure 4), potential output is more volatile under this method. This reflects the fact that deviations from trend output are influenced only by demand shocks – filtered through nominal rigidities – which monetary policy seeks to address, while the other frictions still affect output.

Two key episodes stand out. First, during the pandemic, potential growth fell more steeply than in the baseline estimate. This may suggest that the drop in actual output was more supply-driven than the result of a negative demand gap. Conversely, the estimated potential output is higher in 2021, likely reflecting a lag in the recovery of demand as the economy reopened. It is also notable that after 2023, the output gap appears larger than in the baseline case, indicating stronger demand-side influences during this period.

## Conclusion

For monetary policymakers, one of the most critical tasks is to assess the cyclical position of the econo-

my, commonly measured by the output gap, which is defined as the percentage deviation of current output from its potential level. Since potential output is an unobservable variable, its estimation becomes a necessary prerequisite for effective policy implementation.

In this paper, we have presented estimates of potential output derived from three distinct models, each based on different assumptions. Notably, potential growth accelerated from the second half of 2022 until early 2024, fluctuating in the range of 8–9% annually. However, recent developments indicate a moderation of this growth, with potential growth estimated at around 7.5% in Q1 2025. Looking ahead, normalization is expected toward the long-term trend rate of 5%, which will be driven in part by the diminishing contribution of employment to potential growth.

High potential growth during a period of strong real wage increases can alleviate the cost pressures on prices faced by firms. Consequently, understanding the dynamics of potential growth is essential for analyzing future inflationary pressures. The estimates presented in this study reflect multiple methodologies and assumptions, providing a more comprehensive picture. Rather than being contradictory, these estimates are complementary, offering alternative perspectives that help construct a more policy-relevant assessment of the output gap. For instance, the production function model sheds light on the underlying drivers of potential growth. If employment is the main contributor, then the resulting potential growth may not ease wage pressures, since output per worker remains largely unchanged. On the other hand, the structural models have the advantage of incorporating information from a broader set of variables – most importantly, inflation – to assess demand-side pressures on prices.

Moreover, these models enable counterfactual analysis, allowing for the estimation of output levels – and corresponding gaps – that reflect the influence of demand shocks under conditions relevant for monetary policy. Specifically, they can estimate the output gap consistent with the impact of monetary policy instruments, such as in the case of deviations from potential output under flexible price assumptions. In summary, adopting multiple approaches to estimating potential output strengthens the analytical foundation for policy decisions and supports a nuanced interpretation of the cyclical position of the economy.

## References

Alichi, A., Bizimana, O., Laxton, D. and Tanyeri, K. (2017). *Multivariate Filter Estimation of Potential Output for the United States*. IMF Working Paper No. 2017/106. [online] Washington, D.C.: International Monetary Fund. Available at: https://www.imf.org/-/media/Files/Publications/WP/2017/wp17106.ashx [Accessed 23 Apr. 2025].

Arevadze, L., Mkhatrishvili, S., Metreveli, S., Tsustkiridze, G., Mdivnishvil, T. and Khinashvili, N. (2024). *DSGE Model for Georgia: LEGO with Emerging Market Features.* National Bank of Georgia Working Paper 02/2024. [online] Tbilisi: National Bank of Georgia. Available at: https://nbg.gov.ge/fm/wp/nbg-wp-2024-02.pdf?v=zefs2 [Accessed 23 Apr. 2025].

Arsov, I. and Watson, B. (2019). *Potential Growth in Advanced Economies.* Reserve Bank of Australia Bulletin. [online] Sydney: Reserve Bank of Australia. Available at: https://www.rba.gov.au/publications/bulletin/2019/dec/pdf/potential-growth-in-advanced-economies.pdf [Accessed 23 Apr. 2025].

Benes, J., Clinton, K., Garcia-Saltos, R., Johnson, M., Laxton, D., Manchev P. and Matheson T. (2010). *Estimating Potential Output with a Multivariate Filter.* IMF Working Paper, No. 10/285. [online] Washington, D.C.: International Monetary Fund. Available at: https://www.imf.org/external/pubs/ft/wp/2010/wp10285.pdf [Accessed 23 Apr. 2025].

Berlemann, M. and Wesselhöft, J. E. (2012). *Estimating aggregate capital stocks using the perpetual inventory method: New empirical evidence for 103 countries.* Hamburg: Helmut Schmidt Universität.

Celik, S. K., Kose, M. A. and Ohnsorge, F. (2023). *Potential Growth Prospects Risks, Rewards, and Policies.* World Bank Policy Research Working Paper, No. 10355. [online] Washington, D.C.: World Bank. Available at https://documents1.worldbank.org/curated/en/099439203102334334/pdf/IDU01dc-

8e11c0d0ab047d80b7a60e220b64efa9d.pdf [Accessed 23 Apr. 2025].

Draghi, M. (2024). *The future of European competitiveness: Report by Mario Draghi.* [Online] Available at: https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en [Accessed 23 Apr. 2025].

Epstein, N. and Macchiarelli, C. (2010). *Estimating Poland's potential output: a production function approach.* IMF Working Paper, WP/10/15. [online] Washington, D.C.: International Monetary Fund. Available at: https://www.imf.org/external/pubs/ft/wp/2010/wp1015.pdf [Accessed 23 Apr. 2025].

Felipe, J. and Adams, F. G. (2005). The estimation of the Cobb-Douglas function: a retrospective view. *Eastern Economic Journa*l, 31(3), pp. 427-445.

Fueki, T., Fukunaga, I., Ichiue, H. and Shirota, T. (2016). Measuring Potential Growth with an Estimated DSGE Model of Japan's Economy. *International Journal of Central Banking*, 12(1), pp. 1-32.

Furlanetto, F., Gelain, P. and Sanjani, M. T. (2014). *Output Gap in Presence of Financial Frictions and Monetary Policy Trade-offs.* IMF working papers, No. 2014/128. [online] Washington, D.C.: International Monetary Fund. Available at: https://www.imf.org/-/media/Websites/IMF/imported-full-text-pdf/external/pubs/ft/wp/2014/_wp14128.ashx [Accessed 23 Apr. 2025].

Guindos, L. d. (2024). Bridging the gap: reviving the euro area's productivity growth through innovation, investment and integration, *European Central Bank.* [online] Available at: ecb.europa.eu/press/key/date/2024/html/ecb. sp241002~33cedce2bc.en.html [Accessed 23 Apr. 2025].

Hajkova, D. and Hurnik, J. (2007). Cobb-Douglas production function: the case of a converging economy. *Czech Journal of Economics and Finance,* 57(9-10), pp. 465-476.

Igan, D., Rosewall, T. and Rungcharoenkitkul, P. (2024). *Productivity in the post-pandemic world: old trend or new path?* Bank of International Settlements Bulletin 93. [online] Basel: Bank for International Settlements. Available at: https://www.bis.org/publ/bisbull93.pdf [Accessed 23 Apr. 2025].

Imnaishvili, A. (2010). *Estimating the potential level of the Georgian Gross Domestic Product. Discussion Paper.* Tbilisi: National Bank of Georgia.

Juillard, M., Kamenık, O., Kumhof, M. and Laxton, D. (2006). *Measures of Potential Output from an Estimated DSGE Model of the United States.* Czech National Bank Working Paper No. 11/2006. [online] Prague: Czech National Bank. Available at: https://www.cnb.cz/export/sites/cnb/en/economic-research/.galleries/research_publications/cnb_wp/cnbwp_2006_11.pdf [Accessed 23 Apr. 2025].

Karabarbounis, L. and Neiman, B. (2014). The global decline of labor share. *The Quarterly Journal of Economics,* 129(1), pp. 61-103.

Liqokeli, A. (2017). Estimating the potential growth rate of the Georgian economy. *Economics and Banking,* 5(1), pp. 31-51.

National Bank of Georgia. (2012). Estimating capacity utilization and potential output of the Georgian economy. *Inflaton Report,* National Bank of Georgia, pp. 20-21.

National Bank of Georgia. (2025). *Monetary Policy Report.* National Bank of Georgia. [online] Available at: https://nbg.gov.ge/fm/პუბლიკაციები/ანგარიშები/მონეტარული_პოლიტიკის_ანგარიში/2025/2025q1-geo.pdf?v=jf1d1 [Accessed 23 Apr. 2025].

Novakova, L. (2020). The impact of technology development on the future of the labour market in the Slovak Republic. *Technology in Society*, vol.62, issue C, pp. 1-12.

Oulton, N. and Sebastiá-Barriel, M. (2013). *Long and Short-Term Effects of the Financial Crisis on Labour Productivity, Capital and Output.* CEP Discussion Paper No 1185. London: Centre for Economic Performance, London School of Economics and Political Science.

Piketty, T. and Zucman, G. (2014). Capital is back: wealth-income ratios in rich countries 1700-2010. *The Quarterly Journal of Economics*, 129(3), pp. 1255-1310.

Shaikh, A. M. and Moudud, J. K. (2004). *Measuring capacity utilization in OECD countries: a cointegration method.* The Levy Economics Institute of Bard College Working Paper N. 415. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.

Tvalodze, S., Mkhatrishvili, S., Mdivnishvili, T., Tutberidze, D. and Zedginidze, Z. (2016). *The National Bank of Georgia's Forecasting and Policy Analysis System.* Tbilisi: National Bank of Georgia.

Vetlov, I., Hlédik, T., Jonsson, M. and Kucsera, H. (2011). *Potential output in DSGE models.* ECB Working Paper No. 1351. Frankfurt am Main: European Central Bank.

Zhang, S., Zhu, J., Fang, Q., Liu, Y., Xu, S. and Tsai, M. H. (2019). Solving the time-varying Cobb-Douglas production function using a varying-coefficient quantile regression model. *Journal of Advanced Computational Intelligence and Intelligent Informatics,* 23(5), 831-837.



*5 Maneti. Sketch. 1992. Author: Nodar Malazonia.*
*Preserved at the Money Museum of the National Bank of Georgia.*


*10 Maneti. Sketch. 1992. Author: Nodar Malazonia.*
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# ESTIMATING NEUTRAL (R-STAR) AND NATURAL (R-BAR) INTEREST RATES FOR GEORGIA

BY SERGO GADELIA, MARIAM TCHANTURIA, GIORGI GIGINEISHVILI AND TAMTA SOPROMADZE

**Abstract**

This paper examines the concept of the neutral interest rate, a key benchmark for monetary policymakers in assessing the stance of monetary policy. The neutral rate remains unobservable, presenting challenges and sparking ongoing debates regarding its interpretation. This paper specifically focuses on the semi-structural New Keynesian Georgian Economy Model (GEMO) to evaluate neutral rate for Georgia. The study distinguishes between short- and long-run neutral rates, commonly referred to in the literature as the neutral and natural rates, respectively. The assessment of the aforementioned rates is grounded in an analysis of the trends and steady-state components of the underlying variables that drive their dynamics.

**Key words:** neutral interest rate, natural interest rate, monetary policy.

## Introduction

Neutral and natural interest rates exert a significant influence on the day-to-day financial decisions of households and businesses. These rates play a critical role in determining the cost of borrowing for purposes such as purchasing a home, acquiring a vehicle, or financing business investments. Moreover, they affect the returns on savings, thereby shaping consumption and investment behavior. A proper understanding of these interest rate concepts provides valuable insights into the prevailing macroeconomic environment and the likely trajectory of future financial conditions.

*The natural rate of interest, R-bar ($\bar{r}$),* refers to the interest rate consistent with the economy operating at full capacity and inflation remaining stable over the medium to long term. It serves as a fundamental benchmark against which the stance of monetary policy can be assessed, enabling central banks to determine whether current policy settings are expansionary or contractionary relative to the underlying economic conditions.

*The neutral interest rate, R-star ($r^*$),* is the policy rate that neither stimulates nor restrains economic growth. When the central bank sets the policy rate above this neutral level, borrowing becomes more expensive. Consequently, higher interest rates dampen credit demand, leading to a contraction in aggregate demand, which in turn moderates both economic growth and inflation. Conversely, when the policy rate is set below the neutral rate, monetary conditions become accommodative, fostering increased investment and borrowing. This stimulates aggregate demand and, over time, exerts upward pressure on inflation.

It is important to underscore that both the neutral and natural interest rates are unobservable variables, whose levels are shaped by a range of structural and external factors. These include, among

other things, technological progress, productivity dynamics, demographic trends, a country's risk premium, and prevailing global financial conditions. A thorough understanding of these underlying determinants is critical for the formulation of monetary policy, as they play a pivotal role in guiding the appropriate stance and direction of policy over time.

Maurice Obstfeld (2023) highlights the secular decline in natural interest rates observed over recent decades, attributing this trend primarily to demographic shifts, the slowdown in productivity growth, and increased demand for safe assets. He further emphasizes that, while the assessment of the long-run natural interest rate provides an important starting point, it is not always sufficient for guiding the appropriate stance for short-term monetary policy. As such, it is essential to also take into account the current account balance, prevailing financial conditions, and the credibility of monetary policy.

For consumers, the dynamics of these interest rates are manifested in the market rates applied to loans and mortgages. For businesses, these rates significantly impact decisions regarding investments and the expansion of operations. A comprehensive understanding of the factors influencing $r^*$ and $\bar{r}$ equips both groups to make more informed financial decisions and to better assess future economic conditions.

The objective of the present study is to assess Georgia's neutral and natural interest rates and the direction of its monetary policy over a historical horizon. The paper aims to contribute to the ongoing discourse on this topic and to highlight the significance of external factors for a small, open economy such as that of Georgia.

## Literature Review

The neutral interest rate is a pivotal concept in monetary policy and is typically analyzed from various perspectives. It is, therefore, crucial to first establish a clear conceptual definition of this before delving into the methodological framework. A key source of confusion arises from the interchangeable use of two terms, the “neutral” and “natural” interest rates, which are both employed to assess the policy stance. Although this usage may be appropriate in certain contexts, the timeframe under consideration plays a critical role in distinguishing between these terms.

According to the literature, the natural rate is consistent with the long-run equilibrium, where the economy is at its full potential and inflation is at the central bank’s target level, once all cyclical disturbances have dissipated. In contrast, the neutral rate reflects temporary cyclical factors and headwinds, which may cause deviations from the long-run equilibrium (Rachel and Smith, 2015), and at which monetary policy remains neither disinflationary nor inflationary (Obstfeld, 2023).

There is an extensive body of literature devoted to identifying neutral and natural interest rates. However, as these rates are inherently unobservable, estimation results vary based on the methodology applied. Building on this extensive literature, the following section reviews the key methodologies used in identifying neutral and natural interest rates, such as time-series techniques, structural and semi-structural macroeconomic models, and term structure-based approaches, addressing their assumptions, advantages, and limitations.

One of the most widely used methods for estimating the neutral rate is the approach taken by Holston, Laubach and Williams (HLW) (2023), which builds on the foundational work of Laubach and Williams (2003). The authors utilize a semi-structural model, akin to a linearized New Keynesian framework, also accounting for time-varying volatility and persistent supply shock to capture the economic dynamics of the pandemic and post-pandemic periods. The model incorporates the relationship between the output gap and real interest rate gap, representing the IS Curve, and between inflation and the output gap (i.e., the Phillips Curve). Their so-called natural rate is driven by output trend growth and residual

factors, reflecting other underlying determinants of the variable. The output gap is inferred from the deviation of inflation from its target and is used to identify the natural interest rate. Inflation exceeding its target serves as an indication that the real interest rate is below its natural level, while inflation falling below the target suggests the opposite. However, according to Obstfeld (2023), the HLW methodology is more accurate in estimating the neutral interest rate than the natural rate, which is defined by longer-term determinants.

In contrast to the HLW methodology, which imposes an underlying economic structure, Lubik and Matthes (2015) use a time-varying parameter VAR model that incorporates three key variables: real GDP growth rate, PCE Inflation and the short-term real interest rate. This identification approach is more flexible and agnostic, simply capturing correlations between these variables. Their original work was subsequently updated to account for the COVID-19 shock and post-pandemic period by limiting the variability in the model's parameters (Lubik and Matthes, 2023). The authors estimate the natural interest rate, i.e. the interest rate prevailing in the flexible-price equilibrium, by computing a five-year-ahead forecast for the real interest rate. The obtained results diverge from those of the HLW methodology in several historical episodes, suggesting that structural equations based on behavioral relationships between economic factors are critical for capturing the regime (e.g., structural) changes that can lead to shifts in the natural interest rate. A similar methodology is employed by Del Negro et al. (2019), which utilizes a common-component VAR to obtain the natural interest rate as a latent trend of the short-term real interest rate. Furthermore, the authors emphasize the presence of a common global factor across countries, highlighting the importance of incorporating open-economy features when estimating the natural interest rate.

In addition to semi-structural and time-series methods, fully structural macroeconomic models offer another approach for estimating the natural interest rate. Although this approach is susceptible to model misspecifications, it allows for the incorporation of a rich set of factors that may influence the natural interest rate. One strand of this literature utilizes New Keynesian DSGE models (Del Negro et al., 2017), deriving the natural interest rate as the real short-term rate that would prevail in a flexible-price economy, where output is at its natural (flexible-price) level. According to Obstfeld (2023), this interpretation aligns with a longer-run equilibrium rate, as it relies on the expected future level of the equilibrium real interest rate. Alternatively, some researchers adopt overlapping generations (OLG) models (Platzer and Peruffo, 2022; Rachel and Summers, 2019), which account for life-cycle dynamics within a finite horizon and enable analysis of long-term determinants such as population growth, inequality, savings and investment imbalances, etc.

Another strand of the literature leverages data from financial markets and the term structure of long-term interest rates to extract a forecast of the long-run real interest rate (Adrian et al., 2013; Hördahl and Tristani, 2014). This approach utilizes information from the maturity spectrum of sovereign bonds, decomposing long-term yields into the expected real short-term interest rate, expected inflation, real term premium and inflation risk premium. The real rates are then derived by adjusting nominal rates using market- or survey-based measures of inflation expectations. Hence, the first component of this decomposition is regarded as a market-based measure of the natural real interest rate.

Although these methodologies provide valuable insights, many studies either overlook or fail to adequately account for open-economy characteristics. For many small open economies, global financial conditions and broader global factors play a crucial role (Rachel and Smith, 2015), and these influences are treated as exogenous due to their limited ability to affect them. As Obstfeld (2023) argues, domestic savings and investment are not necessarily equal, given that many countries run current account deficits or surpluses. Consequently, factors like capital

flows and the long-term risk profile of particular countries can influence the neutral and natural rates in these economies.

In a simple semi-structural setting, inclusion of the equilibrium real exchange rate serves as a means of incorporating open-economy considerations. Central banks that have implemented the Forecasting and Policy Analysis System (FPAS) as their monetary policy framework, utilize semi-structural forecasting models to derive the neutral and natural interest rates by considering both the trend real exchange rate and potential growth. A notable example of this is Castaing et al. (2024), who utilize a quarterly semi-structural model with New Keynesian features to estimate the neutral interest rate for New Zealand, incorporating equilibrium real exchange rate dynamics and the global neutral interest rate through the real uncovered interest parity (UIP) condition. Similarly, Hlédik and Vlček (2018) and Bulíř and Vlček (2024) use a semi-structural model for the Czech economy, augmenting the HLW framework by accounting not only for potential output growth but also for the trend real exchange rate appreciation. Adjusting potential growth for equilibrium real appreciation allows the capture of not only the yields from the growth of productive capacity but also the process of economic convergence toward advanced economies. On the other hand, unlike HLW, this approach is forward-looking, closing the model by specifying a monetary policy rule. The authors find that while potential growth positively influences the neutral interest rate, real trend appreciation has an offsetting effect, as it increases yields on investment realized in foreign currency.

## Theoretical Framework and Applied Methodology

### Theoretical framework

In this section, the assessment of both the neutral and natural interest rates is conducted within a theoretical framework largely based on the approach proposed by Maurice Obstfeld (2023). While the fundamental determinants of the neutral and natural interest rates are largely similar, their principal distinction lies in the time horizon over which they are defined. Additionally, a clear differentiation is made between nominal and real interest rates, with the latter adjusted for inflation expectations. This distinction serves as one of the key criteria for separating medium- to long-term rates from their short-term counterparts. In the medium and long run, inflation expectations typically converge toward the central bank's target, provided that the policy framework is deemed credible. However, in the short run, expectations may deviate from that target. In light of this, the long-term concept can be adjusted to assess the short-term interest rate – referred to as the neutral interest rate (NIR – which requires accounting for cyclical factors influencing inflation expectations, as well as domestic and external real trends. The natural rate, in turn, is more closely associated with the long-run concept and is treated within this framework as the long-term neutral rate, with the two terms being used interchangeably.

The second criterion for differentiating between neutral and natural rates is based on distinguishing the so-called 'stars' and 'bars' in real interest rates. The former is a short-term concept ($r^*$), whilst the latter is a long-term concept ($\bar{r}$), which is more shaped by slow-moving factors arising from both global and country-specific sources and can be analyzed within the context of demand and supply dynamics (Rachel and Smith, 2015). The most widely accepted framework for understanding the long-run $\bar{r}$ involves examining the equilibrium between desired savings (S) and desired investments (I) and their long-run drivers, namely productivity growth, demographic shifts, inequality, financial market frictions, country-specific risk premia, and fiscal and monetary policy considerations. In particular, if we consider a Ramsey setting with population growth and agents with constant relative risk aversion (CRRA) preferences, the real interest rate that balances savings and investments can be expressed as:

$$\bar{r} = 1/\sigma\, g + n + \rho \qquad (3.1.1)$$

Where n corresponds to population growth, σ is intertemporal elasticity of substitution, g is productivity growth and ρ is time preferences.

Hence, demographics is another significant determinant of the natural interest rate. However, the relationship between demographics and the natural rate of interest ($\bar{r}$) is complex. The Ramsey framework with population growth offers a simplified representation of more intricate real-world dynamics, where population composition is as important as overall population growth. The OLG literature provides a more comprehensive approach by accounting for life-cycle dynamics and population age structure in determining the long-run real interest rate.

In open economies, $\bar{r}$ is also influenced by the balance between domestic and foreign savings and investments; a higher domestic $\bar{r}$ relative to foreign $\bar{r}$ may signal higher returns on capital domestically (Obstfeld and Rogoff, 1994). Desired investment, impacted by factors such as the relative price of capital goods, public investment levels, and credit spreads, also plays a crucial role in determining $\bar{r}$ (Rachel and Smith, 2015). Thus, while the Ramsey model underscores the role of productivity in shaping long-run $\bar{r}$, the overall impact on it emerges from a complex interplay of demographic shifts, technological advancements, and financial market conditions.

Beyond secular forces, fiscal and monetary policies may also shape long-run real interest rates. In models with heterogeneous agents and incomplete markets, households may hold government debt for self-insurance, implying that fiscal expansion can, by increasing public debt, lower aggregate savings and raise the natural rate (Rachel and Summers, 2019; Campos et al., 2024). While monetary policy is traditionally viewed as neutral in the long run, some studies suggest that expansionary policy can boost productivity and growth by improving resource allocation (Benigno et al., 2024). Conversely, an excessively loose policy may lead to debt accumulation, weakening demand and lowering the natural rate.

In addition to the internal macroeconomic balances framework of desired investment and savings, which focuses on explaining the natural real rate, the external balance approach offers perspectives on both r* as well as $\bar{r}$, particularly through the real Uncovered Interest Rate Parity (UIP) framework. This approach is commonly used in inflation-targeting countries with FPAS frameworks using New Keynesian DSGE models. Based on this approach, r* could mimic the hypothetical real interest rate that would prevail in a frictionless economy, without nominal rigidities (Lindé et al., 2022).

The rationale behind the real UIP is that it reflects investors' indifference between domestic and foreign government bond investments by linking the domestic real interest rate, the real exchange rate (RER), and country riskiness with the foreign real interest rate in the equilibrium. This relationship is expressed as follows:

$$r_t^* = r_{f,t}^* + \overline{prem}_t - \Delta\bar{Z}_t \qquad (3.1.2)$$

Where $r_t^*$ denotes the domestic real neutral rate, $r_{f,t}^*$ the foreign real neutral rate, $\overline{prem}$ the equilibrium country risk premium and $\Delta Z_t$ reflects real exchange rate trend appreciation.

The real UIP underlines the influence of both global and domestic factors on both r* and $\bar{r}$. For example, rising global real rates make foreign assets more attractive, thus exacerbating capital outflow and pushing domestic real neutral rates up to mitigate depreciation risks and to converge with the new equilibrium.

Besides, productivity gains, such as the catch-up effect in emerging market economies (EMEs) – particularly in the traded sector, as suggested by the Balassa-Samuelson theory – can lead to higher relative prices compared to trading partners. This, in

turn, may lead the real exchange rate to appreciate, which might put pressure on domestic real rates to decrease in accordance with Purchasing Power Parity (PPP).

Additionally, improved productivity and reduced sovereign risk premia can lower term premia and real neutral rates. However, the immediate effect of productivity gains on the real interest rate can be complex as well. If increases in productivity lead to higher expected future income, it might reduce the need for current savings, resulting in a lower real interest rate in the short term. However, if productivity gains significantly boost investment demand, this could put upward pressure on the real interest rate as the economy adjusts.

Notably, the natural rate does not provide policymakers with information on the real rate adjusted for current economic conditions, and therefore, does not guarantee a neutral policy stance amid cyclical fluctuations. To make the nominal neutral rate more informative and reflective of the current monetary policy stance, it is essential to broaden this concept by incorporating shorter-term perspectives on factors such as country risk premia, global real rates, and the exchange rate. This approach requires careful calibration of their trends and steady states.

Examining the short-term and long-term NIR reveals that the policy stance may appear tighter or looser from a short-term perspective compared to a longer-term view. Therefore, it is essential to consider both estimates when assessing the overall policy stance and making informed policy decisions.

## Applied Methodology: New-Keynesian Model

This section outlines the fundamental equations of the Quarterly Projection Model, the Georgian Economy Modeling (GEMO) framework, as employed for Forecasting and Policy Analysis at the National Bank of Georgia (Tvalodze et al., 2016). The model serves as a key analytical tool used to estimate the short- and long-term neutral interest rates. GEMO is a semi-structural gap model with rational expectations, blending key insights from New-Keynesian DSGE models regarding nominal and real rigidities and desired empirical properties, and is designed to capture specific characteristics of the Georgian economy.

The model comprises four main blocks[1], reflecting the typical features of a small open economy. The aggregate demand block is depicted by an IS curve:

$$\hat{y}_t = \alpha_1 \hat{y}_{t-1} + \alpha_2 E_t\{\hat{y}_{t+1}\} - \alpha_3 \left(\hat{r}^{eff}_{t-1} + \widehat{prem}_{t-1}\right) - \alpha_5 \hat{Z}_{t-1} + \alpha_6 \hat{y}^*_t + \alpha_7 \hat{g}_t - \alpha_8 \hat{s}_t^{\frac{GEL}{USD}} + \alpha_9 \widehat{cr}_t + \varepsilon^{\hat{y}}_t \quad (3.2.1)$$

The output gap ($\hat{y}_t$) depends on its lagged value ($\hat{y}_{t-1}$), capturing the degree of persistence of aggregate demand on the expected output gap, based on information at time ($E_t\{\hat{y}_{t+1}\}$). The output gap is also related to the lagged real effective interest rate gap ($\hat{r}_{t-1}^{eff}$), which is a weighted average of domestic and foreign interest rates, capturing the interest rate channel of monetary policy, and lag of the country risk premium gap ($\widehat{prem}_{t-1}$). Additionally, the output gap depends on a lag of the real effective exchange rate gap ($\hat{z}_{t-1}$), summarizing the net export effect; the foreign output gap ($\hat{y}_t^*$), capturing the foreign demand channel; the government structural budget deficit gap ($\hat{g}_t$); the balance sheet effect of financial dollarization, as depicted by directly including the bilateral nominal exchange rate gap vis-à-vis USD ($\hat{s}_t^{\frac{GEL}{USD}}$) the credit gap ($\widehat{cr}_t$) accounting for the credit channel in the IS curve; and demand shock ($\varepsilon_t^{\hat{y}}$).

1. For the detailed documentation of the model, see the National Bank of Georgia's Forecasting and Policy Analysis System (Tvalodze et al., 2016).

The real effective interest rate is defined as:

$$r_t^{eff} = \sigma r_t^{l,d} + (1-\sigma) r_t^{l,fx} \quad (3.2.2)$$

Where $r_t^{l,d}$ is the domestic lending rate, computed as a weighted average of domestic real interest rates at different maturities, while $r_t^{l,fx}$ is the USD real lending rate, computed in the same way but using USD real interest rates at different maturities.

The supply side is described by a hybrid New-Keynesian Phillips curve:

$$\pi_t = \beta_1(\beta_2 \pi_t^m + (1-\beta_2)[\beta_3 \pi_{t-1} + (1-\beta_3)\pi_t^e]) + (1-\beta_1)\left(\beta_4 \pi_t^{oil} + (1-\beta_4)\pi_t^{food}\right) + \beta_5 \hat{y}_t - \beta_6 \hat{Z}_t + \beta_7 \hat{s}_t^{\frac{GEL}{USD}} + \varepsilon_t^{\pi} + u_t^{\pi} + \rho l * u_{t-1}^{\pi} \quad (3.2.3)$$

In equation (3.2.3) $\pi_t$ represents quarter-on-quarter annualized headline inflation, which depends on imported inflation ($\pi_t^m$); the lag of headline inflation ($\pi_{t-1}$) and future expected inflation ($\pi_t^m$), oil ($\pi_t^{oil}$) and food ($\pi_t t^{food}$) inflations, accounting for the direct effects of these variables on headline inflation, which themselves are modelled as exogenous processes with persistence and are highly dependent on international commodity prices and the GEL/USD exchange rate; the output gap ($\hat{y}_t$) capturing the inflationary pressures from the demand side; the real effective exchange rate ($\hat{z}^t$) to account for imported intermediate inputs; the GEL/USD exchange rate $(\hat{s}_t^{\frac{GEL}{USD}})$ gaps depicting FX debt servicing costs for firms arising from financial dollarization; and standard cost-push ($\varepsilon_t^{\pi}$) alongside high-frequency supply-side shocks ($u_t^{\pi} + pl * u_{t-1}^{\pi}$).

The inflation expectations ($\pi_t^e$) are considered as a weighted combination of backward- ($\pi_{t-1}$) and forward-looking ($E_t\{\pi_{t+1}\}$) expectations and expected inflation shock:

$$\pi_t^e = \delta E_t\{\pi_{t+1}\} + (1-\delta)\pi_{t-1} + \varepsilon_t^{\pi^e} \quad (3.2.4)$$

The nominal exchange rate follows a modified uncovered interest rate parity (UIP) condition:

$$i_t - i_t^* = 4\left(s_t^{\frac{GEL}{USD},e} - s_t^{\frac{GEL}{USD}}\right) + prem_t + \varepsilon_t^s \quad (3.2.5)$$

Which suggests that the interest rate differential between domestic ($i_t$) and foreign ($i_t$*) short-term interest rates should compensate for expected annualized depreciation

$$\left(4\left(s_t^{\frac{GEL}{USD},e} - s_t^{\frac{GEL}{USD}}\right)\right)$$

adjusted for the country risk premium ($prem_t$), so that there are no arbitrage opportunities.

Finally, the monetary policy reaction function is described by the forward-looking Taylor-type rule:

$$i_t = \gamma_1 i_{t-1} + (1-\gamma_1)\left[i_t^N + \gamma_2 E_t\left(\pi_{4,t+4} - \pi_{t+4}^{tar}\right) + \gamma_3 \hat{y}_t\right] + \varepsilon_t^i - \gamma_4 \varepsilon_t^T \quad (3.2.6)$$

Where $i_t$ is the nominal policy rate, $i_t^N$ is the neutral nominal interest rate, $\pi_{4,t+4}$ is the year-on-year inflation expected in the next year, $\pi_{t+4}^{tar}$ is the inflation target for the next year, and $\varepsilon_t^i$ is the standard monetary policy shock.

The monetary policy rule ensures that the policy rate responds to deviations of expected inflation for the following year from its target, as well as to the output gap, with a stronger reaction to the former than the latter. Additionally, the inclusion of the lagged policy rate ensures inertia in policy adjustments. Finally, the rule incorporates the nominal neutral rate ($i_t^N$), as a clear understanding of this rate is essential for monetary policymakers, serving as a key reference point for determining whether to tighten or ease the policy stance.

The nominal neutral interest rate ($i_t^N$), whether short- or long-term, serves as a reference for monetary policy and is defined as the sum of the corresponding real neutral rate and expected inflation. In the short

term, inflation expectations are proxied by one-year-ahead forecasts, while in the long term, they are anchored to the expected targeted inflation rate over the same horizon. Additionally, it exhibits a degree of persistence, reflecting its gradual adjustment over time:

$$i_t^N = \gamma_5 i_{t-1}^N + (1-\gamma_5)(\bar{r}_t + E_t\{\pi_{t+4}\}) \quad (3.2.7)$$

The real (short- or long-term) neutral rate itself is determined by the real UIP condition:

$$\bar{r}_t = \rho_{\bar{r}}\bar{r}_{t-1} + (1-\rho_{\bar{r}})(\bar{r}_t^* + \overline{prem}_t - E_t\{\Delta\bar{Z}_{t+1}\}) \quad (3.2.8)$$

The real neutral rate depends on the foreign real neutral rate (the neutral rate in the U.S.), given that Georgia, as a small open economy, is highly susceptible to global capital flows and financial conditions. Additionally, it is shaped by secular factors such as productivity growth, which is reflected in trend real exchange rate depreciation. Higher productivity growth usually leads to trend real appreciation, thereby lowering the neutral interest rate. Conversely, the real neutral rate also depends on the country risk premium trend/steady state. A rise in the country risk premium trend or the steady state leads to a higher domestic real neutral rate, as investors perceive investments to be riskier in the long-run and demand higher compensation, thereby pushing long-term interest rates up.

## Discussion of Results

In 2009, the National Bank of Georgia (NBG) adopted an inflation-targeting regime, with the monetary policy rate (refinancing rate) serving as its primary instrument. Initially, the regime operated under a relatively flexible framework, commonly referred to as "light" inflation targeting (LITE). However, in 2016, the NBG transitioned to a full-fledged inflation-targeting framework, which included communication of the forecast path of the policy rate (forward guidance). Notably, over the past decade, despite a range of supply and demand shocks, the NBG has maintained a high degree of credibility. This is reflected in various indicators, including yields on government securities (the yield curve), and inflation expectations surveys conducted among financial market participants and enterprises.

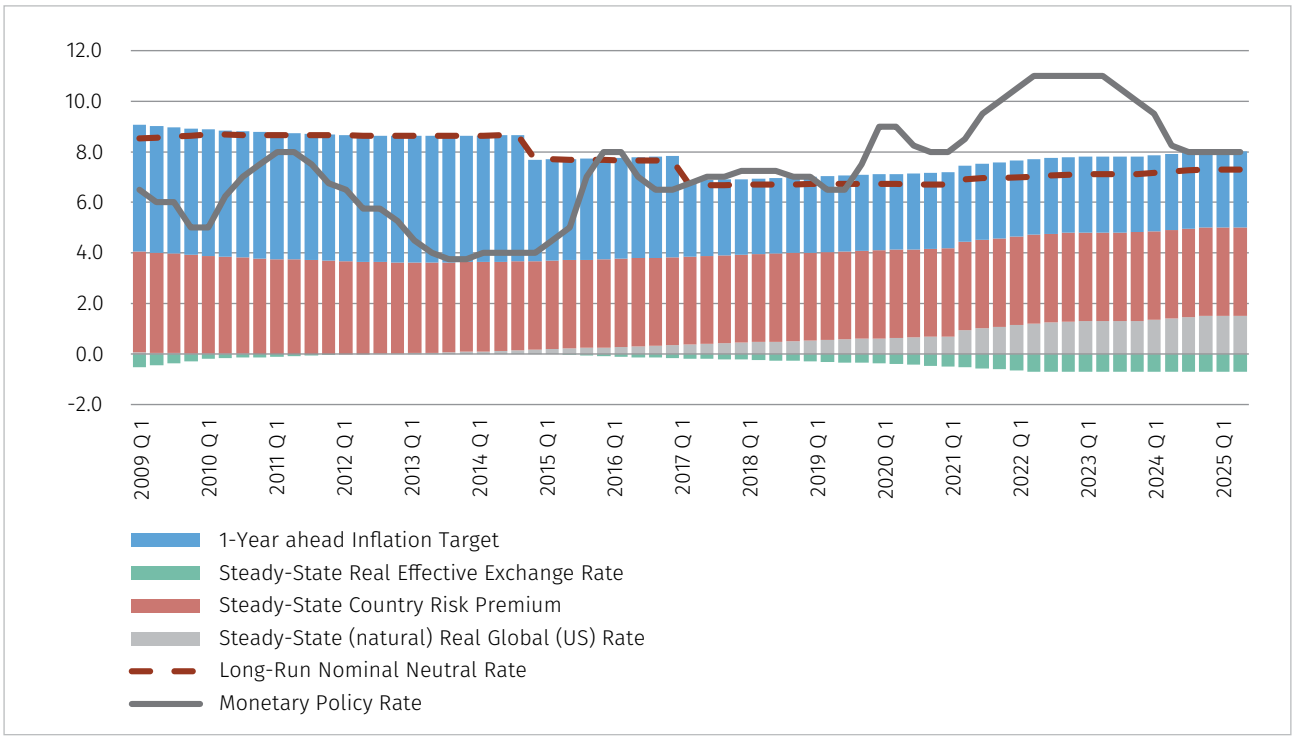
In analyzing the neutral interest rate for Georgia, we employ both empirical evidence and theoretical approaches to estimate equilibrium levels over the short and long term. These assessments are subsequently integrated into the framework of the real uncovered interest rate parity (UIP) condition. Specifically, the long-term equilibrium levels are calibrated by accounting for structural shifts in the domestic economy as well as in those of Georgia's trading partners, while the estimation of the short-term neutral rate places greater emphasis on current and medium-term macroeconomic trends. As previously noted, this study defines the "natural rate" as the long-term neutral interest rate, whereas its short-term counterpart is referred to as the short-term neutral rate.

The analysis commences with an evaluation of global determinants. Specifically, within the framework of the real Uncovered Interest Parity (UIP), the U.S. interest rate emerges as a fundamental anchor for the estimation of Georgia's neutral interest rate across both short- and long-term horizons. Notably, over the past decade, economists have primarily focused on explaining the decline in global real rates, with both structural and cyclical factors contributing to this trend. However, recent debates among leading economists, including Blanchard and Summers, has shifted towards assessing whether the neutral rate globally, and particularly in the U.S., is now elevated compared to pre-pandemic levels. The debate has intensified around the long-term $\bar{r}$ (natural rate) because factors such as fiscal expansion and advancements in artificial intelligence (AI) suggest a potential upward shift in the rate. At the same time, demographic trends and other economic factors cast doubt on whether a sustained increase in $\bar{r}$ has occurred. Given the uncertainty surrounding $\bar{r}$, different approaches have emerged. The New York Fed, for instance, uses the Laubach-Williams (LW)

and Holston-Laubach-Williams (HLW) models, which place $\bar{r}$ in a range of 0.5-1.5%, aligning closely with the Federal Reserve's projections. Market expectations similarly point to higher long-term rates, driven by AI-led productivity gains and fiscal dynamics, which exert upward pressure on Georgia's neutral rate as well. However, it is essential to distinguish whether the rise in real rates, particularly in the U.S., is primarily attributable to AI-induced productivity growth or fiscal factors. These drivers carry different implications for emerging markets like Georgia and must be carefully evaluated to understand their distinct impacts. In our estimates, we incorporate an upward shift in both the natural and neutral real rates in the U.S. Our perspectives on U.S. real rates are consistent with the views articulated by Larry Summers and the estimates derived from the LW and HLW models.

Another critical component within the real UIP framework is the country risk premium, which encompasses both sovereign and exchange rate risks. In this analysis, the sovereign risk premium is proxied by the Emerging Market Bond Index (EMBI), as reported by Bloomberg. The exchange rate risk premium, on the other hand, is an unobservable variable and is estimated using the semi-structural model described above (GEMO). Notably, a downward trend in Georgia's sovereign risk premium has been observed over the past decade. Specifically, following the 2008 global financial crisis and the 2008 Russia-Georgia war, the premium steadily declined. As a result, the estimated equilibrium level of the combined sovereign and exchange rate risk premia has also been revised downward, from approximately 4% to 3.5% (see Figure 1).

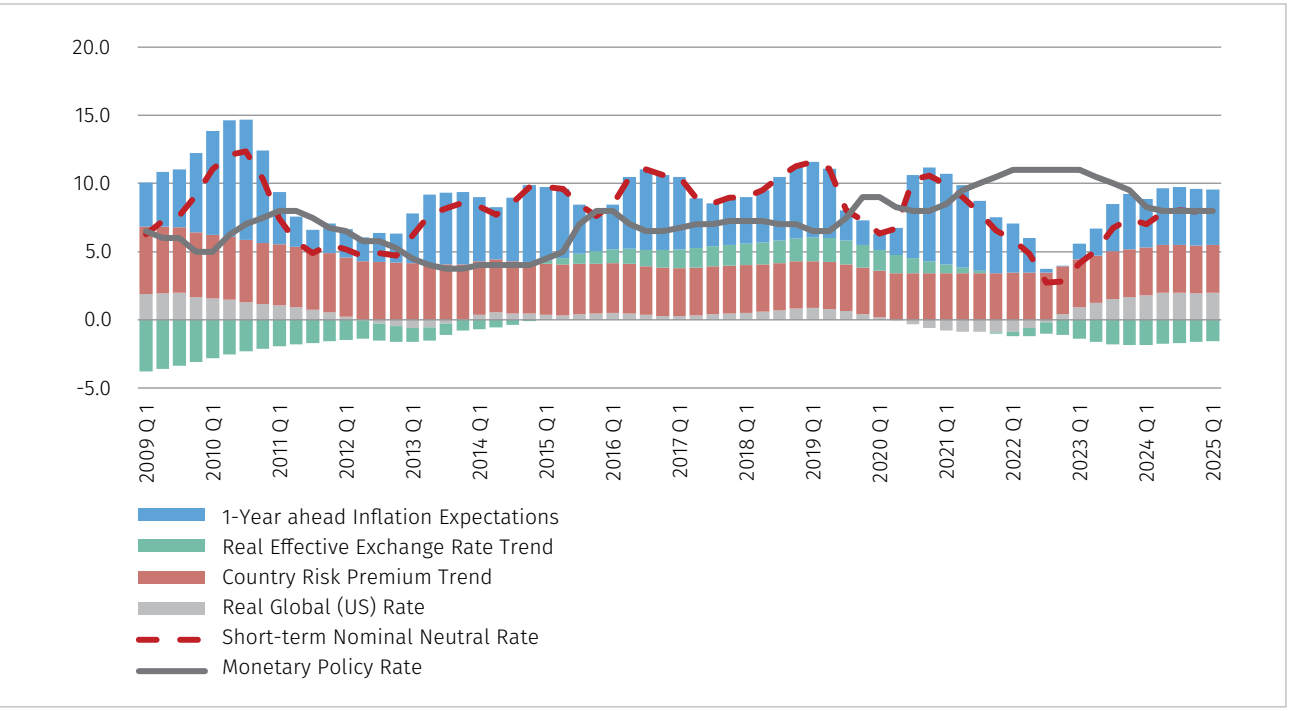
**Figure 1. New-Keynesian Model Decomposition of the Long-Run Nominal Neutral Rate in Georgia**




*Source: National Bank of Georgia and Authors' calculations.*

The short-term trend of the risk premium is characterized by relatively higher volatility, a result of existing shocks, and is assessed using the GEMO model (see Figure 2).

**Figure 2. New-Keynesian Model Decomposition of the Short-term Nominal Neutral Rate in Georgia**




*Source: National Bank of Georgia and Authors' calculations.*

Lastly, exchange rate trends play a key role in the real UIP condition.[2] After 2009, Georgia transitioned from a phase of rapid growth to a period of moderated growth, particularly in the traded sectors. It is worth noting that in 2014-2015, Georgia faced significant nominal GEL depreciations due to the global strengthening of the U.S. dollar and reducing external inflows from trade partners. This, coupled with moderated growth in the traded sectors relative to the non-traded sectors, led to a trend depreciation of the real effective exchange rate (REER), which put upward pressure on the neutral rate even before the pandemic (see Figures 1 and 2). The picture began to change in the post-pandemic era. Since 2022, Georgia has seen rapid capital inflows and productivity gains, notably in the IT sector, which led to a surge in traded sector productivity and an appreciation of the nominal exchange rate. Consequently, the REER trend began to appreciate, exerting downward pressure on the neutral rate. Looking ahead, the future trajectory of the REER is closely linked to the persistence of productivity gains and the geopolitical landscape. There is significant uncertainty about its longer-run steady-state value, but current estimates suggest it stands around 0.5-1%.

To summarize, while the long-term estimate of the neutral interest rate remains in the range of 7-7.5%, the short- to medium-term neutral rate tends to exhibit greater volatility around this steady-state

2. We consider UIP based on the real effective exchange rate of the GEL, assuming that the trend depreciation of trade partners' currencies against the U.S. dollar is zero.

benchmark. According to the current assessment, the short-term neutral rate is broadly aligned with the current monetary policy rate (of 8%), suggesting that the stance of monetary policy is currently neutral, being neither restrictive nor expansionary with respect to economic activity.

## Conclusion

Understanding the neutral rate is essential for avoiding what Olivier Blanchard refers to as the "dark corner", which implies a misperception of how restrictive monetary policy truly is. The primary challenge lies in the fact that the neutral rate is unobservable. Given this, relying on a single approach may be insufficient. Instead, it is more prudent to draw insights from multiple frameworks, integrating these perspectives through informed judgment.

In the present analysis, the neutral interest rate is estimated using the Georgian Economy Modeling (GEMO) framework, a semi-structural New Keynesian model that serves as the core of the Forecasting and Policy Analysis System (FPAS). The semi-structural nature of the model allows for the integration of expert judgment, which constitutes a key strength of this methodological approach. As a result, the estimation of the neutral interest rate in this study reflects a combination of model-based evidence and expert interpretation. The analysis produces estimates for both the long- and short-term neutral interest rates. Specifically, the findings suggest that the long-term neutral rate currently fluctuates within the range of 7-7.5%, while the short-term neutral rate is estimated to be around 8%.

## References

Adrian, T., Crump, R. K., and Moench, E. (2013). Pricing the term structure with linear regressions. *Journal of Financial Economics*, 100(1), pp 110-138.

Benigno, G., Hofmann, B., Nuno, G. and Sandri, D. (2024). Quo vadis, r*? The natural rate of interest after the pandemic. *BIS Quarterly Review*.

Buliř, A. and Vlček, J. (2024). The Mirage of Falling R-stars. *Czech National Bank Working Papers, 6/2024.*

Campos, R. G., Fernandez-Villaverde, J., Nuno, G. and Paz, P. (2024). Navigating by Falling Stars: Monetary Policy with Fiscally Driven Natural Rates. *Banco de Espana Working Paper No. 2439.*

Castaing, A., Chadwick, M., Galimberti, J. K., Sing, M. and Truong, E. (2024). Estimates of New Zealand's Nominal Neutral Interest Rate. *Reserve Bank of New Zealand Bulletin,* 87(4).

Del Negro, M., Giannone, D., GIannoni, M. P. and Tambalotti, A. (2017). Safety, Liquidity, and the Natural Rate of Interest. *Brookings Papers on Economic Activity,* 48(Spring), pp 235-316.

Del Negro, M., Giannone, D., GIannoni, M. P.and Tambalotti, A. (2019). Global trends in interest rates. *Journal of International Economics,* 118 (C), pp 248-262.

Hlédik, T. and Vlček, J. (2018). Quantifying the Natural Rate of Interest in a Small Open Economy – The Czech Case. *Czech National Bank Working Papers*, 7/2018.

Holston, K. Laubach, T. and Williams, J. C. (2023). Measuring the Natural Rate of Interest after COVID-19. *Federal Reserve Bank of New York Staff Reports No.* 1063.

Hördahl, P. and Tristani, O. (2014). Inflation Risk Premia in the Euro Area and the United States. *International Journal of Central Banking*, 10(3), 1-47.

Laubach, T. and Williams, J. C. (2003). Measuring the Natural Rate of Interest. *Review of Economics and Statistics,* 85(4).

Lindé, J. Tietz, R. and Platzer, J. (2022). Natural versus neutral rate of interest: Parsing disagreement about future short-term interest rates. *VoxEU Column*, July, Volume 26.

Lubik , T. A. and Matthes, C. (2015). Calculating the Natural Rate of Interest: A Comparison of Two Alternative Approaches. *Richmond Fed Economic Brief,* pp 15-10.

Lubik , T. A. and Matthes, C. (2023). The Stars Our

Destination: An Update for Our R* Model. *Richmond Fed Economic Brief*, 23(22).

Obstfeld, M. (2023). Natural and Neutral Real Interest Rates: Past and Future. *NBER Working Papers, No. 31949*.

Obstfeld, M. and Rogoff, K. (1994). The Intertemporal Approach to the Current Account. *NBER Working Paper No. 4893.*

Papetti, A. (2019). Demographics and the natural real interest rate: historical and projected paths for the euro area. *ECB Working Paper Series No. 2258*.

Platzer, J. and Peruffo, M. (2022). Secular Drivers of the Natural Rate of Interest in the United States: A Quantitative Evaluation. *IMF Working Papers,* 22(30).

Rachel, Ł. and Smith, T. D. (2015). Secular drivers of the global real interest rate. *Bank of England Staff Working Paper* (No.571).

Rachel, Ł. and Summers, L. H. (2019). On Secular Stagnation in the Industrialized World. *Brookings Papers on Economic Activity,* 50(1), pp 1-76.

Ramsey, F. P. (1928). A Mathematical Theory of Saving . *The Economic Journal,* 38(152), pp 543-559.

Tvalodze, S., Mkhatrishvili, S., Mdivnishvili, T., Tutberidze, D. and Zedginidze, Z. (2016). The National Bank of Georgias Forecasting and Policy Analysis System. *NBG Working Paper 2016-01.*


*50 Maneti. Sketch. 1992. Author: Nodar Malazonia.*
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# THE CONTRIBUTION OF BUSINESS LOAN GROWTH TO ECONOMIC ACTIVITY

BY DAVID UTIASHVILI AND MARIAM KHARAISHVILI

**Abstract**

This paper investigates the relationship between credit activity and economic growth for Georgia, with a focus on the structure and composition of credit rather than its overall volume. While robust economic growth tends to stimulate credit expansion, the precise type of lending – whether consumer, mortgage, or business – plays a crucial role in shaping its economic impact. Drawing on both international literature and a comprehensive empirical analysis of Georgia, this study highlights the importance of business loans as a key driver of sustainable growth, capital formation, and productivity enhancement. Statistical analysis shows that recent credit expansion in Georgia has been increasingly driven by business lending, which coincides with periods of strong economic performance. To further examine this relationship, a VARX model is employed to assess how changes in the contribution of different loan components to total credit growth affect the contribution of investment to real GDP growth. Although data limitations constrain causal inference, the econometric findings are consistent with the statistical results and international evidence. The study suggests that a shift toward business-oriented lending, alongside improved loan quality, could enhance Georgia's long-term economic prospects.

**Keywords:** Credit Composition, Business Loans, Economic Growth, Investment Dynamics, VARX model

## Introduction

The link between economic growth and the expansion of credit activity has long been a focus of empirical research. On one hand, robust economic growth tends to drive increased credit activity. On the other, the expansion of credit – by improving access to finance – plays a significant role in fostering economic growth.

Credit activity consists of three main components: consumer loans, mortgage loans, and business loans. Each has a distinct impact on the economy. When the growth of the credit portfolio is driven by business loans, the transmission effect on the economy tends to be more fundamental and less cyclical. Business loans directly influence investment dynamics, thereby supporting capital accumulation, the expansion of productive capacity, and the overall growth of a country's economic potential. Consumer loans generally influence the economy through the consumption channel. An increase in such lending facilitates consumption smoothening over time and contributes to higher aggregate demand. In contrast, mortgage loans tend to stimulate investment in real estate, which in turn enhances

overall economic activity, especially in construction and related industries.

It is important to recognize that credit activity also has the capacity to amplify economic cycles. Rapid credit expansion can fuel excessive consumption and investment, particularly in the real estate sector. This often leads to rising asset prices – and, in turn, higher collateral values – which further reinforces the credit cycle, creating a "feedback loop" effect. Conversely, a sharp contraction in credit activity can trigger a decline in both consumer and investment spending, depress asset values, and restrict access to finance. Given these dynamics, understanding the link between credit and economic activity requires careful consideration of which credit component is driving overall credit growth.

The structure of the credit portfolio is a key determinant of both its sustainability and its effect on economic growth. When business loans are the main driver of credit expansion, such growth is more likely to foster long-term productivity improvements, enhance labor efficiency, and support the expansion of the economy's potential. Additionally, credit growth led by business lending is generally less associated with the formation of asset price bubbles.

Conversely, when credit growth is driven mainly by consumer or mortgage loans, there is a greater risk that demand will exceed the economy's supply capacity. This can heighten the likelihood of real estate market bubbles and result in households becoming over-indebted relative to the pace of their income growth.

This paper provides a focused analysis of the key features, composition, and recent trends in credit activity in Georgia, and investigates its potential role in shaping the country's economicgrowth dynamics – an area that, to the best of the author's knowledge, has not yet been thoroughly examined in the context of Georgia.

## Literature Review

The link between economic growth and credit activity has been a central topic in macrofinancial analysis for many years. However, in recent years, the focus of research has shifted from the overall volume of credit to its composition/structure. The main question has become not just how much credit is growing, but who is primarily receiving it – corporations or households. The literature shows that the purpose of credit – whether for investment or consumption – has a significant impact on both long-term economic growth and a country's financial vulnerability.

One of the most widely cited studies in this area is that of Beck et al. (2012), which examines the characteristics of corporate and consumer credit and their impact on economic growth across 45 countries during the period 1994–2005. Their findings reveal that corporate credit significantly supports economic growth, while consumer loans do not exhibit a similar positive effect. Furthermore, the authors show that the growth of business lending is strongly associated with a rapid reduction in income inequality, whereas no such relationship is observed for consumer credit. The study also highlights that the share of consumer loans tends to be higher in more urbanized countries with relatively smaller manufacturing sectors.

Büyükkarabacak and Krause (2009) explore the effectiveness of credit composition by analyzing how household and corporate lending influence the trade balance across different countries. While strong credit activity is often interpreted as a sign of well-developed financial markets and broad access to finance, their model and empirical findings suggest that it is the structure of credit – not its total volume – that plays a decisive role in shaping trade balance outcomes. Their results show that credit extended to firms has a positive effect on the trade balance, whereas household lending is associated with a negative impact.

A notable historical perspective is offered by Jordà, Schularick and Taylor (2016), who compile data spanning 140 years across 17 advanced economies. The authors describe how credit systems shifted from being firm-oriented to household-oriented,

a transformation they term "The Great Mortgaging". Their findings suggest that excessive growth in mortgage lending can significantly increase financial vulnerability in advanced economies. In fact, mortgage booms have been one of the major sources of financial instability in the post–World War II period. The study emphasizes the importance of breaking down credit activity by its components and examining them individually to better inform macroprudential policy design.

Dell'Ariccia et al. (2016) compiled a new database on credit booms covering over 100 countries. Based on their analysis, the authors distinguish between "good" and "bad" credit booms. A credit boom is classified as "bad" if it is followed by a banking crisis and associated with a recession within the next three years. Historical assessments suggest that such harmful credit booms are less likely to be driven by growth in business lending.

Additional notable insights are provided in the BIS study by Cecchetti, Mohanty and Zampolli (2011), which analyzes panel data from industrialized countries. The authors find that while high levels of debt tend to undermine economic growth, the impact varies significantly depending on the type of debt. They identify threshold levels for different debt categories, beyond which growth begins to slow. Importantly, they indicate that corporate debt has a higher tolerance level, and its excess has a less pronounced negative effect on economic growth compared to excessive household or public debt.

The results of the previously discussed studies are further reinforced by the research of Garcia-Escribano and Han (2015). Their study analyzes the role of credit portfolio growth and its composition – corporate, consumer, and mortgage lending – in driving economic growth in emerging economies. Using multi-country panel regressions, the authors demonstrate that credit growth significantly influences real GDP, with the scale and transmission channels of the effect varying by credit type. Their findings show that corporate credit shocks impact growth primarily through investment, while consumer credit shocks are linked to changes in household consumption. Consequently, growth in corporate lending tends to support the expansion of economic potential, whereas growth in consumer loans mainly affects the economy through the demand channel. In addition to the panel analysis, the paper also applies a time series model using Brazil as a case study to assess how credit growth and its structure affect real economic growth. The results of this case study align closely with the panel findings. A similar analysis for Georgia is presented in the following sections of this paper.

Recent studies also provide evidence supporting the main focus of this research. A notable example is the work by Hirano and Stiglitz (2024), which explores the impact of credit growth on long-term productivity and economic expansion through a two-sector endogenous growth model. The model incorporates financial frictions and distinguishes between a growth-driving sector (construction/manufacturing) and a non-productive sector (real estate). The authors argue that the key to long-term productivity lies not in the overall volume of credit, but in its allocation across sectors. Credit directed toward capital investment contributes positively to economic growth. Their analysis also suggests that in the absence of adequate financial regulation, low interest rates and an overly accommodative monetary policy may fuel speculative activity in land markets, crowding out productive investment and ultimately hindering economic growth.

The objective of this study is to analyze the dynamics and structure of credit activity in Georgia and its possible connection to economic growth – an aspect that, to the author's knowledge, has not been specifically explored for the country.

## Data

This paper relies primarily on data from the National Bank of Georgia and GeoStat. Credit growth figures and their decomposition into consumer loans, business loans, and mortgage loans are drawn from

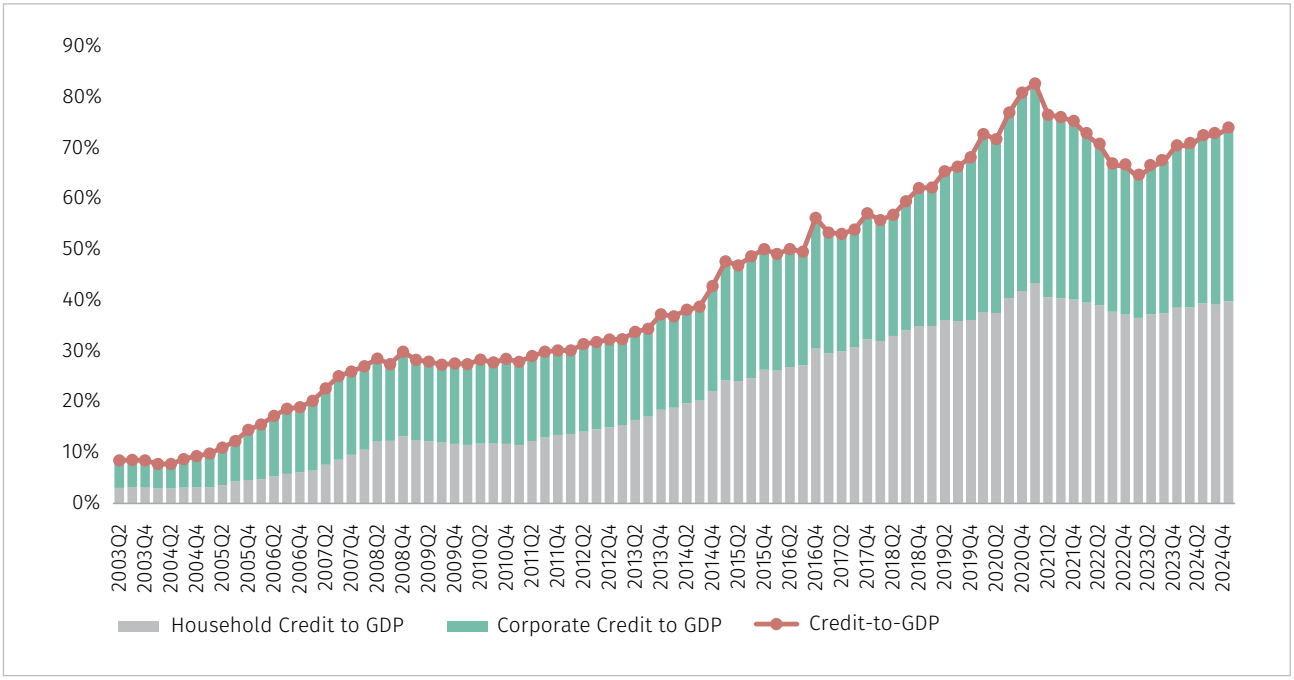
the National Bank. The analysis also incorporates annual turnover growth by firm size and examines loan dynamics across different economic sectors. In addition, the National Bank provides data on bond market developments, the monetary policy rate, and the effective exchange rate. Data on broader economic activity are sourced from GeoStat, including GDP growth and its breakdown by expenditure components, the GDP deflator, government spending, and the trade balance.

The paper utilizes a range of sources for data related to international markets. Brent crude oil prices and the VIX volatility index are obtained from the Federal Reserve Economic Data (FRED) database. GDP data for OECD countries are sourced directly from the OECD databank, while information on LIBOR and SOFR rates comes from both FRED and the Federal Reserve Bank of New York. Additional indicators used in the analysis are constructed or adjusted based on the authors' own calculations. To convert nominal variables into real terms, the study applies the GDP deflator growth rate. Depending on data availability and the specific requirements of the research, both monthly and quarterly data are used.

## Analysis of Credit Activity and its Decomposition

Commercial banks account for roughly 90% of Georgia's financial sector, making the dynamics of bank lending a primary driver of financial sector developments and related economic activity. The credit-to-GDP ratio currently stands at approximately 74% (see Figure 1), a relatively high level compared to similar countries (see Figure 2), indicating strong access to finance. This ratio has increased significantly over the past two decades. While such growth may reflect improved financial inclusion, it can also point to potential financial stability risks if the expansion becomes excessive. For this reason, it is important to evaluate credit growth by loan category to better understand its underlying drivers and economic implications.

**Figure 1. Credit[1] to GDP Ratio**



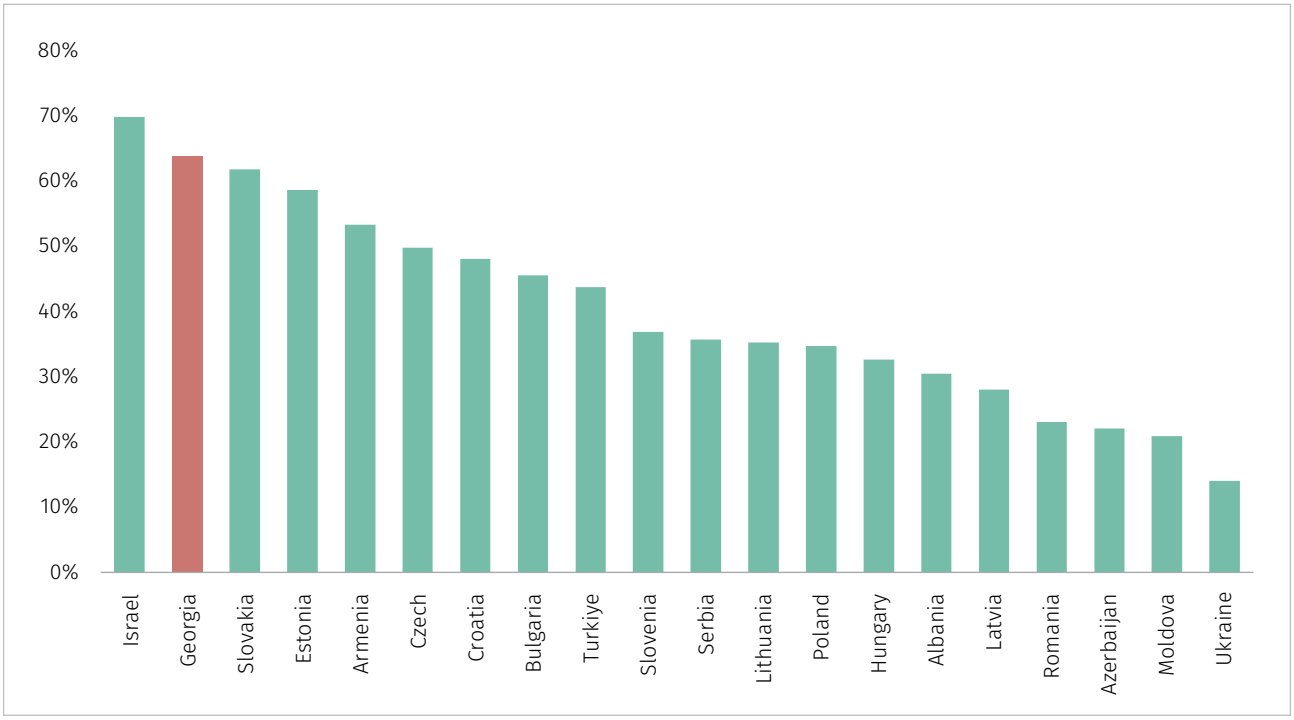

*Source: National Bank of Georgia.*

1. The credit measure includes loans directly issued by commercial banks and microfinance institutions as well as bonds issued domestically by the non-financial sector.

Figure 3 presents indicators that illustrate access to finance. Compared to other countries, Georgia has a relatively high share of firms using bank loans or credit lines. Moreover, the time required for banks to make lending decisions is comparatively short. These factors suggest that firms in Georgia generally enjoy easy access to finance. This is further supported by the Financial Access Perception Index, which is based on survey responses.

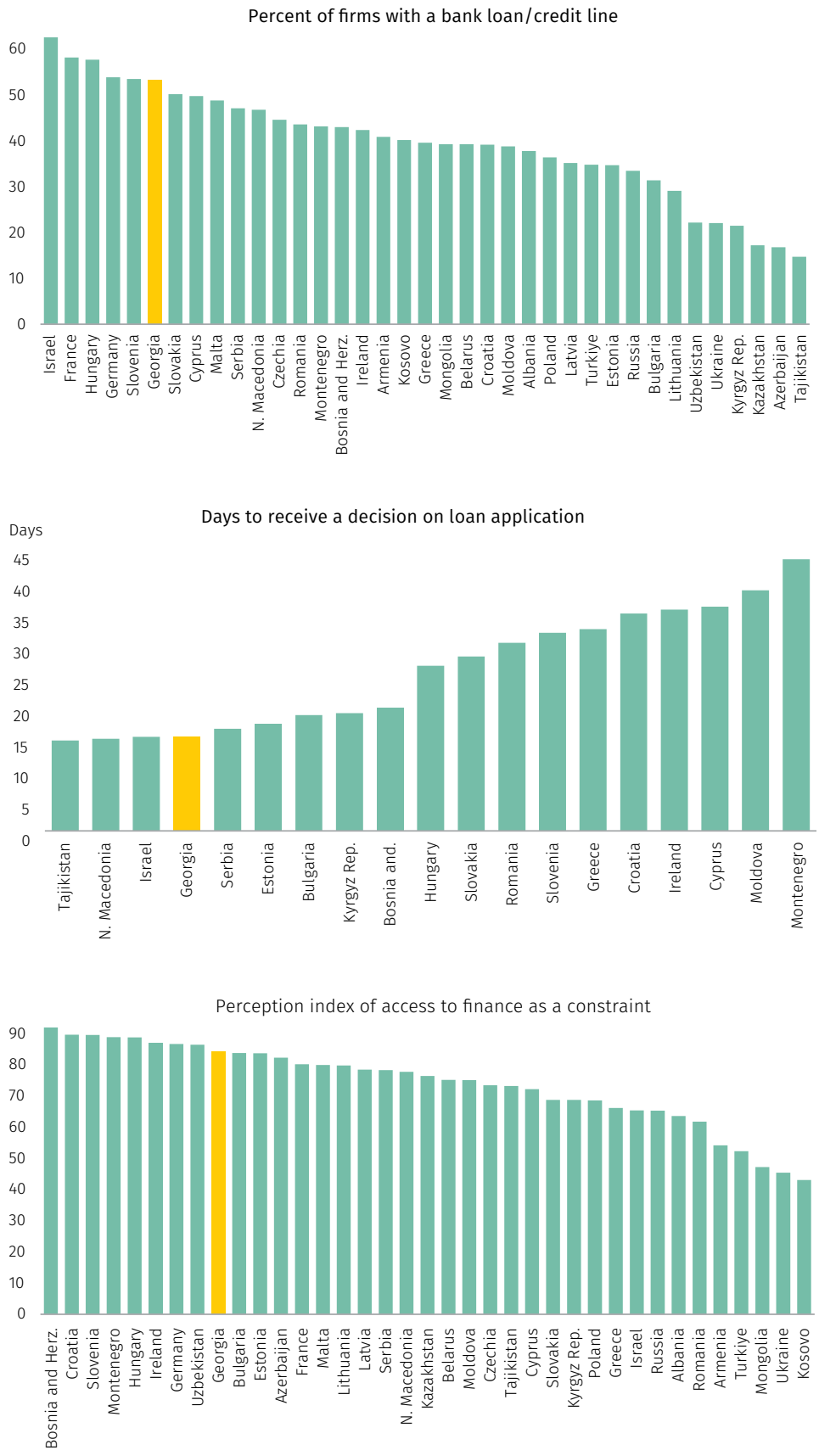
However, it is important to note that the share of loans requiring collateral is relatively high in Georgia, which can constrain credit accessibility. This is largely due to the limited use of movable collateral in lending practices. Still, considering the broader set of indicators and the overall positive trend in business lending, it can be concluded that access to finance for firms in Georgia remains relatively easy.

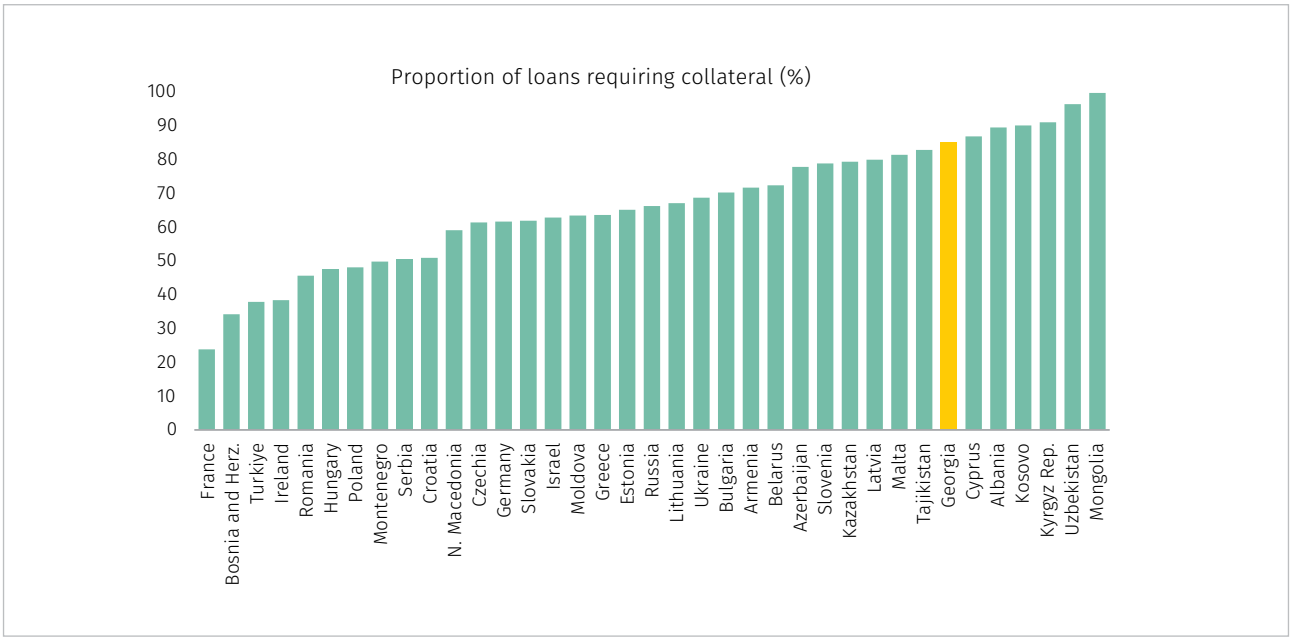
**Figure 2. Bank Loans to the Private Sector as a Percentage of GDP, 2023**




*Source: International Monetary Fund.*

**Figure 3. Companies' Access to Bank Loans (selected indicators)**



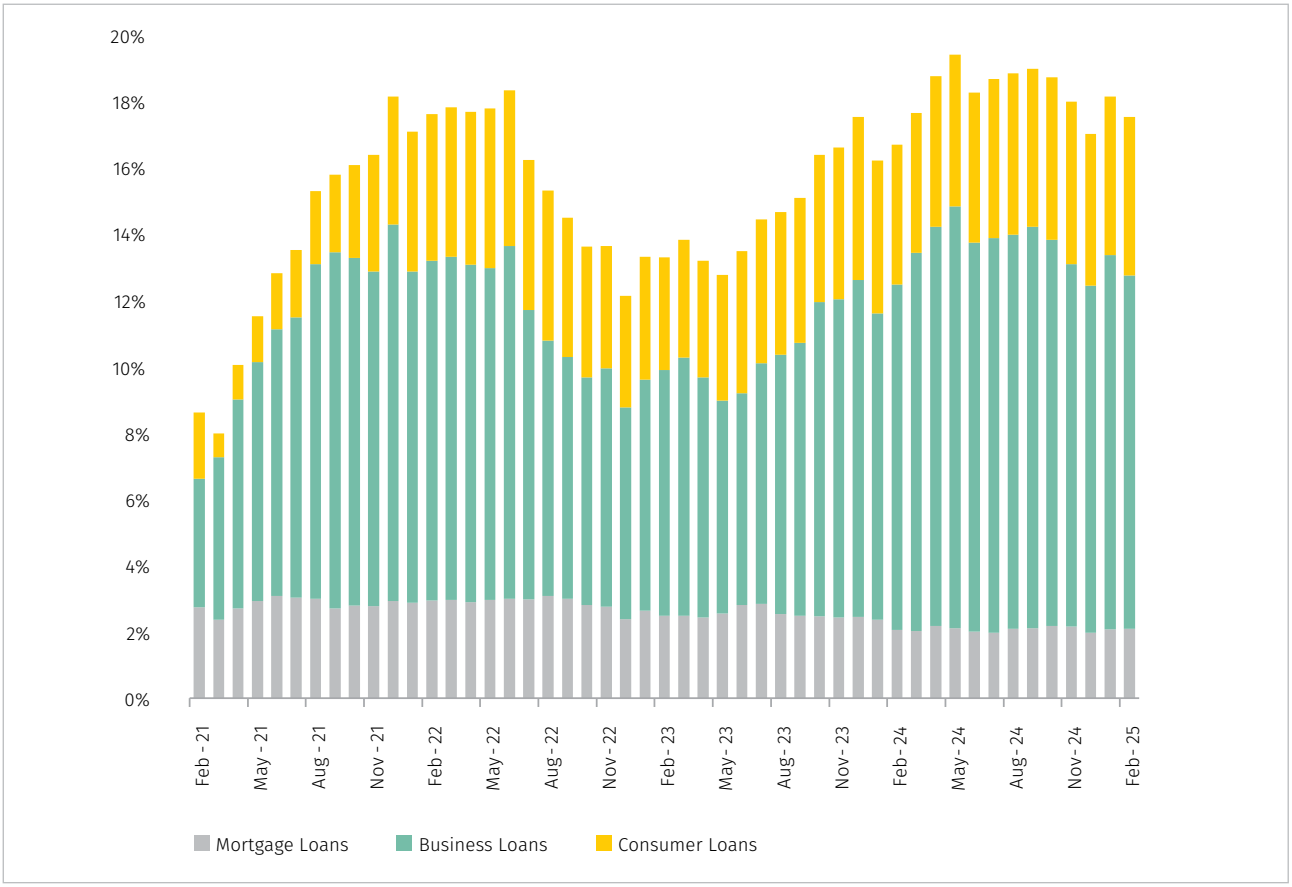



*Source: World Bank Enterprise Surveys (2023).*

As of February 2025, the annual growth rate of loans – adjusted for exchange rate effects – reached 17.4%. Business loans accounted for a significant share of this increase, contributing 11 percentage points (see Figure 4). Since 2022, the contribution of business lending to overall credit growth has steadily increased alongside the broader expansion in credit activity. This trend typically aligns with – and may actively contribute to – the strong economic growth observed during this period.

Looking at the dynamics across loan categories, the annual growth rate of mortgage lending (adjusted for exchange rate effects) has stabilized at around 10% in recent years. Consumer loan growth has been more volatile, with annual rates fluctuating between 20% and 25%. In contrast, business loan growth began accelerating in 2023 and has increased by roughly 10 percentage points over the past two years (see Figure 5).

**Figure 4. Decomposition of Annual Loan Growth Rate (excl. FX impact)**



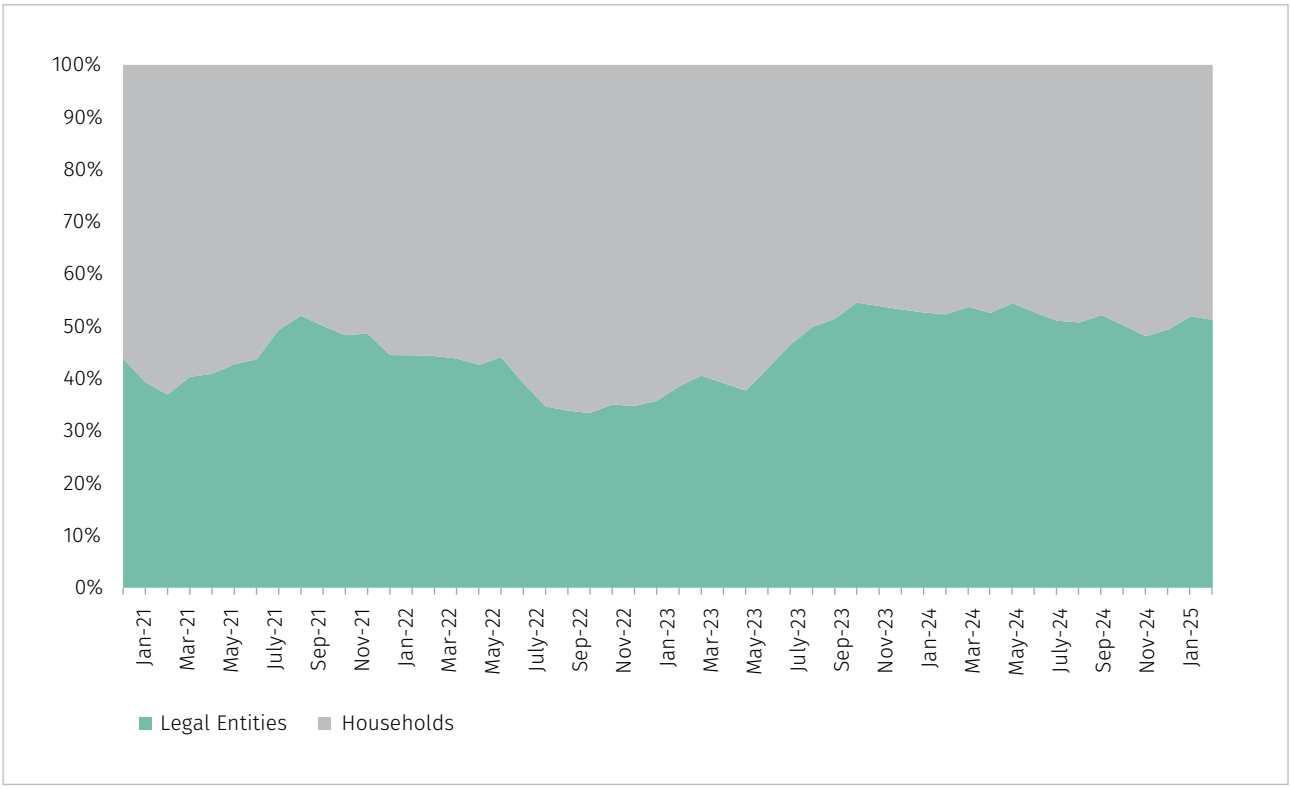

*Source: National Bank of Georgia.*

**Figure 5. Annual Loan Growth Rate (excl. FX impact)**


*Source: National Bank of Georgia.*

A similar pattern emerges when analyzing the dynamics of lending to legal entities and households. In recent years, the share of legal entities in the overall loan growth rate has increased (see Figure 6).

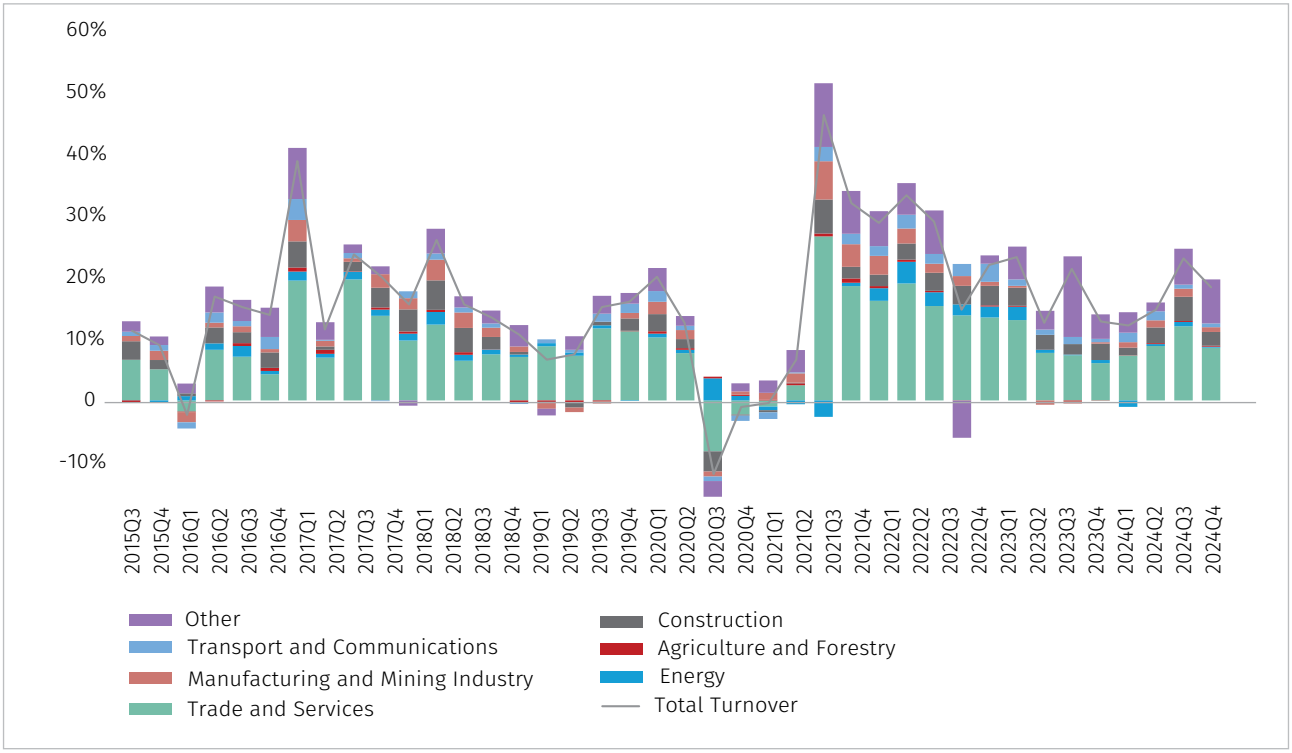
**Figure 6. Decomposition of Annual Loan Growth (excl. FX impact)**




*Source: National Bank of Georgia.*

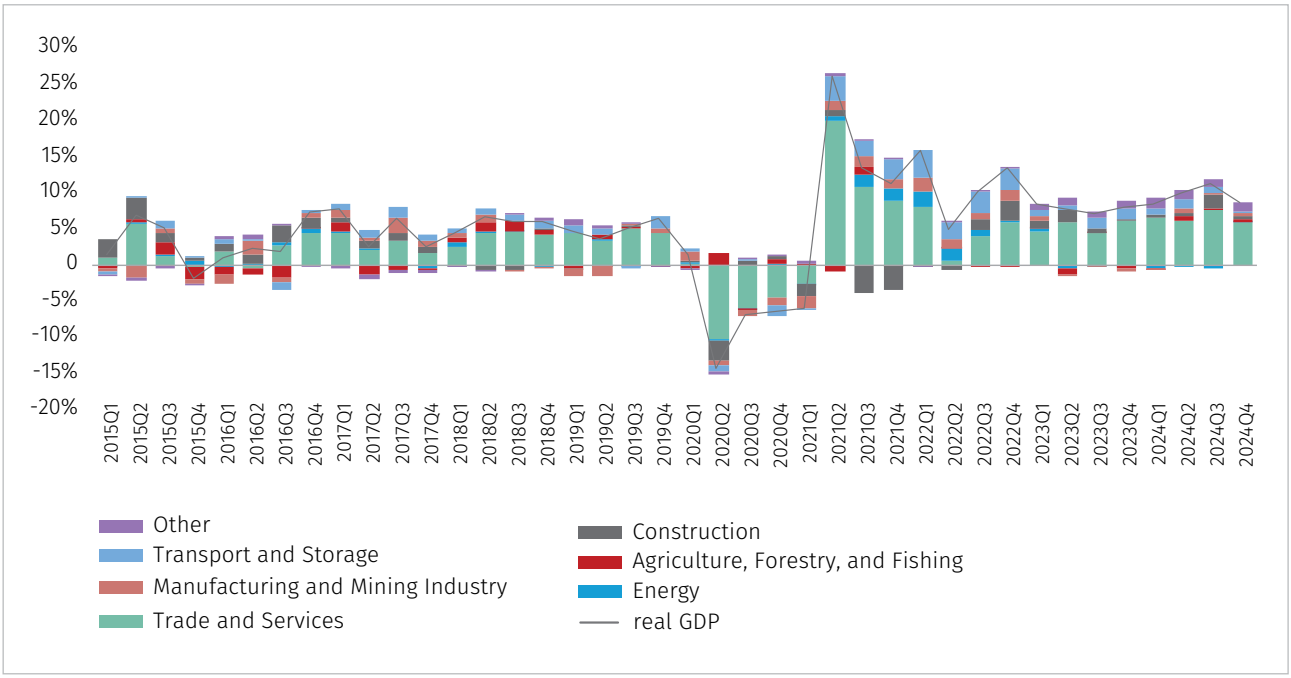
The economic literature consistently points to a strong connection between business lending and economic growth. However, this relationship is inherently endogenous: on one hand, strong economic growth drives increased demand for business loans; on the other, the expansion of business credit supports higher GDP growth. This interplay is particularly evident when viewed through a sectoral lens. Figure 7 illustrates the sectoral composition of growth in bank turnover, while Figure 8 shows the same sectors' contributions to real GDP growth. As expected, sectors that account for a large share of banking turnover have also made significant contributions to economic expansion. Figure 9 provides a more detailed sectoral breakdown of lending, which mirrors the trends shown in the previous two figures. On the one hand, it is logical and expected that sectors that make a strong contribution to economic growth would also account for a large share of banking turnover and lending. On the other hand, it is important to recognize that improved access to finance and credit has been a key factor enabling the rapid development of these sectors and, in turn, supporting the broader expansion of the economy.

**Figure 7. Sectoral Contribution to the Growth of Bank Turnover**



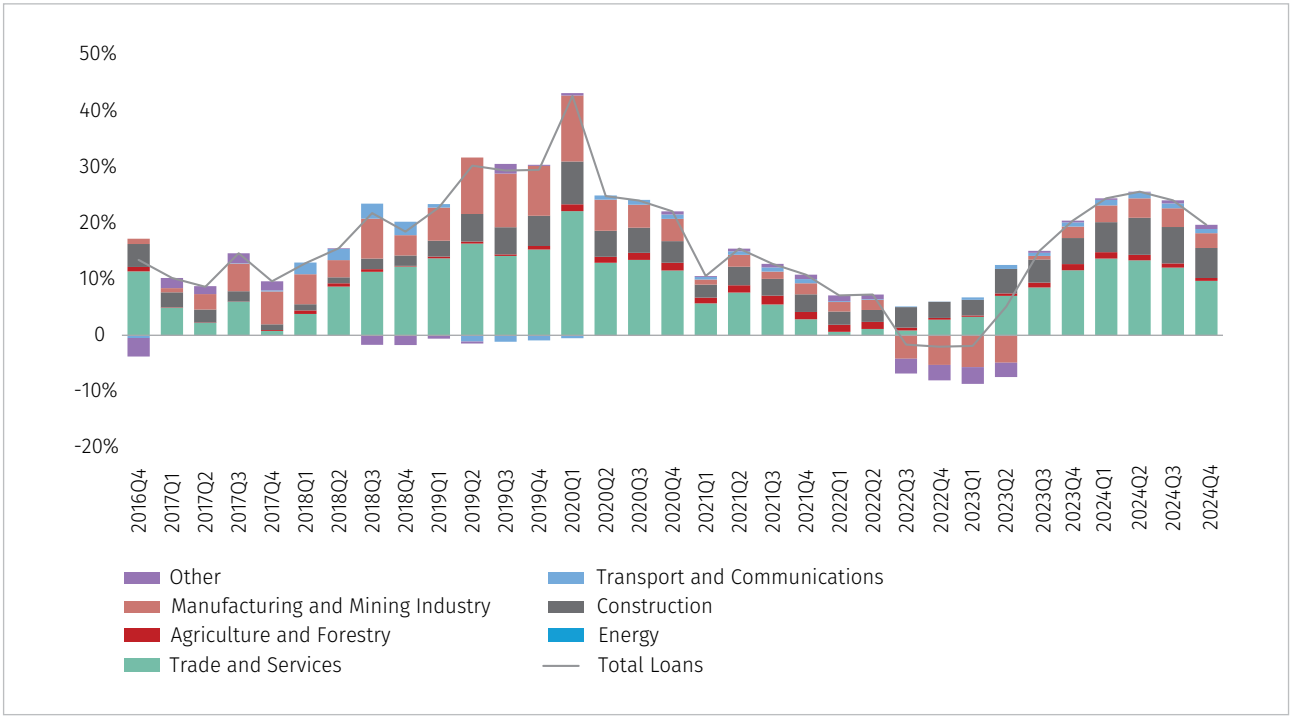

*Source: National Bank of Georgia and Authors' calculations.*

**Figure 8. Contribution of Sectors to Real GDP Growth**




*Source: National Bank of Georgia and Authors' calculations.*

**Figure 9. Sectoral Loan Contribution to Bank Loan Growth[2]**



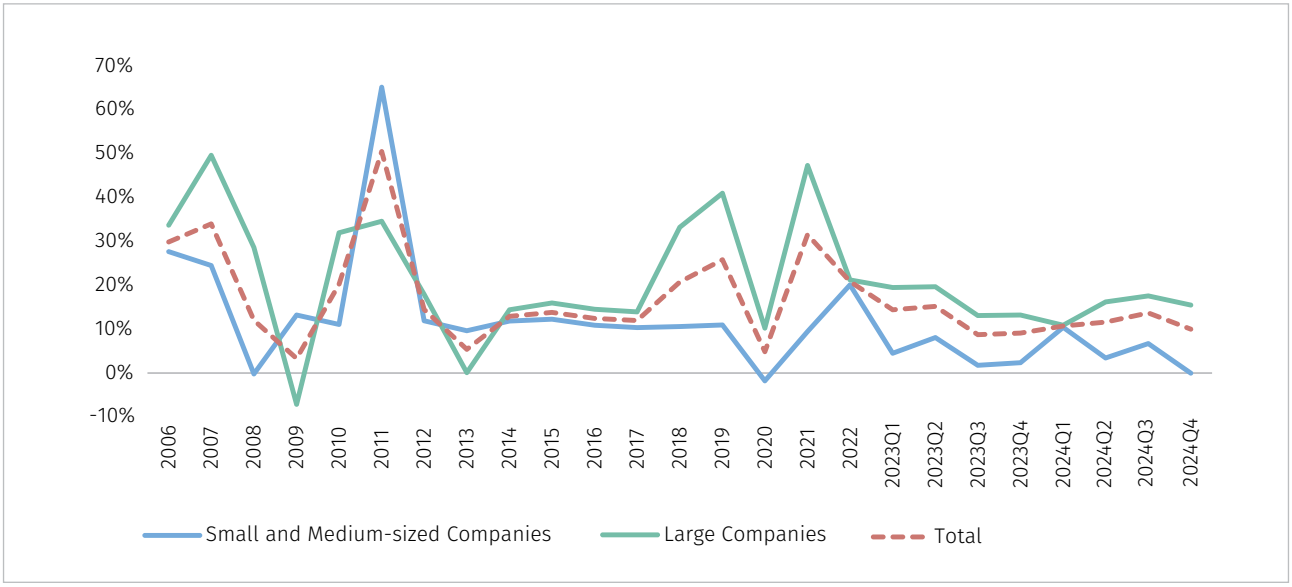

*Source: National Bank of Georgia and Authors' calculations.*

An important aspect of analyzing the relationship between business loans and economic activity is assessing business lending by firm size. Empirical evidence typically suggests that small- and medium-sized enterprises (SMEs) are the primary drivers of economic activity.[3] However, this pattern has not been observed in recent years in Georgia. A comparative analysis of annual turnover growth reveals that large companies have consistently outpaced SMEs over the past decade (see Figure 10). Additionally, loans to large firms have accounted for a consistently higher share of the total business loan growth (see Figure 11).

It is also worth noting that, historically, the annual growth rate of loans issued to small- and medium-sized enterprises (SMEs) has been higher than that of loans issued to large companies (see Figure 12). However, this pattern shifted during two key periods over the past decade – in 2019–2020 and again in 2023–2024 – when the growth rate of loans to large firms surpassed that of loans to SMEs. Considering all of the above, it is unlikely that overall economic growth can be attributed solely to the performance of firms of a particular size. However, it is also important to note that the analysis covers a relatively short time period that has been characterized by several macroeconomic shocks and systematic changes in the macro-financial environment.

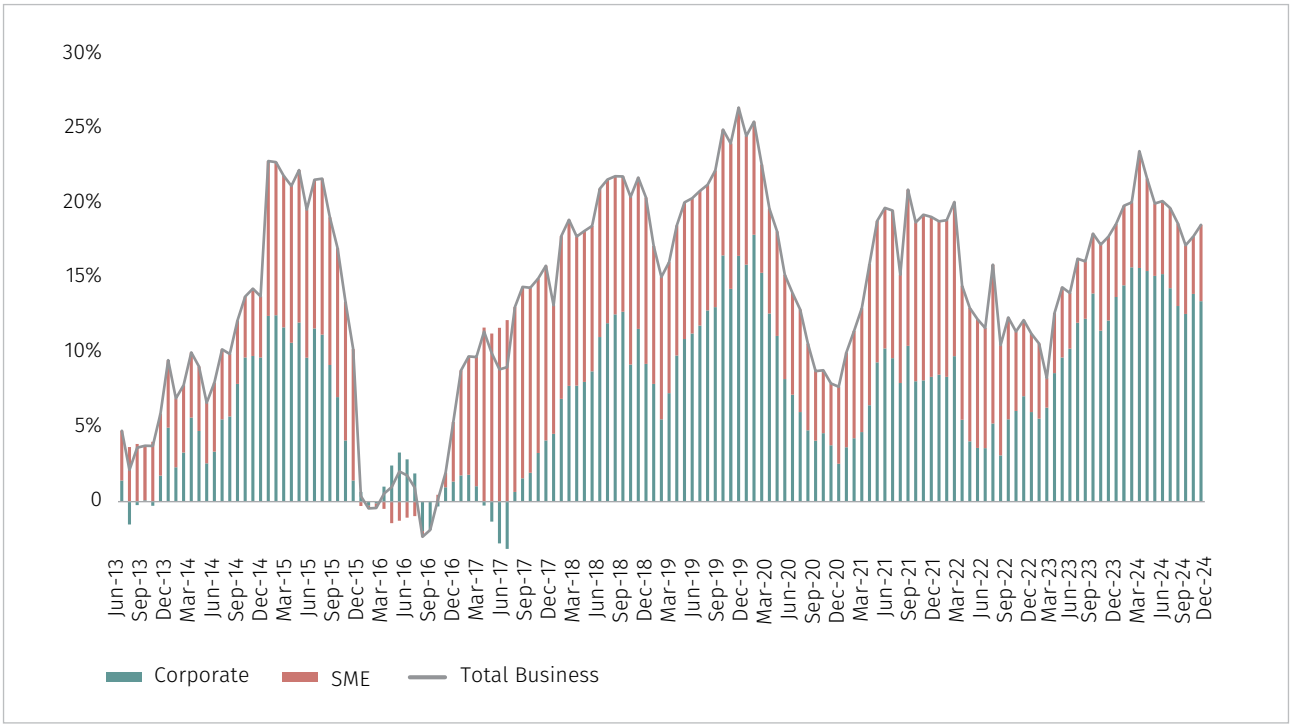
2. The classification in Figure 8 has been structured to correspond with the categories used in Figures 6 and 7. However, due to differences in the original categorization, the components within each category may not align perfectly.
3. For example, see Gherghina et al. (2020); Al-Haddad et al. (2019).

**Figure 10. Annual Turnover Growth by Company Size**



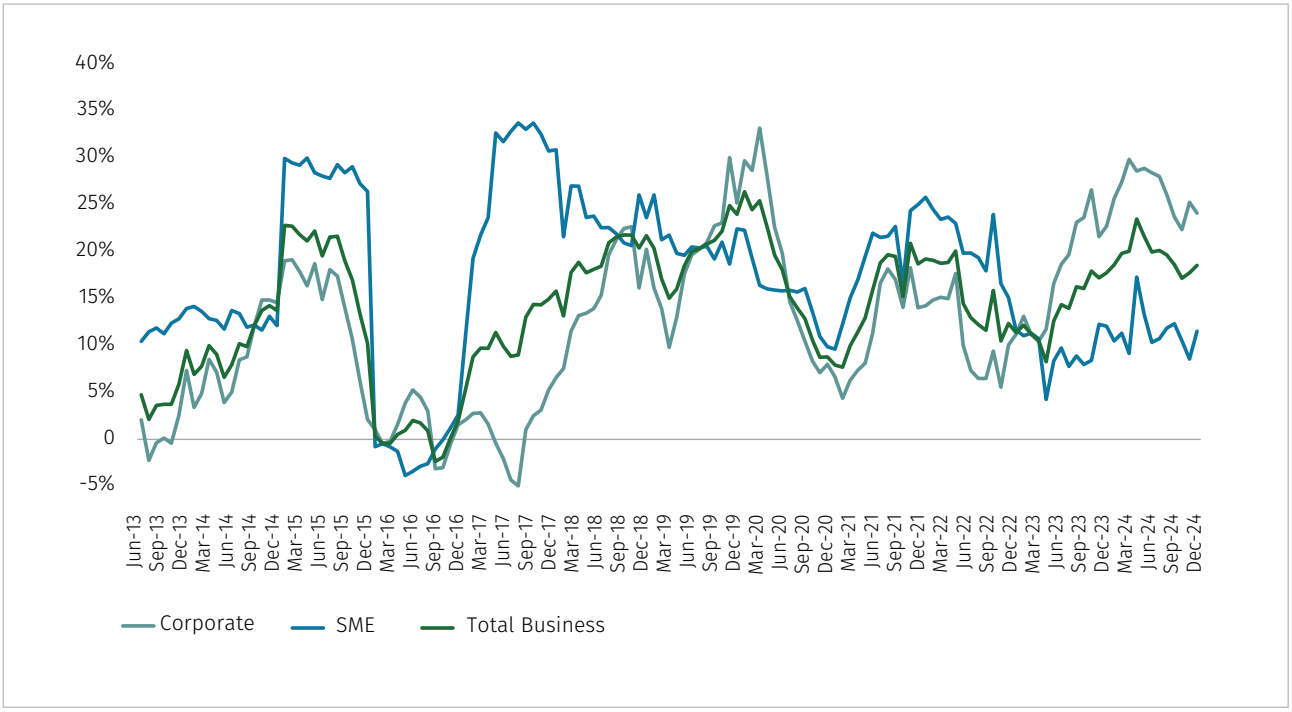

*Source: National Bank of Georgia.*

**Figure 11. Decomposition of the Annual Business Loan Growth Rate**




*Source: National Bank of Georgia.*

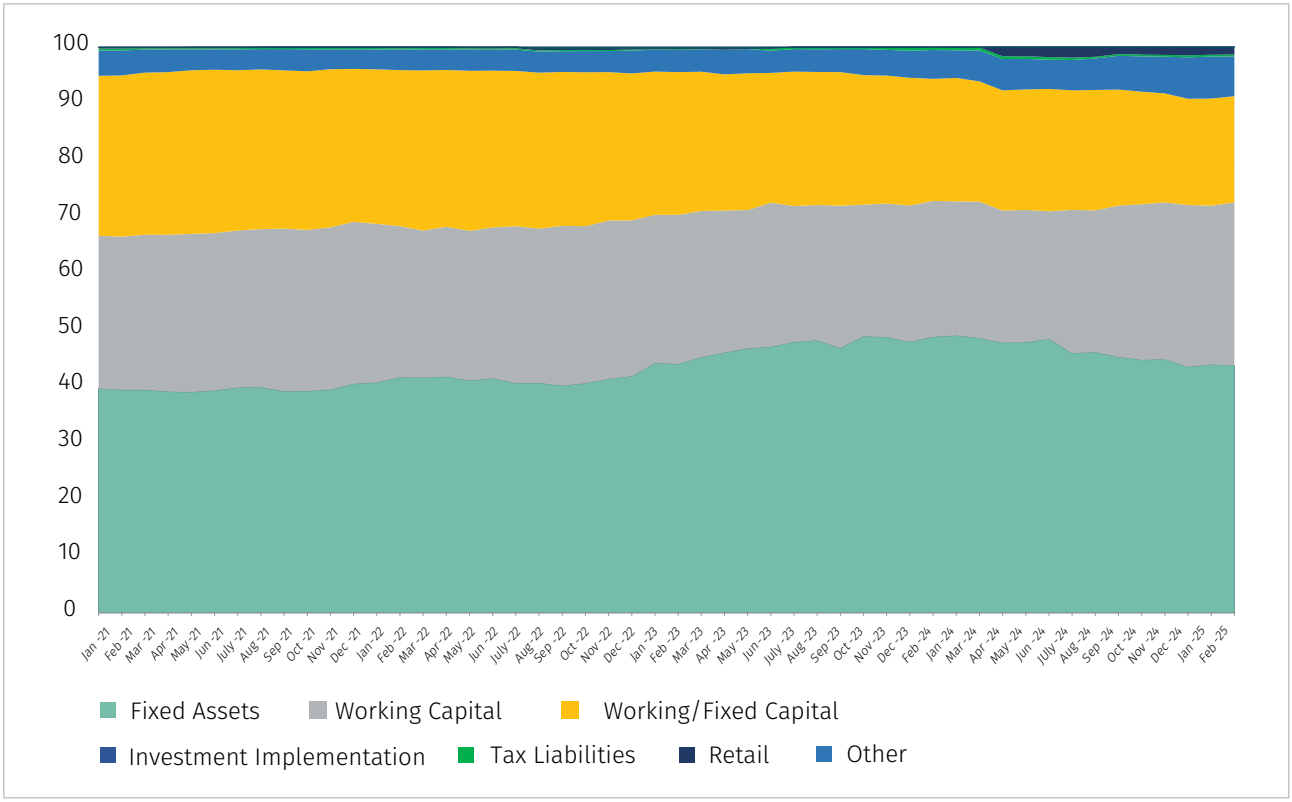
**Figure 12. Annual Growth of Business Loans by Company Size**




*Source: National Bank of Georgia.*

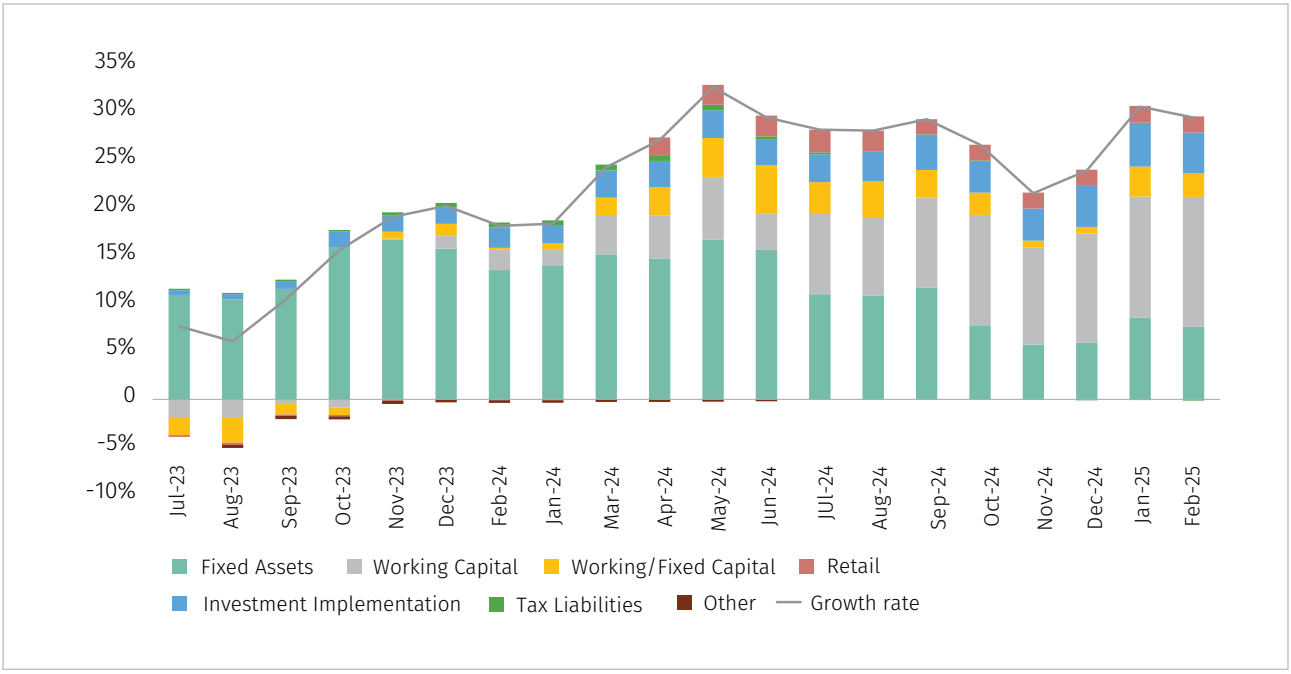
The positive contribution of business loans to economic growth is largely linked to their role in financing capital formation. As business lending expands, it supports investment, which in turn strengthens the economy's productive capacity. A clearer understanding of this relationship can be gained by analyzing the distribution of business loans by economic purpose, as shown in Figure 13. Based on the classification in the figure, loans allocated to fixed asset purchases, investment activities, and partially to working and fixed capital financing can be considered supportive of capital formation. The purpose-based breakdown indicates that a significant share of business loans is directed toward these uses, suggesting strong potential to drive long-term economic growth. This trend is further confirmed by the decomposition of business loan growth in Figure 14, which shows that in 2023–2024, a large portion of the increase was driven by lending aimed at fixed asset acquisition and investment implementation.

**Figure 13. Business Loan Decomposition by Purpose (in percentage terms)**




*Source: National Bank of Georgia.*

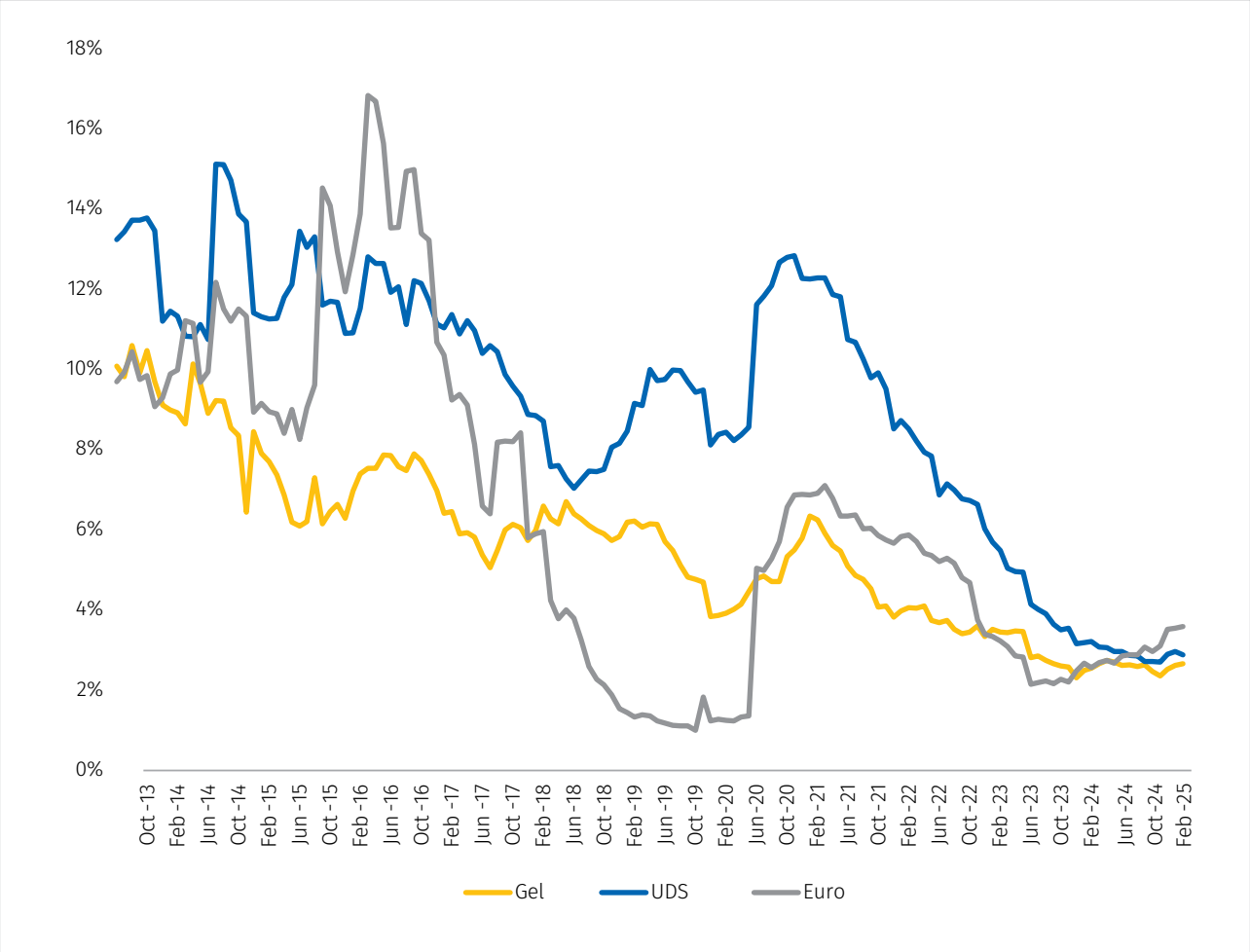
**Figure 14. Decomposition of Large Business Loan Growth by Purpose (in percentage terms)**




*Source: National Bank of Georgia.*

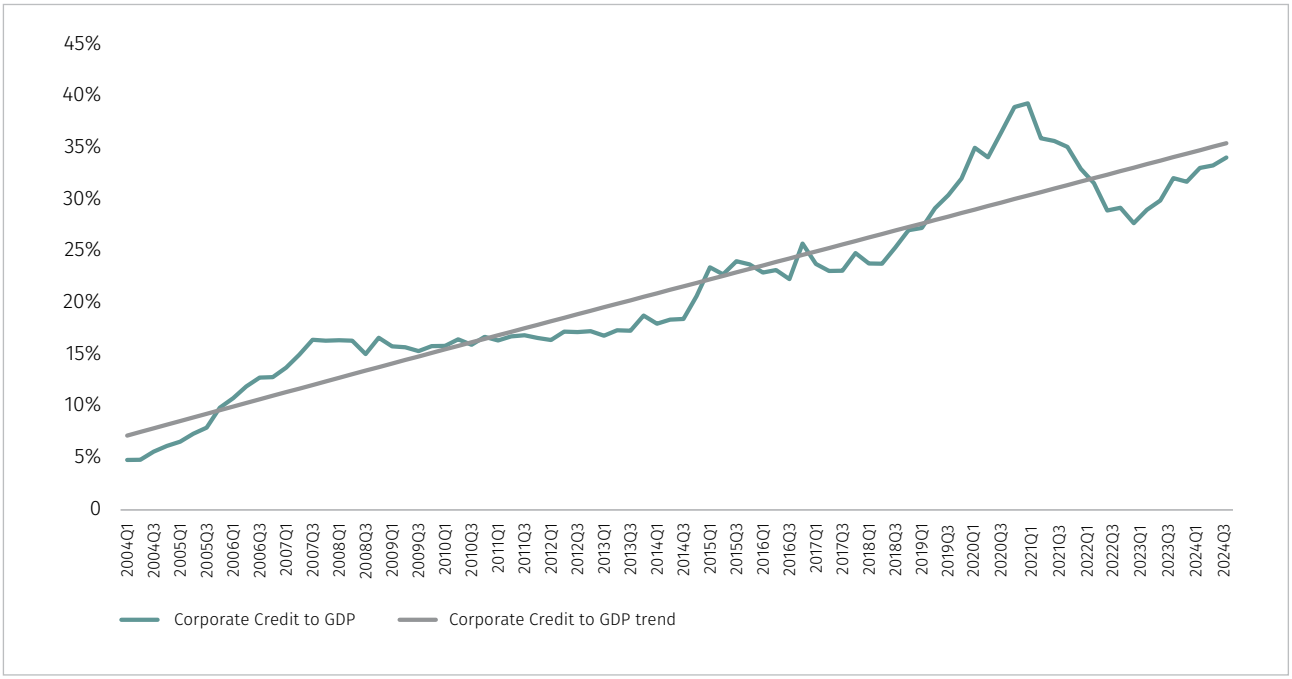
Based on the presented statistical analysis, several key insights emerge. Business loans clearly play a significant role in total credit activity, with a large share of these loans directed toward capital formation. The analysis also shows that as the contribution of business loan growth increased, the real growth rate of economic activity rose markedly. While the short length of the data series makes it difficult to establish clear causality, the econometric analysis provided below offers partial insight into this relationship. It is also noteworthy that in recent years, not only has the share of business loans within total credit increased, but their quality has also improved – clearly illustrated in Figure 15. The figure shows a significant and sustained decline in the share of non-performing business loans across all currencies since the post-pandemic period. Furthermore, corporate credit has grown broadly in line with economic expansion. Currently, the ratio of this type of credit to GDP remains slightly below trend (see Figure 16), suggesting that there is still room for further growth in business lending.

**Figure 15. Share of Non-Performing Loans in Loans Issued to Companies**




*Source: National Bank of Georgia.*

**Figure 16. Corporate Credit to GDP Gap**




*Source: National Bank of Georgia.*

## Econometric Analysis

The previously discussed study by Garcia-Escribano and Han (2015) explores the link between credit activity and economic growth, with a particular focus on the composition of credit rather than its total volume. The authors emphasize the role of business loans within total credit activity, breaking down credit growth into contributions from corporate, consumer, and mortgage lending. Their findings show that these three components play a critical role in shaping the respective contributions of investment and consumption to overall economic activity – and, ultimately, to economic growth. The analysis is based on a panel of emerging market economies. Attempts to replicate the results using Georgian data were unsuccessful, which is not surprising given the limited length of the time series and the significant macroeconomic shifts that occurred during the sample period. As expected, the estimated coefficients for Georgia were not statistically significant. Nevertheless, the paper includes a case study designed to illustrate how positive shocks to consumer, mortgage, and business lending impact overall economic activity through investment and consumption channels.

This study presents a similar analysis for Georgia. Specifically, using a VARX model, it illustrates how changes in the share of business loans within total credit activity affect the contribution of investment to overall economic growth.

The VARX model is specified as follows:

$$Y_t^{Georgia} = A(L)Y_t^{Georgia} + \beta_1 X_t^{Georgia} + \beta_s Z_t + \varepsilon_t^{Georgia}$$

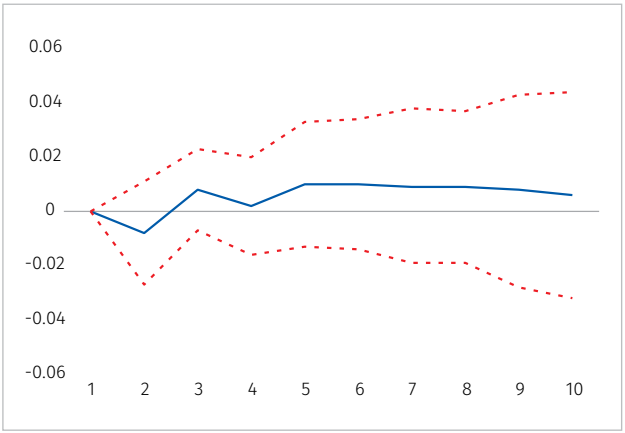
Where $Y_t^{Georgia}$ represents the endogenous variables – specifically, the contributions of consumer loans, mortgage loans, and business loans to the real growth of the total credit portfolio, as well as the contributions of household consumption and investment to real GDP growth.

The vector $X_t^{Georgia}$ includes country-specific exogenous variables such as the monetary policy rate, the real effective interest rate, and the annual growth of government expenditures.

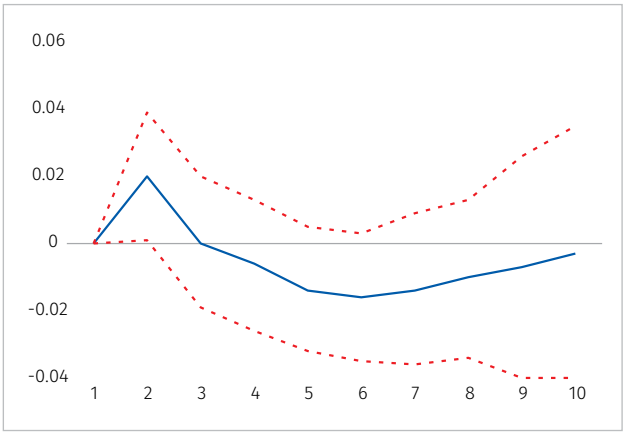
The vector $Z_t$ captures external factors, including global financial conditions (LIBOR and SOFR), real GDP growth in OECD countries, the annual growth rate of oil prices (Brent index), and indicators of economic uncertainty (VIX). Given the limited data availability, Monte Carlo simulations are employed to estimate the confidence intervals.

**Figure 17. Response of Investment's Contribution to Real GDP Growth to Increases in the Contribution of Different Loan Components[4]**

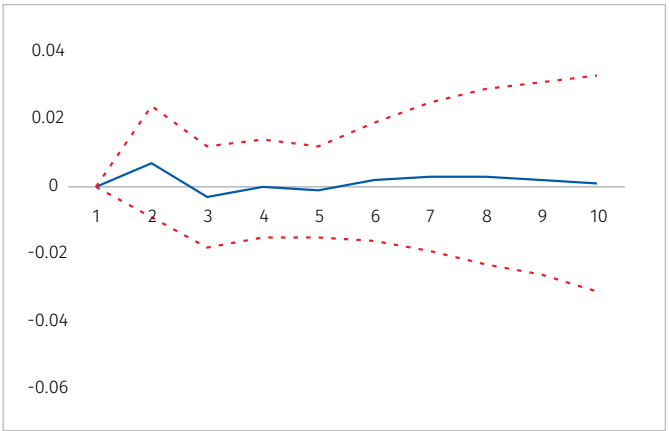
*Impulse response of investment's contribution to real GDP growth to a shock in the contribution of consumer loans to total loan growth (percentage point)*




*Impulse response of investment's contribution to real GDP growth to a shock in the contribution of mortgage loans to total loan growth (percentage point)*




*Impulse response of investment's contribution to real GDP growth to a shock in the contribution of business loans to total loan growth (percentage point)*




4. The blue lines on the graphs show the response to a one standard deviation shock (Cholesky, dof adjusted), while the red lines represent the 95% confidence interval. The time units shown on the horizontal axis represents quarters. The estimated VAR model satisfies the stability condition, with all characteristic roots lying within the unit circle. All impulse response functions converge to zero within 30 quarters; however, only the first 10 quarters are displayed in the graphs, consistent with the approach used by Garcia-Escribano and Han (2015).

Figure 17 presents the impulse response functions, showing the economy's reaction to shocks. The results indicate that an increase in the contribution of consumer and mortgage loans has a positive impact on the contribution of investment to GDP growth. However, in the case of consumer loans, the effect is relatively modest, while for mortgage loans, the initial positive impact is reversed by a negative effect after approximately three quarters. In contrast, an increase in the contribution of business loans initially generates a mild negative response, but from the third quarter onward, the effect turns positive and remains so for up to ten quarters.

These results should be interpreted with caution, considering the wide confidence intervals and the limited availability of data. However, it is noteworthy that the findings are broadly aligned with both the statistical analysis presented earlier in this study and the prevailing narrative in international literature – highlighting that, compared to other loan types, business credit holds greater potential to foster real economic growth.

## Summary

Credit activity plays a vital role in economic growth. However, for it to have a positive impact on the economy, what matters most is not the overall volume of lending, but its composition. When business loans are the main driver of total credit growth, such expansion is more likely to support the development of economic potential and robust economic activity. In Georgia's case, the strong economic growth observed in recent years has been accompanied by credit expansion largely driven by business loans. Moreover, not only has the volume of these loans increased, but their quality has also improved.

Corporate credit has generally grown in line with the overall economy. Currently, the ratio of corporate credit to GDP remains slightly below its long-term trend, suggesting there is still room for further expansion. The rising share of business loans in overall credit growth – alongside the maintenance of high loan quality – stands out as a key factor contributing to sustained real economic growth.

## References

Al-Haddad, L., Al-Shattarat, W., Al-Zu'bi, Z. M. F. and Asad, M. (2019). The role of small and medium enterprises (SMEs) in employment generation and economic growth: A study of marble industry in emerging economy. *International Journal of Financial Research*, 10(6), 153–160.

Beck, T., Büyükkarabacak, B., Rioja, F. K. and Valev, N. T. (2012). Who gets the credit? And does it matter? Household vs. firm lending across countries. *The B.E. Journal of Macroeconomics*, 12(1), 1–46.

Büyükkarabacak, B. and Krause, S. (2009). Studying the effects of household and firm credit on the trade balance: The composition of funds matters. *Economic Inquiry*, 47(4), 653–666.

Cecchetti, S.G., Mohanty, M.S. and Zampolli, F. (2011). The real effects of debt. *BIS Working Paper*, No. 352.

Dell'Ariccia, G., Igan, D., Laeven, L. and Tong, H. (2016). Credit booms and macrofinancial stability. *Economic Policy*, 31(86), 299–355.

Garcia-Escribano, M. and Han, F. (2015). *Credit expansion in emerging markets: Propeller of growth?* IMF Working Paper No. 15/212. Washington, D.C.: International Monetary Fund.

Gherghina, Ş. C., Simionescu, L. N., Hudea, O. S. and Duca, I. G. (2020). Small and medium-sized enterprises (SMEs): The engine of economic growth through investments and innovation. *Sustainability,* 12(18), 7527.

Jordà, Ò., Schularick, M. and Taylor, A. M. (2016). The great mortgaging: Housing finance, crises, and business cycles. *Economic Policy*, 31(85), 107–152.



*2 Lari. Sketch. 1993. Authors: Nodar and Bachana Malazonia.*
*Preserved at the Money Museum of the National Bank of Georgia.*



*10 Lari. Sketch. 1993. Authors: Nodar and Bachana Malazonia.*
*Preserved at the Money Museum of the National Bank of Georgia.*

# OPEN BANKING IN GEORGIA AND THE FUTURE OF OPEN FINANCE

BY VARLAM EBANOIDZE, VASIL SHENGELIA AND ANA PIRTSKHALAISHVILI

**Abstract**

This article discusses the establishment of open banking in Georgia and its impact on the development of the financial sector. It examines the initiatives of the National Bank aimed at improving access to innovative financial services, increasing customer engagement, and enhancing competition. The article outlines the main advantages of open banking, including service flexibility and cost reduction. It presents an analysis of the areas where open banking has particularly high potential. The paper explores the possibilities of transitioning from open banking to open finance in Georgia, taking into account best international practices that demonstrate a significant expansion of financial services. The article highlights the role of multi-stakeholder collaboration and the improvement of technological infrastructure in creating a modern, inclusive financial ecosystem.

**Keywords:** Open Banking, Open Finance, Third-Party Providers (TPPs), Financial Technologies (Fintech), Innovative Services, Application Programming Interface (API), Financial Ecosystem.

## Introduction

Open banking is considered one of the most innovative directions in the modernization of financial services. Since 2019, the National Bank of Georgia has declared the development of open banking as a strategic priority, clearly reflecting the country's ambition to remain competitive on the global financial stage. The pursuit of open banking and open finance is directly linked to enhancing financial inclusion and protecting consumer rights, both of which are critical objectives for transitional economies. Moreover, the prospective shift towards open finance aligns with the global trend of digitalizing financial systems.

Georgia's financial ecosystem is undergoing significant transformation, driven by technological and regulatory innovations aimed at strengthening competition, expanding consumer choice, and enhancing transparency within the banking sector. The transition to open banking enables third-party providers, with the consent of customers, to access banking data and offer a broader range of financial products and services. The steps taken by the National Bank of Georgia towards the establishment of open banking lay the foundations for the country to position itself as a regional leader in fintech innovation, fostering a financial ecosystem that benefits both consumers and businesses.

This article reviews the development of open banking in Georgia and the future of open finance, as well as how these changes will affect financial institutions, third-party providers, and consumers. The paper also evaluates the extent to which the National Bank of Georgia's open banking initiatives align with global best practices and the regulatory frameworks of leading countries.

## Literature Review

The evolution of open banking and its broader economic implications have been widely studied by economists worldwide. The core principles of open banking – enhancing competition, increasing financial inclusion, and fostering innovation – align with broader economic theories related to market efficiency and consumer empowerment.

Economists studying financial liberalization have frequently highlighted the role of regulatory frameworks in shaping banking innovation. For instance, studies on the EU's PSD2 regulation emphasize how mandating data-sharing practices leads to a more competitive banking environment, reducing costs and expanding service offerings. Research by economists such as Philippon (2019) states that open banking contributes to reducing market power concentration among traditional banks, leading to better financial product pricing and improved consumer access to banking services.

Similarly, European economic analyses have examined how open banking facilitates financial stability by diversifying the range of service providers. The transition from open banking to open finance has been explored in studies by scholars like Zetzsche, Buckley and Arner (2021), who argue that the extension of financial data sharing beyond banking and into sectors like insurance and investment enhances overall market efficiency and improves consumer choice.

Various economists have examined the impact of digital financial ecosystems on financial inclusion in emerging markets (for instance, Ozili, 2018; Demirgüç-Kunt et al., 2022). Studies on open banking adoption in countries like Brazil and India highlight how regulatory frameworks tailored to local market conditions can maximize the benefits of open banking. The National Bank of Georgia's approach to having a unified open Application Programming Interface (API) standard in the country, in line with the Berlin Group Standard, reflects an effort to implement best international practices while taking into account the specific needs of Georgia's financial sector (National Bank of Georgia, 2021).

Overall, the economic literature underscores the importance of balancing innovation with consumer protection. While open banking promotes competition and efficiency, economists warn that without robust regulatory oversight, risks related to data security and market monopolization by dominant tech firms could emerge (Carstens, 2019; Zetzsche et al., 2020). Georgia's ongoing regulatory developments will play a crucial role in shaping the long-term success of open banking and open finance within the country's financial landscape.

## Theoretical Framework

Open banking is based on the principle of data portability and consumer consent, which allows consumers to share their financial data with third-party providers (TPPs) in a secure and regulated environment. This approach fosters greater competition among financial institutions, as customers can more easily compare services and switch between providers based on factors like price, service quality, and customer satisfaction. From an economic standpoint, this increased competition leads to more efficient markets, lower transaction costs, and increased innovation (Carletti, 2020; Gomber et al., 2018).

The theoretical model of open banking operates under the assumption that consumers will benefit from greater control over their financial data. This allows consumers to make more informed decisions about financial products and services. In theory, open banking also has the potential to drive financial inclusion by making financial services more accessible to underserved populations. By integrating third-party solutions with banking systems, open banking enables the creation of customized financial products that cater to a wide range of consumer needs, from budgeting tools to alternative lending options (Zetzsche et al., 2020).

Georgia's adoption of this model, particularly through the Berlin Group Standard, helps ensure that the

regulatory framework remains robust and aligns with international best practices. The model is also grounded in the principles of consumer protection and data security, addressing concerns about privacy and safeguarding sensitive financial information while fostering innovation.

## International Practices

Georgia continues its transition from open banking toward the broader concept of open finance, which entails the sharing of end-users' financial data not only from commercial banks but also from other financial institutions, such as insurance companies, pension funds, and investment firms. Consequently, it is essential to analyze how countries at the forefront of financial innovation have navigated this transition. By taking into account their experiences, Georgia will be better positioned to advance and take significant steps toward establishing effective and secure financial ecosystems.

The **United Kingdom's** open banking journey began in 2018 with the Competition and Markets Authority (CMA) mandating the nine largest banks to open their customer data to third-party providers (TPPs) through standardized APIs. Overseen by the Open Banking Implementation Entity (OBIE), the system led to over 7 million users being active by 2023 and spurred a flourishing fintech ecosystem.

In 2019, the United Kingdom's Financial Conduct Authority (FCA) launched the Call for Input: Open Finance initiative, which aimed to gather proposals from interested stakeholders – including banks, fintech companies, and consumer groups – regarding opportunities for the development of open finance. Subsequently, the recommendations obtained through this process were linked to the Smart Data initiative, which envisions extending the portability of consumer data across various segments of the financial sector, including mortgages, pensions, and insurance (FCA, 2019).

The UK's strategy includes the establishment of a Smart Data Council to coordinate cross-sectoral development; the promotion of interoperability and the enhancement of consumer control over their data; and the encouragement of industry-led innovation under strong regulatory oversight.

The development of open finance in **Australia** is based on the Consumer Data Right (CDR) framework, which was launched in 2019 initially within the scope of open banking before subsequently being extended to the energy and telecommunications sectors. This is an integrated open data system characterized by a phased implementation approach; a centralized accreditation system for data recipients managed by the Australian Competition and Consumer Commission (ACCC); a strong emphasis on consumer control and transparency through standardized consent dashboards; and the principles of API reliability and data minimization. This approach enables consumers to seamlessly access and manage their data across multiple sectors, thereby promoting competition (CDR, 2022).

**Brazil's** open banking model, coordinated by the Central Bank of Brazil (BCB), became operational in 2021 and rapidly evolved into an open finance-oriented system by the following year. Brazil's example is notable for its comprehensive inclusion across financial service sectors, including banking, insurance, pension funds, and investment services.

Brazil's approach includes a mandatory participation model for regulated entities. It is based on robust technical standards and a comprehensive regulatory framework. Key features of the system include real-time consent management capabilities; the implementation of Pix, a fast payment platform that is tightly integrated into the open finance framework; and close collaboration among stakeholders involved in and impacted by open finance initiatives (BCB, 2021).

As a result, Brazil has rapidly emerged as a global leader in consumer-centric digital finance and serves as a model for a financial ecosystem governed by a regulatory framework.

In contrast to the models of the United Kingdom and Brazil, **Singapore's** approach to open finance does not mandate compulsory API sharing. Instead, it promotes financial innovation through several key initiatives:

- The APIX (API Exchange) platform, which connects financial institutions and fintech companies across the Asia-Pacific region;
- The Financial Industry API Register, as maintained by the Monetary Authority of Singapore (MAS), which supports API transparency and standardization;
- Regulatory sandboxes, which are designed to test open finance models, including those for cross-border payments, digital identity, and tokenized assets.

Singapore's success demonstrates how government support and international collaboration can accelerate the path toward open finance.

The analysis of different countries' experiences reveals several common strategies that facilitate an effective and seamless transition from open banking to open finance:

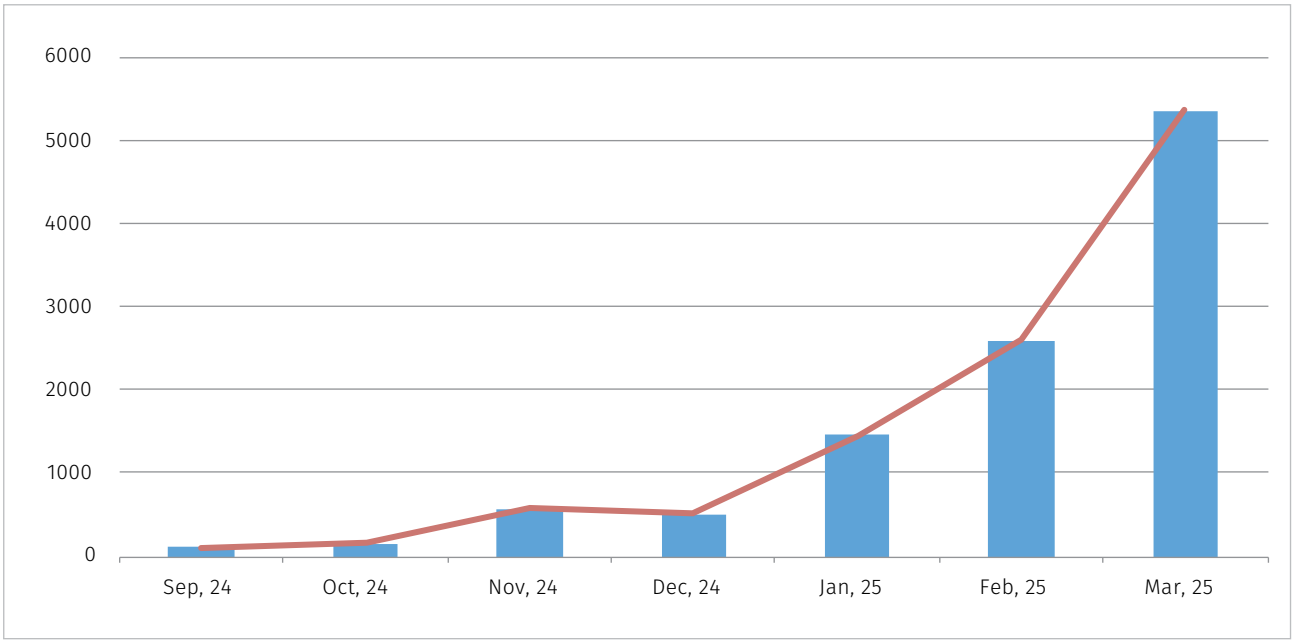
- *Gradual expansion of scope:* Beginning with core banking data (such as accounts, transactions, and payments) and progressively extending to include pensions, insurance, mortgages, investments, and other sectors like telecommunications and utilities;
- *Protection of personal data:* Strengthening consumer trust through secure APIs, consent-based data access, and transparent consent management dashboards;
- *Coordination among involved entities:* Establishing sector-specific groups and committees to foster the development of open finance ecosystems and synchronize cross-sector initiatives;
- *API standardization and interoperability:* Integrating widely adopted standards (e.g., Berlin Group, UK OBIE, FAPI, and ISO 20022).
- *Consumer-centric infrastructure:* Ensuring data portability for users, transparent consent mechanisms, access to innovative financial tools, and the promotion of digital literacy and financial inclusion.
- *Use of regulatory sandboxes:* Testing and monitoring new and innovative models within a controlled regulatory environment (Moneythor, 2020).

## Data Analysis

The data analyzed in this section are derived from the National Bank of Georgia's (NBG) efforts to launch and regulate open banking initiatives within Georgia. These initiatives include the introduction of various Application Programming Interfaces (APIs), which facilitate the seamless exchange of banking data between regulated financial institutions and third-party providers. The data analyzed include metrics on the number of banks and third-party providers participating in open banking, Additionally, it is important to assess the impact of different API standards on the number of participants involved in open banking ecosystems and on the diversity of the services offered.

As of 2025, five leading commercial banks operating in Georgia, the digital bank Paysera Bank, and three non-bank institutions, including the fintech company Keepz.me – all of which have already initiated payment services – are officially registered in Georgia's open banking ecosystem. The National Bank is actively monitoring the statistics of API usage. The key indicators include the number of active users, the volume of transactions, and the total number of transactions conducted through open banking.

**Figure 1. Number of Transactions Made Through Open Banking in 2024–2025**




*Source: National Bank of Georgia.*

The data demonstrate a continuously growing adoption of the NBG's open banking APIs across various financial sectors. The number of active users of application programming interfaces (APIs) for remote identification continues to grow.

Adoption rates across Georgian banks have been accelerating, with an increasing number of third-party providers offering innovative financial services. For instance, non-bank payment service providers (PSPs) are playing a crucial role in expanding the use of open banking to automate payments and offer new subscription-based financial products. This growth reflects both consumer demand for more flexible financial services and the regulatory framework that the NBG has put in place.

The data reflect a growing trend of the adoption of open banking APIs by the National Bank of Georgia across various segments of the financial sector. The number of active users of APIs continues to rise as part of the implementation of remote identification.
The significant increase in the use of open banking in the Georgian market is linked to the growth of third-party providers offering innovative financial services. For example, Payment Service Providers (PSPs) play a crucial role in expanding the use of open banking, particularly in the development of automated payments and financial products.

Observing real data after the implementation of open banking shows that key indicators, such as market competition, customer satisfaction, and financial inclusion, have significantly improved. This assessment is based on shared data, feedback from stakeholders, and an analysis of market dynamics before and after the introduction of open banking-related reforms.

The key point is that open banking has significantly expanded customer access to financial products and services that better meet their individual needs. Through the secure sharing of data and the development of compatible APIs, customers are now able to collaborate more transparently and easily with financial institutions and third-party providers.

From a competition perspective, the impact of open banking is evident. Its implementation has made it mandatory for commercial banks to share customer data with third-party providers based on customer

consent, which has allowed new financial startups and non-bank institutions to enter the market. These players have introduced more flexible, technologically advanced services targeted at previously under-served customers.

In terms of financial inclusion, open banking has emerged as a promising tool. It has enabled people living in regions that may not have access to traditional banking to carry out financial transactions using mobile applications and web services. This change serves not only to reduce economic inequality across the country but also provides customers with the opportunity to manage their finances independently.

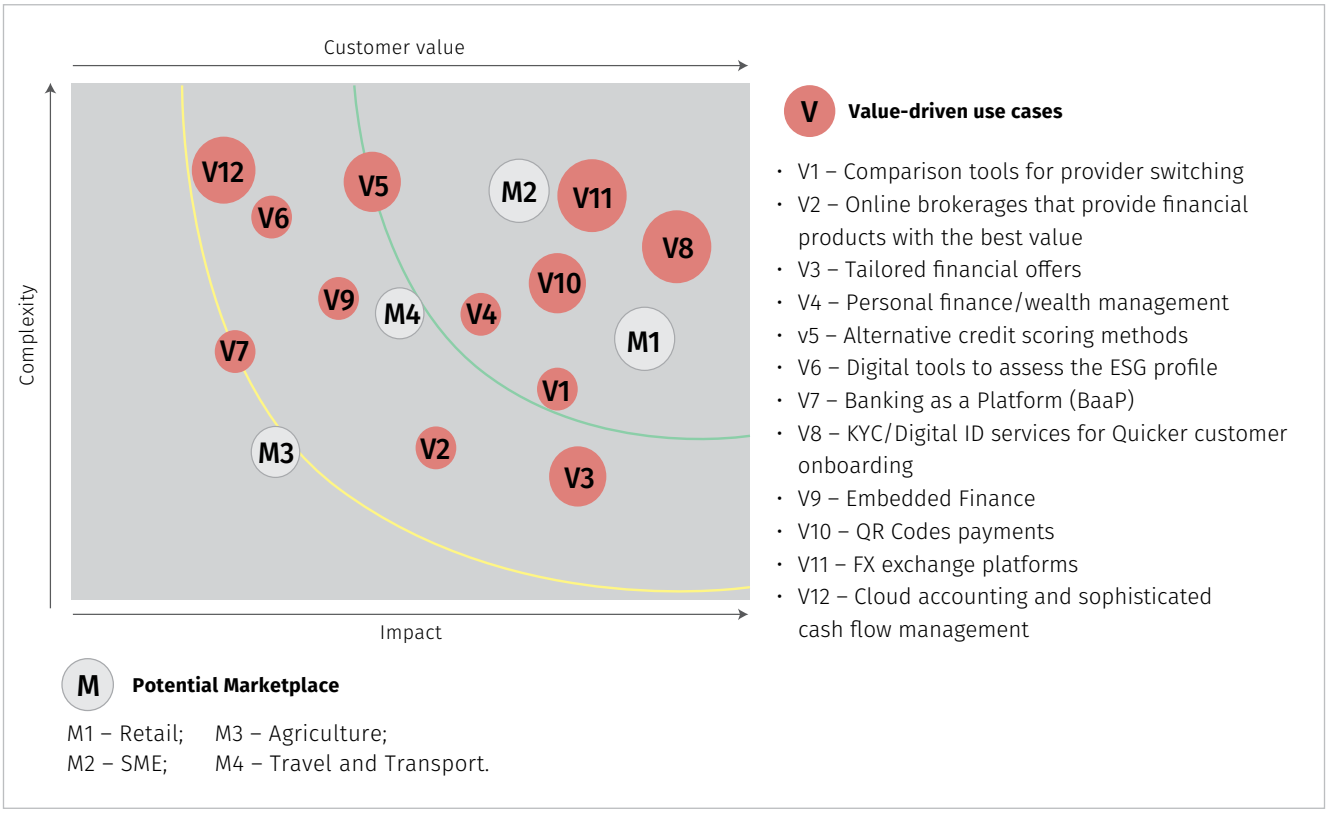
Moreover, the infrastructure of open banking has laid the foundation for the development of data-driven analytics and personalized financial products. In summary, the implementation of open banking in Georgia has improved both the functionality and accessibility of financial services, as well as innovation and customer well-being. As the open finance ecosystem continues to grow and evolve, these benefits will expand and gain greater significance.

## Open Banking and Open Finance Opportunities

The matrix presented below visually represents the opportunities for open banking and open finance based on three key parameters: the value created for the user, market impact, and implementation complexity.

The circles, representing specific opportunities in the context of open banking, are labeled with use cases focused on value creation (V1–V12) and market segments (M1–M4). The placement of the circles within the matrix reflects how much value they create for users, how difficult they are to implement, and the potential market impact they may have.

**Figure 2. Open Banking/Finance Opportunities and Prioritization Matrix**




*Source: National Bank of Georgia.*

The value-oriented use cases (pink circles) represent practical applications or services enabled through open banking. Each point marked with a "V" corresponds to the list provided on the right side of the matrix. For example, V1 and V10 are located in the high value and medium complexity zone, indicating that their implementation is feasible with relatively minimal resources and offers high benefits. Meanwhile, V12 and V6 also create value, but would be more difficult to implement, requiring more resources and greater technical involvement.

Potential markets (gray circles) represent the sectors where open banking tools and services can be applied (the lower part of the right side). For example, M2 (SME), located in the high-value and medium-difficulty zone, is expected to have a significant impact on the country's financial ecosystem; while M3 (agriculture), which is in the low-difficulty but also low-impact zone, could present a good niche opportunity.

The areas/projects in the matrix that represent high value for the customer and low implementation difficulty are the best candidates for investment. Opportunities such as V5 and M2 are positioned in such a way that they are not difficult to implement but offer significant value. More complex but high-value use cases (e.g., V12 and V6) may require long-term planning and infrastructural investments. Markets such as M3 (agriculture) may present lower risk opportunities.

Below is a list of how companies and financial institutions can use this matrix:

- *Investment prioritization:* To focus on areas/projects located in positions where there is high value for the customer and low implementation difficulty;
- *Opportunity assessment and long-term strategic activities:* To analyze where actions can be implemented quickly and where planning will be necessary;
- *Coordination of open banking strategies with customer value and overall business impact:* To ensure that investments and developments meet customer needs and business objectives.

The implementation of open banking initiatives by the National Bank of Georgia has brought positive results, demonstrating the transformative potential of data-driven financial reforms.

Open banking has created a more dynamic and competitive environment in Georgia's financial sector. Standardized data-sharing mechanisms have been introduced, including secure APIs. Open banking has enabled new participants, particularly fintech companies and PSPs, to access and process customer data that was previously only available to banks. The democratization of data has leveled the playing field, allowing smaller and more flexible service providers to compete with traditional institutions. As a result, customers have begun to receive a wider variety of services, including personalized, affordable, and innovative financial products.

The customer-oriented advantages of open banking have significantly increased. APIs supporting digital registration (onboarding) and simplified payments have substantially reduced the complexity and time required for financial interactions. Customers can now access services more conveniently without the need for physical visits to the bank. Features such as automated account aggregation, budgeting tools, and payments from bank accounts without using plastic cards have simplified financial management, positively impacting customer satisfaction and increasing trust in digital financial services.

The flexibility of data, which is a central principle of open banking, contributes to the development of more efficient financial markets by reducing costs and saving time. Through seamless data flows between institutions, financial providers are better able to assess creditworthiness, create more personalized financial products, and process applications more quickly. Increased transparency and accessibility also help improve financial inclusion.

Accordingly, the results of the National Bank of Georgia's open banking initiative confirm that well-planned regulatory and technological interventions can lead to significant progress in the development of various aspects of the financial system. Enhancements in competition, customer experience, and market efficiency, as well as Georgia's role as a regional innovator, are focused on the movement toward open finance.

## Discussion of Results

Although the current results of Georgia's open banking initiative are promising, several areas have emerged that require further development to ensure the sustainable and fair growth of the open finance ecosystem. Key aspects, such as consumer awareness, trust, data protection, and technical standardization, will play a crucial role in the long-term success of these reforms.

The regulatory oversight of the National Bank of Georgia and its alignment with international standards, such as the Berlin Group API specifications, represent a foundational step in creating a secure and reliable ecosystem. However, maximizing the benefits of open banking requires raising public awareness and the development of market participants. Moreover, it is essential for consumers to be informed and aware of their rights.

Another important aspect is the transition from open banking to open finance. While the open banking system is primarily focused on the accessibility of banking data (such as account information and payment services), open finance encompasses a broader range of financial products, including insurance, pensions, investments, and personal financial planning tools. This expansion will require enhancing the efficiency of relationships between financial systems, fostering smooth collaboration, and providing greater regulatory flexibility. Countries such as Australia and Brazil are actively implementing open finance-focused strategies.

The full realization of open banking's potential, especially during the transition to open finance, requires strengthening regulatory frameworks, investing in secure infrastructure, promoting customer engagement, and encouraging both domestic and international collaboration.

## Conclusion

The National Bank of Georgia's strategic focus on open banking – and its gradual transition toward open finance – marks a pivotal moment in the country's financial sector modernization. These forward-looking initiatives are not only reshaping the way financial services are delivered and consumed but are also setting the foundation for a more transparent, inclusive, and innovation-driven financial ecosystem.

Open banking, by fostering greater data portability, consumer empowerment, and API-driven service models, has already begun to increase competition among financial institutions, improve access to financial services, and enable the rise of fintech startups and non-bank financial providers. These developments have direct implications for enhancing consumer choice, lowering transaction costs, and promoting more tailored financial products – especially for underserved or previously excluded segments of the population.

Georgia's alignment with international open banking standards, such as the Berlin Group API framework, and its regulatory emphasis on security, interoperability, and data protection, ensure that these innovations are implemented within a safe and controlled environment. The increasing number of participants in the open banking ecosystem – from large commercial banks to agile fintech companies – demonstrates growing stakeholder confidence and increased ecosystem maturity.

As the country moves from open banking toward open finance, the scope of innovation will expand beyond traditional banking products to encompass a wider array of financial services, including insurance, pensions, investments, and personal financial management tools. This transition has the potential to deepen financial sector integration across domains, foster cross-industry collaboration, and strengthen Georgia's position as a regional fintech

hub, especially within the Middle Corridor.

To fully realize the potential of open finance, continued investment in digital infrastructure, regulatory capacity building, and cross-border cooperation will be essential. Equally important will be efforts to promote consumer awareness, raise digital literacy, and enhance trust in emerging technologies.

In conclusion, the evolution toward open finance offers a unique opportunity for Georgia to lead by example in building a next-generation financial system that is not only more efficient and competitive but also more inclusive, resilient, and responsive to the needs of modern consumers and businesses.

## References


Australian Government (ACCC). (2019). *Consumer Data Right (CDR) Framework.* Available at: https://www.accc.gov.au/focus-areas/consumer-data-right-cdr [Accessed March 2025].

Australian Government (ACCC). (2022). *Statutory Review of the Consumer Data Right Issues paper.* Available at: https://www.cdr.gov.au/sites/default/files/2022-03/Statutory-Review-of-the-Consumer-Data-Right-issues-paper-2022.pdf [Accessed March 2025].

Banco Central Do Brasil (BCB). (2021). *Open Finance.* Available at: https://www.bcb.gov.br/en/financialstability/open_finance [Accessed March 2025].

Banking Association of Georgia. (2021). *Georgian Open Banking Standard.* Available at: https://openfinance.ge/standards [Accessed March 2025].

Carletti, E., Claessens, S., Fatás, A. and Vives, X. (2020). *The Bank Business Model in the Post-Covid-19 World. The Future of Banking 2.* London: Centre for Economic Policy Research.

Carstens, A. (2019). *Data, technology and policy coordination.* Bank for International Settlements (BIS). Available at: https://www.bis.org/review/r190208a.htm [Accessed March 2025].

Demirgüç-Kunt, A., Klapper, L., Singer, D. and Ansar, S. (2020). *The Global Findex Database 2017: Measuring Financial Inclusion and Opportunities to Expand Access to and Use of Financial Services.* Washington, DC: The World Bank Economic Review, Article No.10.1093.

European Parliament and Council of the European Union. (2015). Directive (EU) 2015/2366 on payment services in the internal market. *Official Journal of the European Union,* L 337, 23 December, pp.35–127. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2366 [Accessed April 2025].

European Banking Authority (EBA). (2018). *The Future of Banking: Open Banking and PSD2.* Available at: https://www.eba.europa.eu/regulation-and-policy/payment-services-and-electronic-money [Accessed March 2025].

Financial Conduct Authority (FCA). (2019). *Call for Input: Open finance.* Available at: https://www.fca.org.uk/publications/calls-input/call-input-open-finance [Accessed March 2025].

Gomber, P., Kauffman, R.J., Parker, C. and Weber, B.W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of Management Information Systems,* 35(1), pp.220–265. Volume 35.

Moneythor. (2020). *Open Banking in Singapore; Comparing PSD2 & FPDS.* Available at: https://www.moneythor.com/analysis-opinions/open-banking-in-singapore-comparing-psd2-fpds/ [Accessed March 2025].

National Bank of Georgia. (2021). *Open Banking.* Available at: https://nbg.gov.ge/en/page/open-banking [Accessed March 2025].

Open Banking Implementation Entity (OBIE). (2021). *Open Banking Standards.* Available at: https://www.openbanking.org.uk/about-us/the-obie/ [Accessed March 2025].

Ozili, P.K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), pp.330–340.

Philippon, T. (2019). On fintech and financial inclusion. *NBER Working Paper*, No. 26330, September.

Zetzsche, D.A., Buckley, R.P. and Arner, D.W. (2020). Decentralized finance and the quest for financial stability. *European Banking Institute Working Paper*, No. 2017-006.

Zetzsche, D.A., Buckley, R.P. and Arner, D.W. (2021). Open banking, open data and open finance: Lessons from the European Union. *Journal of Financial Regulation,* pp.172–203.

# INFORMATION FOR AUTHORS

## Guidelines for Structuring Articles and Referencingo

**Article Structure:**

1. Introduction
2. Literature Review
3. Theoretical Section – The economic model/theory on which the article is based
4. Data Analysis
5. Results and Discussion
6. Conclusion

The length of the article should be between 2,500 and 5,000 words.

**Referencing Guidelines (Harvard Style):**

**1. In-text Citations**

When using information from another author/authors/organization in the text, it is mandatory to indicate the author(s) and the year of publication of the referenced work. This applies both to paraphrasing (expressing someone else's ideas or findings in your own words) and direct quotations (copying the author's words exactly). These details should appear at the end of the sentence.

**Examples:** If there is one author – (McCurley, 2012), If there are two authors – (Brown and Taylor, 2021), If there are three or more authors – (Brown et al., 2021)

**2. Reference List**

The reference list includes all the sources cited in the paper.

**a. Books**

When referencing books, the following details should be included in this exact order:

- Author(s) – individuals or organizations, or editor(s); list surname first, then initials;
- Year of publication;
- Title (including subtitle, if any), in italics;
- Place of publication;
- Publisher.

**Example:** Smith, J. (2020). *Global Economics.* London: Routledge.

**b. Chapters in Books**

- Author (surname first, then initials);
- Year of publication;
- Chapter title;
- Editor(s) – first initial, then surname;
- Title of the book, in italics;
- Place of publication;
- Publisher;
- Page numbers.

**Example:** Green, T. (2018). Innovation in education. In: K. Black, ed., *Modern Learning Theories*, 2nd ed. Oxford: Oxford University Press, pp.55–70.

**c. Newspaper and Journal Articles**

- Author(s);
- Year of publication;
- Article title;
- Name of newspaper/journal, in italics;
- Volume/issue number;
- Month and date (for newspapers) or month/quarter (for journals), if volume/issue is not available;
- Page numbers.

**Example:** Taylor, A. and Brown, M. (2019). Climate change and agriculture. *Journal of Environmental Studies,* 45(3), pp.215–230.

**d. Online Sources**

- Author(s) or organization responsible for the website;
- Year (use *no date* if unavailable);
- Title of the webpage or document in italics;
- [online] Available at: URL (link);
- Date you accessed the page – day/month/year

**Example:** World Health Organization. (2022). *Mental health and COVID-19.* [online] Available at: https://www.who.int/mental-health-covid [Accessed 30 Apr. 2025].

National Statistics Office of Georgia. (2023). *Demographic data of the population.* [online] Available at: https://www.geostat.ge/ [Accessed 30 April 2025].

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