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FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS IN UKRAINE

Monograph

Technology Center

2022

UDC 336.1:338.1
F54

Published in 2022
by PC TECHNOLOGY CENTER
Shatylova dacha str., 4, Kharkiv, Ukraine, 61165

Approved by the Academic Council of State Organization "Institute of the Economy and Forecasting of the National Academy of Sciences of Ukraine", Protocol No. 5 of 25.10.2022

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Financial depth-economic growth nexus in Ukraine: monograph / Yu. Shapoval, P. Kerimov, O. Shpanel-Yukhta, S. Korablin and others. – Kharkiv: PC TECHNOLOGY CENTER, 2022. – 192 p.

This book is dedicated to the ongoing debate on the nature of the relationship between financial depth and economic growth. It addresses the theoretical underpinnings of financial depth and reflects the changes in the nature of financial depth-economic growth nexus before and after the GFC. The distinctions between the financial depth-economic growth nexus in Ukraine and other countries, based on their income level, are identified. The dynamics and structure of Ukraine's state lending and debt are examined in order to show mutual connections between financial depth, economic growth and debt burden. The empirical study of the financial depth-economic growth nexus has allowed revealing that "too much finance" hypothesis does not hold for Ukraine, meanwhile, confirming the existence of the relationship between financial openness and financial deepening. The study is concluded with the analysis of the impact of war on the financial depth-economic growth nexus in Ukraine.
This book will be a valuable resource for graduate students and academic researchers whose focus is on the financial and economic development.
Figures 38, Tables 25, References 200 items.

DOI: 10.15587/978-617-7319-61-9
ISBN 978-617-7319-61-9 (on-line)

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ABSTRACT

The book is devoted to the debate on the nature and direction of the relationship between financial depth and economic growth. Addressing the theoretical underpinnings of financial depth, namely the concept, measurement approaches, benefits and drawbacks, and determinants (focusing on the institutional environment) provides insights on prior studies on its relationship with economic growth before and after the GFC. This demonstrates the changes in the nature of the financial depth and economic growth nexus in the context of: the direct-proportional relationship between them, to a weakening and, in some cases, to the opposite influence.

Drawing from the trends of economic development and of financial depth worldwide, distinctions across groups of countries by income and Ukraine are identified. The quantitative analysis of Ukraine's financial depth across assets, liabilities, volumes of services of non-bank and capital market, state debt and lending (of state banks, state investment projects, local loans, and cooperation with IOFs) demonstrates sectoral unbalanced financial deepening of the economy. It is grounded that financial depth, debt burden and economic growth move synchronously or in different directions based on business cycle phases. The estimation of bank loans' impact on economic growth, provided by evaluating the financial performance of Ukrainian industrial firms during 2006–2020, shows bank loans substitution by commercial (inter-firm) credit; preference for short-term loans denominated in the national currency; sufficient profitability to service loans only of mining industry firms; quasi-risky financing model.

Further, the book proposes an empirical study of Ukraine's financial depth-economic growth nexus, revealing that the financial depth just accompanies economic growth but not causes it. During 2008–2020, the impact of bank and non-bank loans was negative, while the impact of trading volume on the securities market was positive, indicating the inability of further credit expansion to contribute to economic growth. Though economic growth has a directly proportionated correlation with external trade and debt, the correlation between mentioned factors and financial depth is inversely proportionate. Meanwhile, the relationship between financial openness and financial deepening in Ukraine is confirmed. The study concludes with an analysis of the impact of war on the financial depth-economic growth nexus in Ukraine.

This book is a must-read for researchers, scholars, and policy-makers interested in a better understanding of the economic growth and financial development of Ukraine alike.

KEYWORDS

Financial development, economic growth, monetization, banks, non-banks, stock market, industrial firms, assets, liabilities, capital, loans, GDP, debt, government bonds, fiscal deficit, cross-border capital inflows, financial openness, institutional development, war, correlation.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

DGB	Ukrainian domestic government bond
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
FDI	Foreign direct investment
GDP	Gross domestic product
GFC	Global financial crisis
GFCF	Gross fixed capital formation
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IFO	International financial organization
IMF	International Monetary Fund
ISIC	International standard industrial classification of all economic activities
MDI	Main Directorate of Intelligence of the Ministry of Defence of Ukraine
MIA	Ministry of Internal Affairs
NBU	National bank of Ukraine
NEFCO	Nordic Environment Finance Corporation
NPL	Non-performing loan
NSSMC	National securities and stock market commission
SME	Small and medium-sized enterprise
SMIDA	Agency for the development of infrastructure of the stock market of Ukraine
SSSU	State statistics service of Ukraine

CIRCLE OF READERS AND SCOPE OF APPLICATION

The research is focused on the causal linkage between financial depth and economic growth in the case of Ukraine.

The theoretical findings demonstrate that financial depth contributes to economic development, but only up to a particular threshold, exceeding which it begins to restrain economic growth, which depends on the quality of institutions and structural characteristics of the financial system. The generalisation of the factors of mutual influence of economic growth and financial development enables to expand the list of variables while modelling. The results of the book may be used in determining the goals and criteria of financial support for post-war economic recovery. In particular, this book recommends to use financial depth as the target indicator of government economic and financial stability policy in conjunction with other macroeconomic variables. Thresholds and direction of influence should be computed using national statistical data. It is advisable to assess the level of financial depth of the economy in terms of financial sector segments and from the position of assets and liabilities, which, unlike existing approaches, allows identifying the components of the financial deepening. While estimating the finance-growth nexus, indicators of export, import, and institutional development should be used as non-financial indicators of economic growth.

The obtained results are characterized by theoretical significance and complement the finance theory in determining the financial depth and assessment approaches to its nexus with economic growth.

The monograph is intended for researchers, economists, lecturers, and postgraduates interested in financial and economic development. With an increasing debate on “too much finance” among researchers and policymakers, users will find different theoretical perspectives and explore financial sector policy implications on economic growth.

The monograph was funded as a part of the "Relationship between financial depth and economic growth in Ukraine" research project (No. 0121U110766), conducted at the State Organization "Institute of the Economy and Forecasting of the National Academy of Sciences of Ukraine".

INTRODUCTION

Recent efforts of researchers to assess the finance-growth nexus have emphasized that while financial development accelerates economic growth in some countries, it can be counterproductive in others, indicating the need to find ways of qualitative financial deepening. GFC raised the matter of re-assessing the role of financial development. Contrary to popular perceptions that a developed financial sector boosts economic growth, the initial impetus to the deploying crisis came from advanced economies, where numerous financial institutions and instruments characterize highly liquid financial markets. In turn, the pandemic crisis has resulted in quantitative easing and fiscal stimulus, contributing to the accumulation of debt, which has also generated a broad debate on the negative consequences of financialization. The war shocks of 2022 have intensified global financial vulnerability. Considering Ukraine's weakened fiscal position and inflation acceleration, the economy is entering a hazardous zone of the debt crisis. Building resilience to war calls for rapid economic growth – much higher than the pre-war average of 3 % yearly. Accordingly, understanding the variables that strengthen or inhibit the relationship between financial and economic development for Ukraine's recovery confirms this research's urgency.

This book aims to investigate the nature of the financial depth-economic growth nexus in Ukraine. For this purpose, the following research methods are employed: analysis and synthesis (while clarifying the concept, determinants, and measurement approaches of financial depth and economic growth), comparison and grouping (while contrasting global and Ukrainian trends of financial depth and economic development), statistical and structural analysis (while distinguishing the features of Ukraine's banking and non-banking, capital market, state lending and debt, industrial firms' financial performance), correlation and regression (while assessing implications of the relationship between financial depth and economic growth, financial depth and financial openness, export structure and economic growth along with financial depth), retrospective analysis (while expressing changes of financial depth-economic growth nexus in the world due to GFC and in Ukraine due to war in 2022). Data processing was carried out using MS Excel and the "gretl" software package. The monograph is structured as follows. Section 1 reviews the theoretical framework of the financial depth-economic growth nexus. Section 2 is devoted to the manifestations of the relationship between financial depth and economic growth in the world. Section 3 provides quantitate assessments of the financial depth of Ukraine's economy, outlining bank and non-banking sectors, capital market. Section 4 explores a dynamic linkage of financial depth, economic growth and debt burden in Ukraine. Section 5 is focused on state lending along with debt of Ukraine's economy. Section 6 assesses industrial firms' loans in Ukraine. Section 7 presents modelling of the financial depth-economic growth nexus in Ukraine. Section 8 is devoted to the wartime financial depth-economic growth nexus.

1 FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS: THEORETICAL UNDERPINNINGS

ABSTRACT

The paper identifies the concept of financial depth of the economy, as well its benefits and drawbacks, determinants and the features of measurements. The authors consider the impact of economic development on financial markets through changes in the structure of financing and in the institutional environment (in particular, the financial openness of the economy). The steps taken by the Ukrainian government on the way to harmonising financial legislation under integration into the EU, which will positively affect the economy's competitiveness and financial depth, are noted. An overview of empirical studies examining the impact of financial depth on macroeconomic outcomes throws light on the "too much finance" hypothesis. As a result, the section offers a conceptual contribution to the determining of the nature of the nexus between financial depth and economic growth, highlighting:

a) its non-linearity, which is manifested in the direction change of influence to the opposite or insignificant by reaching a certain threshold;

b) its cyclical nature, which is confirmed by the change in studies results depending on the periods: from the definitely positive influence of financial depth on economic growth based on the data for the period 1960–1980 to the disappearing influence after this period, that asserts the variability of the nature of the relationship between financial depth and economic growth depending on the phase of the business cycle.

KEYWORDS

Financial deepening, domestic credit, economic development, relationship, institutional environment, law, EU.

1.1 FINANCIAL DEPTH: CONCEPT AND DETERMINANTS

What is financial depth?

Financial depth is an ambiguous concept. Evidently, it relates to empirical research on the factors of achieving economic growth and, consequently, the relationship between economic and financial development. Thus, according to the quantitative approach of the World Bank, financial depth provides the estimation of the financial sector activity and reflects the volume of financial transactions in the economy, and is mainly calculated through the ratio of the domestic credit provided by financial sector to GDP or bank assets to GDP [1]. However, financial depth is a broader

concept than only the growth of quantitative indicators of the financial sector. According to the qualitative approach, the financial depth of the economy is its penetration with financial relations, saturation with money, financial instruments and institutions [2]. At the same time, financial depth is a resulting characteristic of financial development. In this way, financial depth can be defined as a qualitative feature that demonstrates the saturation of the economy with financial resources that enables to assess the ability of the financial system to redistribute financial resources to achieve sustainable economic development.

It should be noted that financial development and financial deepening are not identical concepts since the matter of financial development is broader and involves dimensions of financial depth and financial inclusion. Although the level of financial inclusion is generally higher among countries with greater financial depth, countries can differ significantly in terms of financial inclusion. Two countries may have the same levels of financial depth, but one country will distribute loans to a few large companies while the other will spread credit among a wide range of firms and individuals. Financial depth's indicators of bank deposits and loans do not inform about the average size of the loan (or deposit), and form an imperfect idea about the outreach of the financial sector. Thus, a highly concentrated banking sector, in which a small number of wealthy depositors and borrowers own a large share of banking activity, is characterized by a higher level of financial depth with limited financial inclusion.

If financial deepening is the process of saturating the economy with financial resources, then financialization of the economy is the process of proactive financial sector development compared to other sectors. In a broad sense, financialization is the growing role of financial motives, financial markets, financial entities and financial institutions in the functioning of the economy [3]. Financialization is also observed as a pattern of profit accumulation through financial channels rather than through trade and production of goods [4]. Financialization enhances the importance of the financial sector compared to the real sector, contributing to the transfer of income from the real sector to the financial sector [5]. At the same time, financialization is more than just an increase in finance, as it is characterized by qualitative changes in how economic agents are integrated into international financial markets [6]. In general, despite different approaches to the concept of financialization, researchers agree on an implicit search for ways to counterstain finance's promoting role. The economy's financial depth content is designed with criteria and indicators that make it possible to characterize its current state, dynamics and change trends comprehensively.

The vast majority of empirical studies of the relationship between financial depth and economic growth since the 1970s have estimated financial development using two measures of financial depth – domestic credit to private sector to GDP and, to a lesser extent, stock market capitalization to GDP. For example, Rajan and Zingales [7] use both indicators to prove that greater financial development contributes to economic growth. Arcand et al. [8] use the credit-to-GDP ratio to establish whether there is a threshold above which financial development no longer has a positive effect on economic growth. Dabla-Norris and Srivisal find that financial development, measured by

credit-to-GDP ratio, plays a significant role in reducing the volatility of output, consumption and investment growth, but only up to threshold [9]. At the initial stages of economic development, banks (bank-based financial systems) play a leading role in promoting economic growth. They ensure the availability of standard financial products at a low cost, due to which investments are realized. As the economy moves from the developing category to the developed, entrepreneurs need a broader set of financial instruments. Going forward, the securities market (market-based financial system) is developing, which offers non-standard financial mechanisms for implementing more risky and complex investment projects.

While the first empirical studies of the financial depth-economic growth nexus are based on cross-sectional regressions, the later studies are grounded on time series and panel data. The first commonly accepted approach to measuring financial depth was through the banking system's assets-to-GDP ratio, and large-scale studies used the broad money-to-GDP ratio, noting that all countries computed M2 similarly. In recent studies, financial depth is calculated as domestic credit to the private sector to GDP, assuming that the private sector directs the resulting resources to productive investment. Economic growth is mostly defined as GDP or GNP per capita or as the growth rate of one of these indicators. Current empirical research on the relationship between financial depth and economic growth is based on cross-country comparisons, least squares or method of moments (GMM), fixed-effects panel data or random effects panel data models, or vector autoregression (VAR) models. Although the traditional quantitative indicators of financial depth are currently the ratios between domestic credit to private sector and GDP, assets of financial intermediaries and GDP, money supply and GDP, stock market capitalization and GDP, debt obligations and GDP, the most relevant is credit-to-GDP ratio, as the latter indicator usually has the highest significance indicators in the regression of GDP or GDP per capita among financial development indicators. World Bank and the IMF's approaches to quantifying the financial depth are founded on estimating the size of banks, non-bank financial institutions, and the capital market to the size of the economy. Since the financial systems with a high-income level are deeper, countries are grouped by income level.

At the same time, general indicators of financial depth only partially cover the various functions of financial resources. In particular, although loans and deposits are expected to be highly correlated, they measure different aspects of financial development. Thus, banking institutions can attract deposits without directing them into lending, but purchasing government securities. Second, while the ratio of domestic credit to private sector to GDP can be a qualitative indicator of financial services development, this is not for financially developed countries, where the predominant part of the funding is provided through complex market mechanisms. Thirdly, the economy can be characterized by a high ratio of M3/GDP (banking system liquid liabilities to GDP), but at the same time, have an insignificant indicator of financial intermediation on the part of deposit banks. Snizhko [10] singles out that liquid liabilities (M3) do not consider the difference between the allocation of financial resources in the private and public sectors, so it can wrongly indicate that an economy with directive lending has an advanced financial system.

To conclude:

1. Financial depth is a parameter of financial relations, the value of which reflects the ability of the financial system to redistribute financial resources and influence the economy in terms of not only its liquid provision but also the formation of corresponding debt obligations. According to the quantitative approach, financial depth reflects the volume of financial transactions in the economy. The qualitative approach demonstrates the permeability of the economy with financial relations and saturation with money, financial instruments and institutions. Although financial depth is often used as an indicator of financial development, the issue of financial development is broader and encompasses both financial depth and financial inclusion.

2. Financial depth is assessed by measuring the size of financial institutions and financial markets regarding the scale of the economy. The financial depth's indicators characterise how businesses and households finance their activities through capital market, banks and non-bank intermediaries. Traditional quantitative indicators of financial depth are the ratios of domestic credit provided by financial institutions to the private sector to GDP, financial intermediaries' assets to GDP, money supply to GDP, stock market capitalization to GDP, and debt obligations to GDP.

Benefits and drawbacks of financial deepening

Financial development creates *favourable* conditions for economic growth by stimulating the supply of financial products and services, and economic development creates anticipatory demand for them (e.g., Shapoval and Shpanel-Yukhta [11]). The higher the economic growth rate, the greater the firms and individuals need for financial intermediation. Economic growth creates demand for financial services, leading to the financial sector's development. In turn, the lower the access to financial resources and the higher their cost, the smaller the scale of economic activity that can be financed, and therefore the lower the economic growth [12]. First, financial depth contributes to the distribution of surplus funds and the diversification of the spectrum of risk management and financing instruments, the dissemination of information and the diversification of risks. For its part, the economic growth rate is associated with the positive impact of productivity growth, increasing the efficiency of resource allocation, and increasing innovation and investment in human capital (e.g., Shapoval [13]).

The financial markets contribute to economic development not only due to the accumulation of liquidity, which affects the process of making investment decisions, but also due to the reduction of transaction costs (due to their standardization and competition between financial intermediaries). Bencivenga et al. [14] recommend raising transaction costs through taxation in cases where real interest rates are lower than the real long-term economic growth rate to minimize counterproductive transactions in the financial market. Another source of influence of the financial markets development on economic growth is the possibility of diversification of risks, which in turn stimulates investors to reorient themselves to riskier and potentially more profitable projects. This mechanism functions better under the mutual integration of financial markets of different countries.

The relationship between financial depth and economic growth largely depends on whether finance is used to invest in productive assets or to fuel speculative bubbles. The relationship between

growth and financial depth tends to be undulating rather than linearly increasing and weakens at very high levels of financial depth. In other words, financial depth contributes to economic development, but only up to a certain threshold, after which it begins to restrain economic growth, which depends on the level of development of the quality of institutions and structural characteristics of the financial system. Therefore, the priority direction of financial deepening should be developing the appropriate type and quality of financing. In addition, a low level of the threshold of financial depth does not necessarily indicate the need to increase financial depth. Since financial development without economic growth can lead to financial instability, increasing financial depth should be associated with optimal indicators of economic growth.

Under a high level of financial depth, firms can diversify production risks associated with the modernization of technologies since the sources of investment are not only the internal funds of the firms but also foreign capital. In countries with developed financial markets, firms are able to manage projects related to improving the quality of goods. This is supported by a World Bank study demonstrating that improvements in the quality of products that require skilled workers or the use of more expensive materials/equipment are more visible in countries with a higher level of financial depth than in low-income countries [15].

The positive effect of financial deepening on the reduction of inequality in the population's income distribution. Greenwood and Jovanovic [16] were among the first researchers to examine the relationship between financial development and inequality. According to them, stable income distribution and higher economic growth rates are achieved in an economy with a developed financial structure. As the income level increases, the financial structure becomes more extensive, and economic growth accelerates.

In turn, Beck et al. have confirmed that banks that function effectively improve the distribution of financial resources and accelerate the growth of total factor (or multi-factor) productivity (total factor productivity) with positive consequences for long-term economic growth. In particular, the researchers found a statistically significant impact of financial development on the growth of real GDP per capita and labour productivity, and a positive relationship between the development of the banking sector and the accumulation of physical capital and the rate of savings of the private sector (however, the results of the latter are sensitive to changes in assessment methods and indicators development of the banking sector) [17].

Clarke et al. [18] noted that the influence of financial intermediaries positively affected the overall income distribution and had a disincentive effect on income inequality depending on the economy's structure. Similarly, Honohan [19], examining the finance's impact on sustainable economic development, argued that financially intensive economic growth (namely, the depth of banking activity) leads to poverty reduction. In turn, Claessens and Perotti determined that the relationship between financial development and inequality results from the influence of the political and economic elite on the institutional environment of the country [20].

At the same time, Beck et al. have proved that financial depth is also associated with a decrease in inequality in the population's income distribution. Active financial development contributes

to faster growth of the incomes of the poor (the share of people living on less than 1 USD per day decreases) than the average growth of GDP per capita, which reduces inequality in the distribution of income of the population [21]. Likewise, Cihak et al. state that a higher level of financial depth (measured as the domestic credit to private sector to GDP) correlates with a decrease in income inequality (a decrease in the Gini coefficient) [22]. Additionally, Claessens and Feijen stress that financial sector development can play a significant role in reducing the scale of hunger and malnutrition, as increased agricultural productivity leads to increased food production. Even when direct access to financial services is limited for food-insecure households, they can still benefit from financial development because they interact with those with access to financial products and services [23].

Dabla-Norris and Srivisal assert that financial systems with a high level of financial depth serve as shock absorbers, mitigating the negative effects of external shocks on macroeconomic volatility. Research results also emphasize financial depth's role in smoothing the consumption level in countries with high trade and financial openness. Although low-income and developing countries are vulnerable to sharp fluctuations in commodity prices and terms of trade, their economies benefit from financial deepening. However, at high levels of financial development observed in developed economies, the financial depth increases the volatility of consumption and investment [9].

Likewise, Kotarski [24] revealed a significant correlation between M2/GDP and the ratio of domestic credit to private sector to GDP with increasing income inequality. A study of the relationship between financial depth, economic growth and economic inequality in China during 1980–2013, made by Koh et al. [25], confirmed the presence of a two-way relationship between financial depth and economic growth. Chu and Jiang found that financial depth explained 11–28 % of the total variation in income inequality in urban China over 1981–2016 [26].

Contrary to Greenwood and Jovanovic [16], Brei et al., determining a non-linear relationship between financial development and income inequality in 97 developed and developing countries, concluded that more remarkable financial development is associated with a reduction in income inequality below a certain threshold beyond which further financial development correlates with greater inequality income [27].

Meanwhile, De Haan et al. found that over the period 1975–2014, in 84 countries, financial development did not directly reduce the poverty gap and indirectly increased poverty by causing greater income inequality [28].

The impact of liquidity formed by the financial markets on economic development can also be *adverse* due to a potential reduction in savings due to the substitution effect (i.e., the reorientation of economic agents from bank deposits to investments in securities) and a reduction in precautionary savings due to a reduction in investment risk. In addition, highly liquid financial markets allow investors to quickly eliminate ineffective assets, reducing the need for corporate governance control. In turn, this reduces the quality of corporate governance, motivating management to focus on obtaining short-term results at the expense of losses in the long term.

Rapid financial deepening can lead to economic and financial instability. In particular, Rousseau and Wachtel ascertain that the frequency of financial crises weakens the relationship with

financial depth. At the same time, episodes of financial deepening (defined as an increase of more than 30 % or 25 % of the M2/GDP), which do not end with financial crises, strengthen the relationship between the level of financial development and economic growth [29].

In addition, excessive lending can lead to a significant deterioration of the current account balance. Thus, Ekinci and Omay clarified that the growth rates of total lending and lending to households, in contrast to the growth of corporate lending, have a more substantial negative effect on the current account balance at a low level of financial depth [30]. This is consistent with the statement of the too much finance hypothesis.

Detragiache et al. highlight that the greater presence of foreign banks significantly negatively correlates with financial depth [31]. In turn, Cecchetti and Kharroubi draw attention to the fact that the rapid growth of the banking sector can also negatively affect labour productivity. Higher growth in the financial sector reduces the growth of the real sector because the financial sector competes with the rest of the economy for labour resources [32]. The results of Isiaka et al. study indicate that financial depth causes deceleration in real GDP growth among middle-income countries. As a consequence, the negative relationship between financial depth and economic growth signals that a significant share of financial resources is directed to unproductive investments (for example, debt servicing), thereby not contributing to economic growth [33].

Overall, although financial deepening is associated with the increase in the volume and diversification of financial instruments, reduction of income inequality and smoothing of consumption, and diversification of production risks, it can cause the deterioration of the current account due to excessive lending, unproductive investment, growth in employment in non-productive sectors.

Determinants of financial depth

The fact that financial development can negatively affect the rate of economic growth when financial deepening reaches a high level is explained by IMF researchers as follows:

1) the changing role of the credit market and the securities market (as economies become more developed, the banking sector becomes less critical for economic growth);

2) economic instability and the increased probability of economic collapses associated with an excessive financial deepening; migration of labour resources from productive sectors of the economy to those that do not contribute to economic growth;

3) the type of lending (in particular, lending to non-financial corporations positively relates to economic growth, unlike lending to households) [8].

Among the determinants of financial depth are structural factors and factors of monetary authorities' policies (the latter involves macroeconomic and institutional):

1. *Structural factors* of financial depth are country-specific characteristics that cannot be changed by government policy in the short term. The country's general level of economic development, measured by the income per capita, can affect the financial depth by increasing the demand for financial products and services and increasing the supply of savings to the population. Countries with more extensive and higher population densities may have higher levels of financial inclusion –

deeper financial penetration and lower costs of financial intermediation (e.g., Shapoval et al. [34]). The structure of the population by age and employment (for example, the share of the unemployed young and old population) affects the amount of savings and credit schemes [35].

2. *Monetary authorities' policies* can affect the financial environment, namely macroeconomic and institutional policies (regulatory and supervisory policies, accounting and disclosure practices, contract enforcement, etc.), and other financial sector reforms that can contribute to the liberalization of financial markets or increase competition in them [35]. In turn, the central bank's independence and the transparency of its monetary policy are linked to the level of confidence and inflationary expectations of market participants. That is, these factors form the infrastructural and regulatory environment.

2.1. *Macroeconomic factors*. As GDP grows, the demand for financial services increases, leading to better financial deepening. In addition, low inflation is a sign of macroeconomic stability, favouring financial intermediation [35]. Boyd et al. highlight the non-linear relationship between inflation and financial development and that at moderate rates of inflation (15 %), the negative impact of inflation on financial depth is neutralized [36]. Having revealed Although Detragiache et al. the negative effect of inflation on financial depth (domestic credit to private sector to GDP and the ratio of loans to assets), they stressed that the marginal effect of inflation is more noticeable at lower inflation [31].

In turn, Klein and Olivei proved the positive effects of open capital accounts (capital flow restrictions) on financial depth (M3 to GDP and loans of banking and non-banking institutions to GDP) and economic growth in a cross-sectional sample of 95 countries during 1986–1995. However, these results are explained by the estimation of developed countries. They asserted that capital liberalization positively affects financial depth only in the case of the presence of developed institutions and effective macroeconomic policies, which are present in developed countries [37].

2.2. *Political and institutional factors*. A strict rule of law creates a favourable environment for bank lending. Thus, Detragiache et al. note that the enforcement of contracts and the protection of property rights are associated with a larger volume of loans to the private sector [31]. The protection of property rights encompasses the dimension of the rule of law, which is related to the possibility of guaranteeing the quality of collateral security. The perceived likelihood measures political stability that the government will be destabilized. When the political environment is stable, there is less uncertainty in the financial market, and banks are more willing to lend. The functioning of reliable credit bureaus improves the quality of credit information, as they allow lenders, on the one hand, to better screen borrowers and assess and manage risks. On the other hand, borrowers get expanded access to financing. Internet coverage is used as an indicator of infrastructure development, which reduces banks' costs and helps improve the population's geographical coverage. In addition, adequate Internet coverage indicates a reliable telecommunications infrastructure, which is critically essential for banking operations and transfers [35]. Institutional factors include the level of legal restrictions on cash/non-cash payments, the level of legal and organizational/operational availability of credit transactions [38]; the level of efficiency and transparency of the functioning of the central bank.

Factors of financial markets development. The classical monetary approach assumes that the velocity of money affects the demand for money. The higher it is, the lower the demand for money, and vice versa. In addition to the volume of real production, prices, and interest rates, which have already become traditional, the modern theory of money began to recognize the accumulation of wealth, inflation, and changes in market expectations [39]. Among the factors of trust is the level of stability of the banking system, macroeconomic stability, propensity to save and the level of trust in the national currency. Psychological factors or the desire of individuals to keep a certain amount of cash influence monetization. The higher the level of monetization, the greater is demand for real money [40]. Among the factors of *financial infrastructure* is the digitalization of operations. It significantly increases the speed of money circulation, on the one hand, correspondingly reducing the coefficient of monetization of the economy. At the same time, the digitalization of access to cryptocurrency and stock markets simplifies the movement of money from monetary aggregates to other forms of financial instruments. It is essential to note that in small commodity economies, the *dependence of the financial market on foreign trade is a significant factor in the formation of financial depth*. The price decline of raw materials, the main items of Ukrainian exports, leads to a reduction in GDP. This leads to increased instability of the banking system, and against this background, the financial depth of the economy decreases. In turn, the key reason for such dependence on economic growth on the situation in the global commodity markets is the sectoral structure of Ukraine's economy, namely the development of those industries that ensure a quick return on capital investments, which indicates problems in the development of the real sector of the economy.

Thus, the determinants of financial depth involve structural factors (general level of economic development; size, density, population structure by age and employment) and factors of monetary authorities' policies (macroeconomic, political, institutional), which form the infrastructural and regulatory environment.

1.2 INSTITUTIONAL ENVIRONMENT AS FACTOR OF FINANCIAL DEEPENING

The influence of the institutional environment on the financial depth is mostly considered through the prism of the institutional environment's influence on the financial system's development. The focus of such studies is mainly either relatively underdeveloped countries separately or a comparative analysis of such countries with data on developed countries. The time span of research is mainly limited to 1990–2020, primarily due to the lack of data for research. Therefore, trends characteristic of earlier periods is not tracked in modern literature. This situation is sub-optimal, since the study of the financial depth-economic growth nexus demonstrates apparent differences in the trends of this relationship in the 1960–1980 and 1990–2000. In most cases, the research is conducted using statistical and econometric analysis methods, and conclusions are based on the models of different researchers are sometimes mutually exclusive. At the same time, the analysis of the models allows us to conclude the current consensus regarding the indicators

used as proxy variables for the assessment of the institutional environment (which cannot be directly quantified), as well as other related indicators.

Regarding institutional factors of financial development in Africa (sub-Saharan countries), Anayiotos and Toroyan [41] emphasize that institutional factors affect the financial depth in different countries in different ways. The ratio of bank credit to GDP (as an indicator of the size of the financial sector), a composite indicator of financial services availability, ROE, and the share of NPLs in the total volume of loans (as an indicator of operational efficiency) are taken as financial development indicators. As of institutional environment indicators, the index of the depth of credit information and the indicator of legal rights of borrowers, and indicators of political stability and control of corruption. Across 37 countries, the influence of institutional factors was determined to be strong in 6 countries, moderate in 9, and weak in the rest. Institutional factors were almost equally important in their influence on financial development. However, among financial factors, profitability and operational efficiency (ROE and NPLs) characterized the development of the financial sector to a greater extent than financial depth and access to financial resources. Thus, institutional reforms should have a greater impact on financial depth and access to financial resources.

Le et al. [42] defined the prerequisites for financial development in the 26 countries of the Asia-Pacific region during 1995–2011. Financial depth is determined as a dependent variable, and the regression factors are economic growth, quality of institutions, and foreign trade openness. The authors consider economic growth through the logarithm of real GDP per capita, financial depth – through a composite index formed from the logarithms of the ratio of liquid liabilities to GDP, the ratio of bank credit to the private sector to GDP and shares of assets of banks to the sum of assets of commercial banks and the central banks. The quality of institutions is assessed through a composite index calculated as the arithmetic average of voice and accountability, political stability, government efficiency, regulatory quality, the rule of law and control of corruption. Foreign trade openness is estimated as the logarithm of the ratio of the sum of exports and imports to real GDP. The authors concluded that for developing countries, the main drivers of the development of the financial sector are the quality of public administration and institutional development, and for developed countries – economic growth and foreign trade openness.

Analysis of institutional and macroeconomic prerequisites for financial development in 50 countries of the Organisation of Islamic Cooperation (OIC) over 2003–2011, carried out by Abubakar and Kassim [43], allowed the authors to note the primacy of the income level for financial development. A high-income level contributes to a larger volume of savings, therefore, financial deepening on the one hand, and an increase in the demand for bank lending on the other. The impact of the exchange rate was found to be ambiguous. While a depreciated national currency increases the level of financial depth and volume of lending, devaluation also causes a reduction in savings within the country. The authors consider this a sufficient justification for recommending the exchange rate corridor for such countries. The impact of inflation is also seen positively – due to the encouragement of bank lending coupled with the forcing of investors to reorientation from financial assets to real ones, and negatively – due to a decrease in financial depth. This fact is a sufficient

justification for the inflation-targeting policy. The authors identified the openness of the financial system as significant for the growth of deposits but not lending in the OIC countries. OIC countries can potentially attract foreign resources to their banking systems through deposits. This seems overly optimistic unless the OIC countries can provide extremely high reliability and profitability of such an instrument. The authors consider the quality of the institutional environment as the average value of 6 indicators of the World Bank, namely control of corruption, government efficiency, rule of law, political stability, regulatory quality, and voice and accountability. The authors recognize this aggregate indicator as not affecting the financial depth and mobilization of savings, but it is significant for stimulating banks' lending activity.

Examining the relationship between institutional and financial development in the USA, Khan et al. [44] point to the crucial role of institutions in the relationship between the development of the financial system and the distribution of rents from natural resources. The impact of financial development on economic growth is more robust in higher-income countries. The strength of such an impact is inversely proportional to government intervention in the economy. Robust institutions, in particular the protection of property rights, are essential for economic growth and financial development. Also, the rent from natural resources negatively affects financial development under an insufficient institutional environment, which indicates the wrong direction of the rent from natural resources.

Going forward, Khan et al. [45], analysing panel data from 189 countries over 2002–2017, concluded that financial development is impossible without improving the quality of public administration and the quality of financial institutions. As an indicator of financial development, the authors used the share of real sector loans to GDP. As an indicator of the quality of institutions, GDP per capita, openness to international trade (the sum of exports and imports), political stability, control of corruption, rule of law, government efficiency, etc., were used. According to the results, the only significant variable at the global level and in subsamples of developing and developed countries was the dependent variable, taken with a lag. In other words, the development of the financial system is universally and directly proportionally dependent on its development in past periods. Among developing countries, an increase in financial depth is associated with an increase in regulatory quality, an increase in the amount of capital, a decrease in the amount of savings, a decrease in trade openness, and a decrease in voice and accountability.

Similarly, but with a focus on the 15 countries of the Economic Community of West African States over 1996–2017, Appiah and Frowne [46], reached other conclusions regarding the influence of the institutional environment on economic growth and financial development. In particular, the authors emphasize the lack of influence of financial development (assessed via the share of bank loans to non-financial corporations to GDP) on economic growth in West African countries. If this variable were significant, the impact would be negative. The influence of the institutional environment was taken into account through indices of the quality of state regulation and corruption control, similar in origin and calculation methodology to the indicators used in the previous study. None of these indicators turned out to be significant within the framework of the model. Their potential influence is similar to the direction of influence of these indicators in the previously considered model.

Namely, the level of control of corruption has a negative effect on economic growth. The quality of state regulation should have a positive effect. However, if in the first model, the dependent variable was financial development, then in the second – economic growth. Taking into account the similarity of model approaches, their results are not directly comparable. The authors defined the previous state of economic growth and capital formation as variables that influence economic growth, both of which have a directly proportional relationship. Therefore, among non-developed countries, capital formation can be essential for economic growth and financial development. In contrast, institutional factors play a significant role in financial development and not a significant one in economic growth.

Hence, most of the approaches used to examine the relationship between the development of the institutional environment and financial depth rely on a hypothesis or a functional form that does not have a theoretical model as a basis. For the most part, the basis of such models is general predictions that the development of institutions should positively affect financial development. In cases where the predicted relationship does not exist in the model, the authors still conclude that it exists de facto, and give recommendations on the need to implement regulatory measures to increase a statistically insignificant variable with the apparent expectation that this will lead to its acquisition of statistical significance importance (Klein and Olivei [37]). In other cases, it brings up the direction of the nexus (Khan et al. [44]), namely, the negative effects of the transparency of democratic institutions on financial development. The nontransperancy of democratic institutions allows for a significant expansion of bank lending as a form of bribery or lobbying in emerging countries with weak institutions.

Overall, the institutional environment is assessed almost via World Bank or Doing Business indicators. Therefore, the institutional environment is assessed by a de facto expert method based on data from aggregated expectations surveys. The financial development is evaluated through the share of bank lending in GDP or the monetization ratio. In some cases, additional parameters are added, which characterize not only the potential volume of financial resources but also the access to them by potential recipients, particularly the share of firms with a bank loan or an open credit line. Anayiotos and Toroyan also propose taking into account the financial sector's profitability and operational efficiency, which is the most comprehensive approach to assessing financial development [41].

*Summing up***,** the main factors of financial development among some countries are the control of corruption, and the quality of state regulation and legislation, while among others – the openness of foreign trade, the liberalization of capital movements, and economic growth. Liberalization of capital movements does not lead to significant growth or development of the financial system in developing countries. Rent from natural resources has a negative impact on financial development in the absence of strong institutions. The level of institutional development, assessed according to the World Bank indicators, is significant for the development of the financial system. At the same time, the less developed the country, the more significant the expected impact. The influence of institutional development on the development of the financial system often occurs not through the financial depth but via other indicators of the development of the financial system.

Financial legislation implementation: Ukraine's path to the EU

Since the signing of the Association Agreement with the EU by Ukraine in 2014, intensive reformatting of the Ukrainian legislative base to European legislative norms and standards in economic, political and social spheres has begun. The Agreement includes most industries vital for European and Ukraine's geo-economic and political processes. The implementation of the provisions of the section of the Agreement on economic and sectoral cooperation (Chapter V Economic and sector cooperation) will contribute to the gradual regulatory convergence and harmonization of Ukrainian and EU legislation, the development of cooperation in the majority of economic sectors. It will also contribute to the reform of the institutional capacity of the relevant Ukrainian institutions [47]. The Agreement considers 22 sectors and 592 obligations for legislative implementation. In particular, such processes occur in trade, external security, energy, taxation, telecommunications, agriculture, health, education, company activities, etc. The changes also affected banking regulation, supervision of the activities of credit institutions, insurance and investment companies, electronic money, the stock market and securities.

The EU financial market has its own legislative experience and specificity regarding supervision and regulation in the financial sphere. The signing of the Association Agreement allowed Ukraine to speed up the processes of harmonization of Ukraine's legislation, consider its own experience and the experience of the EU member states, and determine the phasing of its implementation. If this program is adequately implemented, balancing financial services market sectors, infrastructure development and strengthening resistance to risks will be achieved [48].

The road map "Strategy for the development of the financial sector of Ukraine until 2025" was developed for the gradual harmonization in Ukraine. It was possible to implement most measures regarding the implementation of European legislation in the financial sector despite the impact of pandemic risks in 2020–2021. Implementing these legislative actions will push Ukrainian financial companies to European ones and increase mutual investments and the investment attractiveness of Ukraine, enhancing the financial depth. In addition, the updated Agenda of the Association, approved by the Association Council between Ukraine and the EU on March 16, 2015, supplements the obligations regarding the full implementation of the Association Agreement and also fixes the common understanding between Ukraine and the EU regarding actions necessary for further deepening of political association and economic integration [49].

Harmonization of requirements for financial markets regulation is carried out based on the international principles of the Basel Committee on Banking Supervision, the International Association of Insurance Supervisors, the International Organization of Securities Commissions, the Organization for Economic Cooperation and Development and taking into account the best international practices. Harmonization for Ukraine means converging EU law and national norms [50].

EU member states have gone through a difficult and long way in the process of harmonizing their legislation during the period of the creation of the EU. *Consideration, comparison and decision-making regarding the convergence of the legislation of the future EU member had four stages and almost a fifty-year history* [51]. The first stage, 1960–1980, was to form a single market.

The negotiations included provisions on the possibility of introducing a regime of providing services to foreign banks and insurance companies in the same scope and rules as for its participants. The second stage model of mutual recognition and minimum harmonization lasted from 1980 to 2000 against the backdrop of forming a single financial market. Each participating country accepted the regulatory requirements applied by other countries for regulatory purposes. The third stage lasted eight years until 2008. It determined the completion of a single financial market formation within the framework of the EU. The main problems of harmonization were significant national regulation differences and violations in implementing directives. Harmonising corporate governance and conditions for taxation of savings and insurance premiums were also among the issues. The fourth phase comprised issues that occurred after GFC and till now. EU legislation is changing, taking into account the development of mechanisms for post-crisis regulation of the single market, the creation of the Banking Union and a single bankruptcy mechanism.

Ukraine began harmonizing its legislation with European norms and standards after signing the Association Agreement with the EU in 2014. The main goal of the commitments made regarding the adaptation of Ukrainian legislation to EU norms and regulations in the financial services sector *concerns the implementation of Basel II and Basel III standards, as well as the implementation of European directives in the field of the stock market, insurance, financial services market infrastructure and payment services.*

At the same time, new changes are taking place in the EU, and the European integration process continues. Since 2016, after Ukraine signed the Association Agreement in the EU, the complex process of formation of the Economic and Monetary Union: the Banking Union, the Fiscal Union through the growing integration of the fiscal systems of the member countries, and the introduction of a single European system of macroeconomic regulation (European Semester) [52].

As a new member that must fit into the already formed market, Ukraine should adopt its financial markets much faster. Complete harmonization is used for it. The issue is that financial markets in Ukraine are underdeveloped, and some regulations' implementation may negatively affect Ukraine's financial business.

The key goals that should be achieved in the adaptation relate to: the implementation of the principles of adequate supervision of the financial sector; improvement of requirements for corporate management of financial institutions; strengthening of international cooperation with foreign regulators of financial markets following international standards; strengthening the protection of the rights of investors of joint investment institutions; development of the banking market, securities market, insurance market, payment services and financial market infrastructure.

Ukrainian regulatory legislation in banking, within the framework of European integration obligations, needs to be adapted not only to norms and standards but also to the principles of adequate banking supervision of the Basel committee regarding capital buffers, liquidity indicators, leverage standards, new capital structure, requirements for adequacy assessment capital, capital requirements to cover operational and market risks, etc. The key commitments made in the banking sector are aimed at raising level of corporate governance in banks, as EU standards provide reasonably

high requirements for the quality of corporate governance in banks. This implementation will reduce the risks associated with the internal management mechanisms of banking institutions.

At the end of 2020, the NBU updated and published a new plan for implementing bank regulations in 2021–2024 [53]. Since the first quarter of 2021, the net stable funding ratio (NSFR) has been introduced. It corresponds to the norms that the Basel Committee proposed to be implemented by the European banking system, which should encourage banks to invest in long-term deposits and other sources of funding, reducing their dependence on short-term funding. The NBU increased the risk weight to 150 % of the provision of unsecured consumer loans in order to reduce credit risks. The NBU began implementing the internal capital adequacy assessment process (ICAAP) standard and minimum requirements for capital coverage of operational and market risks. The procedure for determining the minimum amount of operational risk by banks and considering it when calculating capital adequacy standards has been approved. *Bringing the capital structure of banks in line with international standards is planned for 2024.* The NBU plans to introduce a three-tier system consisting of core capital and additional capital of the first and second levels to unify requirements with EU approaches. The primary purpose of establishing the leverage ratio, which introduces capital adequacy requirements depending on the total amount of assets, is to form requirements for the adequacy of the bank's capital following European norms.

It is important to note that inappropriate financial development (banks' capitalization, financial markets' liquidity, conditions and volumes of providing financial services) puts Ukrainian financial companies in unequal conditions with European ones coming to the Ukrainian financial market [54]. Weak and underdeveloped financial infrastructure deteriorates the activity of Ukrainian financial markets, which in turn makes the Ukrainian economy extremely vulnerable. An underdeveloped financial system leads to risks associated with a sharp foreign capital outflow or inflow, currency risks, and increased dependence on international financial crises.

The implementation of EU norms in the field of the stock market involves the formation of a single market of financial instruments and the creation of generally accepted operating principles by adapting the national legislation on securities to the norms of the relevant EU law, in particular, the implementation of the provisions of the Directives into the particular laws of Ukraine.

The Law of Ukraine "On Capital Markets and Organized Commodity Markets" (since July 1, 2021) defines the legal basis for the functioning of capital markets and organized commodity markets in Ukraine, and regulates the relations during the emission and circulation of securities. This Law provides a list of financial instruments corresponding to the instruments used in EU legislation. The adaption of Law developed a mechanism for stabilizing financial instruments and introduced the qualified investor concept and procedures for assigning such investors.

Limiting the manipulation and use of insider information in the securities market turned out to be one of the least implemented regulations. In 2021, the draft Law of Ukraine, "On the National Securities and Exchange Commission", was submitted to the Verkhovna Rada of Ukraine for consideration. This Law was expected to regulate the issue of combating manipulation in the capital markets, ensuring the appearance and insider information that may hinder transparency and normal

functioning. The issue of combating financial pyramids was also settled there. This project was withdrawn from consideration and sent for revision to improve the regulatory norms of the relevant segments of the financial market. Levchenko notes that regulation and supervision of non-banking financial institutions should include effective macroprudential analysis, as well as provide approaches and means of protecting the rights of consumers of financial services and the formation of a competitive policy [55]. The Law of Ukraine, "On the National Securities and Exchange Commission", corresponding to European practice, should contain such norms.

EU Directives implementation, associated with minimizing securities market abuse, will improve the trust of companies and society in the stock market and its instruments (shares, bonds, derivatives, etc.). The procedures developed by Federal Financial Supervisory Authority (BaFin) are the basis for the regulation Ukraine is implementing. BaFin's decision-making procedure for detecting signs of manipulation consists of the analysis of the market and the possibilities of market manipulation, and confirmation of the sufficient signs of manipulation. Following European practice requires strict criminal punishment of securities market abuse but also offers the application of sanctions and preventive measures [49]. The adaptation of these norms enables Ukraine's capital market integration into the EU and makes supervision transparent.

The insurance market also needs to bring the legislative and regulatory framework into compliance with EU Directives and other international documents, particularly the international solvency standards SOLVENCY II and its Pillar components in terms of regulation of insurance and reinsurance activities and regulatory requirements for risk management systems. Although in November 2021, the Law of Ukraine "On Insurance" has been adopted, its implementation is expected in 2024, as the insurance market needs some preparation. The Ukrainian insurance market is insignificant compared to the European one, so implementing these norms takes time both for the new regulator and insurance companies. According to the EU standards, the draft law has been developed on making appropriate changes to the Law of Ukraine "On Non-State Pension Provision" (it is under consideration by EU).

The Law of Ukraine No. 738-IX (dated June 19, 2020) concerning *derivative securities* takes into account the requirements of the EU Directives "On markets of financial instruments" (MiFID II, MIFIR, EMIR), which are mandatory for implementation in EU member states. Now the NCCPFRU is developing regulations to ensure this Law's implementation.

The implementation of the European system of payment services requires an update of the legislation regulating the Ukrainian payment market and the transfer of funds through harmonization with the EU market law into national legislation. In 2021, the Verkhovna Rada of Ukraine adopted the Law of Ukraine "On Payment Services". The Law regulates the Ukrainian payment and the money transfer market. Although it considers the norms of European regulatory acts, notably the Second Payment Directive (PSD2) and the Electronic Money Directive (EMD), it is still necessary to make amendments to the legislative acts regulating funds transfers. For instance, non-bank financial institutions aimed to issue electronic money and change the amount of their capital should have to receive permission.

In June 2022, Ukraine received the status of a candidate for membership in the EU. This is an incentive for the integration of financial markets into the EU. Despite the risks arising from the full-scale war on the territory of Ukraine, the adaptation of the Agreement and further integration are determined by Ukraine's government as a priority. Ukrainian financial regulators strengthen co-operation with supervisory EU member states in the field of regulation and supervision of banks and non-bank financial institutions, as well as interacting with the European Banking Authority (EBA) and the European Insurance and Pensions Authority (EIORA), the ECB.

Thus, the *adaptation of Ukrainian financial legislation to the norms and standards of the EU Directives is successful.* According to the Cabinet of Ministers of Ukraine, the overall progress of implementation of the Association Agreement in the financial sector is 62 %, which is average compared to the other 23 sectors. Progress for 2021 was 26 % [56]. The adopted laws, essential for the financial sector development, promote the further implementation of EU Directives. The implementation of the primary obligations is at the stage of advanced regulatory convergence and the beginning of practical implementation [57].

1.3 OUTLINES OF FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS THEORY

Schumpeter was one of the first to investigate the positive *influence of the financial sector on economic development*. He argued that the services of financial intermediaries, namely mobilizing savings, evaluating investment projects, managing risks, monitoring and conducting transactions, are essential for technological innovation and economic development [58]. This idea of the relationship between financial depth and economic well-being was empirically proven by Goldsmith, who introduced the coefficient of financial interdependence to characterize the financial structure and economic development [59]. Goldsmith used assets of financial intermediaries to GNP as an indicator of financial development. Having examined fragmentary data for 35 countries during 1860–1963, Goldsmith determined *the presence of parallel growth of the economy and the financial sector*, if the period of several decades was considered [60]. In parallel, McKinnon emphasized that economic growth accelerates as the economy financially deepens [61]. Following them, Shaw focused on financial liberalization as an economic growth enhancing policy and refuted the financial repressions, causing reduced saving rates and misallocation of investment [62].

Meanwhile, some researchers have confirmed the insignificance of the development of financial markets since only a tiny share of business investment is financed by equity. At the same time, they noted the paradox that the most competitive financial markets in the world were less able to finance the industry (Mayer [63]). As a result, the finance-growth nexus has been formed as a new focus of empirical research.

Unlike Goldsmith, who was limited by a lack of data to establish a causal relationship between financial depth and economic growth, King and Levine [58] and Levine [60], based on the study of 80 countries, confirmed *the existence, positivity and linearity of such a relationship. Financial*

services stimulate economic growth, accelerate capital accumulation and enhance the efficiency of capital use. Researchers have found that not only is the average level of financial development during 1960–1989 closely related to growth during that period, but also that *financial development precedes economic growth*. These results are aligned with the subsequent study of Levine and Zervos, according to which the liquidity of the stock market and banking sector development are positively and stably correlated with the current and future rates of economic growth, capital accumulation and productivity growth [64]. As a result, Schumpeter's followers have identified financial depth as a precondition for long-term economic growth.

Investigating the empirical relationship between indicators of financial market development and economic growth, Demirgüç-Kunt and Levine drew attention to the findings of Levine's previous research on the existence of a significant correlation between these indicators after taking into account the initial level of GDP per capita, of investment in human capital, political stability, the level of development of the banking system, as well as indicators of fiscal, monetary and exchange rate policies [65]. The authors also mention specific differences in economic development of the countries with the same level of financial market development. According to Demirgüç-Kunt and Levine [65], as the economy develops, self-financing is firstly replaced by bank lending and then by funding raised from the capital market. Additionally, the demand for more specialized and complex technologies increases as the economy grows. The relatively higher cost of controlling and monitoring the debtor necessitates a redirection of debt financing towards financing at capital expense. Therefore, the *active use of capital market products is typical of under-developed economies and starts when a certain threshold is reached in the population's income*. Demirgüç-Kunt and Levine have also emphasized the complementary nature of the growth of the banking sector and the financial market.

Bencivenga et al. [14] reflected on the importance of the financial depth-economic growth nexus via *liquidity creation*. Investment projects usually require stable sources of long-term capital, resulting in high opportunity costs to their owners. The liquidity generated by a developed capital market lowers these costs, allowing owners to withdraw and reinvest their financial resources with fewer losses, creating the foundation for economic development. In other words, a developed financial market allows economic agents to share decisions regarding the maturity date and the term of holding assets due to the new possibility of a quick asset sale if necessary. Moreover, without the development of the financial market, which could provide the necessary amounts of liquid capital, the implementation of innovative projects is impossible, as the experience of the industrial revolution confirms [14].

In turn, Rajan and Zingales proved that *greater financial depth influences economic growth rates by reducing the external financing costs of financially dependent firms*. In addition, researchers note that the imperfection of the financial market affects investments and economic growth since the level of financial development is a factor in the industry structure and concentration of the economy [7].

The return on the portfolio of securities formed according to small minus big (SMB) or high minus low (HML) strategies *is a significant predictor of economic growth in future periods and reflects*

future changes in investment opportunities. In other words, the preconditions for economic growth are many innovative small firms with growth potential. In particular, Liew and Vassalou [66] emphasize that the yield of a portfolio of securities built on the strategies of HML and SMB is a significant predictor of economic growth. The HML strategy means that the portfolio includes securities with a high ratio of the book value indicator to the market value, and excludes (sells) securities with a low ratio of this indicator, keeping the yield and size indicators at the same level. The SMB strategy means that small business securities are included in the portfolio and large business securities are excluded. These strategies are based on predictions of Fama and French [67], who state that the securities of companies that currently have a high yield also generate higher returns in the long run than the securities of companies that currently have a low yield. The strategy based on the latter prediction is called winners minus losers (WML). Liew and Vassalou [66] based on 10 countries (Australia, Canada, France, Germany, Italy, Japan, the Netherlands, Switzerland, the United Kingdom, and the United States), demonstrated a significant positive relationship between the returns of portfolios that ground on HML and SMB strategies (but not WML), and economic growth (GDP growth). These factors retain their influence even if other similar indicators are present in the regression, such as the average market yield, the 10-year US government bond yield, or the average dividend yield on the market. The authors conclude about the validity of Fama and French's hypothesis that the return on portfolios, based on HML and SMB strategies, reflects future changes in investment opportunities in the context of the intertemporal capital asset valuation model (ICAPM).

In general, since the Asian financial crisis of the late 1990s, the paradigm of the positive influence of financial depth on economic growth has been shaken. Since the 2000s, studies have shown a non-linear relationship between the growth of financial depth and the economic growth rate.

In particular, Khan and Senhadj [68] examined the relationship between financial depth and economic growth based on a database of 159 countries from 1960 to 1999. Analysing financial depth, they used domestic credit to the private sector as a share of GDP; the stock market capitalisation as a share of GDP; the private and public bond market capitalisation as a share of GDP; stock market capitalisation.

The researchers established a statistically significant relationship between all indicators of financial depth and economic growth using a cross-sectional analysis. In the case of using panel data, i.e., including the time dimension in the analysis, the variables begin to lose significance. The authors interpret this fact, as a possible indicator of the non-linearity of the relationship between financial depth and economic development, and the difference in the growth rates of developed and developing economies. Having tested the quadratic dependence, the authors concluded that the square of the indicator of financial depth had a negative effect on economic development, that is, *threshold, after which the effect becomes negative*.

Furthermore, assessing the effect of domestic debt accumulation in 93 low-income countries during 1975–2004, Abbas and Christensen found a positive effect on its moderate non-inflationary level. In particular, *domestic debt begins to undermine economic growth at the level of more than 35 % of bank deposits* [69].

Likewise, Arcand et al. [8], investigating the relationship between financial depth and economic growth among 42 countries during 1960–2010, found 1) *a loss of the indicator of financial depth (credit to non-financial corporations to GDP) of statistical significance in the case when it reached 72 % from GDP,* and 2) *a negative impact on economic growth when the indicator reached 110 % of GDP*. Thus, the researchers not only confirmed the threshold, but also determined their range. In addition, the authors indicate *a likely non-linear (parabolic) relationship between financial depth and economic development*. As reasons for the declining effectiveness of the financial depth impact, the authors indicate:

1) tendency to reorient economic entities from bank lending to the issue of securities, provided there is a developed financial sector;

2) excess of the positive effect of the expansion of the financial sector by the negative effect of the growth of instability and the danger of a financial crisis;

3) slowing down the economic development due to the reorientation of the best specialists from the real sector of the economy to potentially more highly paid activities related to the financial sector.

Arcand et al. [8] findings are consistent with Rousseau and Wachtel [29]. Having examined cross-sectional and panel data for 84 countries during 1960–2003, researchers found that *the relationship between economic development and financial depth weakens when data after 1980 are added to the regression analysis and disappears if to include the random effects model*, specific for the country. Rousseau and Wachtel [29] used the same financial depth indicators as Levine [60] M3/GDP, (M3-M1)/GDP, and loans to non-financial corporations to GDP. In contrast to Arcand et al. [8], Rousseau and Wachtel [29] explained the weakening and the disappearance of the relationship between financial depth and economic growth as a possible confirmation of the positions of Lucas [70] or Robinson. The latter expressed scepticism that the revealed relationship between financial depth is causal. In particular, Lucas [70] omits the financial component of the economy while building a model of economic development since "the importance of financial issues is greatly exaggerated in popular professional discussions" [70]. In turn, Robinson [71] postulates the primacy of economic development over financial development.

Likewise, Demirgüç-Kunt et al. asserted that *as economic growth boosts, both the banking system and financial markets become more developed. Still, the relationship between economic activity and bank development weakens, while the relationship between economic activity and securities market development strengthens* [72]. Under economic growth rate acceleration, the financial services of securities markets become more important for economic activity than the banks' financial services. At the same time, as noted by Barajas et al., the impact of financial depth on economic growth increases with the financial inclusion increase (measured by the coverage of ATMs or the share of firms that do not consider the lack of finance to be a significant obstacle to using financial services and products) [73].

Law and Singh substantiate a *non-linear relationship between,* on the one hand*, the amount of credit to the private sector, liquid liabilities, domestic credit*, and, on the other hand, *economic*

growth [74]. Similarly, Sahay et al. proved that *the impact of financial development on economic growth weakens at higher levels of financial development*, determined by financial depth, namely the size and liquidity of financial markets and institutions [75].

Demetriades et al. argued *that large amounts of impaired loans exacerbated the negative impact of private credit on economic growth* for 124 countries during 1998–2012 [76]. After quantitative easing, as stated by Perillo and Battiston, increases in loans and deposits, debt securities, stocks and other capital are not associated with increased financing of the real sector of the economy [77].

Having investigated the influence of the structure of financing on economic growth in developed countries, Benczur et al. [78] proved the existence of a non-linear relationship between financial factors and economic development. The financing structure of homogeneous high-income economies was analysed not only in terms of its sources but also in terms of its recipients. In particular, *the impact of bank lending is described by an inverse parabolic function, i.e., it has a decreasing effect after a certain threshold value. The effect of total bank lending on economic growth is more pronounced than the effect of consumer lending or the effect of the sum of bank credit, debt securities, and the stock market*. Thresholds, exceeding which the growth of bank lending begins to have a negative effect on economic development, are determined by the authors at a lower level than Arcand et al. [8], and is less than 50 % of GDP when only the financing source is considered, and less than 70 % of GDP when financing recipients are also taken into account. Thus, the focus on bank lending in the financial system has a negative impact on economic growth, especially if the recipients of loans are primarily households. That is, some reduction in the volume of bank lending (for example, due to a reduction in tax incentives for credit financing) may be useful for stimulating economic growth in developed countries. In contrast, a reduction in consumer lending may be considered particularly useful. The impact of debt securities issued by financial corporations on economic growth is negative. In contrary, debt securities issued by non-financial corporations are not significant (but the direction of their effect would still be negative). Thus, in developed countries, there is currently a problem of exceeding the volume of debt financing at optimal levels. Benczur et al. [78], explain the negative impact of household loans as the effect of reorientating limited resources from the productive sector to consumption. At the same time, this effect is exacerbated during periods of rapid growth of the residential real estate market, which is financed precisely by credit funds. This emphasizes the need to create a balanced financial system in which there is no significant asymmetry in favour of one or another source of financing. The multidirectional impact of debt securities and ownership instruments demonstrates that one cannot blindly support financial market development and expect a positive effect on economic growth. The reasons for the negative impact of debt securities issued by financial corporations are:

1) connection of a significant share of them with the residential real estate market, the growth of which has a similar effect;

2) mutual integration of global financial markets, that allows forwarding the local savings into foreign investments, reducing the domestic resource base;

3) financial globalization and the activity of transnational corporations.

In addition, Qouc Hoi et al. [79] established that *financial market growth has an immediate effect on economic growth, while the growth of lending and money supply is postponed*. The researchers, analysing the economic development of 9 countries (6 ASEAN countries, Japan, China and Korea) during 15 years confirmed the presence of a positive relationship between financial depth and economic growth in the long term. The ratio of loans to non-financial corporations to GDP, M3 to GDP, and the stock market capitalisation to GDP were used as financial depth indicators. At the same time, in the short term, the first two factors had a negative impact on economic development, which transformed into a positive one with a lag of 1 year. The stock market capitalisation to GDP showed a reverse trend.

Financial depth in Ukrainian studies is considered within the framework of another goal as an argument for the necessity of a particular policy or explanation of unsatisfactory values of macroeconomic indicators. The studies devoted to the dependence of financial depth on economic development mainly focus on the technical aspects of the calculation itself and come to the expected result, i.e., the relationship exists and is significant. For instance, Kondrat and Kots [80], using linear regression of the dependence of GDP per capita on loans to the private sector to GDP for 1993–2015, conclude that there is a positive correlation between these indicators, and, therefore, that there is a positive relationship between financial depth and economic development in Ukraine. Bogdan and Lomakovych [81] draw attention to the relatively low level of financial depth in Ukraine, which contributes to the increase in the riskiness of lending, complicates the servicing of already existing debt and contributes to the increase of macroeconomic instability.

Overall, during the recent two decades, research on the relationship between financial depth and economic growth has intensified due to both the development of econometric methodology and the expansion of data availability. The nexus between financial depth and economic growth in most studies is limited by a regression analysis of the relationship between an outcome variable, that reflects economic growth (mostly GDP or GNP adjusted for inflation and/or population), and a variety of independent variables, that reflect financial depth (mostly these are the shares of individual components of the financial sector in GDP). At the same time, empirical studies show mixed findings using different econometric methods, covering different time periods and different countries in the sample. As a result, the focus of the finance-growth link search leaves many open questions about its threshold, after which the beneficial effect of financial deepening decreases.

As the economy develops, the structure of financing changes: initially, self-financing is replaced by bank lending, since banks are the primary and most reliable financial intermediaries. As can be seen from the experience of developed countries, the development of the capital market also leads to the expansion of loans in proportion to the use of real estate instruments.

The financing structure affects economic development as follows: debt financing adversely affects economic development after meeting certain thresholds. In particular, for bank loans to the non-financial sector, this value is around 70 % of GDP, while for bank loans to households, it is already 50 % of GDP. Debt financing obtained from the capital market also negatively affects economic growth. In contrast, debt financing of financial corporations has a greater negative impact on economic growth than debt financing of non-financial corporations.

CONCLUSION TO SECTION 1

1. Financial depth determines the size of the financial sector (banks and other financial institutions, the capital market) relative to the economy (an indicator of economic production). It is the resulting characteristic of financial development, which demonstrates the saturation of the economy with financial instruments and institutions.

2. The existence of link between financial depth and economic growth is now almost universally accepted, but it's nature remains a matter of debate. Depending on the chosen methodology and the period, researchers conclude the presence of an unconditional positive relationship, the presence of a positive relationship under the condition of a certain level of the financial system development, the absence of a relationship, or the presence of a bilateral relationship between these parameters. Notably, researchers who analysed statistical data during 1960–1980 concluded the positive influence of financial depth on economic development, while researchers who studied statistical data after 1980 claimed a negative nexus between them.

3. The question of taking local specifics into account while assessing the nexus between financial depth and economic growth in different countries, particularly countries with a financial system based on the banking sector or the financial market, remains open. Specifically, there are countries with non-standard financial instruments, particularly mostly Muslim countries, where Islamic finance operates, i.e., adaptation of financial instruments to the requirements of Sharia. For Ukrainian researchers, however, the specific features of countries that do not have developed financial markets in general, as well as the related distortions in the financial sector, are of interest.

4. The influence of financial markets on economic growth is achieved through channels such as raising liquidity, reducing transaction costs and diversifying risks. At the same time, these factors can also negatively impact economic growth, particularly due to the reduction of savings due to the substitution effect.

5. The suboptimal structure of the country's financial sector can explain the paradox of the financial market's unimportance for economic growth: the most competitive financial markets are the least capable of financing their real domestic sector. Short-term profitability attracts financial intermediaries to non-productive sectors of the economy, resulting in an imbalance in the long-term funding structure and slowing economic growth.

6. The impact of the development of financial markets on economic growth can be traced through changes in the financing structure of non-financial corporations and of the financial sector as a whole. The influence of economic development on financial markets is also reflected in changes of institutional development.

7. Financial depth contributes to economic development, but only up to a certain level, after which it begins to exacerbate economic growth, which depends on institutional environment and structural characteristics of the financial system. At the same time, a low financial depth threshold does not signal the need to increase financial depth. Given that financial development without appropriate economic growth can lead to financial instability, the increased financial depth should be linked to optimal indicators of economic development.

2 FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS WORLDWIDE

ABSTRACT

The financial prerequisites of economic growth, it's global, and Ukraine's trends are summarized. The analysis of the course of the GFC reflects changes in the nature of the financial depth and economic growth nexus. A comparative analysis of financial depth (ratios of broad money, financial assets and liabilities, domestic credit to the private sector, stock market capitalization, government expenditure, and debt to GDP) of groups of countries by income level and Ukraine is presented. This indicates that Ukraine's level of financial depth is low, except for dangerously high levels of government debt and expenditures to GDP. This section also contains estimates of financial openness's impact on financial depth via the relationship between the foreign capital inflows and financial depth (stock market capitalization, bank assets, loans to households and non-financial corporations, and gross fixed capital formation) in Ukraine during 1998–2021. It has been found that capital inflows are highly correlated with stock market capitalization. The uncontrolled increase of financial openness of small commodity economy results in financial deepening of the most volatile segments, particularly the capital market and consumer lending.

KEYWORDS

Financial development, economic growth, monetization, stock market, debt, GFC, financial openness, cross-border capital inflows.

2.1 FINANCIAL PRECONDITIONS OF ECONOMIC GROWTH

What is economic growth?

Researchers use the concepts of *economic growth and economic development* as synonymous, interchangeable or different. The "growth" refers to an objective, numerically measured phenomenon, while "development" has an integral subjective evaluation component. However, even objective and measurable economic growth does not have a universal and unambiguous definition.

In order to avoid the debate about the goals of economic growth, it can be defined through the physical growth of individual parameters of the economy as an economic unit. Such an interpretation, however, faces the problem of an unambiguous definition of the economic system, its components and the possibility of their physical measurement. The economy can be considered as a set of narrowly technical interdependent relations regarding the production and distribution of goods. However, these relations do not take place in a vacuum, but between people, and the

unit of this system is not so many flows of goods and services as individual decisions of economic agents. In addition, the study of economic growth can take place simultaneously at the micro and macro levels within the framework of a formally unified system, while the growth parameters at each level will be different. Thus, a whole economic unit, the expansion of which would mean economic growth, does not exist or is defined following the research objectives. This finding suggests that the possibility of coexistence and equivalence of individual studies, which, considering the same industry, will determine its development as an increase in the share of exports of this industry in GDP, an increase in the value of the firms that make it up, an increase in their aggregate output in physical terms, or any other combination of parameters.

An alternative definition of economic development in the context of physical changes in economic systems is the movement from a state of "underdevelopment" to a phase of "development". Both of these states are evaluative judgments, and their evaluation faces the same problem of determining the development goal and the indicators that reflect it. Individual attempts to use analogies with biological development were quickly recognized as ineffective. In addition to the problem mentioned above of the impossibility of clearly distinguishing economic units from each other, the theory about the universality of economic development trajectory between economic units of the same scale did not find sufficient confirmation.

Therefore, the definition of economic growth and development needs to be more detailed due to the existing consensus on the lack of an objective formulation of both concepts. Here, there is a certain agnosticism in the definitional debate, which finds its expression in the proposition that any definition is acceptable, provided that it serves the purposes of the study and is used consistently. In turn, this leads to an avalanche-like generation of new and new definitions, the collection and systematization of which quickly lose its meaning. Accordingly, the inclusion of a comparative analysis of the definitions of studies devoted to economic growth and development is currently impractical, and the theoretical and methodological principles should be limited to the determining of indicators that, in the opinion of the author, represent economic development or growth, and factors affecting these indicators. It is worth considering the concept of economic growth and development in the context of a specific system of coordinates, which would provide at least the goal and the means of its achievement, that is, within the framework of the theories of economic development, where these definitions are formulated.

So, for the most part, the economic growth indicators are determined by the growth of the goods, which in turn is mainly defined as GDP or GNP, with corrections for inflation and the number of the population. Thus, the subjective component of the definition of economic growth is the choice of an indicator of goods and approaches to maximization. Economic development, on the other hand, is defined as a change in the qualitative state of the system, a transition from a state of underdevelopment to a state of development, as well as the appearance of new qualities in the system. Therefore, the concept of economic development is primarily subjective to the impossibility of its numerical assessment. The latter is taken into account in the analysis through a wide range of poorly related indicators, such as, in particular, the Gini index, the Doing Business rating, the share of people with a certain level of education in the population.

Determinants of economic growth. Economic growth is a quantifiable indicator of the increase in the production of a basic commodity or a social product, depending on the selected framework theory. In the (neo)classical and (neo)Keynesian approaches, the functional relationship between the amount of products produced in the country and the main factors affecting it is fixed production function. Most theories of economic growth reckon economic growth as a function of a number of exogenous and endogenous variables (human capital as a function of knowledge and labour or technology as a function of knowledge and capital). Economic growth is mostly determined by land, labour force, capital, human capital, R&D. The level of the economy's income is one of the most influential factors of economic growth, which is mostly used to stratify samples to trace the difference in trends for economies with different levels of development.

The traditional definition of economic growth through GDP links financial factors to economic development through the production function, but indirectly because the most used production functions directly include only labour and capital. Consumption and savings affect labour and capital but mostly appear already in the model of general economic equilibrium. The financial infrastructure provides both the possibility of accumulating savings and the possibility of their effective redistribution in favour of the most efficient and, therefore, potentially profitable placement. Thus, if we proceed from the standard production function, the influence of financial factors on GDP is traced through their formation of consumption and savings. Savings depend on the real rate of deposits and/or other income instruments (securities or even investments in postal savings accounts). Investments are based on the average market rate of return. Some researchers combine these indicators into one, namely the interest spread, which is included in the regression as a control variable, along with the consumer price index, financial market capitalization, etc. Therefore, the influence of financial factors is indirect, but always present.

In particular, the economy's trade and financial openness, evaluated through the volumes of its imports and exports (or their ratio), as well as the presence of obstacles to the capital movements, evaluated by an expert method, are factors of economic growth. Meanwhile, studies insist on a separate assessment of such influence for developed countries (where a directly proportional influence is expected) and developing countries (where the expected influence is inversely proportional). For instance, Dornbusch and Reynoso considered financial factors along with the foreign trade regime: if there are no significant distortions in their functioning, their impact on GDP per capita is negligible [82]. However, based on the experience of South American countries, the authors highlighted potential negative impact of financial factors in case of macro-financial instability in the country, particularly inflation and the crisis of defaults.

Christiano et al. [83], investigating the impact of financial factors during the GFC using econometric modelling, identified financial risk as the most influential driver of economic instability in the EU and the USA. The authors identified 4 mechanisms of influence of financial factors:

1) investment price shock, associated with the disruption of the transformation of consumer goods into investment goods (this increases the cost of investment);

2) shock of the marginal efficiency of investments, associated with a change in the cost of installing equipment and, therefore, in the cost of transforming an investment product into capital;

3) financial wealth shock, associated with a change in the total cost of capital in the economy and, therefore in the purchasing power of investors;

4) risk shock, associated with the ratio of the current and expected investment risk, which determines the propensity of investors to invest and banks to lend.

Since the risk shock explained more than a third of investment volatility in the EU and 60 % of the volatility in the USA, this effect strengthened with the growing mutual integration of the real and financial sectors. In addition, the authors concluded about the critical role of the volume of loans generated by banks in the functioning of the economy. Similarly, Furlanetto et al. [84] revealed positive and negative shocks based on quarterly statistics for the USA from 1985–2013. Financial shocks, which the authors defined as a sharp change in the demand for capital, were responsible for about 40 % of the variation in investment and stock prices. At the same time, the role of financial shocks in inflation dynamics was insignificant. Additionally, financial shocks generated a counter-cyclical premium.

In addition, institutional development, which Worldwide Governing Indicators characterize, is a determinant of economic growth. For instance, there is a directly proportional relationship between the rule of law and economic development, which is explained by the stimulating effect of guarantees of the protection of counterparties' rights on their economic activity. However, researchers, in some cases, demonstrate the presence of a relationship that contradicts economic practice. For example, an inversely proportional relationship, between the transparency of democratic institutions and the accountability of officials and financial depth in developing countries, was found by Khan et al. [85]. In such cases, the authors either ignore the inconvenient results or conclude that the factor is "underdeveloped" with an illogical impact on economic growth or financial development and the need to pay additional attention to it in institutional policy development.

Thus, research on the impact of financial shocks demonstrates the importance of financial factors on economic growth while concentrating primarily on their negative aspects, mainly because recent financial crises create interest in such research. Therefore, the leading financial prerequisite for economic growth is financial stability, that is, the ability of the financial system to effectively attract and redistribute resources, minimize risks and survive shocks. For Ukraine, however, the main problem of economic development remains the deformations of the system, such as the dysfunctional financial market, which cause disruptions in the circulation of investments and savings.

Financial depth-economic growth nexus during GFC

Features of the GFC impact on financial development. The financial crisis, which began in the USA at the beginning of 2007 as a result of the collapse of the real estate market, quickly spread to the whole world, while the causes, features and consequences of the crisis were individual for most countries. The crisis, which began as a result of a credit bubble caused by the lack of adequate regulation of innovative securities, created an international solvency crisis, leading to the cessation of lending and debt restructuring. Following the USA, other governments launched massive infusions of liquidity into financial institutions deemed too big to fail, which was a fight against the effects, not the causes.

Specifically, Caballero et al. [86], having traced 20 countries during 2007–2008, stated that the country was more affected by the crisis, the less its banks were integrated into the international banking system. The authors point toward the ratio of current credit to GDP to its trend-predicted value, greater than 5 % over 3 years, as a predictor of crisis. This indicator is the growth rate of financial depth. The authors indicate the price of real estate as another predictor. Therefore, a short-term study of developed countries demonstrated that a higher level of integration into the international financial system eased the course of the GFC.

Alternatively, Aisen and Franken [87], examining the impact of macroeconomic, structural and banking factors on economic growth in a sample of 80 countries during 2002–2009, concluded that the strongest predictors of slow recovery after the crisis were the presence of a significant credit boom during 24 months before the crisis and the reduction of GDP in the main trading partners. The authors indicate that the impact of financial depth on credit growth is positive, but according to their calculations, countries with low financial depth were less affected by the crisis. Another outcome of the authors is that countries with a low level of integration into the global financial system had a better increase in domestic lending, which is directly opposite to the conclusions obtained by Caballero et al. [86]. Hence, a medium-term study on a broad sample of countries, which included both developed and developing countries, demonstrates that *high integration into the global financial system worsened the course of the global financial crisis*. This can be seen from the impact on developing countries. There, gains from lower external shocks (that have been delayed or avoided by insufficient integration) have exceeded the gains from priority access to resources (available to highly integrated developed countries).

Sensoy et al. [88], analysing 87 major world financial markets using random matrix theory before and after the 2008 crisis, found that the correlation of world financial markets increases significantly during periods of high volatility. Thus, the GFC showed the ineffectiveness of the diversification strategy using securities from foreign financial markets due to their high mutual integration, ensuring the rapid crisis transmission between financial markets (contagion effect).

Going forward, Kim et al. [89] indicate the effect of investment substitution, that is, the reduction of private investments and their de facto replacement by state ones, caused by the state policy of stimulating business at the expense of lowering loan rates, compensated by budget funds. According to the model, the US government immediately responded to the onset of the recession by increasing government spending; the growth of public debt reduced private investment during the first four quarters, after which the effect of the reduction stopped. The reduction of public spending at this stage positively affected economic growth, while the accumulated public debt had a negative effect. From this, the authors conclude that the crowding-out effect of investments in these conditions is stronger than the multiplier effect due to public spending. Thus, interventions by the state, carried out with budget funds to stimulate economic growth, led to a proportional reduction in private investment and an increase in public debt, leading to a further slowdown in economic growth after the crisis.

Further, Padmanabhan et al. [90], analysing 95 countries during 2002–2016, asserted that the GFC significantly impacted the distribution of foreign direct investment between groups of

countries according to their level of development and corruption. In particular, the flow of foreign direct investment has significantly decreased for developing countries and countries with transitional economies, despite the significant reduction of the corruption coefficient in these countries during the crisis period. The volume of direct foreign investment to developed countries during the period under study has hardly changed. The authors indicate specific general trends for the countries of the sample. In particular, for all sub-samples, there were no changes in the volume of direct foreign investment before and after the crisis; the level of corruption decreased in all sub-samples, except for the sub-sample of developed countries, where it did not change. GDP volumes per capita increased for all sub-samples in the post-crisis period compared to the pre-crisis period, while GDP growth decreased in the post-crisis period for all sub-samples. Foreign trade volumes also increased in all sub-samples, except for the sub-sample of countries with transit economies. In addition, the volume of foreign direct investment depends on a wide range of macroeconomic indicators of the recipient country, particularly financial depth and gross capital accumulation. As a result of the GFC, the volume of foreign direct investment decreased for developing countries and countries with economies in transition. However, it did not change for developed countries, despite the reduction in corruption indicators during the crisis.

Hence, most markets quickly reacted to adverse external shocks, which led to a vast reproduction of crisis trends in almost all global financial markets, except for the most isolated ones, which was called the contagion effect.

Features of economic recovery after GFC. The post-crisis recovery for most global financial markets began in early 2009. There are two opposite approaches to interpreting the mechanisms of post-crisis reproduction. The market-oriented approach explains the speed of reproduction to macroeconomic factors, market reforms, the level of liberalization, the strength of the financial sector and other market forces. The state-oriented approach explained the way out of the crisis primarily due to the influence of a carefully developed state policy, measures to stimulate demand, and interventions to avoid the bankruptcy of industry-forming organizations (including financial intermediaries).

Specifically, Cerra and Saxena [91], based on a sample of 190 countries for 1960–2001, confirmed the permanence of losses in GDP due to crisis events. The authors found that the reduction in GDP growth that countries experienced as a result of the 2008–2009 crisis was not offset by post-crisis growth. The permanence of economic losses from crises is characteristic of currency, banking and political crises. The highest permanent contraction in GDP growth level comes from combined banking and currency or political crises, while the effects are generally worse for the less developed economy. In addition, Foo and Witkowska [92], researching the post-crisis recovery of global securities markets, found that in less developed countries, the recovery of securities markets occurred with a higher level of volatility. Similarly, Barnichon et al. [93], by comparing the results of econometric modelling of the growth of the US economy, concluded that it is impossible to return to the pre-crisis trajectory of GDP. That is, the country's economy cannot enter the pre-crisis development trajectory after a sufficiently robust financial or political crisis.

Tsangarides [94], examining the impact of currency regulation on the course of the crisis in 50 developing countries, as well as on their post-crisis recovery, concludes that the crisis was similar in countries with fixed and floating exchange rates, while post-crisis reproduction in countries with fixed exchange rates was slower. The countries that had the minimum amount of short-term debt and the maximum amount of gold and currency reserves were the least affected by the crisis. At the same time, volume of short-term debt, gold and currency reserves, as well as changes in fiscal policy, were not significant for post-crisis reproduction. Thus, the point of view regarding the superiority of a floating exchange rate over a fixed one was only partially confirmed; the severity of the crisis does not depend on the currency regime, while its influence on the speed of post-crisis reproduction is relatively insignificant. Instead, the severity of the crisis largely depends on economic growth in trade partner countries, the share of short-term loans in GDP, inflation level and commodity prices on foreign markets. The speed of post-crisis recovery depends primarily on economic growth before the crisis and economic growth in foreign trade partner countries.

Additionally, Ivanov et al. [95], based on a sample of stock market indicators during 2004–2014, found a relatively high level of mutual integration of the stock markets of EU countries and the USA, which led to an unexpected side effect in the form of a slowdown in post-crisis recovery compared to the projected trajectory. A particularly close relationship was found between the stock markets of Germany and the USA, which led to its faster response to shocks – positive and negative – originating from the US market, in contrast to, for example, the Italian stock market, which reacted to adverse shocks, but not on positive ones. Thus, the vulnerability of a country's stock markets to global shocks (contagion effect) depends on their integration into the global stock market. The lower the level of integration, the higher the influence of local factors on their dynamics.

Going forward, Dao [96] revealed that the drivers of the post-GFC recovery in Asian and South American developing countries were the presence of pre-crisis economic growth, a solid financial sector, and, to a lesser extent, a significant volume of gold and foreign reserves.

Thus, in the post-crisis period, GDP growth decreased due to the growth of government debt and the substitution of private investments instead of the expected economic recovery. Failures in traditional risk hedging strategies have led to behaviour aimed primarily at minimizing risk, which has been reflected in a reduction in investment in traditionally considered risky, particularly in developing countries, despite reducing the riskiness of such projects. Likewise, the reduction of foreign economic activity began, which, due to the mutual integration of value creation chains and the dependence of export potential on the import of components, led to a multiplicative reduction in real production, which in turn led to the further deepening of crisis and their prolongation.

The consequence of the GFC was a revision of the relationship between financial development and economic growth. During 1900–2008, the share of countries with an ongoing financial crisis ranged from 45 % (the Great Depression) to 25 % (GFC), while in the period 1940–1970, this share was 0 %. This created the non-crisis period on which most of the early research on the relationship between financial depth and economic growth is based. Furthermore, the trend towards a change in the influence of financial depth on economic growth is precisely related to the GFC.

Also, this crisis undermined the representativeness of human capital development and labour force growth; the inability of these indicators to reflect the impact of relevant resources on economic growth, in turn, raises the question of finding more representative indicator in new reality.

Particularly, Girgin et al. [97], having analysed 147 countries during 2000–2013, confirmed a decline in both the mutual correlation of economic growth and financial development, as well as a deterioration in the representativeness of some standard indicators of economic development in models. Notwithstanding the relationship between financial development and economic growth remains significant, the ratio of M2 to GDP has a negative effect on economic growth. In other words, in crisis conditions, an increase in the money supply does not lead to an increase in GDP. Also, the change in influence from positive in the pre-crisis period to negative in the post-crisis period is characteristic of the share of bank assets to GDP and the share of loans to the non-financial private sector. Other standard indicators that lost significance during GFC were human capital development (the number of students enrolled in high school) and labour force growth indicators, which the authors explain by the increased level of unemployment during this period.

In turn, Wachtel [98] provided a toolkit for distinguishing financial deepening that leads to economic growth from credit booms that cause economic crises. The author summarizes that, firstly, this relationship between financial depth and economic growth is observed only during 1960–1989. Secondly, the density of the nexus depends on the country's economic development level, as well as its macro-financial indicators: in particular, inflation at the level of 13–25 % leads to the disappearance of the relationship between financial deepening and economic growth. Thirdly, the density of the nexus decreases over time, followed by its weakening when using data for 1990–2010. Fourthly, the density of the nexus decreases when the financial depth exceeds the threshold value of 100 % of GDP.

To conclude:

1. The GFC, which began as a default crisis caused by ineffective regulation of newly created securities of uncertain value, temporarily paralyzed lending in the USA. As a result of the high integration of world financial markets, it quickly spread to most developed countries, as well as developing countries and countries with transitive economies (contagion effect).

2. Post-crisis economic recovery was slow and incomplete in most countries. The impossibility of entering the pre-crisis trajectory of development means that the crisis led to the loss not only of the results of those years during which it occurred, but also of the years following them. Depending on the accompanying crisis phenomena and the country's level of development, losses could reach up to 20 % of GDP. Even at the pre-crisis level, recovery could drag on for a decade. The main factors in the post-crisis recovery were the presence of pre-crisis economic growth, the presence of economic growth in the main foreign trade partners, and the presence of a solid financial system. On the other hand, the presence of a robust financial system means its high level of integration into global financial markets, which led to the "import" of crisis phenomena due to the contagion effect. The results of the impact of anti-crisis policy on post-crisis recovery remain questionable due to the reduction in economic growth due to the increase in public debt, as well as the relatively more substantial effect of, for example, foreign trade and macroeconomic factors.

2.2 FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS: GROUP COMPARISONS

Trends of economic growth

Global GDP (**Fig. 2.1**) showed a clear upward trend, with dips in 2008–2009 (GFC) and 2019–2020 (the COVID-19 pandemic). The global GDP growth increase in 2021 is associated with the partial recovery of the economy due to the lifting of quarantine restrictions. Global growth surged to its most robust post-global recession pace in at least 50 years. The dynamics in 2022 indicate the slowing down of GDP growth and the risk of recession. As of October 2022, global growth was forecasted to slow from 6.0 % in 2021 to 3.2 % in 2022 [99]. Every global recession since 1970 preceded a significant global growth weakening in the previous year and coincided with sharp slowdowns or outright recessions in several major [100].

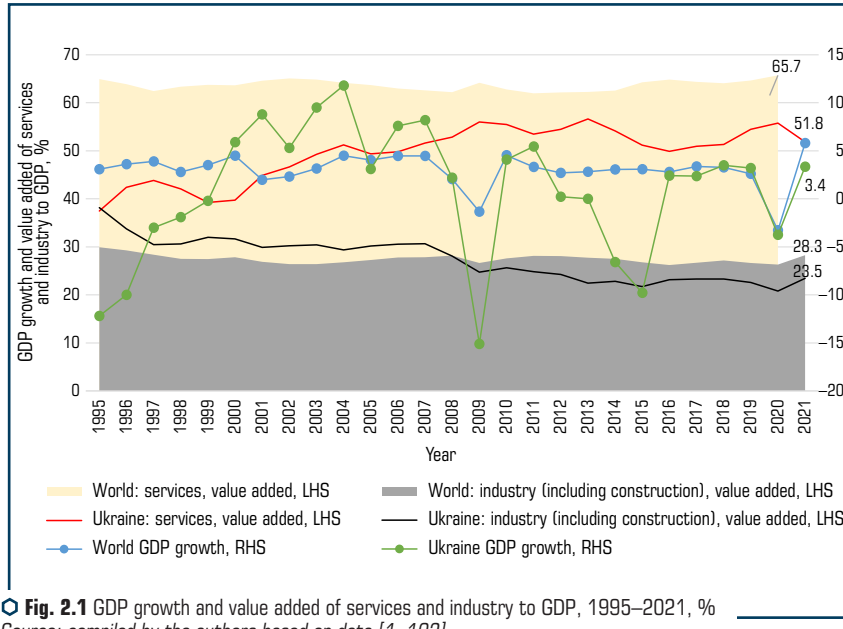

Fig. 2.1 GDP growth and value added of services and industry to GDP, 1995–2021, %
Source: compiled by the authors based on data [1, 102]

In the 1990s, Ukraine's GDP growth was constantly negative in spite of the revival of economic activity (**Fig. 2.1**). Since 2020, the GDP of Ukraine has grown to 5.9 % for the first time during its independence, and from 2001 – 9.5 %. Then GDP jumped from 11.8 % (2004) to 3.1 % (2005), associated with political instability. From late 2008, domestic GDP contracted due to the GFC, and in 2009 GDP fell to a negative value of –15.1 %. Since 2010, economic recovery ended with a decline in 2014–2015 due annexation of Crimea, the beginning of the war in Donbas, and

the accompanying reductions in world trade. If in 2020 the GDP was negative and amounted to –3.75 % during the pandemic crisis, then in 2021, the GDP recovered and increased to 3.4 %. Due to russia's full-scale war against Ukraine, the NBU estimated a decrease in GDP for 2022 of around 32 % (as of October 2022) [101].

In addition to decline in GDP growth (**Fig. 2.1**), global recessions are accompanied by slowdowns in global employment, industrial production, foreign trade and capital flows. Alth ough globally, the contribution of services and industry to economies has slightly changed over time, the service sector is more dynamic than manufacturing. At the same time, after the GFC, the increase in the value-added of the production of services did not recover to pre-crisis 2007 and is currently slowing down but not declining. Industrial value-added follows a similar trajectory but with higher volatility: after growing by nearly 7 % in 2010 (which exceeded the pre-crisis level), it reached –2 % in 2020. Such extreme volatility suggests that global production of goods and services is not had time to recover fully after GFC. Value added of industry (including construction) accounted for 28.3 % of GDP, while value added of services – around 66 % of GDP in 2021. Similarly, in Ukraine services sector emerges as the largest segment in and driving force of the economy, contributing 51.8 % of GDP, while industry – 23.5 % in 2021. The focus of most countries and Ukraine on the production of services and relatively low investments in physical assets create a potential crisis, which will increase inflation.

Gross savings, which reflect the potential supply of financial resources for investment, are a driver of economic growth among upper-middle-income and lower-middle-income countries. Since 1982, gross savings from GDP (**Fig. 2.2**) has reached peak values: in the world – in 2006 (28.1), high income – 1998 and 2006 (23.7), upper-middle-income – in 2008 (39.5), lower-middle-income – in 2006 (32.9 %), low-income – in 2019 (23.6). After GFC, the fall in gross savings continues to decrease without recovering to its maximum due to the worsening economic situation. In Ukraine, since 1993, a constant reduction of gross savings to GDP share reached 12.2 % in 2020, i.e., a level below low-income (23.3 %) and heavily indebted poor (24 %) countries. Low domestic savings constitute low domestic investment for economic growth, which calls for foreign investment. The inflow of external capital provided periods of increase in Ukrainian gross savings to GDP. That indicates that the financial depth of domestic investment was not fully realized. Therefore, it is necessary to increase the level of gross savings in Ukraine and further ensure their effective transformation of savings into investment resources.

Additionally, the global level of net investment in nonfinancial assets to GDP can be used as a proxy for productive investment. Since 1989, this indicator has fluctuated within 1±0.5 % of GDP globally (1.4 % in 2016). Such a low average value confirms that most countries do not pay enough attention to the development of the real sector. Meanwhile, the low level of investment in non-financial assets and the downward dynamics of industry value-added create a situation similar to the beginning of the GFC.

Another financial and economic crisis predictor is reducing foreign trade. Exports of goods and services to GDP globally also decreased, starting with the GFC (2008 – 31.2 %, 2009 – 26.5 %),

which changed the increasing trend prevailing since 1970 (12.9 %). Despite a partial recovery in 2011 (30.7 %), the post-GFC and the pandemic 2020 caused a downward in both indicators. Meanwhile, a partial recovery in 2021 (29.1 %) does not offset the decline in 2020 (26.3 %). The reduction of foreign trade, which did not have time to recover after the GFC, is significant due to its multiplier effect on production. Given the high level of mutual integration of the global economy and the transnational nature of value chains, exports and imports decreased at a significantly higher rate compared to the dynamics of GDP. Since a significant share of exports at the current stage depends on imported components, the disruption of export-import relations leads to a situation similar to that which arose after the dissolution of the Soviet Union. There was the need for radical reorganization or the closure of a wide range of previously interdependent firms and loss of sales markets due to the disappearance of their main counterparties. Moreover, import-dependent industries show a slower post-crisis recovery compared to, for example, credit-dependent industries.

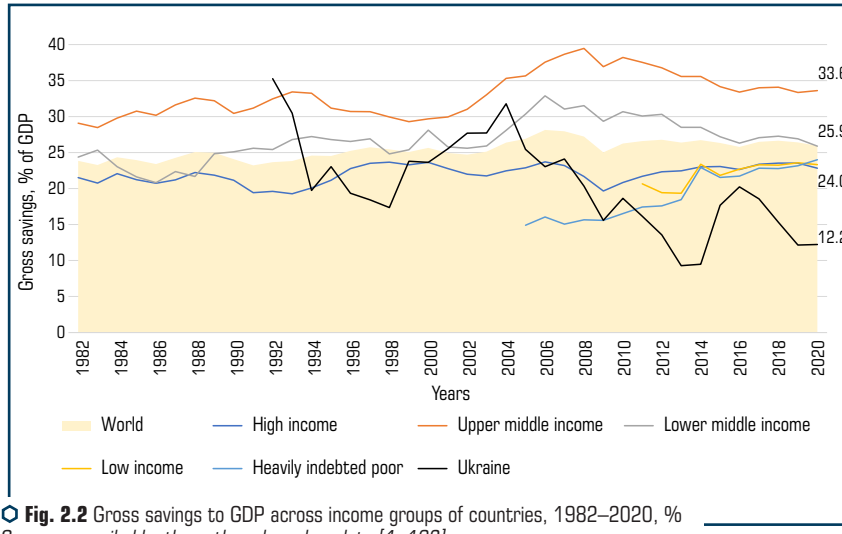

Fig. 2.2 Gross savings to GDP across income groups of countries, 1982–2020, %
Source: compiled by the authors based on data [1, 102]

To conclude:

1. The dynamics of the global economic growth indicators indicate the beginning of a new global economic crisis, characterized by an excessively high level of financial depth along with its rapid growth against the background of the deterioration of the key macroeconomic indicators. Global trade (exports and imports) decreased, starting with the crisis of 2008, simultaneously with the reduction of value added of services and industry to GDP. Given a sharp reduction of global gross savings (from 26 % of GDP in 2019 to 22 % of GDP in 2020) and a relatively low level of investment in non-financial assets (1±0.5 % of GDP during 1990–2016), most countries are still

focused primarily on the production of services, which was more affected by the pandemic and the anti-pandemic measures. In contrast, the resource base necessary for expanding the firms' production or implementing economic stimulation measures is rapidly shrinking.

2. There was an increase in Ukraine's GDP growth until 2004, the peak of which has never reached since then. The share of services remains predominant in GDP. In order to finance their investment, Ukraine uses mostly foreign savings as their domestic savings (gross savings to GDP) are quite scarce and decreasing, which does not stimulate economic growth.

Trends of financial depth

Monetization, like financial depth, is often used to reflect the same phenomenon – an increase in the ratio of *broad money to GDP*. However, monetization characterizes the degree of the economy saturation with money, and is considered from the point of view of money circulation (M1, M2 or M3). Meanwhile, the definition of financial depth through M2 includes only private sector liquidity but excludes external capital inflows and public lending from the financial sector. Accordingly, the M3 is more complete as an indicator. The growth of monetization of the economy is traditionally associated with an increase in the banking system's liquidity. Notwithstanding global recession periods, the common feature for most countries is a constant increase of monetization, except for Ukraine (**Fig. 2.3**). During COVID-19, there was a rapid expansion of the monetary base as central banks increased their balance sheets by buying debt and other securities while offering repo facilities to the banking sector.

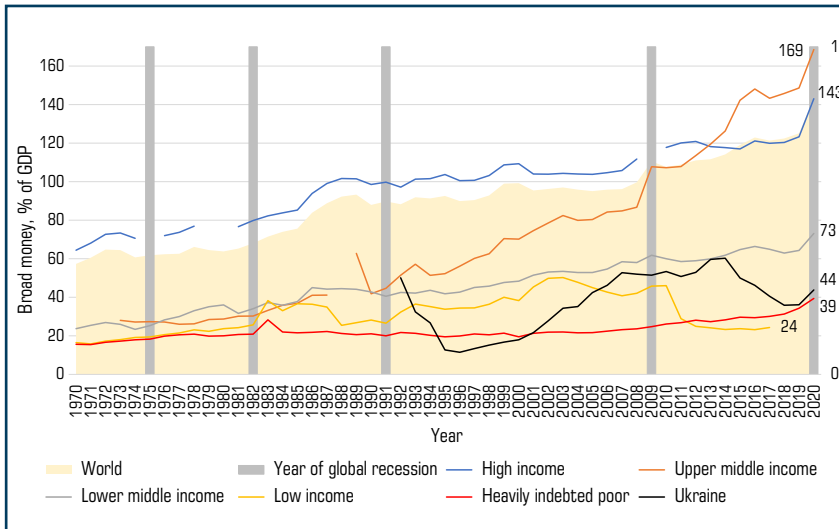

Fig. 2.3 Broad money (M3) to GDP across income groups of countries, 1970–2020, %
Source: compiled by the authors based on data [1]

Generally, a higher level of monetization is characteristic of high-income and upper-middle-income countries where inflation is low and stable for a long time (**Fig. 2.3**). In parallel, low-income and heavily-indebted poor countries have the lowest broad money-to-GDP level. While the Ukrainian economy lags behind even the average indicator for the group of countries (lower middle income) it belongs to, it does not necessarily indicate its economy under-monetized. During 2012–2014, the monetization of the economy increased, reaching 60.3 % in 2014 and evidencing the expansionary monetary policy, against almost zero GDP growth (GDP growth was 0.22 % in 2012, 0.002 % in 2013, 6.58 % in 2014). At that time, banks lent mainly to unreliable borrowers. The process of "cleaning up" the banking system in 2015–2016 also became one of the reasons for the decrease in Ukraine's monetization.

In the recent two decades, the importance of the financial market in the economy has increased, which was also marked by the growth of the value of the financial depth regardless of the specific type of financial structure. Thus, during 2002–2020, the global share of *assets of financial institutions to nominal GDP* increased from 366.1 % (US$ 127.8 tn) to 552 % (US$ 468.7 tn) (**Fig. 2.4**). At the same time, the assets of banks and central banks account for only half of the global financial assets.

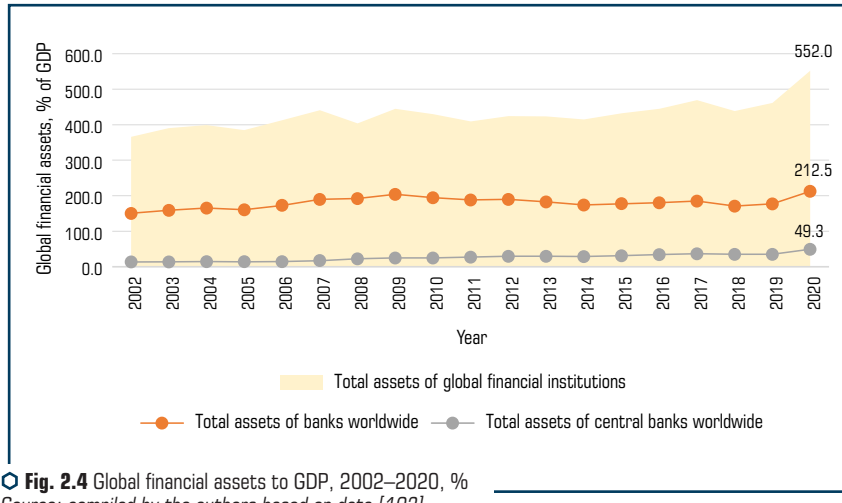

Fig. 2.4 Global financial assets to GDP, 2002–2020, %
Source: compiled by the authors based on data [103]

The global level of *domestic credit to the private sector to GDP* has been growing since the 1980s, and reached 147.3 % in 2020 (**Fig. 2.5**). Meanwhile, the pace of global GDP growth has slowed, with the rate of decline in global GDP per capita growth during the GFC and the pandemic in 2019–2020 being two back-to-back record lows. In 2022 economic growth in per capita terms, approaching 3.2 %, became another downturn episode (as of October 2022) [99].

This indicates a dangerous disproportion in favour of the financial sector, as starting from 100 % of GDP, increasing financial depth leads to economic recession.

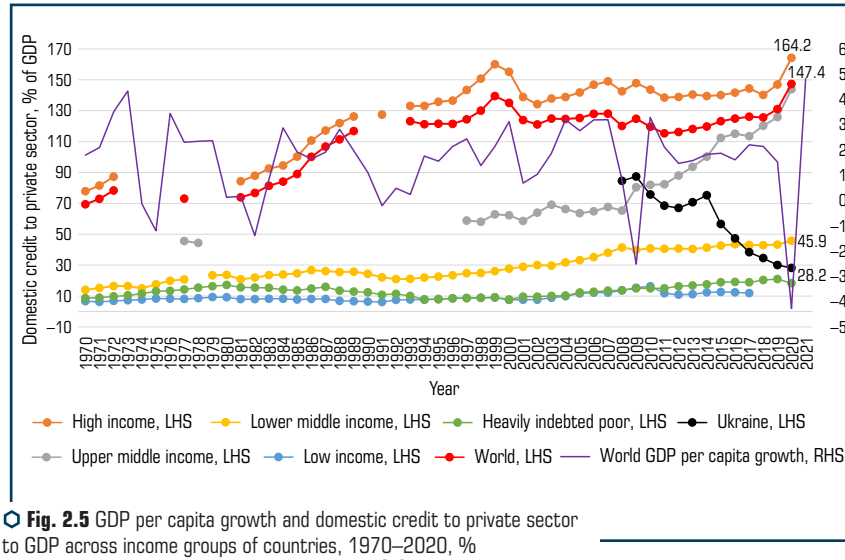

Fig. 2.5 GDP per capita growth and domestic credit to private sector to GDP across income groups of countries, 1970–2020, %
Source: compiled by the authors based on data [1]

The highest domestic credit characterizes high-income countries to private sector to GDP ratio. On the one hand, this shows that these countries are able to generate a sufficient level of domestic investments to ensure economic development, and savings are effectively converted into investments. On the other hand, the GFC's experience suggests how vulnerable the financial systems of advanced countries are to external shocks. In addition, since the GFC, upper-middle-income countries have seen faster credit growth compared to a slower pace in lower-middle-income and heavily-indebted poor countries.

In contrast to upward global trends, Ukraine's level of involvement in the credit market in economic development decreased. If, in 2009, the share of domestic credit to private sector to GDP was 87.35 %, then in 2020, it was 28.2 %. Meanwhile, this indicator was across lower-middle-income countries – 45.9 % (Ukraine belongs to this group).

Until the 1980s, *stock market capitalization* grew in line with GDP. But over subsequent decades, an unprecedented expansion saw the ratio triple and has remained persistently high capitalization: 27.17 % in 1975 to 133.6 % in 2020 (**Fig. 2.6**). In groups of low- and lower-middle-income countries, the importance of the banking sector in the financial depth is significantly higher than that of the capital market, which is confirmed by the low value of the market capitalization of listed companies. The size of stock markets varies considerably even among countries

with reasonably similar economic structures, productivity and GDP per capita, reflecting the different historical paths followed by their financial systems: some are bank-oriented, while others are securities-oriented [104]. Ukraine's stock market capitalization to GDP, compared to similar lower-middle-income countries, remains insignificant, which confirms the bank-centricity of the financial depth of the Ukrainian economy.

During the recent two decades, *global financial liabilities* more than tripled in dollar terms between and relative to GDP since 1970 (from 1.8 times GDP in 1970 to 6.1 times GDP in 2020). Currency and deposit liabilities have been the most significant source of financial sector liability growth relative to GDP, expanding by 153 p.p. over the past five decades. Liabilities linked to equity were the next-largest source of growth, adding 135 p.p. [105]. Over the past decade, almost two dollars of debt were added for every dollar of net investment in the economy. Expanded to include all liabilities, growth in total liabilities was roughly four times greater than cumulative net investment. Outside the financial sector, growth in debt was 1.8 times greater than cumulative net investment over the past decade [105].

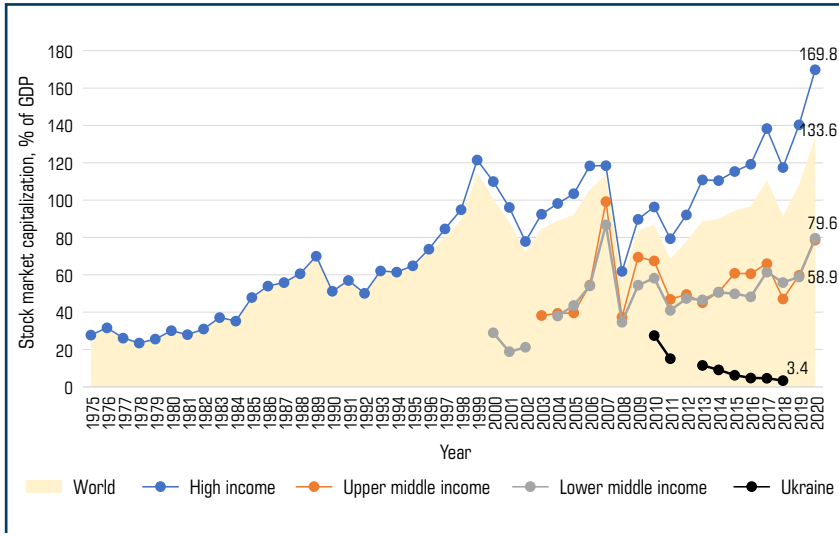

Fig. 2.6 Market capitalization of listed domestic companies to GDP across income groups of countries, 1970–2020, %
Source: compiled by the authors based on data [1]

Under new normality, financial deepening turns into a factor of economic destabilization. *Global debt* has trended up since 1970, reaching the largest surge in 50 years – 256 % of GDP in 2020 (public – 99 % of GDP, household – 58 % of GDP, non-financial corporations – 98 % of GDP) [106]. As a comparison, in 2007, total borrowings by governments, companies and

households amounted 195 % of the global GDP (**Fig. 2.7**). Hence, borrowing was already surging before the pandemic, and in 2022 the war in Ukraine pushed global debt to new highs.

While debt levels rose, interest rates and debt servicing costs declined until 2022 as central banks pursued an expansionary monetary policy to stimulate demand and help the economy recover. However, in 2022, higher debt levels became burdensome when interest rates began to rise, or nominal GDP declined. The most highly indebted governments, households and firms are hardest hit by significant interest rate rises. Too high public debt could crowd out private borrowing, raise interest rates for borrowers, and slow economic recovery.

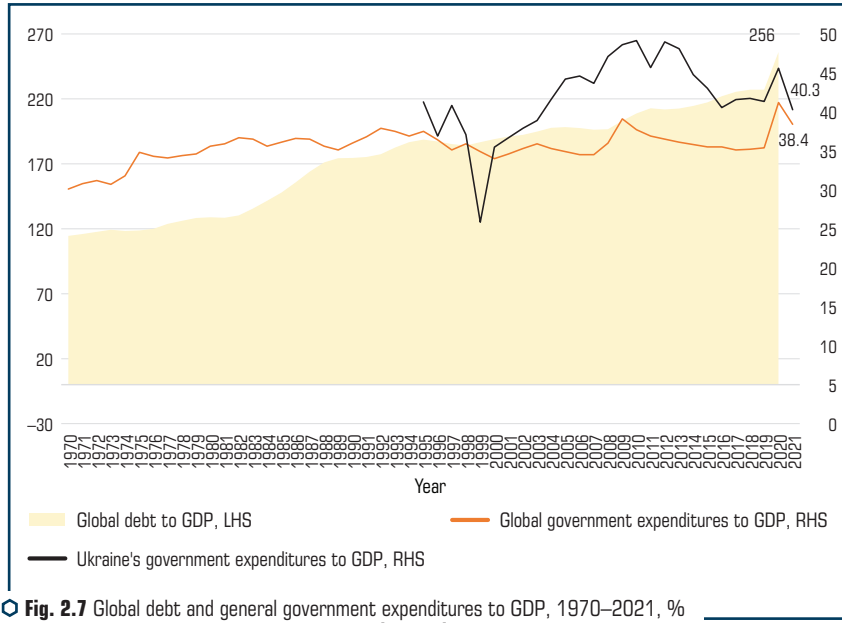

Fig. 2.7 Global debt and general government expenditures to GDP, 1970–2021, %
Source: compiled by the authors based on data [1, 102]

A decrease in global government spending to GDP was observed only before recessions in 1990, 2000, 2007, and 2017–2019, which is explained by higher GDP growth rates in the pre-crisis years (**Fig. 2.7**). After crises, global government expenditure relative to GDP is declining. In the pandemic 2020, it reached 41.2 %, i.e., its highest level since GFC (2009 – 39.1 %). In contrast the global average level, Ukraine's government expenditure to GDP was always higher. High government spending under low institutional capacity slows down economic growth.

Alongside fiscal stimuli, the global total government debt trajectory spirals upward persistently, accounted 96.8 % of GDP in 2021 (**Fig. 2.8**). Due to the pandemic, in 2020, global government debt to GDP recorded the fastest one-year jump since 1970. Across both advanced and emerging

economies, jumps in debt-to-GDP levels since 1975, 1991, 2008, and 2020 were experienced with notably less GDP growth (global recessions).

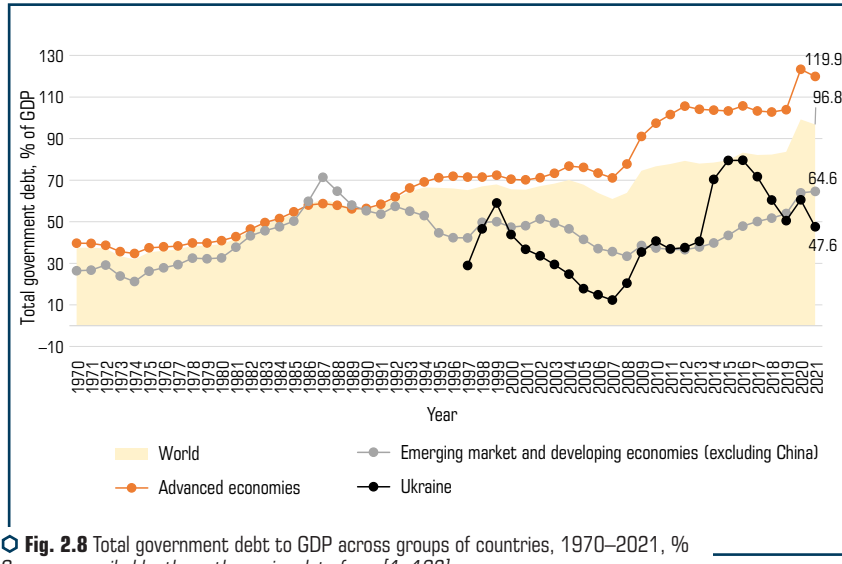

Fig. 2.8 Total government debt to GDP across groups of countries, 1970–2021, %
Source: compiled by the author using data from [1, 102]

The GFC and pandemic have taken their toll, especially on the public finances of advanced economies. Since 1970 the government debt build-up has been particularly fast in advanced economies, reaching 119.9 % in 2021. In 2021, the government debt reached 64.6 % of GDP across emerging market and developing economies (excluding China) (the highest level since 1987, during the debt crisis in Latin America). Ukraine's total government debt exceeded the level of emerging market and developing economies (excluding China) in 1999 (59 % of GDP) against the backdrop of the previous decade of low Ukrainian GDP fell and since 2014–2017 in light of the beginning of the war in the east of Ukraine. At the end of 2022, the rapid growth of general government debt is estimated to be almost 100 % of GDP.

To conclude:

1. Unlike the GFC, central bankers' efforts during the pandemic in 2020 were accompanied by significant fiscal and monetary stimulus (increasing level of monetization). The rapid growth of monetization in upper-middle-income countries and slower growth in high-income countries is evidence of expansionary monetary policy in these countries. Although across lower-middle-income countries, which includes Ukraine, there is a slow increase in broad money to GDP, the monetization of Ukraine's economy, on the contrary, is decreasing, which indicates a low level of financial depth in terms of saturation of the economy with money. That is, the money supply does not stimulate economic growth.

2. Globally, financial assets and liabilities, domestic credit to private sector, stock market capitalization, debt to GDP increased despite GDP slowing down during GFC and pandemic. This indicates a dangerous disproportion in favour of the financial sector because the rapid pace of increasing financial depth could lead to an economic downturn.

3. In contrast to the rising global trends, the dynamics of the Ukrainian economy were marked by a drop in the level of involvement of the credit market in the economic development due to Ukrainian banking and currency crises, and stock market capitalization decreased due to the underdevelopment of the capital market. Conversely, there is a high government debt-to-GDP issued to finance government fiscal expenditures. In parallel, general government expenditures to GDP remain high compared to the global level. Although, in general, a high share does not negatively impact economic growth, only if there are high-quality institutions for redistributing economic resources through the public sector. In turn, the effectiveness of the institutional environment of Ukraine is limited, which does not contribute to the formation of financial depth and the institutional capacity for effective redistribution of resources.

2.3 ON RELATIONSHIP BETWEEN FINANCIAL OPENNESS AND FINANCIAL DEEPENING IN UKRAINE

The formation of the financial depth of the national economy largely depends on its openness to the movement of cross-border capital flows. As far as the start of the GFC, financial openness and the expansion of the foreign capital inflows were mainstream in economic theory. Before the GFC, Koze, Prasad, and Rogoff [107] or Karmiani and Chodhuri [108] justified that the openness of the economy to international capital flows stimulates financial deepening and the qualitative development of financial institutions, which has a positive effect on the acceleration of economic growth. After the GFC, this statement underwent revision since excessive uncontrolled cross-border capital flows created significant vulnerabilities for the stability of the national financial system. The statement regarding the benefits of financial deepening was also revised due to the risks of systemic instability. Therefore, the current scientific task remains to identify the regularities of the influence of financial openness on changes in the parameters of the financial sector to optimize financial openness and financial depth in the interests of economic development.

In general, the economy's financial openness level is determined by the institutional relations developed in cross-border capital flows [109]. At the same time, legal restrictions on the movement of capital flows (de jure financial openness) and their volumes (de facto financial openness) enhance financial depth. The economy's actual level of financial openness reflects the relative indicator of the volume of cross-border capital flows (de facto financial openness) normalized by the country's GDP, according to Lane and Milesi-Ferretti [110].

In Ukraine, there is quite a significant contradiction between the levels of de jure and de facto financial openness. The Ukrainian economy's regulatory restrictions on cross-border capital flow remained high since 1991 compared to other Central Eastern European economies – at the

maximum level of 0.17 against the average of 0.8 [111]. The government restricted currency regulation under exogenous shocks despite the financial liberalisation policy. *Meanwhile, regulators' weak institutional capacity caused Ukraine's real financial openness in certain periods to reach the average level for the CEE region at 15–17 % of GDP*.

Therefore, the total volume of foreign capital inflows should be analysed to determine the impact of financial openness on financial depth. The main components of cross-border capital inflow into the country are foreign direct investment (FDI), portfolio investment (FI) and interbank loans for countries with relatively undeveloped financial markets, including Ukraine. Loans from development institutes or state borrowing on foreign markets can also indirectly influence the growth of financial depth. Moreover, they may not influence if they flow to replenish international currency reserves or foreign service debt.

This chapter uses the total volumes of inflows of FDI, PI and interbank loans (from the corresponding liability items of the financial account of the balance of payments) to assess the impact of cross-border capital flows on financial depth. Calculating the level of financial openness follows Lane and Milezzi-Ferretti's methodology. Method of comparison of correlations is employed to demonstrate the relationship between changes in the volume of cross-border capital inflows, increase of stock market capitalization, assets of the banking system, loans to households and non-financial corporations, as well as the dynamics of gross fixed capital formation in Ukraine during 1998–2021.

Among studies devoted to the impact of financial openness on changes in the parameters of national financial markets, the most notable results refer to the relationship between capital inflow and indicators of financialization [112], the depth of the stock market [113], credit load in the economy [114]. Apart from that, it is necessary to consider the characteristic of national economic development in the chronological sequence of their occurrence, taking into account the global economic context while analysing the relationship between financial openness and the change in the characteristics of the national financial markets.

In general, the quantitative parameters of financial development and, in particular, the financialization of the economy moves upward in proportion to the foreign capital inflows. The influx of capital inflows to developing countries in the 1990s and the first half of the 2000s enlarged the financial depth in terms of active operations of banks, stock market capitalization, etc.

The case of Ukraine demonstrates how these parameters changed simultaneously up to GFC. Before 2008 large volumes of foreign capital inflows significantly affected the strengthening of Ukraine's financial market. After GFC's impact, this movement uniformity became visible during 2010–2012, when the capital inflow resumed. Since 2014 under the background of other crises and the war, Ukraine's economy has suffered significant losses, particularly in the financial sector, and the foreign capital inflows has significantly decreased. At the same time, the influx of cross-border capital flows contributed to the extensive financial deepening in Ukraine during 2003–2008, both in terms of gross capital accumulation and an increase in lending volumes. Nevertheless, to what extent did the influence of capital inflow affect the qualitative change in financial

development? To answer this question, examining the impact of capital inflows in those financial markets fields that determine the nature of economic growth is advisable. Furthermore, the latest studies no longer confirm a positive connection between financial openness and economic growth.

Economic growth determines by the demand – consumer lending increase, and by the supply along with the technology side – the upsurge of lending to legal entities. The public debt acceleration, which usually compensates for the deficit of budget expenditures, does not directly depend on the financial openness of the economy. The influence of public debt on economic growth relies on whether the support of the effective demand of the population or the implementation of national economic development programs is the primary source of the budget expenditure deficit. The role of stock markets in economic growth for most small open economies remains insignificant, given their minor volumes in such countries.

It is advisable to conduct a comparative analysis of the specified areas of cross-border capital flows allocation in the case of their uncontrolled influx in a small open economy with a relatively weak development of financial markets of a raw material nature. That will enable to determine not only the characteristic directions of financial deepening but also to predict the possibilities of the structural development of such economies under uncontrolled financial liberalization. It is important to note that the history of Ukraine's financial sector development was accompanied by some exogenous shocks (in 1998, 2004, 2008, 2014), dramatically disrupting the trends and interdependence of factors. Hence, the regression analysis on the example of yearly data of Ukraine's financial sector over 1998–2021 does not meet the criterion of theoretical justification. At the same time, a large number of shocks makes detailed periodization necessary, which in the annual format causes insufficient data to build a relevant regression. Since more detailed quarterly or monthly data for most of the period is unavailable, the relationship between the inflow of foreign capital and indicators of financial depth in Ukraine is revealed having used the correlation method (**Table 2.1**).

Table 2.1 Correlation between cross-border capital flows and financial depth in Ukraine, 1998–2021

Indicator	International capital inflow
Stock market capitalization	0.76
Bank assets	0.50
Loans to non-financial corporations	0.22
Loans to households	0.33
Gross fixed capital formation	0.60

Source: developed by the author based on data [1]

The tightest direct correlation of the dynamics of the cross-border capital flows is considered to the stock market capitalization, that is consistent with Barnos [115], Calderon and Kubota [114], Estrada et al. [116], and the early results of Levine et al. [64] Stock market indicators demonstrate the noticeable impact of financial openness on its expansion, in particular in the

segment of corporate bonds. During 2003–2007 the most notable rise of the corporate securities market in Ukraine was noted. The share of the issues increased from 1.2 % of GDP in 2004 to 6.2 % of GDP in 2007, and decreased to 1 % of GDP in light of restrictions on cross-border capital flows in 2009 and after 2014. The change in the stock market capitalization illustrates the same: 20.1 % in 2004, 78.4 % in 2007 and less than 10 % since 2014 [117].

The abovementioned trend coincides with the increase in participants, the number of issues, and the volume of trades. At the same time, apart from the development of quantitative parameters, the growth of qualitative indicators remained quite limited: low capitalization of domestic companies, lack of interest in the securities market from the population side, a small number of liquid shares, and high turnover of listed companies.

Excessive volatility, information opacity and price manipulation are features of Ukraine's stock market. Besides, the lack of financial instruments and the focus on speculative capital led to the stock market's distraction from the real sector of the economy and its fragility and subsequent reorientation to more reliable government bonds.

A significantly smaller connection of cross-border capital flows with the level of gross fixed capital formation is not surprising since some cross-border capital inflows traditionally refer to the purchase of firms or investments in real estate. Specifically, the connection appears significantly less than with the stock market capitalization. The reason for this is the correlation of cross-border capital flows with bank loans to non-financial corporations. Expanding business lending to firms is one of the most desirable effects of financial openness, which small commodity economies can enhance to accelerate their structural development. On the contrary, the connection with bank loans to households is 30 % tighter. *Therefore, the increase in financial openness for a small commodity economy will lead to financial deepening in the most liquid and volatile segments, particularly the stock market and consumer lending. In this case, it cannot be a matter of qualitative financial deepening*.

More than extension of individual areas of activity or deepening its segments is required for consideration under qualitative financial development in terms of increasing financial openness. If financial openness has severe influence, financial development should be provided via the improvement of its primary functions, such as:

a) capital accumulation;

b) effective allocation of credit resources (primarily in the business segment);

c) diversification and risk hedging;

d) deepening of connection between financial and real sectors;

e) information support enhancement [118].

During economic downturns, particularly after 2008, there was an outflow of capital from Ukraine and a long-term stagnation of the gross fixed capital formation share. Thus, Ukraine's financial openness trends mark the period of sudden inflow and outflow of foreign capital as a change in the stages of its economic development. The notable upturn of financial openness in 2003–2007 can be noted as a "crossing of the Rubicon", after which the Ukrainian economy became dependent

on external financing and never returned to the path of endogenous growth. The specific feature is not only a fall in economic growth rates but also a reduction of domestic savings. This affirms the need for cross-border capital flow control and regulation of the level of financial openness of the national economy.

The obtained results fully confirm the expected positive impact of financial openness on the financial deepening in bank lending and consumer one to a great extent. The reasons involve the gradual reorientation of the financial sector in terms of the influx of significant amounts of financial resources into consumer lending due to its shorter business cycle and higher profitability. The low functional capacity of the financial sector, which does not meet the economy's needs to direct capital from abroad into the production sector, is as well vital.

The consumer lending market supplanted enterprise lending during the cross-border capital inflow boom (2003–2007), besides a relatively productive inflow of foreign investment into the real industry sector in the early 2000s. Therefore, the intensification of foreign capital inflows to the domestic market had a relatively limited effect on the institutional development of Ukraine's financial sector. Meanwhile, it increased imbalances in the part of the currency and segmental structure.

The emerging role of financial intermediaries in the accumulated financial resources was noted during 2005–2008 when the domestic credit (10 times the peak value of UAH 338.4 bn) and savings increased (adjusted gross savings increased by 4.5 times to UAH 264.9 bn). Meanwhile, in 2007–2008 foreign borrowings became a significant share of the sources of accumulation (25.4 %), mainly accumulated through the financial sector. Later, in 2009–2010, lending to individuals did not resume, and banks reoriented themselves to profit from short-term operations despite the growth of macroeconomic indicators and banking sector stabilization [119].

One of the relationships between financial openness and financial deepening consists of the diversification of risks, the development of competition and the improvement of information provision in the financial sector. Such institutional strengthening of Ukraine's financial sector should have a noticeable impact on its quantitative and qualitative development.

However, the statistical analysis does not provide such confirmation not only for Ukraine but also for a broader sample of Central and Eastern European countries. Specifically, the dynamics of the concentration of the banking markets of 10 Central and Eastern European countries remained relatively stable during 1999–2015, i.e., the most active phase of financial liberalization of these countries. Despite the noticeable growth of financial openness, the concentration level of these countries' banking markets did not decrease [120]. The concentration level of this region stabilized at 50–70 % after the decrease in concentration under the influence of reforming administrative economies. It remained at the same level 15 years later, i.e., in 2015, despite significant foreign capital inflows to these countries.

In practice, the improvement of competition and diversification of risks in the financial sector due to the inflow of foreign capital and the entry of foreign banks into the domestic market has an ambiguous effect. On the one hand, competition is intensifying due to foreign banks' appearance in Ukraine's financial services market. On the other hand, domestic banks have to lower requirements

for the reliability of borrowers and operate with riskier instruments to compete with more powerful foreign banks. Meanwhile, foreign banks can diversify their portfolio abroad and have a safety cushion from the parent structure. Hence, foreign banks operating in Ukraine's domestic market with risky instruments take on much less systemic risk, although they provoke its growth.

Additionally, foreign capital inflows in an underdeveloped institutional environment, characterized by a high concentration level, does not always contribute to strengthening competition. On the contrary, with a high level of market concentration, the arrival of small foreign investors who could increase competition is difficult. Therefore, more meaningful foreign investors, financial companies and banks should be expected. This herewith will reduce market concentration and later fix it at this level for a long-term period, limiting the further development of financial market intermediation.

Besides, Ukrainian banks are forced to reduce their rate of profit and optimize costs competing in the domestic market with foreign banks. Domestic banks consequently try to avoid low-profit and costly areas of activity. First of all, it distracts investment lending of real sector firms, whose actions are not highly profitable and require significant bank expenses for analysing their solvency.

The low level of market institutions' development, inherent to transitive economies, limits the influence of financial openness on the qualitative financial deepening of the Ukrainian economy. The insufficient level of market institutions' development constrains both the transfer of technologies and the spread of best management practices.

This situation is typical for commodity economies. The impact of FDI on increasing productivity factors in such economies is limited. On the one hand, natural resources are crucial in raising FDI, as these flows into resource-rich countries are more directed to the extraction industry. On the other hand, FDI flows into the extraction industry do not bring the expected benefits in terms of technology transfer. Technology transfer in such cases will take place through the market in the presence of chains of cooperation with foreign transnational corporations that have entered the country or a high level of competition. Meanwhile, these segments in developing countries are strongly monopolized, and transnational corporations implement their activities using competitive advantages: scale, capital, and technologies. The technology transfer does not occur under such conditions.

The influence of financial openness on the development of financial markets of the transformation economies of Central and Eastern European countries during 1996–2014 (after that, the openness upturn stopped) shows that the growth of financial openness did not affect financial development in the long term [121].

The financial openness upturn demonstrated a slightly noticeable positive connection with financial development only in Estonia and Hungary, which cannot be considered a systematic case. At the same time, it shows a negative connection with financial development in the Czech Republic and Slovakia. Thus, the systemic manifestation of a positive relationship between financial openness and the development of the financial sector is not observed at the regional level.

The question arises whether the country should open its financial sector to stimulate its deepening, given the adverse effects of financial openness during the financial crisis. It may be more rational for governments not to open at the stages of a weak financial sector since informal capital

distribution mechanisms (foreign investments from related parties through captive banks or funds) function effectively at this stage [122].

The positive relationship between financial depth and financial openness with economic growth becomes even less pronounced. Research after GFC [123] shows that the country's financial development positively affects economic growth up to a certain level. After exceeding the threshold values, the financial sector can hinder further economic development, and the rapid financial deepening inhibits total factor productivity [32, 124]. The GFC strengthened the arguments against financial openness, as it became the most visible form of the adverse impact of external shocks on internal financial stability. The economy is oversaturated with finance when loans to the private sector reach 80–100 % of the GDP [8]. *Exceeding this threshold signals the need for monetary regulation and the establishment of restrictions on capital inflow if interest rates do not influence the financial market*.

Another approach asserts that financial openness affects economic growth mainly through the stimulation of total factor productivity and not simply through the accelerated accumulation of capital. This view corresponds to the neoliberal approach. It explains why the effects of liberalization have a limited manifestation as they act on a permanent, not a temporary basis. Therefore, it is difficult to distinguish them over a limited period under the influence of the specifics of the trend. In particular, Bekaert et al. [125] confirmed the positive relationship between financial openness and GDP growth without clarifying the causal relationship. Additionally, they proved the positive relationship between financial openness and total factor productivity growth, emphasizing that this should be considered the main positive effect of financial openness. This statement is entirely based on the neoclassical approach to economic growth with total factor productivity, substantiated by R. Solow. The critical condition for such a positive relationship is a certain threshold level of developed institutions of financial markets.

The contradiction of the theory of free capital movement suggests the following. On the one hand, financial openness promotes financial development, mainly in developing countries. On the other hand, capital flows direct more to the financial markets of advanced countries because of the presence of developed market institutions, which are absent in developing transit countries. Hence, financial openness positively affects the growth of the general factor of productivity for those countries that already have developed financial markets. There is no sufficient reason to expect financial openness to overcome the threshold value of the level of financial development.

The limited influence of cross-border capital flows on qualitative financial development and economic growth is due to their irrational allocation and the existing features of the financial sector. Furthermore, the level of financial development is low in transitive economies. Cross-border capital flows should be rationally subordinated to the parameters of financial market development.

Financial openness should adjust to the state of developed financial markets with structural characteristics close to optimal, considering the prerogative of supporting the catch-up development of transitive economies. Higher financial openness is possible at the stages of functioning of the financial sector in an advanced form, which does not occur in practice.

That is why any country, even with the most developed financial markets, needs to restrict capital movements when the structural features of the financial sector or macro-environment threaten economic stability, and cross-border capital flows only intensify risks. Cross-border capital flows should be directed within the framework of the relevant national policy, regulating financial openness and structural financial development. At the same time, profitable industries of the economy act as a driver for foreign capital flows attraction.

To conclude:

1. The financial openness increase of the national economy has a marked connection with the financial deepening. It manifests itself to the greatest extent through the rise in stock market capitalization, the consumer lending market and the accumulation of capital investments. The latter depends on positive economic dynamics.

2. The level of regulatory restrictions on the movement of cross-border capital flows in Ukraine remained high compared to other transitive economies despite the active "open window" policy for foreign investments and attempts to stimulate their inflow through financial liberalization and tax incentives. This practice reflects the presence of a particular regulatory paradox in Ukraine's financial openness. The government applied numerous restrictions in the field of capital flows, including within the framework of currency regulation, as regular exogenous shocks naturally prevented the continuation of the financial liberalisation policy. Meanwhile, the weak institutional capacity of regulators led to Ukraine's financial openness in certain periods reaching the average level in the CEE region in light of numerous regulatory restrictions. Therefore, the sustainable growth of the national economy has attracted foreign capital, which on a free, unregulated basis, mainly finances already existing well-functioning high-profit markets and industries and provides limited financing for economic potential. At the same time, the successful economic development and the presence of profitable sectors that demonstrate growth act as a driver for the foreign capital inflows in various products, which reflects the movement's prompt nature concerning macroeconomic dynamics inherent in cross-border capital flows.

3. The cross-border capital inflows on a free, unregulated basis do not contribute to the productive development of the economy and its financial sector, which means the financing of promising industries. Such feedback of factors confirms the reactive nature of the cross-border capital flows concerning macroeconomic dynamics when the potential and acceleration of economic growth can act as a factor in attracting foreign investments. Hence, cross-border capital's unregulated nature also deepens the financial sector's existing structural and functional characteristics but cannot contribute to its structural transformation in an underdeveloped institutional environment. Therefore, more than financial openness is needed for increasing factor productivity, accumulating productive capital, technological rearmament and overcoming the threshold value of the level of development of market institutions. Even FDI, the most reliable and effective instrument for the inflow of foreign capital, mainly reproduces speculative interests.

4. The cross-border capital flows can form a procyclical impact despite the limitation of the influence of unregulated financial openness on the structural development of the economy.

The strengthening of the export raw material orientation, provoking a credit boom, price imbalances on financial assets markets, accumulation of foreign debt and avoidance of fluctuations in the national currency rate are the channels of such impact. The procyclical nature of the influence forms factors of systemic risk of financial instability of the economy. Furthermore, the procyclical quantitative financial deepening of the economy only strengthens existing imbalances.

5. The uncontrolled foreign capital inflows, even direct foreign investment, did not play a significant role in the qualitative development of Ukraine's financial sector's structure and functional capacity. During 2003–2007 the inflow of substantial amounts of financial capital, with a decrease in the price of financial resources, did not affect the development of investment lending or competition in financial markets. At the same time, foreign capital strengthened the procyclical financing of consumer lending and the volatility of speculative markets of financial assets (stock, currency, real estate). This led to Ukraine's trade deficit deterioration, structural and functional imbalances of the real sector, dollarization, the formation of credit booms, price disparities in the market of financial assets and other systemic risk factors. Hence, the positive effect of increasing financial openness and foreign capital inflows is manifested in the presence of well-functioning financial markets and technology industries within the limits of the realized economic potential at a particular moment.

CONCLUSION TO SECTION 2

1. Financial infrastructure provides both the opportunity to accumulate savings and to reallocate them effectively. Based on the standard production function, the influence of financial factors on GDP is traced through their formation in consumption and savings. Thus, financial depth indicates the ability of the financial system to transform consumption into savings.

2. According to the results of empirical studies of the relationship between credit deepening and the occurrence of GFC, firstly, strong predictors of the crisis are not the level of external debt, financial depth, real estate prices or banking sector liquidity but their rapid growth. Secondly, countries with a more robust financial sector grow faster, often leading to crises. Nevertheless, the long-term impact of financial deepening and liberalization remains positive if the crisis does not become systemic. Approximately 30 % of credit booms end in a crisis. Thirdly, credit booms, which have systemic financial crises, are marked by: beginning at high values of financial depth (domestic credit to GDP), external borrowings (balance of payments) and banking sector liquidity (loans-to-deposits ratio); continue longer; are not related to the expansion of real production (for example, booms in the real estate market).

3. The dynamics of global economic growth indicators coincided with crisis downturns in 1975, 1982, 1991, 2009, 2020 and 2022. At the same time, the average values of financial depth (broad money, financial assets and liabilities, domestic credit to private sector, stock market capitalization, debt to GDP) have been growing since the 1970s. The GFC demonstrates that

the rapid increase in financial depth by 30 % or more over the past 10 years, as well as its value of more than 100 % of GDP, together with the insufficient development or reduction of real production, indicates the beginning of a systemic financial crisis followed by a long period of economic recession.

4. Compared to the financial depth of groups of countries by income level, the level of Ukrainian financial depth is lower by all indicators except dangerously high levels of government debt and expenditures to GDP. Furthermore, the low level of Ukraine's integration into global financial markets, along with the low level of financial depth, did not ease the impact of the GFC and pandemic crisis. Thus, even countries conditionally isolated from the world financial markets still react to adverse shocks originating from outside, and the mutual correlation of the world financial markets only increases during crisis events. Moreover, the avoidance of an immediate financial shock did not ease the crisis consequences since the low level of financial openness also means complicated access to credit resources due to the priority borrowers from developed countries give to their closer counterparties.

5. For the development of new industries, projects or infrastructure, cross-border capital flows should be directed within the framework of the relevant national policy. In this case, capital inflows positively influence the formation of economic growth drivers. The predominantly counter-productive effects of foreign capital inflows in Ukraine confirm the need to implement special state policy measures aimed at adapting the level of financial openness of the national economy to the actual needs of its development.

3 FINANCIAL DEPTH OF UKRAINE'S ECONOMY

ABSTRACT

The section identifies the features of the depth of banking and non-banking sectors, and capital market across systematized development stages. The banking sector's depth review from 1996 – August 2022, using the ratios of monetization, banking system's assets, bank capital and liabilities, bank deposits and loans to GDP, highlights the distraction of Ukraine's banks from the real sector of economy needs and their focus on quick incomes. Predominant lending is short-term corporate and consumer. The population does not keep a significant part of their accumulation in the banking system, as demand deposits prevail. Non-banking sector's depth examination during the 2005 – Q2 2022 (by analysing the ratios of the non-banking assets to GDP; volumes of services provided by insurance companies, credit unions, financial companies and lessors, pawnshops, non-state pension funds) indicates: the increasing financial companies' share; the insurance companies' supersession since 2015; minor shares of non-state pension funds, pawnshops and credit unions. The study of capital market notes DGBs leading position, predominantly held by the NBU and commercial banks. Non-residents, Ukrainian legal entities and individuals do not attract financial resources via the capital market, given the miserable liquidity of the securities circulation. Overall, the findings suggest that the financial depth of Ukraine's economy is not the cause of economic growth but only accompanies it.

KEYWORDS

Banks, non-banks, capital market, broad money, assets, liabilities, loans, deposits, securities.

3.1 DEPTH OF UKRAINE'S BANKING SECTOR

Based on the fact that the influence of financial depth on economic growth depends on the optimal structure of the financial sector, it's sectoral analysis by assets and liabilities will show the possibilities of using the financial depth in the interests of post-war recovery of Ukraine's economy.

It is to be noted that, the financial sector of Ukraine's economy has a bank-centric model (about 90 % of the financial are bank). The story of the banking sector is not long, but it is quite dynamic and includes the following stages:

1992–1999: during the first years of independence, the introduction of the national currency into circulation, the creation of the first state and commercial banks, formation of the legislative framework of banking activity took place.

2000–2008: the foreign capital inflows into the banking system, against the backdrop of GDP growth, contributed to the increase in bank lending and deposits.

2009: the credit boom of 2007–2008 ended with the Ukrainian banking crisis due to the withdrawal of deposits by the population.

2010–2013: there was a post-crisis lending recovery and deposit funds' return to banks.

2014–2015: banking crisis resulting from the "clean-up" reform of the banking system was marked by the liquidation of banks, leading to a sharp decrease in lending. In addition, the occupation of Crimea and areas of Donetsk and Luhansk regions, where significant industrial business' assets of the largest banks were concentrated, provoked macroeconomic shocks (in particular, devaluation), under the pressure of which the problems of the banking system gradually led to a systemic banking crisis. During 2014–2016, 84 banks (180 as of January 1, 2014) were declared insolvent, while their assets accounted for almost a third of the banking system's assets. Subsequently, the gradual reduction in the number of banks led to only 67 banks functioning (as of October 1, 2022).

2016–2019: the closure of commercial banks and the growth of assets of state-owned banks led to an increase in the share of state-owned banks in the banking system's total assets to 53.4 % (as of June 2022). State-owned banks occupy a dominant position in terms of the share of deposits of individuals against the background of the highest share of problem loans.

2020–2021: the 2020 corona crisis ended by the recovery in 2021, when:

1) retail lending rates exceeded the pre-corona crisis level; retail lending grew more rapidly than before the coronavirus crisis;

2) corporate lending began to grow, including in particular thanks to the launch of the Affordable Loans 5–7–9 % program, within which around a quarter of all new net hryvnia loans were granted in 2021.

2022: full-scale russia's invasion of Ukraine caused the reformatting of Ukraine's economy into a military one. The reduction in budget revenues along with growing public spending under the pressure of military and social spending caused the war bonds issue. Monetization of the budget deficit does not create new resources in the economy but influences the foreign exchange market, putting pressure on the hryvnia exchange rate. The emission of money had similar consequences (acceleration of inflation, devaluation of the hryvnia, and a drop in GDP) as in 1992–1994 and 2014–2015 crises.

Monetisation of economy

Ensuring liquidity is an equally important function of the financial sector, which directly impacts the acceleration of economic dynamics. The increase *in monetary base to GDP* in 2009 (20.6 %), in 2010 (20.9 %), 2013–2014 (21 %), in 2020 (14.1 %) indicated that the increase in the monetization of the economy was not supported by GDP growth in crisis periods (**Fig. 3.1**). In turn, *monetary base growth* lagged behind GDP in 2006 (17.2 %), in 2011–2012 (18.5 % and 18.2 %), in 2015 (16.9 %), in 2018–2019 (12.2 % and 12 %), in 2021 (12.1 %) was a consequence of the NBU's restrictive policy or the improvement of GDP dynamics in connection with the recovery after the economic crisis. The increase in monetary base growth in 2013 (20.3 %)

and in 2020 (24.8 %) indicates the emission of cash hryvnia in crisis periods since the main component of the monetary base is cash, and to a lesser extent, funds in reserve accounts at the NBU. The growth of the monetary base is mainly realized via the NBU's FX interventions.

The decrease in *broad money (M3) growth* in 2009 (–5.5 %), in 2014 (5.3 %), in 2015 (3.9 %), and 2018 (5.7 %) demonstrates the decrease in banks' ability to lend money. Despite the pandemic, in 2020, the bulk share of broad money (M3) growth was provided by increased cash and demand deposits. The increase in the *M3 to GDP* by 2013 (62 %) characterized positive economic trends and the approximation of the characteristics of Ukraine's money market to similar indicators of emerging market and developing economies. At the same time, increased M3 to GDP is not always accompanied by increased lending to industrial firms. Since 2014, M3 to GDP has decreased; and in 2021 it amounted 37.9 %. This trend indicates the deterioration of the supply of money to the economy.

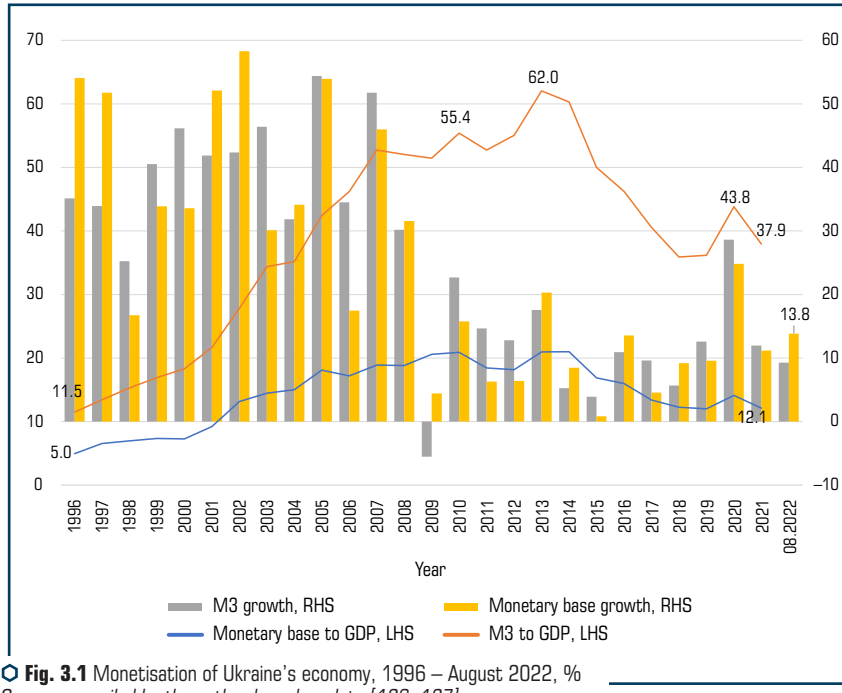

Fig. 3.1 Monetisation of Ukraine's economy, 1996 – August 2022, %
Source: compiled by the author based on data [126, 127]

In 2022, Ukraine's colossal wartime deficit forced the NBU to provide financing for the budget by buying war DGBs. When the Ukrainian financial market became dysfunctional in the first months of the war in 2022, the NBU took the other side until investors returned or others came in.

The purchase of war bonds by the NBU in exchange for money is the degree to which public debt is monetized. As a result (and because of the drop in government revenues), fiscal deficits are exploding. Despite monetization of the deficit, the growth of the hryvnia money supply is absorbed by the NBU's FX interventions. The NBU sells international currency reserves (including the currency of the Ministry of Finance of Ukraine, which the government receives as international financial assistance) and buys hryvnia liquidity from banks on the interbank foreign exchange market.

In general, the monetization of Ukraine's economy is still low, proving the insufficiency of economy's saturation with money supply. At the same time, monetisation growth faster than GDP growth under firms demand in lending indicates that most of the financial resources are invested not in the real sector of the economy but in the financial sector.

Bank assets

The peak increase of *assets of the NBU to GDP* in 2015 (50.7 %) and 2016 (46.5 %) demonstrates the expansion of the central bank's loans to the financial sector, i.e., banks, through liquidity insurance and stabilization lending operations. Accordingly, in these years, opportunities for crediting the real sector of the economy grew (**Fig. 3.2**). The *bank assets to GDP* display the power of the banking system and the importance of banks for the economy. Since 2014, bank assets to GDP had been rapidly decreasing from 83.0 % to 37.6 % in 2021, which indicated a significant decrease in the financial depth of the economy.

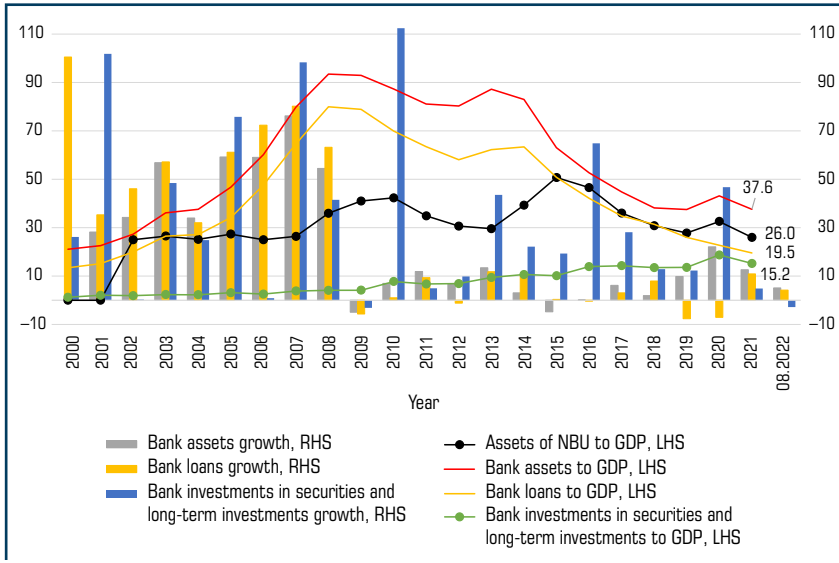

Fig. 3.2 Assets of Ukraine's banking system, 2000 – August 2022, %
Source: compiled by the author based on data [126, 127]

During 2005–2008, the foreign capital inflows led to *bank loans growth* (61.2 % in 2005, 72.3 % in 2006, 80.2 % in 2007, 63.2 in 2008) and *bank assets growth* (59.2 % in 2005, 59.1 % in 2006, 76.2 % in 2007, 54.5 % in 2008). Despite the bank assets growth in non-crisis periods (2000–2008, 2011, 2013, and 2020), the bank loans growth slowed down. In 2021 the positive dynamics of bank lending resumed (bank assets growth was 12.6 %, while bank loans growth was 10.9 %) after the decline due to the consequences of the pandemic (in 2020, bank assets growth was 22.1 %, while bank loans decline was –7 %). However, in 2022 there was a slowdown again.

At the same time, the *bank loans to GDP* grew prior the GFC, reaching 80 % in 2008. Meanwhile, bank loans growth rates exceeded GDP growth several times, which was a positive phenomenon. After the GFC, bank loans to GDP significantly decreased during 2009–2012 and since 2014, despite the growth in the volume of bank loans in absolute terms. In 2021, bank loans to GDP remained at a low level and amounted to 19.5 %.

Decreasing bank loans growth and bank loans to GDP in crisis periods suggests the deterioration of the financial deepening due to inefficient financial resources allocation. In 2022, loans grew only at the expense of state banks due to the state program "Affordable loans 5–7–9 %", while the net loan portfolio decreased across private domestic and foreign banks. Under war, the total NPLs grew from 27.1 % to 29.7 % in Q2 2022.

One of the reasons why bank loans growth lags behind bank assets growth is the higher *bank investments in securities and long-term investments growth* since 2010. If in 2009, *bank investments in securities and long-term investments to GDP* was 4.2 % and the decline was –3.1 %, then in 2020 – 18.7 % of GDP and growth was 46.7 %). At the same time, although since 2016, the volumes of DGBs on banks' balance sheets have increased significantly, such growth indicates not so much the deepening of the public debt market but rather the recapitalization of banks. Similarly, during 1995–1998, financial resources were diverted from the real sector of the economy due to the high profitability of DGBs. However, as of August 2022, such investments have declined due to the greater attractiveness of the NBU's certificates of deposit. Higher interest rates on the latter give banks a higher profitability and discourage banks from investing in DGBs or lending to businesses. Rates for DGBs in hryvnia on the primary market fluctuated in the range of 12–16 % for six months to one and a half years, and on the secondary market – 18–22 % (as of September 2022). Therefore, the insignificant bank investments in securities and long-term investments growth, namely in DGBs, was explained both by the low level of the yield of DGBs and by the monetary policy aimed at banks income formation by placing excess bank liquidity in overnight deposit certificates.

The peak values of *bank individuals' loans to GDP* were in 2013 – 29.6 % and 2014 – 26.2 %, while of *bank corporates loans to GDP* in 2013 – 16 % and 2014 – 16.5 %. In the following years, the credit depth decreased to 13.9 % – bank corporates loans to GDP, 13.3 % – bank individuals' loans to GDP in 2021 (**Fig. 3.3**).

Although corporate lending always prevails across bank loans (as of August 2022, *share of bank corporates loans* was 76.4 %), there were certain shifts in the structure of lending in favour

of households during 2006–2009 (*share of bank individuals' loans* 28.9 % – 29.8 %) due to the development of the consumer and mortgage lending. A significant part of these funds was provided by the consumer lending (as of August 2022, *share of bank individual's consumer loans* was 83.2 % while *share of bank individuals' loans for house purchase* was 12 %). The high growth rate of consumer lending was supported by easing bank lending terms and the rapid increase in households' incomes. Such redistribution of loans limits the financing of innovation economic activities. In 2022, retail lending decreased and mortgage lending stopped.

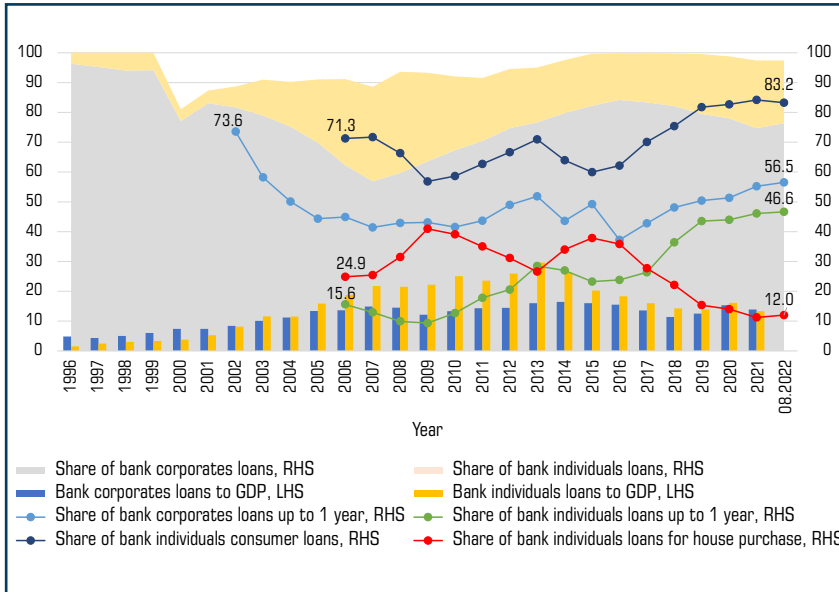

Fig. 3.3 Ukraine's bank loans, by types and terms, 1996 – August 2022, %
Note: total bank loans include loans granted to individuals, corporates, non-bank financial institutions, general government.
Corporates loans include loans granted to non-financial corporations' (corporations engaged primarily in the production of market goods and non-financial services, and is subdivided into sub-sectors: public non-financial corporations, private non-financial corporations and foreign-controlled non-financial corporations).
Individuals' loans include loans granted to households (employees, own-account workers, employers, recipients of property, pensions and other transfer incomes).
Source: compiled by the author based on data [127, 128]

Banks increased long-term lending until 2009, but since 2010 – short-term lending: *share of bank corporate loans – up to 1 year* expanded from 41.4 % in 2007 to 56.5 % (as of August 2022), while *share of bank individuals loans up to 1 year* enlarged from 9.3 % in 2009 to 46.6 % (as of August 2022). That is, there is a reduction in long-term lending resources.

So, in recent years, Ukraine's banking system has demonstrated a reduction in the volume of corporate lending, and only a slight increase in household lending (due to a reduction in the share of bank individuals' loans for house purchase against the backdrop of increase in the share bank individual's consumer loans. In 2022, corporate lending grew exceptionally due to the support of the state, while retail lending decreased and mortgage lending stopped.

Bank capital and liabilities

The gradual change in banking legislation and its adaptation to international standards contributed to the increase of *bank equity capital to GDP* starting in 2000 (**Fig. 3.4**). The outpacing of capital growth rates compared to GDP growth rates was a positive phenomenon. During 2006–2008, there was a significant increase in *bank equity capital growth*: 67.2 % in 2006 and 71.4 % in 2008. It happened due to the foreign capital inflows, that was connected not so much with positive changes in Ukrainian economy, but with the possibility of obtaining quick surplus profits, primarily at the expense of households lending. As a result, during 2006–2008, the share of bank individual loans increased to 28.9 % in 2006 and to 33.9 % in 2008. During 2014–2015, under banking system crisis, the number of functioning banks and the amount of their capital decreased. However later, in 2016–2017, 2019, and 2021, Ukrainian banks finally achieved positive bank equity capital growth dynamics.

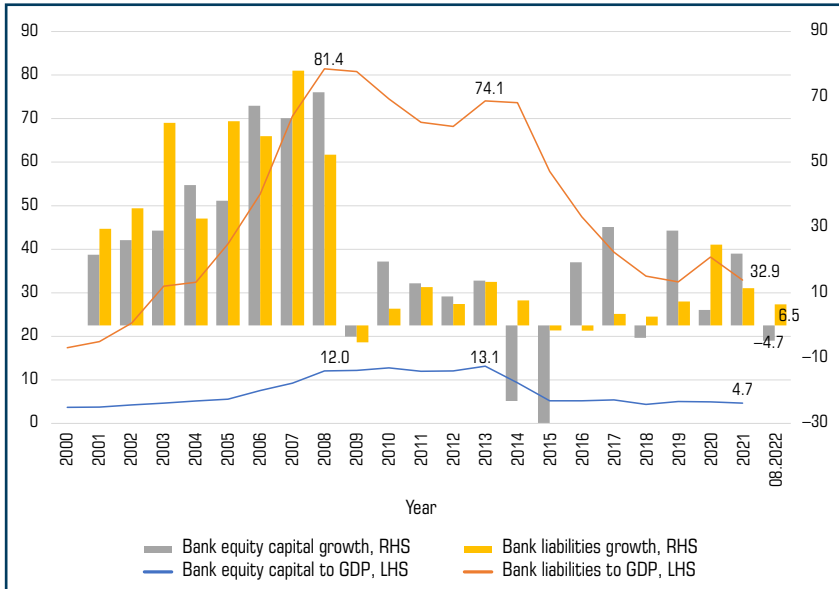

Fig. 3.4 Capital and liabilities of Ukraine's banks, 2000 – August 2022, %
Source: compiled by the author based on data [127, 128]

In order to provide Ukraine's economy with long-term loans, banks should accumulate appropriate amounts of long-term liabilities. An increase in the resource base due to *bank liabilities growth* (particularly deposits) was observed until 2009 due to the stabilization after the 1998 crisis. If in 2008, *bank liabilities to GDP* were 81.4 %, then in 2021 – 32.9 %.

Bank deposits

Before the systemic banking crisis of 2014, *bank corporates and individual deposits to GDP* multiplied. However, demand deposits/on current accounts in national and foreign currencies prevail over the structure of deposits (**Fig. 3.5)**. If, until 2014, the *share of bank individual deposits (including saving certificates)* was the leading share of the funds raised by the banking system, then after the reduction of the number of banks since 2014, there has been a steady increase in the *share of bank corporates deposits*.

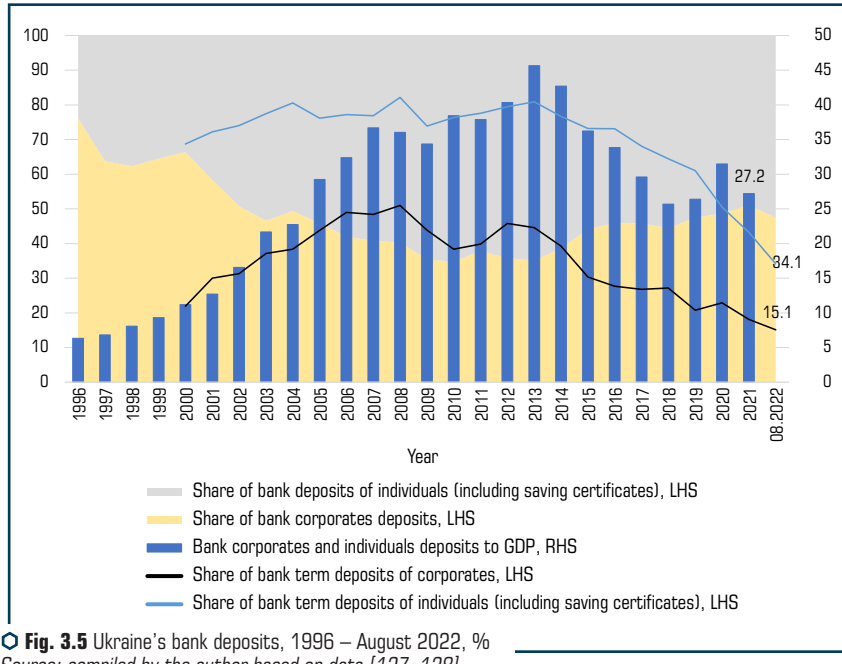

Fig. 3.5 Ukraine's bank deposits, 1996 – August 2022, %
Source: compiled by the author based on data [127, 128]

Bank liabilities remain mostly short-term, that is negative because long-term deposits are a source of long-term lending. The *share of bank term deposits of corporates* in 2013 was 44.6 %, and in 2021 – 18.1 %. The *share of bank term deposits of individuals* (including saving certificates) was 80.9 % in 2013 and 43.2 % in 2021. The predominant share of demand deposits among both

firms and the population indicates an unsatisfactory structure of the funds involved, that indicates risks in funding and worsens long-term lending terms.

War risks in 2022 do not contribute much to the growth of long-term deposits, especially without the right of early withdrawal under martial law. Interest rates remain quite low: an average of 11 % per annum for bank term hryvnia deposits. Despite the increase in rates for *bank deposits of individuals* (in average three-month in hryvnia rates by 5 p.p. from June to August 2022), they remain much lower than the new level of inflation. Average rates on deposits of individuals in dollars remain below 1 %. Although, as of August 2022, there was an inflow of funds to banks, it was directed mainly to current/saving accounts. Demand deposits ensured the growth of deposits in 2022. The *share of bank demand deposits of corporates* exceeds 84.9 % and the *share of bank demand deposits of individuals* exceeds 65.9 %. The increase of the NBU's discount rate did not contribute to the transfer of household and business funds from demand to term deposits. Such bank funding structure does not provide long-term investments.

Therefore, the increase in population deposits was provided primarily by funds in current/saving accounts. In particular, unused salaries of military personnel and state employees were accumulated there. In 2022, interest rates on hryvnia deposits gradually increase but remain markedly lower than the key policy rate. This does not incentivise investors to prefer hryvnia assets over FX instruments.

To conclude:

1. The increase in the monetization of the economy, assets, capital and liabilities of banks to GDP demonstrates the increase in the financial depth of the Ukrainian banking sector before the GFC. Thus, the deepening of deposits prior to the GFC has led to the increase of bank loans until 2008. Since then, corporate and individuals lending have stagnated, while the share of long-term lending has declined. In parallel, demand deposits predominate among corporate and individuals' deposits. The structure of loans is characterized by the predominance of corporate loans. The main driver of bank individuals' loans is consumer lending, that is, small unsecured loans. Mortgages form a minor share of the bank individuals' loans.

2. Over the past few years, banks have reduced the share of corporate loans, while increasing the share of investments in securities and long-term investments. At the same time, under the war in 2022, banks lost interest in DGBs due to low rates versus higher rates of the NBU's certificates of deposit. In other words, bank resources are not used to boost investment activity or to support budget financing, but are redistributed to short-term but highly profitable instruments.

3.2 DEPTH OF UKRAINE'S NON-BANKING SECTOR AND CAPITAL MARKET

Non-banking sector

Instead of financial intermediation, non-bank participants are often concerned with a cash settlement of the shadow economy or lending to unreliable clients who do not fall under the

stricter standards of banks. The development of Ukraine's non-banking sector is characterized by the following *stages*.

1991–2000: *formation*. Due to the absence of special legislation and independent supervisory authority, many non-banking financial companies were set up like financial pyramids.

2001–2007: *buoyancy*. With the establishment of supervision authority and infrastructure of the non-banking sector, assets (volumes of accumulated capital and lending) grew rapidly (**Table 3.1**).

2008–2009: *recession due to GFC*. The decline of insurance companies' and credit institutions' assets was compensated by the growth of the market of pawnshops, financial companies and non-state pension funds.

2010–2016: *post-crisis recovery*. The growth of the number and assets of all non-banking institutions was interrupted by the annexation of Crimea, followed by the beginning of the war in Donbas. The number of insurance companies, credit unions, and pawnshops began to decline as these participants did not conduct professional activities for more than six months or decided to cancel their licenses. In addition, a significant number of institutions were inactive because they were registered in the temporarily occupied territories, and Ukrainian legislation did not allow to exclude them from the register.

2017–2018: *buoyancy*. Assets of all types of non-banking intermediaries increased despite significant differences between the growth rates of various segments of the non-banking sector, that indicated the significant potential for its activity.

2019–2021: *reforming*. In 2019, weak and unreliable companies were withdrawn due to the regulatory actions of the NSSMC to clean up the non-banking sector. At the same time, there were simultaneously active new financial intermediaries. As part of the "split", from July 1, 2020, the NBU took over the functions of the regulator of non-banking financial services of the financial sector, which comprises insurance companies, leasing companies, factoring companies, credit unions, pawnshops, and other financial institutions. The NSSMC continued to control non-state pension funds. During 2020–2021, the NBU improved the rules of operation, the procedure and the conditions for access to the market (licensing, disclosure of ownership structures, reporting, on-site supervision, inspections, risk assessment, application of influence measures, etc.). The transformation of the non-banking sector continued, primarily through several dormant financial companies' voluntary withdrawals from the market. The NBU, based on the updated regulatory framework, applied corrective measures to breakers of regulatory requirements.

Despite the COVID-19 crisis and reforms (decrease in the number of non-banking institutions), the non-banking sector scaled up the volume of operations, with financial companies the most (**Table 3.1**): if in 2019, assets amounted to UAH 236 bn, then the Q2 2022 – UAH 278.13 bn. Russia's full-scale invasion of Ukraine in 2022 stopped the non-bank lending market: volumes of main financial services of all non-bank providers decreased (**Table 3.1**). In Q2 2022, in order to maintain market discipline and protect consumer rights, the NBU has resumed imposing corrective measures on participants of the non-banking sector for failing to submit reports, violating specific required financial ratios, and engaging in risky activities. The regulator also introduced several requirements for non-bank institutions that trade FX cash.

● **Table 3.1** Depth of Ukraine's non-banking sector, 2005 – Q2 2022, UAH bn

Period	Gross insurance premiums	Gross insurance claims paid	Loans, issued to credit union members	Deposits of credit union members	Financial services provided by finance companies and lessors	Loans issued by finance firms	Loans issued by pawn-shops	Non-state pension funds contributions	Non-state pension funds payments
2005	12.9	1.9	1.44	1.15	7.05	0.22	1.43	0.04	0.002
2006	13.8	2.6	2.60	1.93	12.23	0.33	1.14	0.12	0.004
2007	18	4.2	4.51	3.45	11.25	0.24	1.40	0.23	0.01
2008	24	7.1	5.57	3.95	14.23	0.27	2.13	0.58	0.03
2009	20.4	6.7	3.91	2.96	21.83	0.20	3.51	0.75	0.09
2010	23.1	6.1	3.35	1.95	27.06	0.33	5.50	0.93	0.16
2011	22.7	4.9	2.24	1.19	26.47	1.04	7.33	1.10	0.21
2012	21.5	5.2	2.53	1.29	60.20	3.59	8.95	1.31	0.25
2013	28.7	4.7	2.35	1.33	83.06	7.02	8.37	1.59	0.30
2014	26.8	5.1	1.99	0.99	68.53	6.98	8.41	1.81	0.42
2015	29.7	8.1	1.79	0.86	81.05	7.37	12.46	1.89	0.56
2016	35.2	8.8	1.80	0.83	127.75	5.78	16.72	1.90	0.63
2017	43.4	10.5	1.90	0.94	249.97	26.94	16.39	1.90	0.70
2018	49.4	12.9	2.02	1.05	160.92	51.91	16.44	2.00	0.81
2019	53	14	2.28	1.21	141.91	79.18	18.18	2.16	0.95
2020	45.2	14.2	2.38	1.43	205.20	88.68	16.57	2.38	0.11
2021	51.3	18.5	1.97	1.15	284.80	125.47	11.91	2.56	1.24
Q2 2022	17.8	6	1.38	0.81	51.00	27.28	4.06	–	–

Source: compiled by the author based on data [127, 128]

While there was an increase in non-bank financial services' penetration (**Table 3.1**) owing to the remote opportunities during the latest decade, the non-banking sector does not play a role in financial deepening due to the low transaction volume.

Regarding the *assets structure*, Ukraine has a bank-centric model of the financial sector: the share of non-bank institutions' assets does not change since 2017 and as of Q2 2022 was at 12 % (**Fig. 3.6**). Until 2008, *insurance companies* held the most significant weight in the non-banking sector, whose assets in 2005 comprised 83 %. However, there were no positive trends after the GFC, and their share decreased to 23.6 % (UAH 65.56 bn) as of Q2 2022. The

assets of *credit unions* also increased before the GFC. Later, their share decreased: if in 2007, the assets amounted to UAH 5.26 bn or 12.7 %, then in Q2 2022 – UAH 1.63 bn or 0.6 %). In turn, since 2008, the *financial companies'* assets have rapidly increased (73.2 % or UAH 203.66 bn as of Q2 2022) due to the intense activity of leasing companies. At the same time, this segment is the least regulated. Likewise, the growth of pawnshops' assets was observed during the post-crisis period: if in 2009 the assets amounted to UAH 0.62 bn, then in Q2 2022, UAH 3.48 bn, while their assets share remained at the level of 1.3 % (assets grew predominantly in 2016–2017). The invocation of *pawnshops* and financial companies in consumer lending against the backdrop of banks' and credit unions' closing up is based on lower standards of control over customers' reliability than banks. Although the assets of *non-state pension funds* began to grow in 2008 (if in 2007 the assets amounted to UAH 0.28 bn or 0.7 %, then in Q2 2022 – UAH 3.79 bn or 1.4 %), their level remained insignificant.

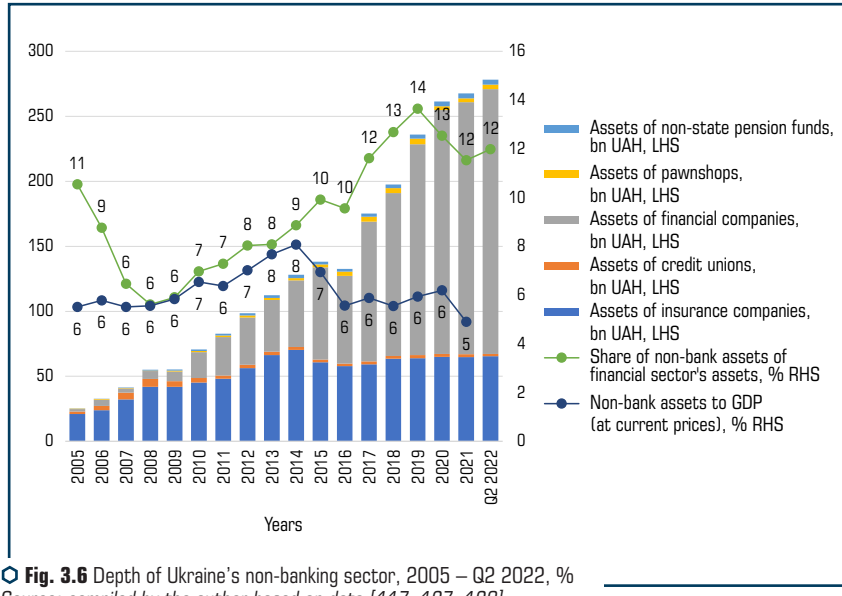

Fig. 3.6 Depth of Ukraine's non-banking sector, 2005 – Q2 2022, %
Source: compiled by the author based on data [117, 127, 128]

Overall, the non-banking sector's assets declined during periods of macroeconomic instability. Since 2005, the share of insurance companies' assets has significantly decreased. In the crisis and post-crisis periods, lending by banks and credit unions declined, and financial companies filled this niche. The pawnshops and non-state pension funds developed somewhat slowly after the crises; however, the total capacity of these sectors remains low at the level of 1 %, that indicates their relative insignificance.

Insurance companies were characterized by dynamic development before GFC, however, since 2008, some insurance companies closed down their activities. In the post-crisis period, the volume of insurance premiums exceeded the level of 2008 (UAH 24 bn) only in 2013 (UAH 28.7 bn), (**Table 3.1**). After the GFC and the crisis of 2014–2015, the number of insurance companies and their assets steadily decreased (**Fig. 3.6**). In 2020, due to the non-fulfilment of solvency requirements, several insurance companies voluntary withdrew from the market. However, these bankruptcies had no effect, indicating a significant number of captive insurers and low insurance penetration.

Insurance penetration ratio (the ratio of gross insurance premiums to nominal GDP) is quite low – at the level of 0.94 % in 2021 (while it should be at least 2 %), slowly decreasing (**Fig. 3.7**). Likewise, *insurance density ratio* (the ratio of gross insurance premiums to the population) is low; on average, one Ukrainian spent 45.66 dollars on insurance protection in 2021. At the same time, the crisis periods, which caused a reduction in insurance companies' numbers and assets, did not affect the growth of gross insurance premiums and payments due to the reduction of unreliable insurance companies and regulatory pressure regarding the assessment of their assets. As a result, against the background of growth (**Table 3.1**), the *insurance claims paid ratio* (gross insurance pay-outs to gross insurance premiums made) increased to 34 % (as of Q2 2022).

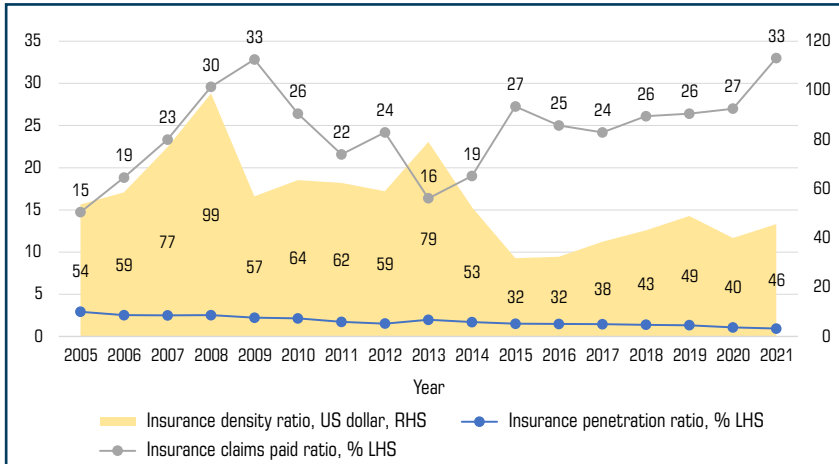

Fig. 3.7 Depth of Ukraine's insurance market, 2005–2021
Source: compiled by the author based on data [127, 128]

Therefore, although the insurance market is significant in terms of the assets share of the non-banking sector, it cannot influence the economy due to the low level of insurance services usage.

Credit unions segment, which is insignificant in terms of assets share, turned out to be the most vulnerable to the crisis of 2008, 2014 and 2020. Volumes of assets and the number of credit unions have decreased since 2009.

The COVID-19 crisis significantly influenced credit unions, the activity of which decreased significantly during the pandemic, and the deterioration of assets quality due to non-repayment of loans by borrowers led to losses. In 2020–2021, diminished solvency of borrowers and a legislative ban on penalties for late repayments on loans eroded loan portfolio quality. Credit unions' assets declined due to a constant decrease in the number of "active" members (those who use credit union services). The branching of credit unions is insignificant, despite the location in remote settlements where other financial institutions do not operate. In addition, credit unions do not provide online remote lending services due to limited resources for technological development. It is difficult for them to compete with other lenders offering a greater range of supplementary services and doing more online transactions.

Credit unions carry out their activities only partially at the expense of deposit sources. The volume of their loan portfolio is almost twice as large as the deposit one: as of Q2 2022, the ratio of loans to deposits was 1.7 %. Accordingly, the volume of credit unions directly depends on the contributions of their members. Therefore, increasing the number of credit union members and their mandatory contributions is essential for expanding credit union lending activity. There is low trust in credit unions as unions are not members of the Deposit Guarantee Fund, and depositors often lose their savings without the right to compensation for losses.

Unlike credit unions, *finance companies* provide remote lending services. Since 2017, there has been a boom in the growth of both the number and volume of assets of finance companies (**Fig. 3.8**). A significant share of the finance companies' loan portfolio consisted of small short-term consumer loans, which indicated the growing popularity of microloans among Ukrainians. Since 2017, finance companies' lending has been on the rise despite exaggerated conditions. In addition, the volume of factoring operations grew rapidly, mainly involving the purchase of NPLs for further settlement (collection activity). Leasing also grew and almost caught up with lending. In spite of the growing number of financial lessor companies that are financial institutions, they do not provide significant volumes of services. This is explained by the fact that most active lessor legal entities are owned by banks or are part of business groups.

Despite the reduction in finance companies' number due to the split reform in Q3 2020, finance companies' assets remain three times larger than the insurance companies' assets (as of Q2 2022).

As of Q2 2022, finance companies' lending decreased fivefold compared to Q4 2021, and the leasing volume was sixfold and factoring threefold. Almost no guarantees have been issued since the start of the full-scale invasion. During Q2 2022, the volume of new loans decreased by 57 %, primarily due to the population's reduced lending. Finance companies have not stopped issuing loans to legal entities. However, these are primarily loans to related companies. Under martial law conditions, leasing services can be used to purchase agricultural machinery and equipment, trucks and passenger cars.

Pawnshops continued to curtail their activities from the beginning of 2020 and also slowed down lending volumes (**Table 3.1**). The volume of pawnshops' loans decreased by a third: if in 2019 – UAH 18.18 bn, then in 2021 – UAH 11.9 bn.

Similar trends of a low level of population involvement are observed in the Ukrainian market of *non-state pension funds*. While pension funds are among the fastest-growing investors in global capital markets, despite slow economic growth after the GFC, in Ukraine, the share of non-state pension fund assets remained insignificant at 1.4 % (in 2021). The main barriers to non-state pension funds' development are the unimplemented pension reform and the lack of opportunities for internal investment in Ukraine because pension funds traditionally invest in bonds and shares.

To conclude:

1. Although the non-banking sector accelerated after the crises, it remains 7.3 times smaller than the banking sector in terms of assets. Given the low levels of usage of non-bank financial services, the depth of the non-banking sector cannot impact the lending of the real sector of the economy.

2. The fastest-growing segments of the non-banking sector are finance companies and pawnshops. The credit union market has continued to shrink gradually since 2009. The market of insurance companies and non-state pension funds is developing more slowly regarding assets and volume of operations growth. Although the emergence of new financial participants contributed to the deconcentrating and development of other financial market segments, the total capacity of the non-banking sector remains low, which indicates their relatively insignificant roles in financial deepening.

Capital market

During 1991–1994, *capital market development was tepid* due to the slow pace of privatization and the lack of necessary institutional infrastructure. There was no secondary securities market.

Over 1995–1999, not only *quantitative but also qualitative development of Ukraine's capital market* in consequence of the acceleration of privatization was observed.

During 2000–2014, *the completion of privatization was substituted by the foreign capital inflows into the Ukrainian economy*. As a result, operations and trading on the capital market were actively developing. In 2007, the stock market demonstrated a record trading volume of securities – 17.74 % of GDP. After 2014, there was a constant decrease compared to the previous year's volumes.

The period of 2015–2019 was marked by *the capital markets clean-up* and the combat with price manipulation on the stock market. As a result, the volumes of transactions with shares and bonds of firms decreased.

In 2015 increase in listing requirements and removal of securities with dubious market price provability led to decrease in depth of capital market. The circulation of securities of 49 issuers was stopped due to signs of fictitious nature. Due to consideration of cases of offences, trading of securities of 273 issuers was stopped, and 136 licenses for carrying out stock market activity were cancelled. Locking "junk" securities enabled one to obtain a more objective assessment of the stock market. Due to the reduction of the non-market transactions in the organized market, the volume of trades in firms' shares and bonds in the organized market decreased in 2018 by 80 % compared to 2014.

Consolidation of securities trading at two trade organizers PJSC "Stock Exchange "Perspektiva" and JSC "PFTS STOCK EXCHANGE" is in evidence since 2014, that is a positive trend for capital

market development from the standpoint of fragmentation decrease. As a result, in 2020, their share of total trading volume amounted to 99.28 %.

Regarding Ukraine's capital market depth, first of all, the ratio of *trading volume on the securities market to GDP* demonstrates the value of securities issues that pass from sellers to buyers, i.e., the trading turnover during the day. This ratio dynamics (**Fig. 3.8**) illustrated the origin of transactions in the Ukrainian stock market during 1997–2001. Going forward, there was a steady increase in stock market trading, which positively characterized the development of the securities market during 2002–2007. Since 2017, there has been stagnation. So far, the ratio of trading volume on the securities market to GDP is decreasing too fast. It is important to note that such a drop in 2017 is mainly due to the withdrawal of the NBU's certificates of deposit from calculating trading volume on the securities market. Until 2017, trading in the NBU's certificates of deposit took place mainly on the over-the-counter market, and their share was half of trading on the stock market. 2019 was a year of an inevitable revival of trade in the stock market of Ukraine. Later, trading volume on the securities market to GDP ratio was 19.77 % in 2021. Therefore, the Ukrainian stock market remains unattractive to investors. In addition, transactions with securities are often partly formal without actual execution.

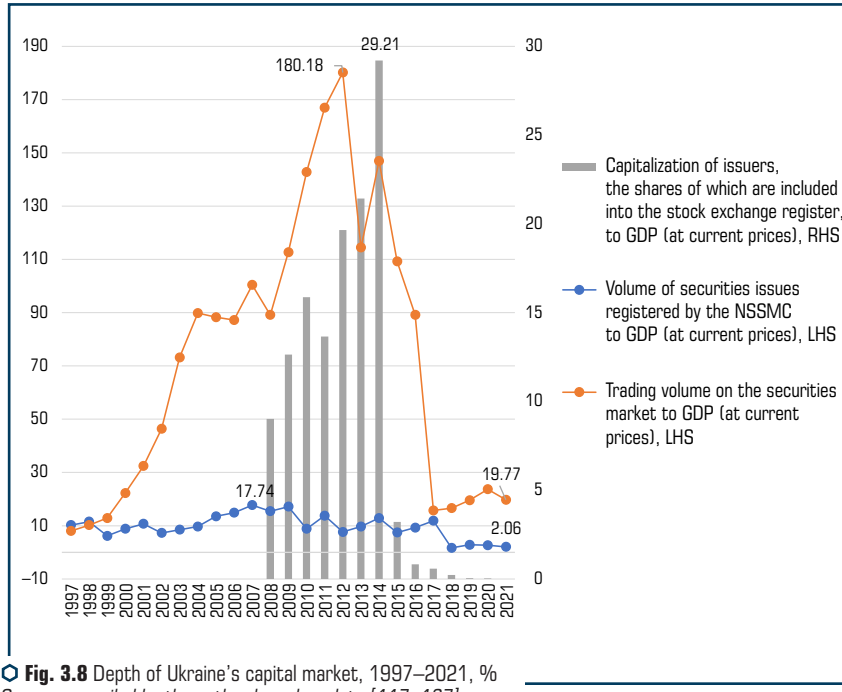

Fig. 3.8 Depth of Ukraine's capital market, 1997–2021, %
Source: compiled by the author based on data [117, 127]

Secondly, since 2015, there has been a trend toward a declining *volume of securities issues* on the stock exchange (**Fig. 3.8**). More generally, *firms have no intention to increase their capitalization and no interest in attracting investments to the economy via the purchase of shares and bonds in their issuance process*. During 2014–2018, the leading position among financial instruments in the volume of registered securities issues was occupied by shares, the dynamics of which had a decisive influence on the banking sector. Notably, the largest volumes of net income were noted by securities issuers of the following sections: processing industry – 28.27 %, mining and quarrying – 24.20 %, information and telecommunications – 20.26 % (in 2020) [117]. In 2021, the total volume of securities issued amounted to UAH 112.39 bn (in 2020 – UAH 113.40 bn): 86 issues of shares for UAH 42.88 bn, 113 issues of corporate bonds for UAH 9.98 bn [117]. It should be noted that the increase in the volume of securities issues does not always means that the growing financial depth of the stock market positively effect firms' provision with financial resources. In essence, releases are often only technical.

Thirdly, *the fall in the number of share issues, which meet the listing conditions, since 2014 led to a decrease in capitalization* (**Fig. 3.8**). According to the dynamics of *capitalization of listed companies to GDP*, the degree of development of equity capital in the Ukrainian economy is negligible. The capitalization of the Ukrainian securities market amounted to 9.02 % of GDP in 2008, and reached its maximum of 29.21 % in 2014. Later, the capital market's clean-up and the increase in the transparency of the stock exchange were marked by a decrease in the number of shares issues listed on the stock exchange register. The capital market reformation decreased capitalization to 0.03 % of GDP in 2020.

The market for derivative securities is almost entirely absent. Since 2014 the derivatives market, represented by futures contracts, options, option certificates and state derivatives, is decreasing. In 2021, the volume of trading in derivative contracts (option and futures) on operators of organized capital markets amounted to UAH 59.31 mn or 0.01 %. The volume of trading outside the organized capital market amounted to UAH 627.25 bn, including trading in derivative contracts amounted to UAH 61.40 bn or 0.98 % [117].

The *variety of financial instruments* on the securities market, circulating on the Ukrainian capital market, *drastically decreased* since 2006 (**Fig. 3.9**). In particular, the bills of exchange are almost gone from circulation, while in 2006 – 28.8 %, as well as shares and shares of the CIF: 0.15 % in 2021 as opposed to 45.8 % in 2006) and corporate bonds (0.53 % in 2021 as opposed to 12.6 % in 2006). At the same time, *the largest trading volume accrued to transactions with Ukrainian government bonds* (99.1 % in 2021 as opposed to 8.29 % in 2006).

The redistribution of trading volumes on the stock market in favour of government bonds has been observed since 2010 (**Fig. 3.10**). In 2021, the most significant volume of trading for financial instruments at operators of organized capital markets (UAH 451.96 bn) was recorded with DGBs, specifically UAH 443.76 bn or 98.18 %. Since February 24, the NBU has bought UAH 315 bn worth of DGBs from the government. As of September 2022, the NBU owns DGBs the

most among all investors, namely more than UAH 619 bn or 48 % (banks – 39 %, non-residents and Ukrainian legal entities – 5 %, individuals – 2 %). Individuals and territorial communities' do not participate in the stock market trade, and their share of securities has been less than 1 % since 2007. In addition, since 24 February 2022, the lack of coordination between the NBU and the NSSMC caused a further decrease in the liquidity of the capital market and squeezed the investments from regulated assets into non-regulated ones [129].

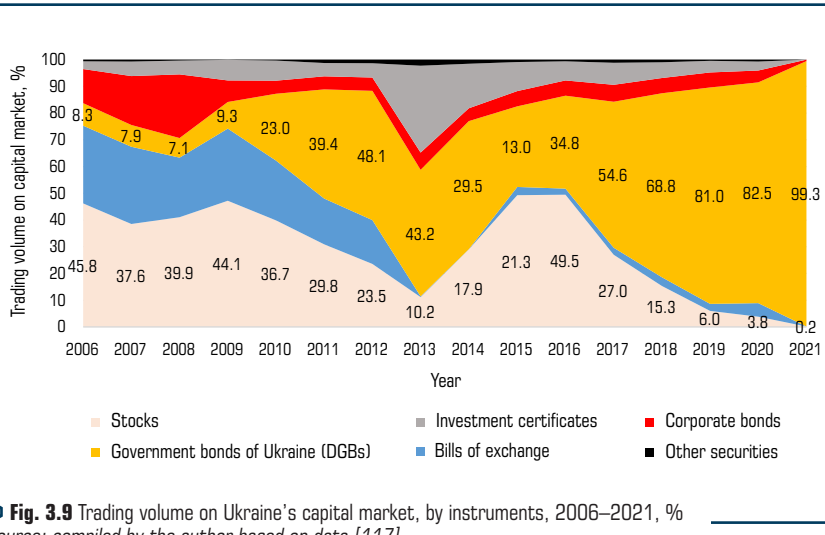

Fig. 3.9 Trading volume on Ukraine's capital market, by instruments, 2006–2021, %
Source: compiled by the author based on data [117]

In essence, the three primary financial instruments on the securities market, which firms can use to attract financial resources via the capital market, account for less than 15 % of the overall trade volumes on the capital market. Ukrainian firms do not deem the capital market as the source of financing. Stocks are primarily used for ownership redistribution within the firms themselves. Meanwhile, there is low trade intensity (securities of some firms can be traded only a few times per year, though most estimation techniques presuppose the trade is conducted at least every week) and a low number of deals with stocks and corporate bonds.

Thus, a significant decrease in the capital market's activity since 2015, caused by its clean-up, drastically reduced the volume of trading and changed its structure, which, in turn, almost stopped any stock market activity. Due to higher listing requirements, examples of attracting investments from foreign stock exchanges are few and far between. They are usually among the firms that belong to financial-industrial groups or multinationals. Particularly, in 2020, trading shares and bonds of foreign issuers and foreign government bonds were held, but trading volume by these instruments amounted to just 0.02 %.

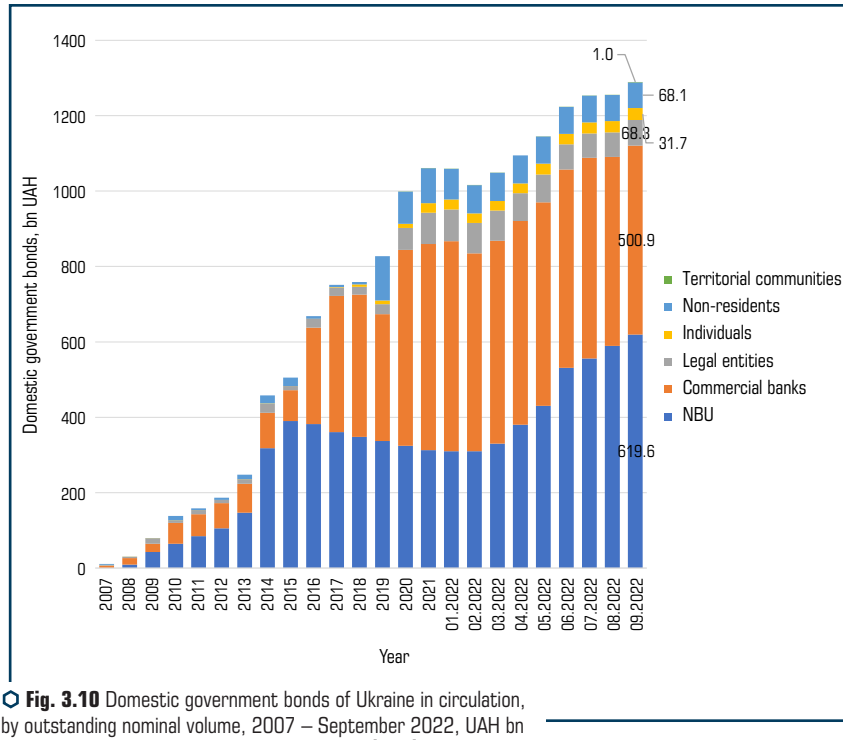

Fig. 3.10 Domestic government bonds of Ukraine in circulation, by outstanding nominal volume, 2007 – September 2022, UAH bn
Source: compiled by the author based on data [126]

To conclude:

1. The depth of Ukraine's capital market is miserable to affect resource allocation for economic growth: neither the variety of financial instruments nor the sufficient level of development of shares and corporate bonds markets. In essence, capital market does not provide financing for industrial firms.

2. If by the 2000s, the privatization and the emergence of joint-stock companies led to a stock market activity boom and the establishment of over-the-counter circulation of securities; the reforms since 2014 (i.e., capital market's clean-up) caused a reduction in stock market trading platforms and a decline in securities market trading volumes. Likewise, the indicators of investments attracted via the stock market (volume of securities issues and the capitalization of listed companies on the Ukrainian stock market) have become historically minimal.

3. The government bond market plays a crucial role in depth of the capital market. DGBs serve as an instrument of state financial borrowing on the capital market. During 2007–2022, the absolute majority of DGBs belonged to the NBU and banks, while the share of non-residents and legal entities diminished from 33 % and 11 % in 2007 to 5 % and 5 % in September 2022.

CONCLUSION TO SECTION 3

1. Banks are the major in financial depth formation of Ukraine's economy. The non-bank segment lags far behind the banking segment in both assets and volume of transactions. Nor does the capital market play an important part in financial deepening because it does not provide financial instruments with high investment qualities. The significant decrease in the capital market's activity since 2015, caused by its clean-up, drastically reduced the volume of trading and changed its structure, which, in turn, almost stopped any stock market activity.

2. Prior to GFC, there was an expected increase in financial depth. Financial institutions, their assets and the volume of their financial services have gone up. At the same time, even during financial crises, the non-bank market continued lending because of more favourable lending conditions than those of banking institutions. The fastest-growing segments of the non-bank sector are finance companies and pawnshops. Credit unions, insurance companies and non-state pension funds are growing at a slower rate.

3. Although the Ukrainian economy's monetisation level has been decreasing since 2014 (indicating a worsening of the money supply), even the periods of M3/GDP growth (2008–2013) were not accompanied by an increase in lending to industrial firms.

4. The fact that in non-crisis periods (during 2000–2008, 2011, 2013, 2020), the bank loans growth rate slowed down, despite the high rate of bank assets growth, shows that banks began to invest excess liquidity in securities. The decline in the growth of bank loans and bank loans to GDP since the GFC and 2014 crisis suggests that financial deepening is deteriorating due to the inefficient allocation of financial resources.

5. Before the systemic banking crisis in 2014, bank corporates and individuals' deposits to GDP increased. Demand deposits on current accounts predominate in the deposit structure. If until 2014, the leading share of the funds was share of bank individuals' deposits (including saving certificates), then after the reduction of the number of banks since 2014, there has been a steady trend towards an increase in the share of bank corporates deposits. The predominant share of demand deposits among both businesses and the population indicates an unsatisfactory structure of bank funding. It is impossible to boost long-term deposits as a source of resources for long-term loans under martial law conditions in 2022. Until February 24, 2022, public demand was mainly dependent on long-term bank deposit yields. Furthermore, up to 24 February, the need to increase the amount of guaranteed compensation for deposits was on agenda.

6. Corporate and household loans peaked in 2013 and 2014. While business loans still predominate in all bank loans, there were specific changes in favour of households, namely consumer loans, in 2006–2009. Since 2009, long-term credit has declined in the economy. Under the war in 2022, corporate loans rose exclusively with government support, retail loans declined and mortgages ceased.

7. The economy's low level of financial depth and its disproportional formation can't provide a financial buffer to help Ukraine absorb crises, including those arising from the war in 2022. Periods of financial deepening were not complemented by reform efforts by governments to facilitate quick mobilization and effective delivery of financial resources after the end of favourable with support from international partners.

4 FINANCIAL DEPTH, ECONOMIC GROWTH, AND DEBT BURDEN IN UKRAINE

ABSTRACT

The paper provides the theoretical substantiation of how financial depth is associated with changes in the debt burden. Based on presented projections of Ukraine's GDP, gross fixed capital formation and debt, it is concluded to which extent financial depth will depend on their future rates. Having considered debt as the level of financial depth, the hypothesis that higher economic growth resulting from financial deepening leads to greater marginal efficiency is grounded. It is stressed that when the volume of not enough efficient loans/investments (in particular, NPLs) reaches a critical threshold, their marginal efficiency turns out to be less than the additional debt associated with servicing them. Therefore, the relationship between financial depth, debt burden and economic growth is not mechanical since they shift according to economic cycle phases.

KEYWORDS

GDP, gross fixed capital formation, bank loan indebtedness, external debt.

4.1 FINANCIAL DEPTH AND ECONOMIC GROWTH: ISSUE OF DYNAMIC LINKAGE

The historical vector of the nexus between financial depth and economic growth seems evident because the progressive movement of financial and commodity markets goes side-by-side. However, this fact does not indicate the mechanical nature of financial and economic processes [9, 130–133]. Otherwise, the central bank emission activity could guarantee sustainable economic growth, and any increase in monetary aggregates could assure industrial growth. In practice, the dependence on financial and economic dynamics is more complex, and changes in relevant macro-indicators can be multidirectional, even over long periods. Such a dichotomy does not deny the historical direction of mutual attraction of financial and economic processes, but emphasizes the absence of linear dependence between them.

Financial depth: math aspects of common measurement

Financial depth is generally seen as an indicator of the financial saturation of some economic relations. This applies primarily to the output of GDP and its components at the national economy's level. It is not surprising that in this analysis, special attention is paid to the study of the simultaneous dynamics of real GDP and financial/monetary aggregates (money supply, loans granted, stock market volume, etc.) as a percentage of nominal GDP [9, 130–133].

In the most simplified form, the indicator of financial depth (*FD*) has the following representation:

$$FD = F/(Y^*P); \quad (4.1)$$

$$FD = (F/P)/Y, \quad (4.2)$$

where F – nominal financial/monetary aggregate; Y – real GDP; P – price level; Y^*P – nominal GDP; F/P – deflated (real) financial/monetary aggregate.

Considering the standard form of the arithmetic financial depth indicator (4.1), a directly proportional and inversely proportional relationship can be observed with real GDP. Under unchanged price conditions and a nominal financial/monetary aggregate, the latter's ratio to nominal GDP decreases as real GDP increases. As a result, the *nexus between financial depth and real GDP is inversely proportional*.

However, the hypothesis of the invariance of the price level and the volume of financial/monetary aggregates is an apparent simplification. Sustainable real growth requires specific "grease effects" in terms of moderate inflation [134–140]. Consequently, prices, real GDP and nominal financial/monetary aggregates constantly change within the economy. Taking this into account, as well as the possible presence of the ratio of the mentioned aggregates to nominal GDP in the form of a fraction, where the numerator is an indicator of the real (deflated) financial/monetary aggregate, and the denominator is real GDP (4.2), the following can be drawn:

– *if the growth of the real (deflated) financial/monetary aggregate is ahead of the real GDP growth*, i.e., a simultaneous increase in the real GDP and financial depth and the presence of a directly proportional relationship between them;

– *if the growth of the real (deflated) financial/monetary aggregate is equal to the real GDP growth*, then the latter occurs against the background of an unchanged financial depth;

– *if the growth of the real (deflated) financial/monetary aggregate is lower than the real GDP growth,* then the latter is accompanied by a decrease in financial depth, and the relationship between them is inversely proportional.

This arithmetical approach can also be related to a decline in real GDP, as follows:

– *lags behind the real (deflated) financial/monetary aggregate decline*, i.e., a simultaneous decrease in real GDP and financial depth, and the relationship between them is directly proportional;

– *is equal to the rate of the real (deflated) financial/monetary aggregate decline*, then the economic recession occurs under an unchanged financial depth;

– *is greater than the rate of the real (deflated) financial/monetary aggregate decline*, then the economic downturn is accompanied by an increase in the financial depth, and the relationship between them is inversely proportional.

The above-mentioned examples are indicative as they demonstrate the uncertainty of the relationship between financial depth and economic growth even under unidirectional dynamics of their real key components. The fact that the dynamics of the latter can also be multi-directional

only increases the level of uncertainty between the dynamics of the macroeconomic financial and economic indicators.

Despite the formal analysis of equations (4.1) and (4.2), the nature of dependence on macroeconomic financial and economic parameters is also not indicative of its mechanical nature. A visual example of this can be the relationship between real GDP and the level of monetization, which is a separate but quite indicative case of the relationship between economic growth and financial depth.

Turning to equation (4.2), it is not too much of a leap to understand that if money supply increase (*F*) always leads to an outpacing growth of real GDP (*Y*) and not prices (*P*), the problem of sustainable economic growth would not have existed at all. Then only the automatic issuance of money would have been sufficient for this. In reality, money emission and monetary policy remain a field of severe scientific and practical discussions, where there is no stable consensus regarding the definition of universal monetary and currency regimes. Moreover, although certain mainstreams in this area, such as rigid currency regimes, inflation targeting, or currency and exchange rate liberalization [141–146], may seem flawless, they demonstrate certain shortcomings. Unexpected economic crises quite quickly destroy seemingly logical ideas about the theoretical possibilities, monetary policy goals and instruments (not to mention the features of specific national markets, and the economic growth of which this policy should provide).

The GFC was more telling in that sense. Before its onset, theory and practice were dominated by solid beliefs about the efficiency of deregulated markets and the corresponding concentration of central banks exclusively on maintaining price stability through the use of the interest rate with complete rejection from control over the exchange rate and cross-border movement of capital [147, 148]. In terms of equation (4.1), this de facto meant the recognition of the neutrality of real GDP (Y) concerning the money supply (F) and the level of monetization (DF). The immutability of the price level (*P*) was considered the key condition of economic growth, regardless of the level of monetization changes.

Nevertheless, the factors and depth of the global crisis forced to abandon such a concept. Awareness of market imperfections, the positive, though limited, effects of inflation, and currency neutrality have contributed to global quantitative easing policy [149]. Due to it, it was possible to achieve simultaneous growth of financial and economic macro indicators. Despite all the criticism, expanding the balance sheets of the world's leading central banks became one of the critical elements of countering the GFC and, later, the pandemic. As a result, the balance sheet of the Federal Reserve System increased by 4.4 times in 2008–2014 and by 2.1 times in 2020–2021 [150].

Meanwhile, the subsequent rise in inflation has shown the shortcoming of quantitative easing. As a result, after its reactivation during the fight against the COVID-19 crisis, the Fed and the ECB were forced to switch to a tightening monetary policy in 2022 [151, 152]. Nevertheless, it is unclear to what extent this will affect the change in prices and real GDP and how directly the relationship between financial depth and economic growth will manifest in the respective countries.

There are several explanations for that uncertainty. It is the imperfection of markets since crises often occur due to the violent bursting of financial/credit bubbles. Gaps in government

regulation, which do not note the emergence of bubbles, are another factor in the inequality of financial and economic macroeconomic dynamics [153].

Changes in the marginal usefulness of financial resources may also account for this phenomenon. Considering that these resources are a different factor of market production, the usefulness of each of their subsequent increments can either increase or decrease, depending on the dynamics of other factors. As a result, periods of direct and inversely proportional shifts in financial depth and economic growth can be observed.

Another factor of such uncertainty may be the loanable nature of financial resources, when, for example, the banks' loan portfolio growth occurs due to the banks' increase in deposit (debt) obligations. In this case, the increase in financial depth is accompanied by an increase in the debt burden, which begins to affect the rate of economic growth at some level adversely.

Small open economies are also characterized by the direct influence of the external environment on their dynamics and the corresponding influx of foreign capital. In this regard, the growth of commodity prices and financial markets on the eve of the GFC was obvious. The influx of foreign investment has hit Ukraine into the financial sphere, with historical jumps in bank lending and maximizing economic growth (12 %, 2004). However, the unexpected collapse of commodity markets in 2008 immediately dispelled Ukraine's promising outlook, plunging it into a deep financial and economic crisis in 2009.

Subsequent episodes of recovery of Ukraine's economy (2010–2012, 2016–2019) and its decline (2014–2015) have also been associated with fluctuations in world export commodity prices [154–156]. This synchronisation of financial and economic processes only within national borders may reveal their almost mechanical dependence. However, based on external factors, this interpretation seems overly simplistic. This is since the presence of spacious international markets, which determine the fluctuations of the global economy, is a notable factor in the development of financial and economic parameters of small open economies. At the same time, their parallel movements may indicate an internal relationship and a simultaneous reliance on third-external factors, the dynamics of which are so far from perfect [148].

The remainder of global market failures is of particular importance for Ukraine because not only financial and economic macro-dynamics but also the availability of the primary conditions for business activity are challenging for the domestic economy. In particular, the inability of the state to ensure its protection and prevent external military aggression became one of the key factors in rapid Ukraine's real GDP decline and the potential growth of financial depth, even though their substantive analysis indicates a sharp narrowing of the financial market.

Ukraine: economic and financial constraints in 2022

One of Ukraine's critical current problems is the absence of economic and financial potential for the independent protection of its territorial integrity. The fundamentals of this incapacity began almost from the beginning of the country's independence. The failure of the state to correctly identify its national interests and goals, to determine global risks and threats, to ensure the universality of legal norms and to compete decently in the markets of the latest technologies caused the gradual

degradation of not only the economic and financial, but also the defence potential of the country. After the outbreak of a large-scale war, these miscalculations caused enormous losses of life, industry, infrastructure and society in Ukraine, that became a reflection of deliberate attempts to destroy it.

Economic losses in Ukraine. The economic downturn in Ukraine after 24 February 2022 reflects the loss of its production and financial capacities. In this regard, the expected momentum of Ukraine's GDP indicates a sharp decline in its financial potential.

According to the April IMF forecast, Ukraine's GDP could drop by 35 % in 2022 [157]. In accordance to the March estimates, in the case of a rapid end of the war and significant availability of donor financial support, the decline could be 10 % [158]. According to World Bank estimates, Ukraine's GDP could decline by 45.1 % in 2022. At the same time, the early termination of military intervention could limit its decline to 26 % [159]. The finance minister of Ukraine estimates that GDP losses could range between 33 % and 50 % in 2022. The prime minister of Ukraine estimated the country's direct losses at the start of the war at over US$ 500 bn. At the same time, infrastructure damage has been estimated to be nearly US$ 106 bn [160]. According to the Institute of Economics and Forecasting of the NASU's forecast, the depth of the possible fall in the GDP of Ukraine is 17.9–46 % in 2022. Different scenarios and approaches explain the significant spread of values to calculations by: extrapolation of losses received in 2014–2015, possible reduction of electricity consumption, exclusion of certain territories from the economic turnover, and the expected drop in incomes of certain sectors of the national economy.

The average range of these estimates and a number of other forecasts is 33.0–38.6 % [161]. Since it is based on calculations carried out in the first month of the war, even these parameters can be optimistic. At the end of April 2022, the Ukrainian prime minister noted that the GDP decline in 2022 would be 30–50 % [162]. The damage quoted is overwhelming in itself. However, it is even more stunning, given that the most profound annual decline in Ukraine's GDP so far was 22.9 % in 1994, and its total reduction during the 10 years of the transformational crisis in the 1990s was only 61.8 %. With that in mind, the IMF's projections for Ukraine do not exceed the economic horizon of 2022. This also indicates an extraordinary level of uncertainty regarding the future size of the domestic economy and its financial capabilities. Nevertheless, under this year's 35 % decline, the national GDP will decline to the 1999 level, the lowest during Ukrainian independence. If the decline is more profound (even less than 50 %), the economy will shrink to a size that has never been recorded since the first calculation of the GDP indicator in 1988.

Financial capacity of Ukraine's output. Under these circumstances, the financial potential and depth of the state will largely depend on the country's economic dynamics, as its acceleration will increase national financial resources. And inversely. At the same time, the accumulation of gross fixed capital will act as a source of investment, the power of which will directly affect the speed of the reconstruction of destroyed production and infrastructure facilities (even under the conditions of their restoration on a new technological base).

Consequently, the size of Ukraine's financial resources will depend on the future growth rate of GDP and of gross fixed capital formation (GFCF). **Table 4.1** demonstrates the terms of restoring the pre-war GDP volume (US$ 200 bn, 2021) at different levels of the mentioned indicators and the depth of the recession in 2022 (35 % or 50 %). Meanwhile, it is assumed that output and infrastructure losses will be limited to US$ 105.5 bn.

Table 4.1 Projected terms of GDP and fixed capital of Ukraine's reconstruction

Scenarios of growth and accumulation of fixed capital	Assumption			Time of losses reconstruction, years	
	GDP decline in 2022, %	GDP growth, %	GFCF, % of GDP	GDP	GFCF
Ukraine, average indicators of 2016–2019					
Scenario 1	35	2.9	16.6	16	18
Scenario 2	50	2.9	16.6	25	20
World, average indicators of 2016–2019					
Scenario 3	35	3	25.2	16	15
Scenario 4	50	3	25.2	25	17
Conditional (optimistic) indicators of reconstruction					
Scenario 5	35	7	33	8	9
Scenario 6	50	7	33	12	10

Source: developed by the author

Suppose that future GDP growth (2.9 %) and the GFCF rate (16.6 %) will reach their average values observed in Ukraine during its pre-war growth (2016–2019). In that case, the return of the national economy to the pre-war level ($200 bn) and the generation of financial resources ($105.5 bn), sufficient for reconstructing of destroyed industrial and infrastructure facilities, will require:

– scenario 1 (fall in GDP in 2022 – 35 %) – 16 and 18 years;

– scenario 2 (fall in GDP in 2022 – 50 %) – 25 and 20 years.

If Ukraine can increase its growth rates and the rate of GFCF to the average world level, as observed in 2016–2019 (3 % and 25.2 %), the terms of its economic recovery will be the following:

– scenario 3 (fall in GDP in 2022 – 35 %) – 16 and 15 years;

– scenario 4 (fall in GDP in 2022 – 50 %) – 25 and 17 years.

Finally, if Ukraine manages to ensure annual growth rates at the level of 7 % (double GDP every 10 years) and the norm of GFCF – 33 % (observed in 2016–2019 among upper-middle-income countries), the restoration of its pre-war GDP and the accumulation of resources sufficient to rebuild the lost production and infrastructure potential will continue:

– scenario 5 (fall in GDP in 2022 – 35 %) – 8 and 9 years;

– scenario 6 (fall in GDP in 2022 – 50 %) – 12 and 10 years.

Notwithstanding the conditionality of the estimates given, they indicate that:

– *under the most optimistic scenario*, Ukraine's independent generation of financial resources to offset losses will last for about 10 years;

– during this period, its national investments should be directed exclusively towards the reconstruction of destroyed production and infrastructure facilities;

– *under the inertia scenario*, the implementation of the specified tasks will take 16–25 years;

– reaching by Ukraine of the average global dynamics of GDP and the norm of GFCF allows it to obtain results that are only slightly better than the consequences of the inertial scenario;

– the reparation of the damage done by the aggressor country can last the whole life of an entire generation of Ukrainian citizens;

– in the short run, Ukraine will not have its financial resources sufficient for rapid economic recovery because even under the conditions of a 35 % drop in its GDP in 2022, the losses already incurred ($105.5 bn) will amount to 81 % of its GDP;

– the prolongation of military aggression will worsen the financial capabilities of Ukraine because of the growth of both inevitable losses and poverty of the population: according to World Bank estimates, its level may increase ten times in 2022, from 1.8 % to 19.8 %, while another 59 % of the country's population will be on the poverty threshold [159].

4.2 FINANCIAL DEPTH AND DEBT BURDEN

From the point of view of the traditional indicators of financial depth (4.1), the economic and financial losses suffered by Ukraine due to the war may have a rather unexpected interpretation. These indicators, quantitatively, can grow due to a significant decline in real GDP, which formally may seem to be a sign of increasing financial depth. Although, in fact, such a phenomenon only visually indicates a rise in the debt burden. An example may be the expected dynamics of these financial indicators, like credit levels and Ukraine's external or state debt, calculated according to equation (4.1). At the same time, it is taken into account that the expected drop in real GDP (35 % or 50 %) will automatically increase their value in all sectors of the economy since the purely arithmetical consequences of such a drop raise the corresponding indicators:

– 1.54 times, with a 35 % drop in GDP;

– 2 times, with a 50 % drop in GDP.

At the same time, accelerating inflation in 2022 (current estimates are up to 20 %) is slowing this growth and will result in:

– 1.28 times, with a 35 % drop in GDP;

– 1.67 times, with a 50 % drop in GDP.

Since inflation acceleration will cause devaluation pressure on the hryvnia, the volume of GDP in equivalent currency (dollar) will decline sooner or later. Given this, it is assumed that the effects of inflation and depreciation are mutually absorbed while assessing trends in foreign currency debt.

Ukraine's bank loans indebtedness. In Ukraine, the depth of bank lending is low – 19.1 % of GDP (2021), both in terms of loans to the corporate sector (14.2 % of GDP) and households (4.4 % of GDP) (**Table 4.2**).

Table 4.2 Ukraine's bank loans indebtedness to GDP, %

	2021	Under conditions of real GDP decline by:			
		35 %	50 %	35 %	50 %
				(inflation/devaluation – 20 %)	
Total	19.1	29.4	38.2	24.5	31.9
other financial corporations	0.2	0.3	0.4	0.2	0.3
general government	0.5	0.8	1.0	0.6	0.8
corporate sector	14.2	21.8	28.4	18.2	23.6
households	4.4	6.8	8.9	5.7	7.4

Source: developed by the author

Under 20 % price and hryvnia devaluation, as well as an expected drop in real GDP (35 % or 50 %), the level of indebtedness of bank loans may increase:

1) corporate sector – up to 18.2 %, or 23.6 % of GDP;

2) household sector – up to 5.7 %, or 7.4 % of GDP.

This relative growth in the banking loan portfolio may be misinterpreted as an increase in financial depth. But, since such growth is caused solely by the fall in business activity, *it is necessary to consider the level of the bank indebtedness for the involved liabilities rather than the financial depth*. Furthermore, such debt will be associated with the simultaneous growth of bad debts, whose share in the total loan portfolio exceeds 50 %.

Ukraine's state debt. Typically, financial depth is directly related to indebtedness relationships: the more significant it is, the higher the level of indebtedness. At the same time, the emergence of debt is often preceded by a lending process, both in terms of providing credit resources and recognizing the creditworthiness of the future borrower/debtor, regardless of whether it represents the private sector or the state.

The standard focus on private companies in assessing financial depth is entirely understandable. From the standpoint of production, it locates financial resources more efficiently. Furthermore, the funding of public needs is often associated with the crowding-out effect of private investment [163]. However, a systematic increase in private financing under current conditions has often not been possible without the financial deepening of the public sector. Consequently, the increase in the monetisation of national economies is generally not without the issuance of money and a simultaneous soaring of public debt. At the same time, the value of state bonds is the basic

price of private debt instruments. The entry of foreign investors into domestic stock markets generally begins with the purchase of bonds from public issuers (the least risky), not private ones.

Given this, *the level of debt may be considered not only as a direct reflection of financial relations but also as the level of financial depth.*

The economic and financial losses, Ukraine suffered during the war, changed the level of debt burden not only in the part of loans provided by banks, but also in lending for state needs and external financing. **Table 4.3** illustrates a possible soaring of state debt, as well as Ukraine's gross external debt, relative to its values in 2021. In particular, with a 20 % depreciation of the national currency, the level of public-guaranteed debt can rise by 48.9 % of GDP to:

1) 62.7 %, with a 35 % drop in GDP;

2) 81.6 %, with a 50 % drop in GDP.

Table 4.3 Ukraine's debt burden under projected GDP decline and hryvnia devaluation

	2021	Under conditions of real GDP decline by:			
		35 %	50 %	35 %	50 %
				(inflation /devaluation – 20 %)	
State and state-guaranteed debt	48.9	75.3	97.9	62.7	81.6
Gross external debt	64.6	–	–	99.4	129.2
– public sector	28.4	–	–	43.7	56.8
– private sector	36.2	–	–	55.7	72.4

Source: compiled by the author based on data [164]

From a formal standpoint, this growth can be interpreted as an increase in the public sector's financial depth and in Ukraine's economy's access to foreign capital. However, given the reasons for this growth, this is just an increase in the debt burden. Furthermore, the expected level of public debt and public-guaranteed debt exceeds 60 % of GDP, i.e., the threshold defined in Art. 18 of the Budgetary Code of Ukraine [165], which indicates a low probability that the state will repay its debts independently.

Ukraine's *gross external debt* will increase from 64.6 % of GDP in 2021 to 99.4 % or 129.2 % of GDP (with a drop in real GDP by 35 % or 50 %). Considering that more than 80 % of Ukraine's *external private debt* is formed before companies registered in offshore jurisdictions (Cyprus, Luxembourg, Virgin Islands (Britain), Switzerland, Austria, Malta, Panama, etc.), these bonds are mostly near-debt, formed by the Ukrainian firms in front of them.

At the same time, Ukraine's *external public debt* increase will have diametrically opposite consequences. It cannot just increase by 28.4 % of GDP to 43.7 %, or 56.8 %, depending on the depth of the decline in real GDP (35 % or 50 %). It should be noted that the burden of servicing Ukraine's state and state-guaranteed debt foreign debt even before the war exceeded the corresponding

indicators of developing economies by 2–3–4 times, even those classified as the poorest with an excessive level of foreign debt (heavily indebted poor countries). Furthermore, such a surplus was observed regarding GNI and foreign exchange receipts from exports and primary incomes (**Table 4.4**).

Table 4.4 External debt burden across income groups of countries, 2020

	External debt stocks, % of GNI	Servicing of state and state-guaranteed external debt to:	
		GNI, %	export and primary income, %
Ukraine	81.4	4.2	9.3
Middle income	28.9	1.3	5.4
Upper middle income	27.6	1.1	4.6
Lower middle income	32.9	1.8	8.0
Low income	39.0	1.5	7.5
Heavily indebted poor countries	–	2.3	9.5

Source: compiled by the author based on data [1]

Given that such excess has been observed since 2013, at least a 1.5-fold increase in the burden of external debt payments will make it impossible realization in the planned volumes. These conclusions are fundamental, as they reflect only the devastating consequences of real GDP decline and the parallel hryvnia devaluation and do not consider the simultaneous increase in nominal state debt observed since the beginning of the war.

Lack of free access of Ukraine to global financial markets. The expected decline in real GDP, foreign exchange risks, growth in the state debt burden and inflation will inevitably aggravate sovereign ratings. In particular, in the early stages of the war in 2022, the main rating agencies downgraded Ukraine's rating as follows:

– Fitch Ratings (February 25, 2022) – from B to CCC [166];

– Standard & Poor's (February 25, 2022) – from B to B-;

– Moody's (March 4, 2022) – from B3 to Caa2;

– The ratings were then downgraded, after which they all returned to pre-default levels:

a) Moody's (May 20, 2022) – from Caa2 to Caa3 [167];

b) Standard & Poor's (May 27, 2022) – from B- to CCC+ [168].

These realities and assessments prevent the country from having free access to international capital markets. The too-high price of new loans cuts off the private and public sectors from them. Ukraine is, therefore, directly dependent on external government funding, which it can only receive from donor states or international financial organizations on a bilateral basis. Given the size of the projected recession in Ukraine and the scale of the deliberate destruction of its production and infrastructure potential, such post-war dependence could last for years.

CONCLUSION TO SECTION 4

Financial depth is directly associated with changes in the debt burden. However, these indicators are not unambiguously related. While the emergence of new financial relations is directly associated with increasing dependence on debt, this does not lead to automatic financial deepening. One possible reason for this asymmetry is unforeseen economic downturns, which increase the level of the debt burden without increasing financial depth. Furthermore, access to financial resources generally worsens during economic crises. Consequently, financial deepening may turn into financial drying up, despite the simultaneous increase in pressure on the debt.

This dichotomy of financial and debt relations causes their non-linear dependence: they expand in parallel in phases of economic growth, but lose such synchronicity during economic crises, up to the emergence of the periods of their multidirectional dynamics. For small commodity-based economies, these moments usually occur when the external environment for their export products decreases significantly. Ukraine repeatedly encountered such situations during the 2008–2009, 2014–2015 and 2020 crises, when phases of financial deepening were rapidly replaced by periods of acute debt problems in the banking/private and fiscal/public sectors against the background of falling export revenues and volumes of national output.

The failure of financial deepening to avoid these economic crises asserts the imperfection of financial markets. During rapid economic growth, they are overwhelmed by overly optimistic expectations. The euphoria prevails over them, which prevents them from investing carefully and making balanced financial decisions. When the volume of lacking efficient loans/investments reaches a critical threshold, their marginal efficiency turns out to be less than the additional associated burden. Sustaining economic growth is a crucial factor and a macroeconomic effect of financial deepening. Without such an impact, the financial investment makes no macroeconomic sense. Therefore, the higher the macroeconomic growth resulting from financial deepening, the greater its marginal efficiency. Under these circumstances, the economy grows. At the same time, the additional debt burden, associated with financial deepening, should be lower than its marginal effectiveness, i.e., the simultaneous increase in macroeconomic dynamics.

As a consequence, the relationship between financial depth, debt burden and economic growth is not mechanical. They may evolve synchronously or in different directions according to economic cycle phases. However, economic crises make it possible to eliminate dissonance in their dynamics, thus cutting the mistaken financial decisions and unsuccessful investments. This forms a historical vector of their unidirectional movement, in which financial deepening is a factor of economic growth, and the level of debt burden does not prevent their mutual strengthening.

Ukraine is currently under the war in which the aggressor deliberately destroys its human, industrial, infrastructural and social capital. This leads to a significant decrease in economic and financial activity. On the other hand, the pressure on the debt increases due to the rise of the new public debt securities. Financial deepening under such conditions largely depends on external public funding, reflecting state institutions' solvency and their ability to minimise unproductive financial investments.

5 STATE LENDING AND DEBT OF UKRAINE'S ECONOMY

ABSTRACT

The study of state loans' dynamics and structure shows a higher share of NPLs and low efficiency due to disproportions by industry lending. The generalization of peculiarities of Ukraine's cooperation with IOFs notes their focus on the lending of transport, logistics and agriculture. The examination of existing state investment projects indicates:

a) the limitations of financial depth and a narrow sectoral distribution (in particular, focussing on transport and the energy sector), which negates the potential multiplier effect that could be achieved by investing in industrial firms;

b) a chronic lack of budgetary funds for their implementation, causing the delays of such projects, their freezing and their replacement by newer ones.

The analysis of the dynamics and structure of the state debt, the term and currency structure of local borrowings demonstrates:

a) increasing public debt against the backdrop of exceeding debt payments;

b) growing trust of lenders for the local communities' solvency and their attempts at hedging currency risks.

Overall, the results suggest that notwithstanding state banks, actively buying DGBs, divert potential credit resources from lending to the economy and the potential of state investment projects is limited, government-targeted preferential lending can regulate sectoral disproportions of demand and supply for credit resources.

KEYWORDS

State bank, state investment project, international financial institution, financial resources, local loan, state debt.

5.1 UKRAINE'S STATE LENDING

State bank lending

State banks are one of the mechanisms of the monetary policy influence on the real sector of economy.

Their functions are diverse:

1) supporting specific (usually export-import) operations (Ukreksimbank, the Bank for International Settlements);

2) sectoral banks, which focus on support of financial operations within certain sectors of economy, and are subject to industry-specific regulations (the Agricultural Development Bank of China, the UK Infrastructure Bank);

3) development banks, which serve as financial agents for infrastructure project and/or export and credit agencies (Oman Development Bank, the Vietnam Development Bank);

4) commercial banks, which ended up state property due to nationalization or other historical reasons (Oshchadbank, Industrial Bank of Korea) [169].

The trends that formed the state bank pool, historically stem from the collapse of the USSR. In 1991, Oshchadbank and Ukraina Bank were created. In the next few years, a number of industry-specialized banks were created, some of which were quasy state-owned: Ukreksimbank, Energobank, Express-bank. From the mid-90s, the commercial bank pool begins to form. From that time on, what the commercial banks did was to serve as the foundation of banking sector growth for the next 20 years. The problems, Ukraina Bank had in 1998, led to its liquidation in 2001, which caused the first substantial crisis of Ukrainian banking sector, including the crisis of confidence in banks, especially the state-owned ones.

The next point of bifurcation, both in Ukraine and the wider world, was the financial-economic crisis of 2008. On the background of world-wide trends, the nationalization of Kyiv Bank and Rodovid Bank were conducted, which led to *concentration of banking assets under the state control* [170].

Since the state banks were among the biggest of the deposit-taking corporations by liabilities volume (after nationalization of Privatbank, the share of client liabilities, owned by the state banks, exceeded 50 %), the state has the ability to use this resource to increase effective financial depth (**Fig. 5.1**). The absolute majority liquidity, available to the state banks, is not used to credit the real sector of economy. The insignificant difference between the share of securities and the share of loans to legal entities in total bank assets indicates that financing the state budget by buying out state-issued securities is one of the main functions of the state banks in Ukraine. In fact, instead of using the available liquidity to sustain the economy, it is used for state budget refinancing. In other words, one of the key channels of free liquidity is the purchase of state securities (on recommendation or by order of the bank management, AMC (Asset management company) or other kind of committee, based on the high yield of DGBs [171]).

In the meantime, *a significant share of these DGBs was issued in order to recapitalize banks in the first place*. Interest payments received by the state banks from DGBs, which were issued to recapitalize them, substantial impact their yield. It is estimated, that state banks in 2019–2020 received around UAH 12 bn of yearly interest income from "recapitalization-purposed DGBs". It accounts for around 16 % of four state banks' total interest revenues. Or more than 40 % of net interest income, received by the state banks (banks do not attract additional funding for purchasing of "recapitalization-purposed DGBs", thus these interest payments are, in fact, a guaranteed "passive revenue") in 2019, which indicates low real loaning activities of the banks, on which interest revenues is supposed to be based on. The Ukreksimbank and Oshchadbank have highest income from "recapitalization-purposed DGBs" to net interest revenues ratio – 78 % and 42 %

respectively. Considering high administrative and operative costs of these banks, without the revenue from "recapitalization-purposed DGBs" these banks would most be operationally unprofitable in 2019–2020, and would have negative financial results (net loss) by the end of 2019.

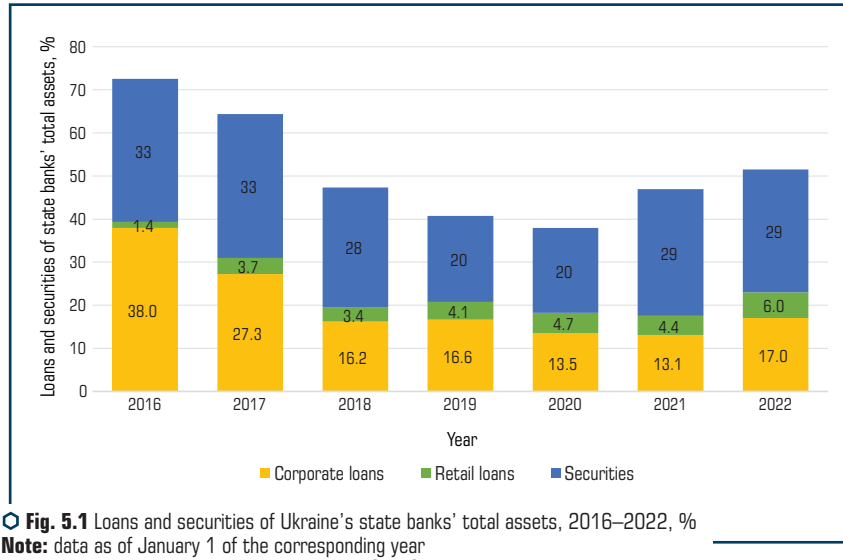

Fig. 5.1 Loans and securities of Ukraine's state banks' total assets, 2016–2022, %
Note: data as of January 1 of the corresponding year
Source: compiled by the author based on data [126]

To compare, the data from Ukraine's banking sector as a whole indicates, that the commercial banks have a much stronger bias for lending to the real sector of economy (**Fig. 5.2**). *With the share of the securities in their portfolios remaining relatively constant, they have significantly higher shares of loans to legal entities in their total assets*, which indicates that commercial banks in Ukraine are the foundation for financial depth, which is realized via state sector. *The operation models of commercial banks are aimed towards lending to industrial firms much more than those of the state banks.*

The quality of credit portfolio of the state banks, including the portfolio, issued after 2014–2015, remains a separate problem for its effectiveness. The state banks in 2021 reduced the volume of NPLs by UAH 56.2 bn, which accounts for almost 2/3 of the general reduction of NPLs across the banking sector as a whole. As a result, the share of NPLs in the state bank's total assets reduced from 57.4 % to 47.1 % during that year alone. Simultaneously, the state banks still account for over 70 % of total NPL portfolio. They proceed to implement the plans of NPL reduction, approved by the Financial Stability Board. This is a necessary precondition for increase in their investment attractiveness, and is one of the structural beacons of the cooperation program with the IMF.

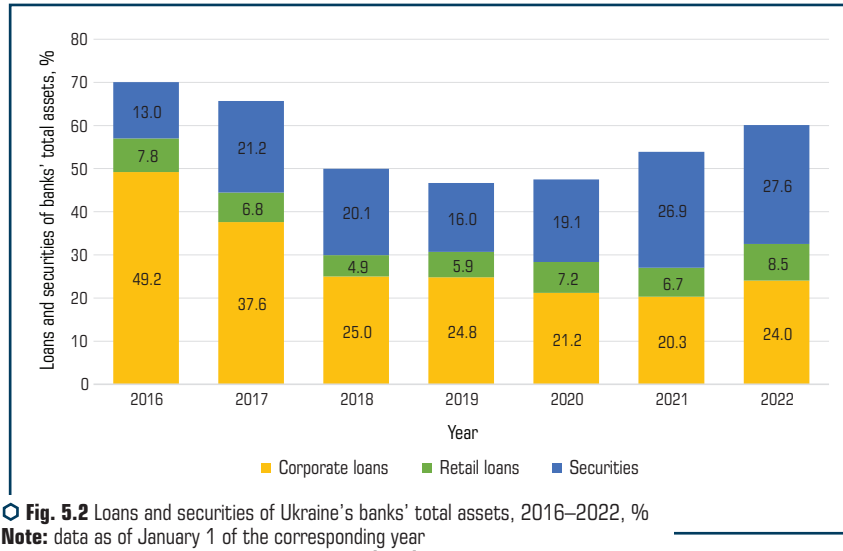

Fig. 5.2 Loans and securities of Ukraine's banks' total assets, 2016–2022, %
Note: data as of January 1 of the corresponding year
Source: compiled by the author based on data [126]

In general, the vulnerability of the state banks to crises in Ukraine is caused by three major factors:

1. Politically motivated lending, i.e., granting loans to the projects with dubious economic efficiency and to the companies, which do not have the ability to receive financing from private banks or foreign investors due to their weak solvency and/or desire to receive non-market conditions (lower rates, lack of collateral, et cetera).

2. Ineffective credit risk management policy, which manifests itself in lack of adaptability to changing environment, as well as the priority of credit monitoring on formal correctness of the agreements over their economic validity.

3. Conservative approach of the regulating agency. The NBU, as a regulating agency, has instruments of influence over the banks, which understate their risks. These include, but not limited to, requirements to recalculate credit risk (prudential reserves), fines, restrictions on attracting deposits or granting loans, etc. The state banks, on the contrary, often exaggerate the real risks, as opposed to understating them, aiming to receive additional capital from their shareholders [172].

One of the main elements of ensuring sufficient levels of financial depth is congruence between the demand and supply structure on the credit market. The need to account for individual industries' specifics, the complexity of estimation of industrial and macroeconomic risks often results in banks specializing in crediting certain industries only. It is worth mentioning that in these conditions the specifics of state banks' loaning, based on the level of openness of the economy, can be based on such aims:

1. Lending to state firms/quasi-lending to finance state budget expenses. In these conditions the state banks essentially fulfil the role of the state as a creditor of certain industries/firms.

One of the examples of such behaviour is Oshchadbank lending to Naftogaz on the conditions, which are regulated by the Cabinet of Ministers of Ukraine. The last renegotiation of terms took place in March 2022, when the 12 % rate for a loan, taken in 2009, was prolonged. This certifies the non-market approach to loaning, and thus the risks of the state firms are covered and their activities are financed via the banking sector.

2. Balancing the credit market. State loan programs can supply the demand for loans from certain highly specialized, perspective or high-risk industries, which is not covered by the regular banks. An example of such programs is the "5–7–9" program, since before this micro-loan program was in place, the small firms, especially those that are registered as an individual entrepreneurs, preferred to take loans as individuals instead, since the banks either flatly refused to issue loans to small firms, or included a wide variety of additional conditions to approve such a loan, which not only resulted in worse terms and conditions (for instance, higher collateral) but also significantly prolonged the process. The most significant part of the investment component of this program was implemented via the state bank channel.

Simultaneously, all of the state banks are included in the Top-10 by the volume of loans provided, if the two other program components are to be accounted for (namely, the anti-crisis loans and volumes of refinancing).

3. Market loan policy. The state banks can function on the market only if they adhere to commercial goals and manage to secure their operational activity profitability.

The structure of banks' credit portfolio from the loan subjects' point of view is one of the main characteristics of the banks' financial depth provision level. The main focus of credit portfolio is on legal entity borrowers (**Fig. 5.3**). The state banks, even though they lend to budgetary institutions far more than the commercial ones, contribute only up to 2 % to the total amount of loans, which is largely inconsequential for Ukraine's credit market.

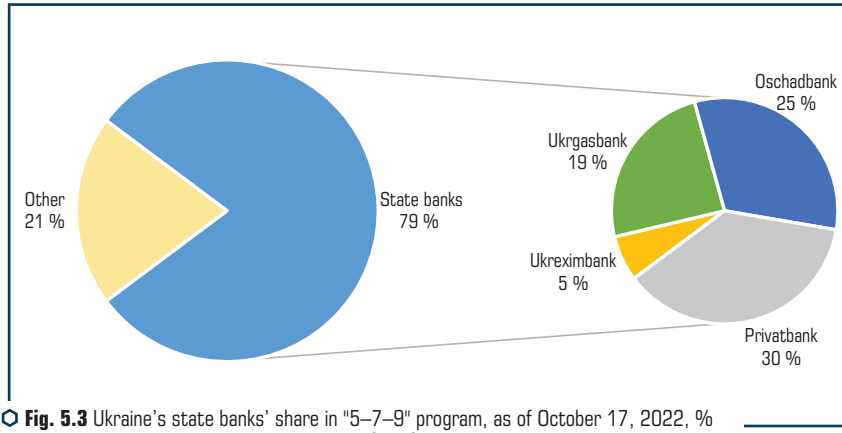

Fig. 5.3 Ukraine's state banks' share in "5–7–9" program, as of October 17, 2022, %
Source: compiled by the author based on data [173]

Parity in lending to legal entities from both state and commercial banks indicates high levels of concentration of credit portfolio on Ukraine's bank market. A significantly higher share of loans to individuals and individual entrepreneurs from commercial banks, as opposed to state banks, constitutes additional risks for state banks, since their portfolio is less diversified from the borrowers' type point of view.

In general, the operating activity of the state banks on credit market is based on accumulating deposit resources of individuals and further use of them to lend to legal entities. And since, as it was mentioned before, the majority of state banks' assets are concentrated in securities, the state banks' operating model is not effective from the financial depth realization point of view.

The industry structure of credit market coverage reflects the credit mechanism's congruence with the structure of the economy's different aspects. Starting from 2019, the commercial bank reports publishing requirements were changed in terms of lending to different industries. From this moment it is possible to track such activities by a bank or bank groups.

In 2019, top priority industries for state and commercial banks are the same, and the main recipients of loans remain the non-manufacturing industries: wholesale and retail trade. The second-highest priority industries are the manufacturing ones, namely the food and agricultural industry, which are usually credited by commercial banks.

The state banks usually have low effectiveness in dealing with NPLs. For the majority of industries, the state banks have higher share of NPLs than the commercial ones, which indicates that:

1) the state banks have less effective credit policy and inferior credit applications verification process;

2) the state banks have less effective procedures of problem debt recovery;

3) the state banks have low effectiveness of implementing of risk-oriented approach in lending to certain industries.

During 2019–2022 (**Fig. 5.4**), *the lending became increasingly concentrated on the trade-related industries*, which indicates higher demand, and the fact that the banks' credit process is more adapted to lending to trade firms, and less capable of complex analysis of credit risks, needed to lend to big manufacturers. One of the factors that plays into this trend is the peculiarity of firm registering process in Ukraine: when a legal entity, registered in tax heavens/quasi-offshores (Cyprus, Bahamas, Virgin Isles), is the owner and/or end beneficiary of a firm, any credit application from such a firm is automatically declined by banks' credit committees.

The aforementioned issues result in a situation when it is the commercial banks, who form the financial depth for Ukraine's economy. A separate issue with the loan structure by industry is its' only partial congruence with existing demand. For instance, based on the economic surveys by the NBU, during 2019–2022 the main customers, which had plans to take loans, were large firms of the manufacturing industries, energy and water suppliers, which participated in export or import operations [174]. Simultaneously, the statistical analysis implies another dynamic on Ukraine's credit market, which can indicate either the non-representativeness of such surveys (which doesn't contradict verification data) or an existence of structural imbalance on bank loan

market in Ukraine. Such an imbalance would imply the existence of a large demand for loans from certain industries, which remained constant for years and was never met by the banking sector. As it was mentioned before, it is the satisfaction of such demand, which can be one of the main functions of the state banks on the credit market.

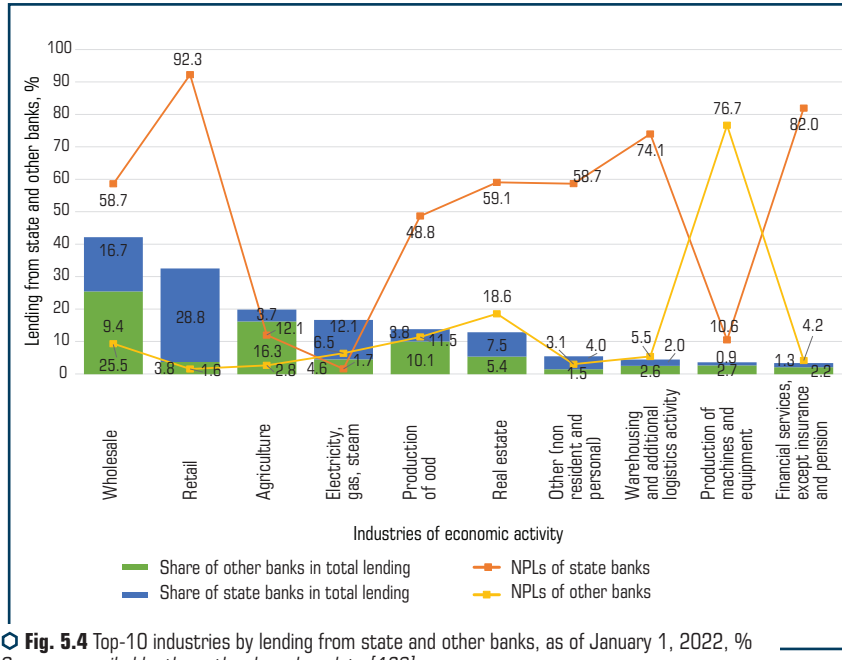

Fig. 5.4 Top-10 industries by lending from state and other banks, as of January 1, 2022, %
Source: compiled by the author based on data [126]

The ambiguity of goals in lending to corporate business is a specific trait of the state banks. For instance, in the financial statements of the biggest state bank – Privatbank, it is underlined, that the bank provides universal service for a wide range of clients, being the leader of the Ukrainian banking market's retail segment. It is also mentioned that Privatbank is actively promoting services for small and medium business, and selectively – for the corporate sector. Funds of the individuals in UAH, largely accumulated on the current accounts, form the bank's resource base. The strategic aim of the bank is to build up a high-quality portfolio of retail and SMEs loans [175]. Similar theses are found in the reports of the other state banks, and it indicates that lending to big corporate business is not set among the aims of state banks, even though the big corporate sector is currently the main contributor to GDP. Instead, Oshchadbank puts this into its reports: "According to this business model, Oschchadbank is the universal bank, which prioritizes the expansion of retail, micro, small and middle business, while maintaining strong positions in the corporate business

direction" [176], thus also predominantly concentrating on retail lending. Similar situation is also common among the other state banks.

Another aspect of financial depth creation is the provision of lending/insurance/reinsurance services for export risks via the export credit agencies. In 2021, after a 5-year forming period, Export-credit Agency (ECA) was launched in Ukraine. According to the results of 2021, it supported 6 loan agreements, which facilitated exports for UAH 96.28 mn, which indicates its low efficiency and lack of impact on the financial depth in Ukraine. The firms, that received support, work in such industries: manufacture of other builders' carpentry and joinery; manufacture of other electrical equipment; manufacture of motor vehicles and their engines; milk processing, production of milk products and cheese; wholesale of grain, raw tobacco, seeds and fodder [177]. *Using ECA is one of the most perspective instruments for incentivizing both exports of high value-added commodities and usage of modern credit instruments*.

In 2020 *state portfolio guarantees program* was launched, which was conceived, among other things, to bolster the commercial banks' lending to small and medium business in Ukraine. As of January 1, 2022, 11 state banks had issued state-guaranteed loans to 2652 firms for the total amount of UAH 7.35 bn. Obligations for principal debt, partially secured by the state guarantees on a portfolio basis, amounted to UAH 3.201 bn. This constitutes around 81 % of total limit of guarantees, provided last year (UAH 3.93 bn). At the same time, in December 2021, 450 loans for UAH 554 mn were granted with a share of obligations, guaranteed by the state for the principal debt, amounting to UAH 263 mn [178].

State bank Oschchadbank was the leader by the volume of loans issued on a portfolio basis – 810 loans for UAH 2.38 bn, or 96 % of the guarantees limit it was granted. Privatbank takes the lead by the number of loans issued – 1339 loans for UAH 1.051 bn, which makes up 99 % of the guarantees limit the bank was granted. Ukreksimbank issued 177 loans for UAH 1.501 bn, or 89 % of its guarantees allowance.

The forecasted increase in total sum of guarantees up to UAH 11 bn in 2022 is negligible, if compared to the total credit market volume in Ukraine [178].

One of the key issues with lending policy implementation remains the focus of all new projects and programs on SMEs, without mass attraction of such firms to the crediting process. Meanwhile, the average profile of client in need of a loan, for the recent 3 years indicates that such programs must also be launched for big corporate business.

To conclude: state banks in Ukraine are the basis of lending mechanism of banking system, since they own the majority of bank assets. Under such conditions the state has an additional lever of direct influence over the economy, but uses it ineffectively due to:

1. The share of NPLs in the state banks' assets is significantly higher than the corresponding indicator for commercial banks.

2. The total loan portfolio structure by industry is non-stimulating and does not meet the markets' demands, which is reflected as the decrease in credit mechanism efficiency in Ukraine as a whole, and particularly on its financial depth. The industries, which need loans, do not receive them in sufficient volume during our long-term period of observation.

3. The structure of SME-corporate crediting requires significant improvement and adjustment to Ukrainian realities. Disproportions between the levels of lending the SMEs receive and their miniscule employment/contribution to GDP must be alleviated in order to realize the true potential of SMEs.

4. Government loan-facilitation programs, that were implemented in 2019, had a positive impact both on the economy and financial depth, but their scale was insufficient (less than 5 % of the total lending) to increase the efficiency of crediting or financial depth as a whole.

State investment projects

Implementation of large-scale investment and infrastructure projects is one of the cornerstones of positive investment climate in a country. The very presence of such projects facilitates more active usage of credit resources in the economy. Certain projects can be implemented only with the state support or at state's expense, and this serves as one of the drivers for increasing the long financial depth of economy. From 2016, the Ministry of Economy of Ukraine has been publishing data on state investment projects, namely their list and the meeting protocols of interdepartmental commission, which approves state investment projects and monitors their implementation. This data allows to analyse the number, structure and financing volume of existing state investment projects, as well as their direction and state of completion. The review of the active investment projects indicates, that they are largely not being credited by Ukraine, even though the joint projects with foreign governments may have state lending involved, in which case it is usually supplied by the counterparty.

According to the international experience, a development bank provides lending to the inner state investment projects. However, the few attempts at creating state development bank, undertaken in Ukraine so far, were unsuccessful. The aims of such banks were described as "to provide lending for structural changes in the economy" and "to attract long-term investments from both within and without to the priority industries". There were at least three draft laws so far, all of which were ultimately discarded, namely Azarov's [179], Omelchenko's [180] and Vilkul's [181]. There was also the negative experience with Vseukrayinsky Bank Rozvytku, which was created in 2009 by Yanukovich, O., which provided "lending" to the state firms at non-market inflated rates, and was ultimately stripped of its license in 2015 and liquidated in 2021.

That is, there is no positive functioning experience for a development bank in Ukraine. The review of the existing state investment projects indicates, however, that *even if there were a development bank in Ukraine, these projects would not qualify for a loan anyway, because the majority of them are not profitable.* For instance, according to the list of the active investment projects for 2020, out of 22 projects in the public health care sphere 9 concern reconstruction, restoration or finalizing reconstruction of individual rooms; 4 – construction or finalizing construction of individual hospital buildings; 4 – for enhancing diagnostics procedures and 2 more – for improving the population's access to medical services. These projects are by and large social spending, rather than profitable projects. Similar situation is common for the projects from other spheres – except for fuel and energy sphere, where the only project – development of production facilities of Novokostiantynivka mine – is partly financed with own funds. Lending to non-profitable projects,

financed from the state budget is generally inexpedient, except for the instances when postponing the project would result in significant increase in its costs, which is indeed the case for the majority of the construction-related projects.

In 2020, the total of 22 state investment projects for UAH 6.83 bn were monitored, out of which 17 were financed out of the general budget fund (UAH 1. 22 bn); 2 out of these 17 additionally received financing from special budget fund and other budgetary programs for the total sum of UAH 1. 64 bn [182]. Another 5 investment projects were financed by the French, Polish and Hungarian loans (UAH 3. 97 bn).

Specifically, *59 % of the total financing volume (UAH 49.9 mn) is distributed towards the transport sphere projects,* namely the improvement, development and bringing up to the modern standards the automotive roads, as well as development of border infrastructure (**Fig. 5.5**). Second biggest direction of public investment is maintaining the general government (UAH 19.1 mn or 23 % of the total financing volume), which includes such projects as construction of an infirmary for SO "Holoprystansk penal colony", creation of the service housing fund for the MDI, development of the border guard units and creation of unified system of aviation security and civil protection in Ukraine. The third biggest direction of the state investment by volume is public health care (UAH 8.5 mn or 10 % of the total financing volume). It includes the medical and diagnostic complex construction project for Okhmatdyt hospital, oncological diseases diagnosis improvement project, the medical and rehabilitation building construction project for the Amosov National Institute of Cardiovascular Surgery, the medical building construction project for the Filatov Institute of Eye Diseases and Tissue Therapy of the National Academy of Medical Science of Ukraine, and the ophthalmologic pathology prophylaxis, diagnostics and surgical treatment improvement project. Environmental protection sphere (UAH 2.97 mn or 4 % from total financing volume) includes the hydraulic structures of the Dnieper reservoirs reconstruction, provision of drinking water supply to Mykolayiv Region rural settlements and flood protection measures in Lviv region projects. The fuel and energy sphere (UAH 2.93 mn, or 3 % of total financing volume) includes a single Novokostiantynivka mine production facilities development project. The projects in education sphere (UAH 0.58 mn or 1 % of total financing volume) include restoration of the main building of Ivan Franko National University of Lviv, creation of the international pilot training center and restoration of Old Academic building of the National University of "Kyiv Mohyla Academy".

Some of the projects, which are being implemented, have military significance – automotive roads, border infrastructure, procurement of helicopters for the MIA (accounted for as "general government" expenses), strengthening of individual infrastructure facilities and pilot training. These projects are, as a general rule, more recent, and receive more financing. Other projects, for instance those, that include repairs of certain buildings for educational facilities, have significantly less funds and receive those intermittently. This may indicate that a number of projects (namely, those launched in 2017–2018) were chosen, taking into account the impending russian invasion, while other projects are long-term investments, launched back in 2011 (the majority of the projects, involving construction of medical and rehabilitation buildings for hospitals) or even in 2002 (the penal facility in Kherson Region renovation).

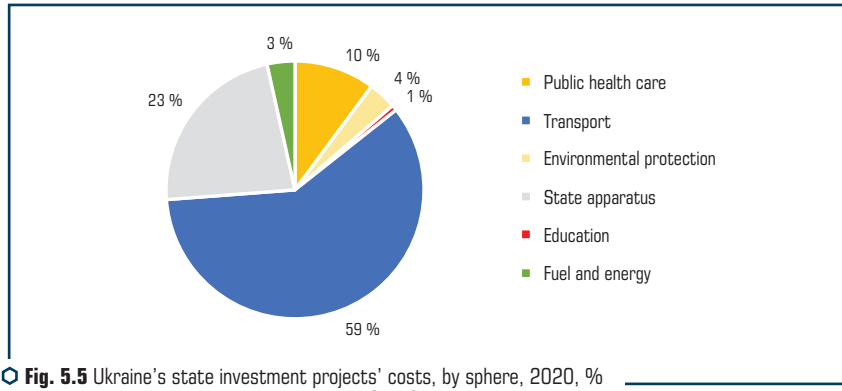

Fig. 5.5 Ukraine's state investment projects' costs, by sphere, 2020, %
Source: compiled by the author based on data [182]

In 2020, out of 17 projects, funded by the general budget fund, 1 project didn't get any financing whatsoever (creation of pilot training center), 3 projects received full refund for accounts payable for work performed in 2019, and the rest 13 projects were financed for 91 %–100 % of their planned financing volume.

In 2020 only 21 projects received any financing. The list of the active state investment projects [183] includes 77 projects in total on for UAH 162.16 bn (**Table 5.1**). The median duration is used in the table instead of average duration due to existence of certain overdue projects, planned over 30 years ago (for instance, construction of the medical building in Odesa, which began in 1986), and thus the average duration values are significantly inflated. The time frames of most projects fall between 2015 and 2023. The absolute majority of investments are planned for transport infrastructure projects implementation: they accumulated 63.3 % of total planned financing. The projects, which are implemented with the least delay, are projects from public health care, education and social-cultural spheres, which are indicated by the project implementation degree, calculated as total financing, allocated to the project to its planned financing. The least financing per project receives aerospace-related production sphere; they were planned to be started in 2021, and thus are not reflected in the reports for 2020. The most financing per project is received by projects in transport infrastructure sphere.

Therefore, *the priority on the planning stage is given to the projects in the transport sphere, general government sphere and public health care sphere, while the projects with the most rapid implementation are those from public health care and social-cultural sphere*. Taking into account the average costs of such projects, it becomes clear that the state has significant difficulties with approving of financing for more "expensive" projects for the yearly budget, and thus social projects (which provide more political benefits) are chosen instead, on the basis of maximization of their numbers with simultaneous minimization of their costs. The fact that among 77 projects registered, only 21 received financing (on the level of 91–100 % of the planned volume), as well as the existence of active projects from 1986, which are not yet finished, indicate chronic funding shortage.

Table 5.1 Active state investment projects in Ukraine, 2020

Sphere	Number of projects	Median duration of the project, years	Total cost of the project, UAH mn	Funds needed for project completion, UAH mn	Project implementation degree, %
Public health care	22	3	14 197.27	9 347.82	34.16
Social and cultural sphere	9	4	6 928.64	4 921.83	28.96
Sports	3	6	2 567.83	2 559.60	0.32
Education	8	4	1 449.56	1 002.52	30.84
Environment protection	10	10	11 428.93	10 322.04	9.68
Transport infrastructure	14	5.5	103 158.79	82 405.45	20.12
General government	8	8.5	19 210.23	14 374.39	25.17
Aerospace-related production	2	2	286.19	286.19	0.00
Fuel and energy	1	4	2 929.48	2 510.65	14.30
Total	77	x	162 156.92	127 730.50	21.23

Source: compiled by the author based on data [183]

Thus, a number of regularities for state investments projects implementation were outlined:

1) the projects are mainly funded by the state budget of Ukraine with insignificant use of loans; in rare cases when the loans are involved, they are given by other states;

2) there is a significant share of transitory projects (i.e., those chosen in previous periods) in their total amount; specifically, in 2020 protocol mentioned 46 out of 56 projects as transitory and 10 as new, while in 2019 protocol mentioned 39 out of 54 projects as transitory, and 15 as new;

3) there is a chronic funding shortage for the state investment projects; as a result, the majority of projects do not receive any funding at any given year.

To conclude:

1. The major part of the state investment projects in Ukraine is financed from the state budget. Due to chronic funds shortage, a small number of projects is chosen for financing every year, while the priority funding receives the cheapest projects – except for the projects, which are being lobbied by the political force currently in power. Such approach results in gathering of long overdue projects, which cannot be cancelled for one reason or another, which further complicates their financing; since, for instance, the budget for reconstruction of medical building in Odesa had to be increased at least several times as much based on material cost alone since 1986, when it first started.

2. Focus on the projects of military significance, which appears to exist in superfluous analysis, is likely to be accidental. This is indicated by the fact that the pilot training program didn't get any funding in 2020, and the lack of funding for infrared missile homing systems project, all while the bulk of the funding went to procurement of used helicopters and road infrastructure. Instead, the reasons behind the choice of the state investment projects appear to be mainly political and

short-sighted, since the long-term advantages of the projects appear to be rarely considered. The projects, which were not fully implemented in due time (i.e., up until the end of cadence of the politician, who started them) are not terminated, and remain stuck in a limbo for indefinite period of time (which is indicated by active projects dated from 1986 and 1990).

3. The usage of loans in the state investment projects is highly limited. In all three instances discovered, the loan was given by the foreign partner for a joint project. It is worth mentioning that in case of the French loan for helicopter procurement the sum of loan for this project alone exceeded the total funding the rest 20 projects received for that year. This underlines the chronic budget funding shortage for the state investment projects' implementation, and may indicate that avoidance of loan usage in such projects was a preceding policy, since all of the projects with a loan component are new. Usage of loans imposes certain inflexible obligations on the state budget, and thus the project with loan financing cannot be postponed: a significant limitation, if to take into consideration that Ukraine has no predictable reliable long-term sources of income.

4. The absolute majority of projects in the list are not profitable: mostly, these are unavoidable investments, which have a clear-cut social significance, for instance support of separate institutions (restoring education institutions' campuses), state-funded research (i.e., development of diagnosis and treatment methods for certain diseases), support of key infrastructure objects (automotive roads within the framework of the "Great Construction" project and water supply facilities), etc. The inability of the majority of the projects to pay for themselves makes it extremely hard to justify the loan involvement for them. The self-sufficiency inability makes such projects unattractive for any potential lender (even for those, which provide preferential conditions, like a development bank), and puts the brunt of potential debt burden onto the state budget, which, as a rule, finances the recipient organization's functioning anyway.

5. A significant number of the projects, which include reconstruction, finishing reconstruction or restoration of separate buildings and rooms indicates, that such projects are an attempt to solve systematic problems with insignificant and unsystematic expenses. russian invasion, which has already caused significant destruction of infrastructure (in particular, a number of buildings and roads, which were being restored as a part of the projects reviewed), made such approach obsolete. The post-war restoration will require far more investments, which have been ever planned for the state investment projects in Ukraine, but even if they will be granted on preferential terms, a new approach to development and formulation of such projects must be implemented, the one that would focus on self-sufficiency.

Cooperation with international financial institutions

Ukraine has been actively attracting funds from the main international finance and credit organizations. Specifically, the cooperation with the IMF began in 1992, and by 1993 Ukraine received its first tranche of financial aid. It is worth noting, that the majority of the IMF cooperation programs are programs for macroeconomic stability support, and have an indirect influence on financial depth. In general, the loans from the IMF facilitate increase in trust to the country's central bank

and the banking system as a whole, which in turn forms informational grounds increase in financial depth. Analysis of IMF loan usage dynamics (**Fig. 5.6**) shows *trends of acute growth during the periods of post-crisis economic recovery (including due to external threats)*. As for 2020, 74 % of all the funds received were directed towards maintaining the level of gold and foreign exchange reserves, as well as the balance of payments, and 26 % – towards the state budget within the framework of post-crisis recovery and extended financing programs [184]. The main operation period of such programs fell on 2008–2014, when Ukraine struggled with the consequences of the world economic crisis, needed additional funds for financing Euro 2012 and for additional reserves infusions due to the usage of fixed exchange rate. The IMF poses a number of conditions for debtor countries, however, adherence to which dictates whether or not the cooperation will continue. Over the recent 10 years one of the biggest problems of Ukrainian financial sector and financial depth was the level of *NPLs of banks' assets*, namely of state banks. Thus, in one of the latest programs, the development of Plans to reduce NPLs' share in the state banks' assets was put as one of such conditions. This plan had to be officially approved both by the bank's shareholders and the NBU's Financial Stability Board. As a result, the state banks reduced the share of NPLs in their assets by UAH 56.2 bn, which constitutes almost two thirds of the total reduction of NPLs in the banking sector. The share of NPLs in the state banks' assets was reduced by 10 %: from 57.4 % to 47.4 %. At the same time, they still accumulate more than 70 % of the total NPLs portfolio [126].

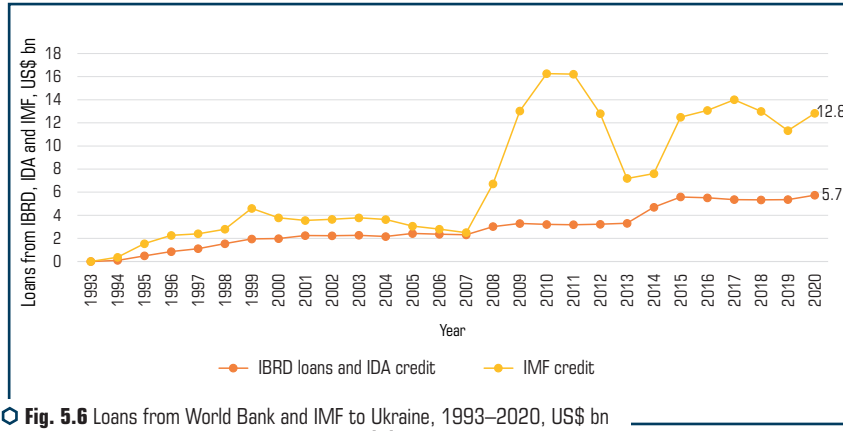

Fig. 5.6 Loans from World Bank and IMF to Ukraine, 1993–2020, US$ bn
Source: compiled by the author based on data [1]

The EBRD. Ukraine is a member of the EBRD since August 13, 1992. The EBRD does not finance the state budget expenses, but provides financing for investment development projects in public and private sector, except for defence and tobacco industries, as well as gambling business projects. In Ukraine the EBRD cooperates both with public and private sector. The EBRD is one of the biggest institutional investors in Ukraine. As of June 30, 2022, the total volume of

financing, received by Ukraine from the EBRD, amounts to EUR 1698 bn across 510 different projects (**Fig. 5.7**) [185].

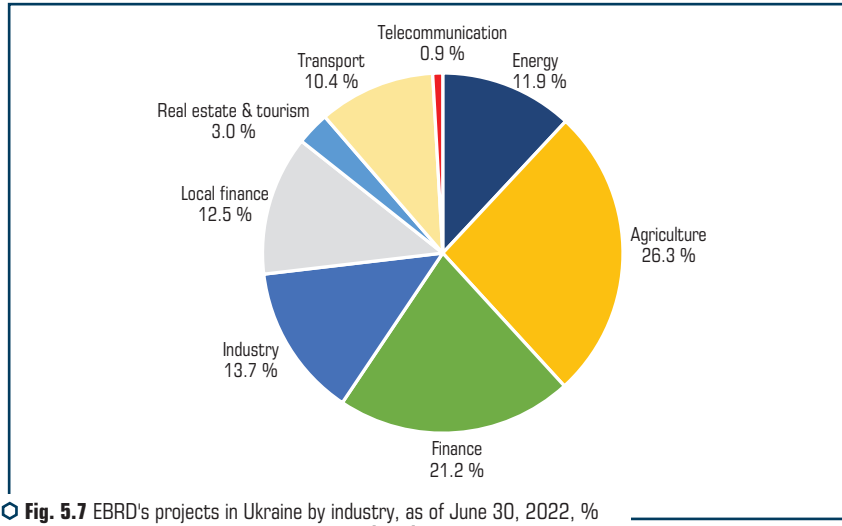

Fig. 5.7 EBRD's projects in Ukraine by industry, as of June 30, 2022, %
Source: compiled by the author based on data [186]

Since the beginning of Ukraine-EBRD cooperation, the main sector involved was the agriculture and other directly related industries. Among the key areas of activities in this sphere, the financing of agricultural logistics and storage infrastructure (Nibulon, Mriya), seed-oil companies, glass production in Hostomel and beer industry are worth mentioning. The factual peak of projects' financing in this sphere occurred after 2000, and it secured financial depth on the background of sustained deficit of banking corporate financing.

The EBRD activities on Ukrainian financial markets deserve special attention. Starting from 1998, one of the key directions of financing was the support of SMEs in Ukraine. The first project, in the form of a loan to the NBU for further financing of banking institutions to facilitate SMEs crediting, was issued in 1998. It was a loan for ECU 120 mn, which included ECU 80 mn as a credit line, guaranteed by the sovereign, and ECU 40 mn for interbank credit lines. Both of these mechanisms were used to finance micro-, small and medium private firms in Ukraine. The project was directed towards three main goals:

1) to support perspective Ukrainian banks in their attempts at becoming effective financial intermediaries and to facilitate their institutional growth;

2) to provide long-term financing for a wide range of private firms, including small and medium ones;

3) to facilitate decrease in loan costs for bank clients by decreasing the resource costs for commercial banks [186].

Since 1998 more than 40 projects have been implemented, both via the NBU and via the state and private banks. The leading partners in Ukraine are the international groups' banks (Prokreditbank, Raiffeisen Bank Aval, OTP Bank and their related parties). Among the state banks, Oschchadbank and Ukreksimbank are the main partners.

Another important area of the EBRD activities in Ukraine is the facilitation of leasing as a form of loan settlements. Starting from 2005, a number of programs were implemented via the EBRD to stimulate leasing in Ukraine. As in the previous example, the leading partners were Prokreditbank and OTP Leasing.

The EBRD actively cooperates with the state sector. There is currently 9 joint Ukraine-EBRD projects being implemented for the total loan amount of EUR 1.76 bn. The volume of the EBRD funds used within these projects was EUR 0.657 bn (37.24 % of the total loan sum) [185] as of June 30, 2022. As for the effectiveness of such cooperation, it is worth mentioning that the fund withdrawal pace is low and thus the programs are not being implemented on the schedule: the majority of the projects given must be completed by more than 70 %, while the fund withdrawal pace lags behind by an average of 2 times as much. Such loan support of the state firms is focused on two industries, namely, the transport and energy industries, which further confirms low level of the EBRD loan funds diversification.

The EIB. Ukrainian cooperation with EIB began in 2007. As of the end of 2021, the total sum of financing provided amounted to US$ 8.09 bn. The main industries, which received investments from it, were transport, finance and energy industries, which got the 80 % of the total loans granted [187].

The EIB project portfolio in the state sector consists of 25 projects for a total sum of EUR 5.2 bn. Out of these projects, 21 are on their implementation stage, for the total sum of EUR 4.55 bn. Among the specific industries, present in the state sector cooperation portfolio, there are investment projects in the higher and vocational/technical education.

The KfW. As of June 30, 2022, the total volume of credit portfolio of the current projects of the Kreditanstalt für Wiederaufbau (KfW) amounts to EUR 0.51 bn, EUR 0.38 bn (75 %) of which were already used [188].

To conclude:

Current financial depth level in Ukraine is partly formed due to direct credit and guarantee support of the IFOs. Loans and guarantees from the IFOs, delivered via country's financial sector, are an integral instrument of financial depth and credit process effectiveness increase due to:

1. The provision of funds takes place via Ukrainian financial institutions with direct involvement of the IFOs both resource-wise, and by implementing some of their standards of risk management, which improves the credit risk assessment policy for the participating Ukrainian institutions, and increases public trust towards them.

2. Industry specialization allows to direct the resources into the industries, where they're needed the most.

3. Better control and limited terms flexibility ensures the funds being used as intended.

Local loans

The borrowings of local self-governing bodies allow local communities to attract additional resources for their developmental budgets, and thus facilitate economic growth in the regions. Transferring investment financing onto the local budget level ensures the need to secure appropriate resources and the power to attract additional resources. The essence of such change is reflected in art. 9, p. 8 of European Charter of Local Self-Government, where the access to capital market for the local self-government bodies was proposed to secure investment loans, and which was implemented as a part of Ukraine's decentralization effort. The loan volume, allowed for the local self-governing bodies is limited to 200 % (400 % for Kyiv) from the average yearly indicative forecast for developmental budget revenues, while the debt servicing payments cannot exceed 10 % of local budget's general fund expenses for any one year during the debt servicing period. Increase in loans of local self-governing bodies occurred during the whole research time frame, with temporary decreases in 2015–2017 and 2018–2019 (**Fig. 5.8**).

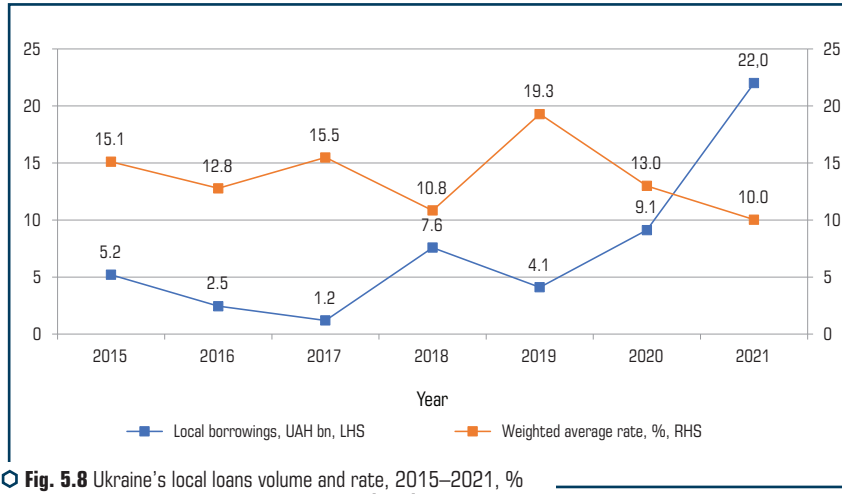

Fig. 5.8 Ukraine's local loans volume and rate, 2015–2021, %
Source: compiled by the author based on data [189]

Growth in loan volume coincided with the decrease in weighted average cost of debt. To calculate the weighted average costs of debt, the foreign currency denominated loans were converted into UAH using the yearly average exchange rate for the corresponding year. Therefore, the local self-governing bodies tried to maximize the volume of loans all while their developmental budget grew, taking advantage of their new found ability to increase their debt servicing payments. The majority of loans by volume during 2015–2021 were the internal ones, i.e., the loans from Ukrainian creditors, all while the majority of credit agreements were made with the external lenders, at least up until 2018. Thus, the majority of external loans were for relatively small sums. *The main internal*

lenders for this period were Oshchadbank of Ukraine, State Eximbank of Ukraine, Ukrgazbank and the Ministry of Finance of Ukraine. The main external lenders were NEFCO (providing mostly UAH-denominated loans); also, there was a small number of loans from the EBRD and the EIB.

During 2015–2021 both the volume of debt and the number of credit agreements grew. From 2020, the fixed rate on the credit agreements was replaced with the floating one, specifically for UAH-denominated loans (the currency-denominated loans were mostly tied to LIBOR or EURIBOR+margin anyway). The NBU discount rate and UIRD (Ukrainian Index of Retail Deposit Rates) were used as the floating rate for UAH-denominated loans, even though the latter only was introduced to wider use in 2021.

Therefore, during 2015–2021 there was an increase in loan volume to local self-governing bodies, the majority of which was attributed to internal UAH-denominated loans (**Fig. 5.9**). The credit agreements on these loans were few and generally each of them provided relatively large sums per borrower, as opposed to the external debt, mostly formalized by numerous small-scale credit agreements.

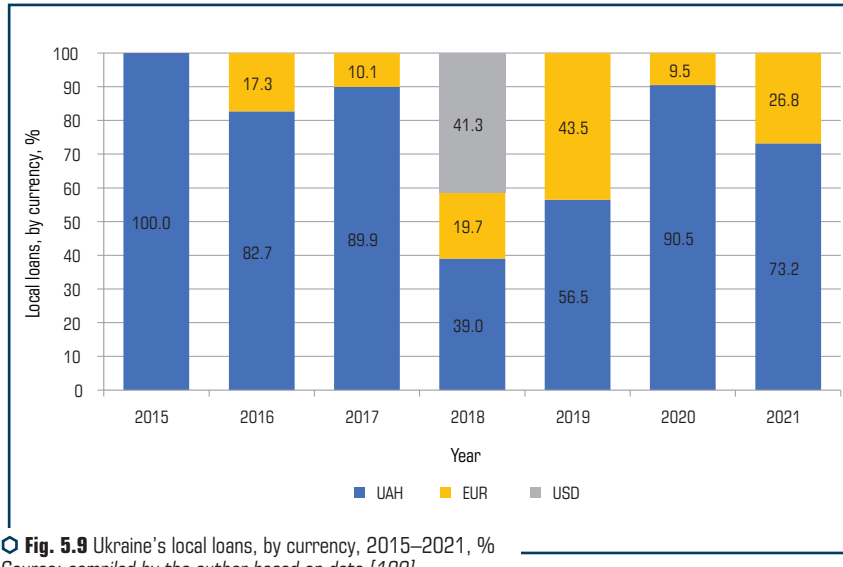

Fig. 5.9 Ukraine's local loans, by currency, 2015–2021, %
Source: compiled by the author based on data [189]

The majority of loans during 2015–2021 were UAH-denominated. The only USD-denominated loan was observed in 2018, and it was received by Kyiv City Council from PBR Kyiv Finance Plc at 7.5 % per year until December, 15, 2022. The EUR-denominated loans, as a rule, were using 6-moths floating EURIBOR rate (which was negative during the entirety of period of observation) + a 2 % to 6.5 % margin. It is worth noting, that even though the part of the EUR-denominated

loans were indeed taken from the foreign lenders, for instance NEFCO, the biggest volume of such loans was issued by the Ministry of Finance of Ukraine.

As it can be seen from the **Fig. 5.9**, the share of currency-denominated loans grew during 2016–2018, following which began to decline. The decrease in share of the currency-denominated loans indicates that the majority of them were short- and medium-term ones, and this conclusion is confirmed by the structure dynamics of local self-governing bodies' loans by terms (**Fig. 5.10**), short-term loans are the loans, issued for the term from 1 to 3 years, medium-term loans are the loans, issued for the term from 3 to 5 years, and long-term loans are the loans issued for the term over 5 years).

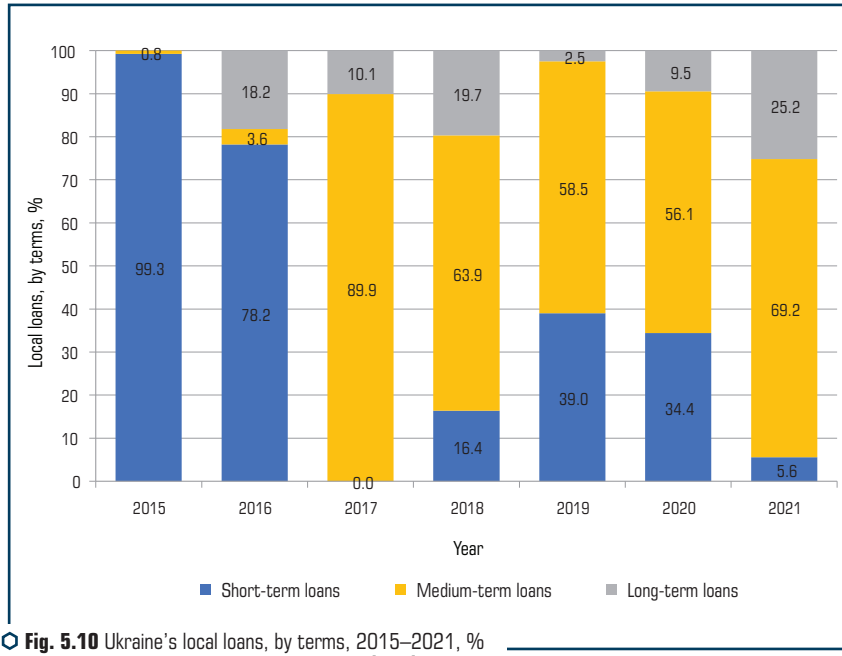

Fig. 5.10 Ukraine's local loans, by terms, 2015–2021, %
Source: compiled by the author based on data [189]

During 2015–2016, the majority of loans were the short-term ones, which was a reflection of the investors' lack of trust for the country, in which hostilities had recently begun. The first long-term loan was given in 2016, which is also the first of the foreign currency-denominated loans, issued in EUR by NEFCO to Chernivtsi City Council for 9 years. The majority of credit agreements, which were made in 2016, were the medium-term ones, but the major part of the total loan volume for this year was concentrated in one single UAH-denominated loan, issued by Oshchadbank and Ukreksimbank to Kyiv City Council. Starting from 2017, the medium-term loans became more common, while the share of long-term loans grew in 2017–2018 and 2020–2021.

According to the Ministry of Finance data, in 2020 the local self-governing bodies made 42 separate credit agreements for the total sum of UAH 7.744 bn and EUR 28 mn, 90.7 % of which were internal borrowings and 9.3 % were external ones. The participants of the credit relations were:

1) *from lenders* – 4 Ukrainian banks out of 74 (i.e., 5.4 % of the total number), specifically 3 state owned ones: Oshchadbank, Ukrgazbank and Ukreksimbank and 1 commercial one – Alfa-bank; one IFO – NEFCO, as well as the Ministry of Finance of Ukraine;

2) *from borrowers* – 27 out of 1470 local self-governing bodies and territorial communities, which constitutes a mere 1.8 % of their total number.

The share of state banks in total loaned volume is overwhelming: three state banks issued 85.2 % of all loans, while the IFO – 7.7 % of loans, private banks – 5.5 % of loans and the Ministry of Finance of Ukraine – 1.6 % of loans.

The municipalities tend to use two kinds of credit agreements as their main instruments: the external loans, the internal loans, as well as the local obligations. In 2020, 63.2 % of total loan volume was attracted as loans and 36.8 % – as the local obligations. Lviv, Kyiv and Kharkiv were the only cities, which issued local obligations.

The loan terms fluctuate between 3–5 years for internal loans and local obligations, and between 7–9 years for external loans. The cost of credit resources also significantly fluctuates: from 3–6 % for the external loans to 12–18 % for the internal ones. An important part of the local borrowing process is the Ministry of Finance of Ukraine approval period for the decisions, adopted by the local councils. The time period between the application submission and its approval by the Ministry of Finance of Ukraine fluctuates from 20 to 132 days with the average being around 50 days.

To conclude:

1. During 2015–2021 there was an expansion in volumes of borrowing by the local self-governing bodies from UAH 5.2 bn to UAH 22 bn, with a simultaneous decline in weighted average loan costs from 12.7 % to 10 %. The absolute majority of loans were of the internal borrowing variety, while some of these internal loans were foreign currency-denominated. The main lenders were the Ministry of Finance of Ukraine, Oshchadank and Ukreksimbank. The main external lenders were NEFCO, the EIB and the EBRD.

2. The structure of the loans, issued to the local self-governing bodies, by terms, indicates that the trust of lenders for the local communities' solvency has been steadily growing. Specifically, there was an increase in the volume of medium-term and long-term debts, which also reflected on its weighted average cost.

3. The currency structure of the loans, issued to the local self-governing bodies, indicates that the borrowers tried to minimize their currency risks, since after the peaking in 2018, the volume of foreign currency-denominated loans decreased. Starting from 2021, the majority of new loans had floating rates regardless of the currency they were denominated in. This may indicate attempts at hedging the inflation and currency risks.

4. The state banks are one of the pillars of supply forming on the local borrowing market, both the short- and medium-term ones.

5.2 UKRAINE'S STATE DEBT

State sector can affect the level of financial resources in economy via the state and local budgets, as well as the state banks. Financing with debt becomes one of the main instruments for covering the demand for financial resources by the development projects, among other things, especially when the state budget is chronically formed with a deficit. Public and state-guaranteed debts in Ukraine began to grow actively, starting from 2014, due to influx of external borrowing. The internal borrowing decreased during 2014–2019, yet began to increase rapidly from 2020. The debt repayment rate, however, did not correspond to the rate of its acquisition (**Fig. 5.11**).

Increase in state debt during 2015–2021 was achieved mostly due to external borrowing, while its repayment – due to internal borrowing. Such dynamics is most linked to longer terms of external borrowing, as well as with certain preferential conditions, such as decreased debt service payments during the first few years of its repayment.

As of 2021, *state debt accounted for 95.6 % of internal debt and 83.3 % of external debt, and the rest was the state-guaranteed debt;* and thus, it is safe to assume that this ratio is preserved for the sums, aimed at servicing the debt. The debt structure by term in 2021 is as follows: the majority of the internal debt (57.9 %) is formalized as long-term DGBs, 24.6 % – as short-term DGBs, and the rest – medium-term ones, all while the external debt consists of the debt to the IFOs (35.6 %) and long-term outstanding Eurobonds (48.07 %).

There is a negative trend of new debt growth rate exceeding the debt repayment rate, and the current force majeure circumstances all but ensure that this trend will be further solidified and deepened in the foreseeable future.

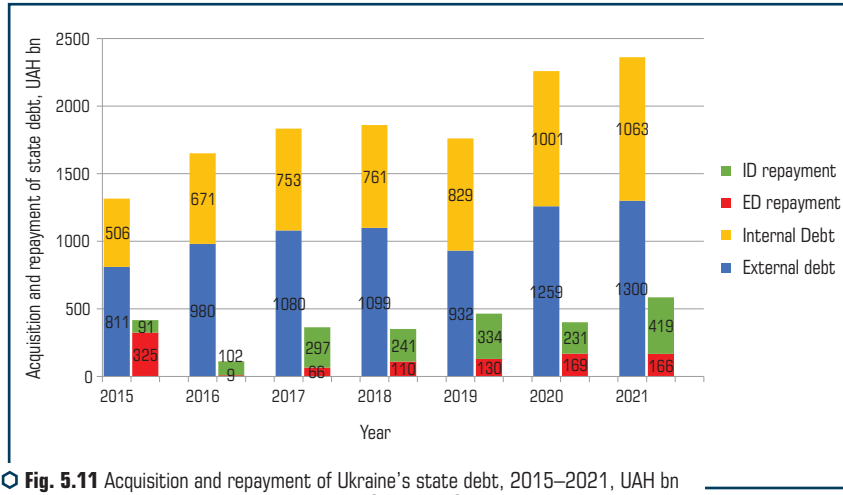

Fig. 5.11 Acquisition and repayment of Ukraine's state debt, 2015–2021, UAH bn
Source: compiled by the author based on data [189, 190]

National currency depreciation is another negative factor, which makes the servicing of the public debt more difficult. Currently, the total income in foreign currency in Ukraine has significantly decreased due to reduction in industrial production and logistical problems (namely, the sea ports blockade and inability of European railway capacities to quickly adjust to serve the full cargo flow from Ukraine in order to compensate the sea trade restrictions), all while the foreign currency expenses are skyrocketing due to the imports of arms and other essential goods. In order to estimate, how vulnerable Ukraine is to increase in debt servicing costs, the currency structure of public and state-guaranteed debt was reviewed (**Fig. 5.12**).

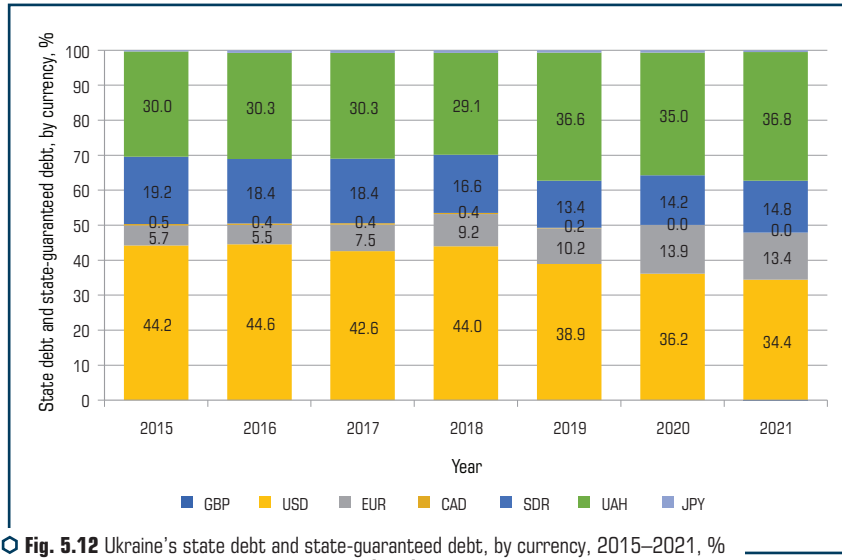

Fig. 5.12 Ukraine's state debt and state-guaranteed debt, by currency, 2015–2021, %
Source: compiled by the author based on data [189]

The brunt of the public debt is divided among 4 currencies: UAH, USD, EUR and SDR. Other currencies – CAD, JPY and GBP – constitute less than 1 % of the total sum of debt, all while the debt in GBP only appears in 2021, and the debt in CAD – disappears in 2020. During 2015–2021, the share of debt, denominated in UAH and EUR, increased, while the debt, denominated in USD and SDR, decreased. Nevertheless, 2/3 of public and state-guaranteed debt is denominated in foreign currencies, and thus bears the currency risk.

There were attempts to partly alleviate this risk by adapting the lending conditions, in particular, by using different kinds of floating rates and additional provisos. *The fixed rate debt still retains the biggest share of public and state-guaranteed debt* (**Fig. 5.13**). Moreover, some kind of rates did not appear up until 2017 or even 2021. "Other" rate, which exists in 2020–2021, and which accounts for a little more than 1 % of total public and state-guaranteed debt, covers a range of

different rates, such as: Ukrainian rate index on the deposits of individuals, floating discount rate of the NBU, EURIBOR and the rates of German banks, which provided loans for Ukraine. Such debt structure by rate type indicates heightened currency risk, since the fixed rate is rarely reviewed or changed. The floating rates like LIBOR or EURIBOR have been negative for the last 5 to 10 years, and thus they usually have additional margin from 2 % to 6 % attached to them. The significant growth in number of rates employed starting from 2020 is worth mentioning; clearly, the lenders tried to compensate the growing inflation risk or to insulate themselves from the currency risk.

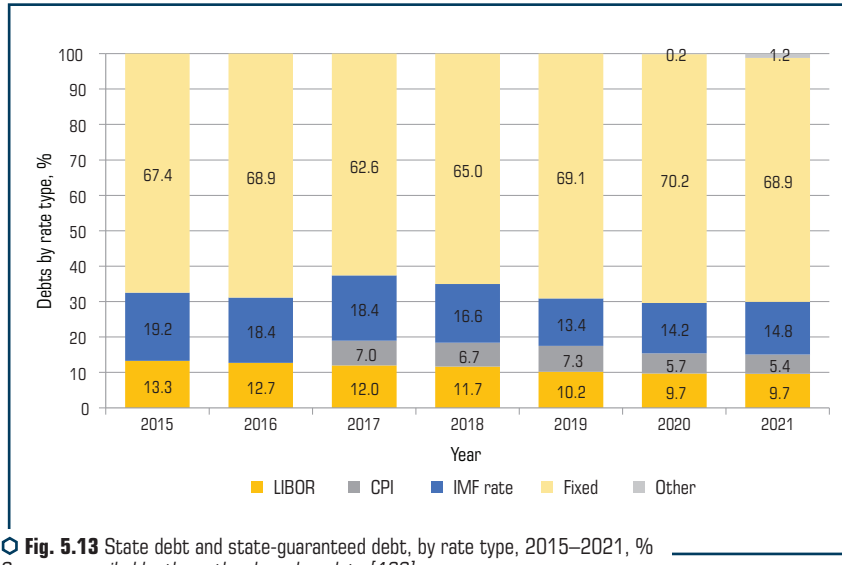

Fig. 5.13 State debt and state-guaranteed debt, by rate type, 2015–2021, %
Source: compiled by the author based on data [189]

Moreover, Ukrainian government conducted a significant restructuring of debts in 2015, which included 20 % write-off (around USD 3 bn) on the condition of increasing the average yearly coupon rate from 7.22 % to 7.75 %. Since the data on the average rate on public and state-guaranteed debt is not available, it is impossible to estimate the impact of this change. The data, which is available, namely, the rates on debts of local self-governing entities, indicates the yearly average rate ranging from 10 % to 15 %.

The debt policy in Ukraine, while being partially directed towards improvement of economic efficiency and financial deepening, has a set of innate restrictions. In particular, for a long time the major part of debt (except for the quasi-emission part of it) was formed by the external debt. In order to stimulate the internal market, the foreign currency-denominated DGBs were introduced in 2010, which allowed for additional low-cost loans within the country. The currency risks, however, ended up burdening the state budget, due to constant devaluation of UAH. The gap between

the rates of the UAH-denominated DGBs and foreign currency-denominated DGBs grew, allowing a de-facto margin for the investors, who chose the UAH-denominated DGBs at the expense of higher national risks. For instance, in the mid–2015, 1-year USD-denominated DGBs were issued with 8.66 % yield, while the 2-year UAH-denominated DGBs were issued with 16.7 % yield (there were no 1-year UAH-denominated DGBs that year), although this situation aggravated by the beginning of 2019. Based on the results of the bond initial and additional placements on January 8, 2019, the half-year foreign currency-denominated DGBs had the yield of 5.4 %, while the UAH-denominated ones – of 17.6 %. Thus, the gap for short and medium-term loans grew significantly. In 2020 the 260-day EUR-denominated DGBs were placed with the yield of 2.22 %, while the 168-day UAH-denominated DGBs brought 14.5 % [189]. This made the foreign currency-denominated DGBs less competitive than the ones, denominated in UAH, and certain issues of the former had the yield even lower than the yield of the currency-denominated deposits for individuals. Relative price stability for UAH-denominated DGBs created a high demand for such securities from non-residents, especially for the short-term ones (with the redemption term of 1 year or less). Since allowing foreign investors to buy such securities would minimize the currency risk for the state budget (by shifting it to the currency market), a number of actions were taken to facilitate such technical capability. In March of 2019, the corresponding accounts were open with the Clearstream system via an account, opened with the NBU depository, which made Ukrainian securities available in the settlement system. Citibank serves as the corresponding bank and the operator of this account in Ukraine. The launch of the historically first link to a foreign depository facilitated foreign investor's access to UAH-denominated state securities [191].

As a result of the activities conducted:

1. As of January 3, 2020, *the share of the non-residents among the DGBs proprietors rose* to 14.2 % (who owned securities for the sum of UAH 117.72 bn) [126], which allowed to optimize the currency structure of Ukrainian debt.

2. *The cost of resource attraction was lowered.* In the beginning of 2019, the 3-month DGBs were issued with the yield of 19.0 %, higher than the NBU discount rate, which at that moment was 18 %. At the auction in early October, the yield was already as low as 15.75 %, lower than the NBU discount rate, which also decreased by that time to 16.5 %. The reduction in obligation yield allows also to note the fact, that there is no financial pyramid forming on the state securities market, as it happened before the crisis of 1998, when each new loan had to be taken at higher cost.

3. *The terms of UAH-denominated loans grew substantially*. Short-term securities with the term less than 1 year constituted more than 92 % of all DGB placements in 2018. There was no demand for longer-term loans, since there was almost no "long money" in Ukraine. Due to the high volume of the short-term loans in that year, the burden of domestic debt payments grew substantially. In fact, the entirety of repayment sums for 2017 was added to that of 2018. However, due to the demand from non-residents, who provided "long money", the Ukrainian government, represented by the Ministry of Finance of Ukraine, managed to pay off the debt without creating a similar situation for 2020. The NBU policy, aimed at gradual strengthening of UAH played an

integral part here, since strong UAH makes short-term UAH-denominated debt less attractive for foreign investors. From January to September of 2019 the share of short-term DGBs decreased to almost 50 %. The rest of the debt was covered by the long-term securities, such as 5-year DGBs of the first issue, which were sold under the market conditions for a total sum of almost US$ 1.4 bn.

During 2010–2021, a significant part of the internal state debt was issued in DGBs and the volume of it grew throughout the entire time period. The DGB-formalized debt grew from UAH 138.4 bn in 2010 to UAH 1062.6 bn in 2021, while the volume of the state indebtedness to the banks and other financial intermediaries (which at this time almost coincides with the indebtedness to the NBU) decreased from UAH 3.3 bn in 2010 to UAH 1.9 bn in 2021. Overall, the obligations under the DGBs constitute from 97.7 % to 99.8 % of the total internal debt of Ukraine. The NBU issues loans exclusively to other banks, thus, the indebtedness to the NBU shows the sum of state banks' refinancing outstanding.

Currently, there are 3-, 6-, 12- and 18-months DGBs, as well as DGBs with maturity date from 2 to 30 years, in circulation. As of December 31, 2021, the biggest share of debt is covered by the DGBs with 15-year repayment period (11.04 % of total volume), the second biggest share of debt is covered by the DGBs with 12-month repayment period (9.04 %), the third biggest – by the DGBs with 3-year repayment period (8.62 %). The short-term (less than 2 years repayment period) DGBs account for 24.66 % of total internal debt, the medium-term ones (from 2 to 5 years repayment period) – for 17.45 %, the long-term ones (more than 5 years repayment period) – 57.89 %.

As of December 31, 2021, the DGB structure by proprietor is as follows: 52 % of total DGBs volume in circulation is hold by banks, another 29 % – by the NBU; i.e., Ukrainian banks hold 81 % of total volume of DGBs issued. The non-residents hold 9 % of the total DGBs, the legal entities – 8 % and the individuals – 2 %. Territorial communities hold less than 0.01 % of the total DGBs. The likely reason for this is the inability or unwillingness of the banks to sell the DGBs on the secondary market, which in turn makes the issuing of the DGBs a disguised emission. The average yearly yield of DGBs on the primary market during 2021 was 11.34 %, while the average banks' return on equity was 35 % [192]. It is worth noting that the 35 % of profitability is a historical maximum, and the same indicator in 2021 was 19 % – which makes keeping the conditionally risk-free DGBs with a yield of 11 % and higher a very lucrative policy for the banks.

Thus, up until 2021 the internal state debt of Ukraine was mostly formed by the domestic government bonds, while 81 % of this debt was retained within the banking system instead of being distributed among the private creditors. High yield of such bonds stimulated the banks to keep them in order to maintain a passive risk-free income. Other constituents of the internal state debt are immaterial.

The internal debt structure by terms potentially creates problems with future solvency, namely with repaying the DGBs debt of UAH 261.59 bn (or 4.79 % of GDP in 2021) in short-term (2 years or less) perspective, UAH 185.09 bn (or 3.39 % of GDP in 2021) – in the medium-term (2 to 5 years) perspective and UAH 614.02 bn (or 11.25 % of GDP in 2021) – in the long-term (from 5

to 30 years) perspective. This assessment only concerns the DGBs already issued, provided that no new DGBs will be issued within the next 30 years. The situation is exacerbated by the fact that the current war guarantees a significant decrease in GDP (minimum 35 %) in 2022 alone, as well as the need to attract significant amounts of loans, which Ukraine is unlikely to be able to pay off at least in the short- and medium-term perspective due to the destruction of critical infrastructure, entire industries, as well as significant loss of workforce. Based on the previous experience, some of the DGBs issued can be refinanced by issuing new ones, but this only postpones the problem. Moreover, the current war is guaranteed to decrease the demand for Ukrainian DGBs.

The loan volume, provided by the Ukrainian banks to the general government exceeds the DGB debt volume, and the growth of the former significantly outpaces the latter, both by tempo and magnitude (**Fig. 5.14**). The loans to the state and local government have higher growth tempo than the loans to the central government. Up until 2016, the volume of bank loans to the general government decreased, however this decrease was overshadowed by its rapid growth after 2016.

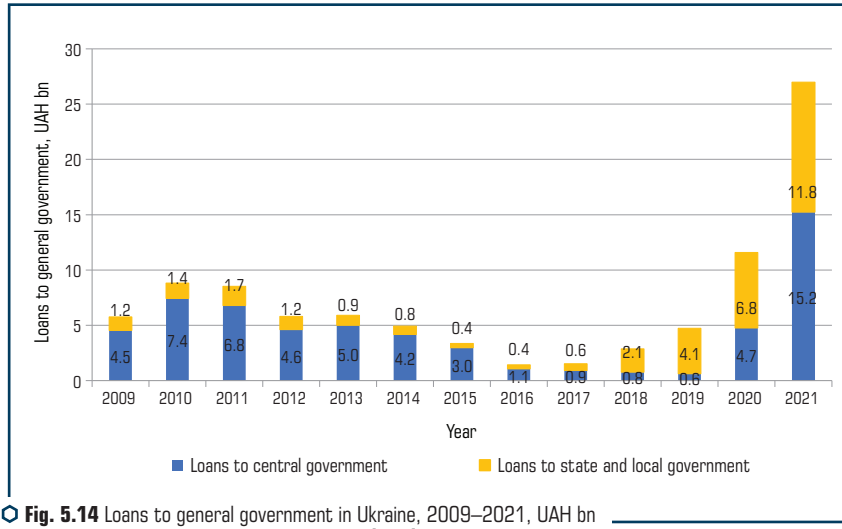

Fig. 5.14 Loans to general government in Ukraine, 2009–2021, UAH bn
Source: compiled by the author based on data [126]

The same reservations apply to the internal debt, formed due to the loans, issued by commercial banks to the general government. Namely, they also create potential problems with at least short- and medium-term solvency, and the need for refinancing.

The structure of the external public debt of Ukraine is similar to its internal public debt structure in its reliance on government bonds – the outstanding Eurobonds. However, unlike the internal public debt, Ukraine's external public debt has another significant constituent – the loans from the IFOs (**Fig. 5.15**). The external debt volumes grew from UAH 128.8 bn in 2010 to UAH 1300.1 bn

in 2021. The main constituents of the external debt were the debts to the IFOs, the share of which in the total debt decreased from 45.7 % in 2010 to 35.6 % in 2021 and the Eurobonds, the share of which grew from 31.1 % in 2010 to 48.1 % in 2021. The structure of debt to the IFOs for 2021 was as follows: debts to the IBRD–36.3 %, to the IMF – 25.7 %, to the EU – 29.4 %, to the EIB – 6 %, to the EBRD – 2.3 %. The structure of loans, received from the governing bodies of foreign countries as of 2021 was as follows: 40.56 % of total debt volume was owed to Russia, 33.39 % – to Japan, 19.19 % – to Germany, 2.8 % – to Poland, 1.37 % – to Great Britain.

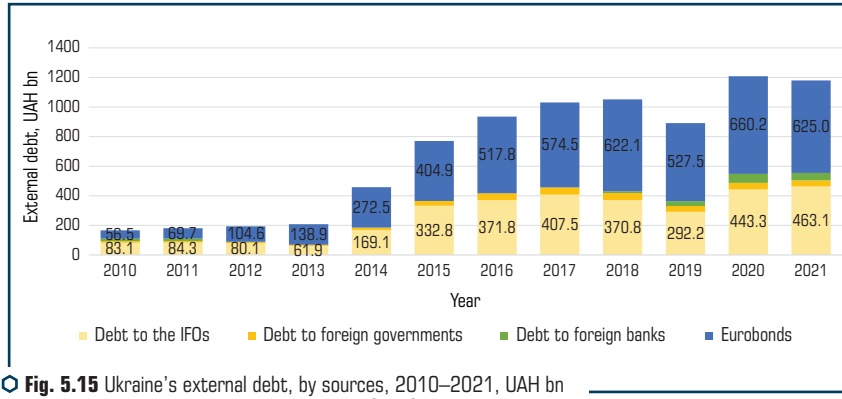

Fig. 5.15 Ukraine's external debt, by sources, 2010–2021, UAH bn
Source: compiled by the author based on data [189]

The dynamics of external debt structure in Ukraine indicates that, *from 2014, the financing of the measures purposed to counter the crisis, which began due to russian aggression, was done mainly using the loans provided by the IFOs*. The interruptions of these loans, caused by the non-fulfilment of the tactical reform requirements, set by the Western partners, were compensated by the internal borrowing. It is worth noting that among the debts owed to the foreign countries' governments Russia still takes the first place by volume with UAH 16.5 bn worth of debt, even after 8 years of war. The decrease in the Eurobonds share in Ukraine's external debt is caused not by the decrease in borrowing using this instrument, but by the significant total increase in the loans taken. The analysis of the external debt alone does not allow to draw conclusions on the directions of spending such attracted funds.

Based on the peculiarities of Ukrainian industry development programs, the state guarantees are the typical approach instead of providing loans per se. Thus, due to the absence of representative statistics for implementation of such state programs (since they do not usually even have tangible final or intermediate objectives), the only way to gauge the level of the state support for the industry is the indirect assessment using the data on the state-guaranteed debt (**Fig. 5.16**).

The dynamics of state-guaranteed internal debt shows growth during 2010–2014 and 2019–2021, while the latter growth period is characterized by extremely high growth tempo.

Up until 2021, the most of the state-guaranteed internal debt was allocated towards the guarantees on securities issued, specifically the obligations of the State Mortgage Institution (7.09 % of total state-guaranteed debt volume) and Ukravtodor (27.43 % of total state-guaranteed debt volume), i.e., on the state incentives for development of the housing stock and automotive roads construction. *In 2021, the majority of internal state-guaranteed debt was allocated to guaranteeing the loans, issued by 13 banks, even though 97.41 % of the total guarantees volume was received by 6 banks*: Oshchadbank (41.97 %), Ukreksimbank (35.24 %), Ukrgazbank (15.06 %), Privatbank (2.38 %), Taskombank (1.64 %) and Credit Dnipro Bank (1.1 %). The remaining 7 banks received 2.59 % of the total guarantees volume, i.e., less than 1 % per bank.

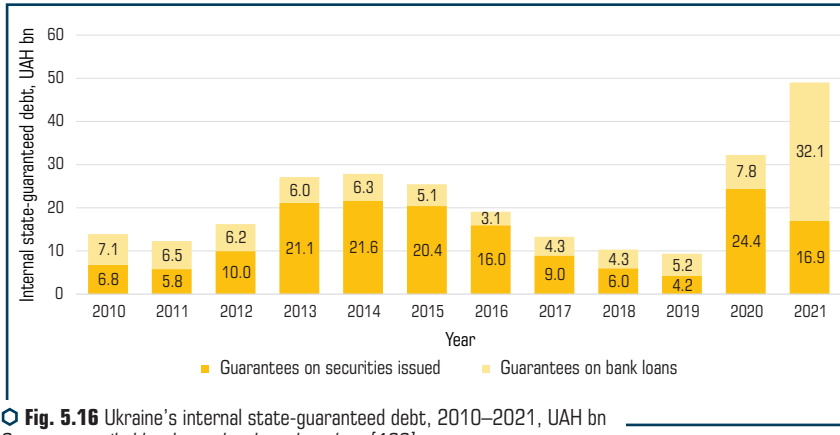

Fig. 5.16 Ukraine's internal state-guaranteed debt, 2010–2021, UAH bn
Source: compiled by the author based on data [189]

State-guaranteed lending by Ukrainian banks. Oshchadbank provides preferential lending to small and medium firms, in particular, with less strict demands for collateral [193]. Ukreksimbank also participates in the "State guarantees on portfolio basis" program for the firms that do not have enough of collateral, and serves as an agent, i.e., gathers and monitors the documents of the other banks, which want to participate in the program as lenders, prepares the projects for the state guarantee agreements, and conducts general monitoring and reporting for this program [194]. These functions are beyond the banks' activity profile and do not explain the second-most share of the resource acquired. Ukrgazbank participates in the aforementioned state guarantees program as a lender, i.e., issues loans to small and big business against the state guarantees. The list of the banks, which participate in this program, changes every year.

Thus, the review of internal state-guaranteed debt indicates, that the housing stock and automotive roads development projects are guaranteed by the state, as well as lending by Ukrainian banks to small and medium firms. Ukrgazbank participates in this program as an agent (and in 2021 it was participating as a lender), the rest of the banks on the list are the lenders. The bank

membership registry is updated every year. The dynamics of internal state-guaranteed debt indicates SME development programs intensification, starting from 2020.

The largest share of the external state-guaranteed debt of Ukraine is attributed to the guarantees on the loans, received from the IFOs – 62.8 % of the total guarantee volume on average during 2010–2021 (**Fig. 5.17**). Moreover, this indicator grew within this time frame both in absolute and in relative terms. As of December 31, 2021, out of US$ 6.8 bn of the total sum of external state-guaranteed debt, the guarantees on IMF-provided loans account for 82 % of the total guarantees on the loans received from the IFOs, on the IBRD-provided loans – for 6.86 %, on the EBRD-provided loans – for 4.98 %, on the EAEC-provided loans – for 4.99 %, and on the EIB – for the remaining 1.17 %. Since the IMF does not issue loans directly to business entities, it is safe to assume that the article of the external state-guaranteed debt, which reads "debt for loans received from the IMF" accounts for the guarantees, issued by the corresponding institutions in Ukraine in the interests of business entities which received state aid out of the IMF-provided funds.

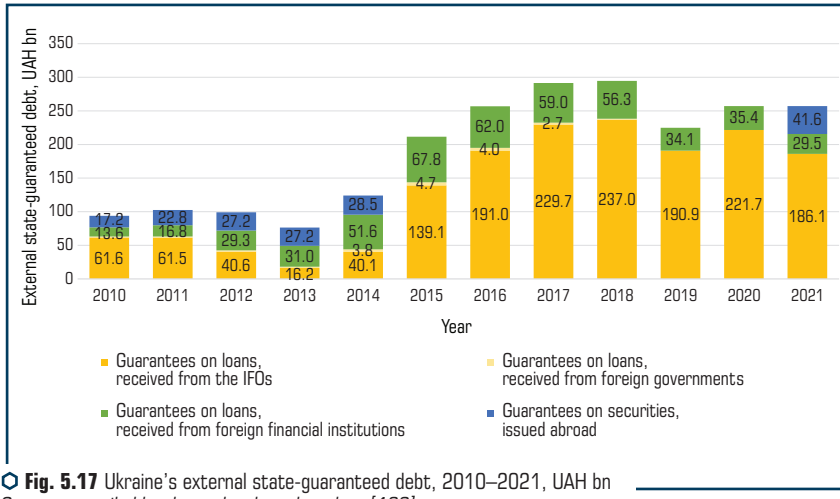

Fig. 5.17 Ukraine's external state-guaranteed debt, 2010–2021, UAH bn
Source: compiled by the author based on data [189]

To conclude:

1. The major portion (around 97 %) of the internal debt in Ukraine is issued as the DGBs, all while 81 % of these bonds never leave the banking system, remaining in the NBU's or commercial banks' possession. High yield of the DGBs makes them attractive for the banks, especially with the risks of issuing loans going up and the majority of potential borrowers not being creditworthy.

2. The public debt (specifically, the debt of the general government) to Ukrainian banks exceeds public debt for the DGBs (the major part of which is also to the same Ukrainian banks). This

indicates that Ukrainian banking system issues loans mainly to the general government, either directly or indirectly, but not to the other business entities.

3. The internal state-guaranteed debt in Ukraine mostly reflects the attempts to stimulate economic development due to state guarantees' popularity as the main instrument for the state support programs. In particular, the internal state-guaranteed debt structure indicates, that the economic development facilitation program, which received the most financing, is the SMEs preferential financing project. The state guarantees in this program are used in order to alleviate the requirements for collateral for the borrower by proving the guarantees for the lender to cover the missing value of the collateral. However, the total amount of the guarantees for this program is less than the amount of the state guarantees on the bonds, issued by the SMI and Ukravtodor, which are allocated to the housing stock and road infrastructure development, which arguably contribute less to the economic development.

4. The dynamics of the external public and state-guaranteed debt indicates that Ukraine tended to finance the measures to counter the crisis, created by the russian aggression with the loans, attracted from the IFOs, the volume and share of which in the total debt grew throughout the entirety of the observed period. The lack of resources was compensated with the internal borrowings, however, the significant loss in material and human resources puts Ukraine into an insurmountable dependence on the goodwill of its external creditors. This predicament is exacerbated by the existence of debts to the aggressor country.

5. The biggest external lenders to Ukraine are the IMF and the IBRD, which provide loans for the stabilizing measures and economic reforms. Nevertheless, the dynamics of the external debt indicates that Ukraine attempts to reorient towards the Eurobonds as its main financing instrument in order to bypass the reform requirements, which go hand in hand with the IFOs loans. Post-war recovery theoretically creates a window of opportunity for quick economic reforms, and thus it would be prudent to use it, as well as the growing international support for Ukraine, for these aims.

CONCLUSION TO SECTION 5

1. The GFC stimulated a significant increase in the share of state-owned banks in the banking sector in Ukraine. Accordingly, state banks have become an additional channel of influence on the formation of the financial depth of the economy. At the same time, unlike state banks, commercial banks are significantly more active in lending to legal entities (mainly retail and wholesale and low-level lending to the high-tech industry).

2. In Ukraine, the potential of state investment projects is limited: there are usually no more than 100–150 active large investment projects financed mainly from the state budget. A narrow sectoral distribution (concentration on transport and the energy sector) eliminates the potential multiplier effect of investments in industry, particularly the military.

3. Cooperation with the IMF and the World Bank was actively revived during the post-crisis recovery of the economy: in 1999, 2008, and 2015. In their joint credit projects, the International Finance Corporation and the EBRD focus on lending to "simple" areas of the economy: transport, logistics and agriculture.

4. The debt growth rate exceeds its repayment rates. On average, the forecasted rates of debt repayment decrease by 28 % every year, while the debt itself grows by 8.7 % every year. If median indicators are used instead, the trend reverses: the forecasted rates of debt repayment increase by 10.4 % yearly, while the debt itself decreases by 7.2 % yearly. Nevertheless, the significant difference between these two indicators does not allow to claim that the public debt is being repaid in a sustainable manner, while the potential decrease in GDP indicates that the situation is unlikely to improve in the foreseeable future.

5. Growth of the state and state-guaranteed debt in Ukraine is caused predominantly due to the external borrowing; the majority of these loans are long-term. Accumulating long-term loans, predominantly denominated in foreign currencies, creates major currency risks for Ukraine. The situation is worsened by the fact that the majority of debt is based on the fixed rate, and, given the negative Ukrainian macroeconomic trends, this will put both long-term currency and inflation risks on Ukraine.

6. In 2015 Ukraine already undertook a partial debt write-off, and thus the creditors will be less inclined to review the terms and conditions of existing Ukrainian debts due to the current force majeure circumstances. The conditions of the previous debt write-offs included certain mechanisms for a temporary decrease in debt servicing payments if certain macroeconomic conditions were to be met. However, the current situation with growth in currency-denominated spendings along with decrease in currency-denominated profits is likely to plunge the country into a debt crisis due to national currency devaluation, regardless of the previous debt write-offs.

5. The development of the market infrastructure has made it possible since 2019 to simplify the access of non-residents to the DGBs market significantly, which has given an additional impetus to the attraction of resources and significantly reduced the cost of attraction. At the same time, state banks are actively buying DGBs, diverting potential credit resources from lending to the economy.

6. Under the decentralization reform, local budgets received significantly more opportunities to attract financial funds. Due to this, during 2015–2021, borrowing increased four times to UAH 22 bn. At the same time, less than 5 % of territorial communities form loans, which indicates the significant potential of this tool.

6 INDUSTRIAL FIRMS' LOANS IN UKRAINE

ABSTRACT

The examination of financial stability and profitability of firms of the real sector of Ukraine's economy over the period 2006–2020 shows their low capitalization, limited organizational capacity, liquidity and sales issues. Based on the analysis of the dynamics and structure of loans to non-financial corporations during 2006–2020, it is concluded that the largest source of financing remains conditionally free accounts payable. The role of loans is secondary, and most of these loans are short-term, denominated in hryvnia. Firms, that use loans, denominated in foreign currencies, have either foreign currency income or long-term debt servicing problems. On average, only mining, pharmaceutical and energy companies can operate under current credit market conditions. The assessment of the acceptability of firms' lending conditions during 2006–2020, has revealed that a significant share of large Ukrainian firms (about 25 % of total assets and total revenue in the relevant industries) do not create a solvent demand for credit resources, and therefore are not subject to the influence of financial depth. The results of regression analysis of the relationship between the bank loans to non-financial corporations, the stock market, and economic growth in Ukraine during 2006–2020, suggest that a) the average firms already in 2020 was unable to attract credit on market terms in because of its high risk and low yield; b) partial compensation of the price of loans and preferential conditions regarding collateral did not lead to the stimulation of the economy.

KEYWORDS

Firms, financial stability, return on equity, return on assets, expected cost of equity, cost of credit, bank loans to non-financial corporations, NPL, correlation.

6.1 FINANCIAL PERFORMANCE OF INDUSTRIAL FIRMS IN UKRAINE

Financial stability of industrial firms

Analysing financial conditions, based on aggregated data, is somewhat challenging, since many constituents of standard analysis are strictly designed for analysis of individual firms, and thus a lot of standard ratios lose their applicability, namely those, which show competitiveness, efficacy of usage of property, and position of the firms in question on the stock market. Moreover, those methods of evaluation of financial conditions, that retain their usability, still lose some of their indicativeness, when extrapolated to meso- or macro level.

In order to substantiate discrepancy between the cost of credit and the existing able demand for loans in Ukraine, it is advisable to estimate financial stability and profitability of an average Ukrainian firm, by industry.

The methodical approach is based on analysis of absolute indicators of firms and on correspondence of firms' inventory and current and non-current assets to their respective sources of formation.

The end stage of the latter analysis would be the juxtaposition of indicators of availability of own current assets (6.1):

$$OCA = BE - NCA, \tag{6.1}$$

where BE – balance equity, NCA – non-current assets, availability of own funds and long-term debt (6.2):

$$OFLD = OCA + LD - NCA, \tag{6.2}$$

where LD – long-term debt and total volume of main sources of financing of inventory and expenses (6.3):

$$WK = OCA + LD + SD - NCA, \tag{6.3}$$

where SD – short-term debt and the share of working capital, immobilized into inventory (I).

Thus, the financial stability is derived from a system of inequalities:

$$\Delta OCA = OCA - I, \tag{6.4}$$

$$\Delta OFLD = OFLD - I, \tag{6.5}$$

$$\Delta WK = WK - I. \tag{6.6}$$

If all three of the indicators are more than 0, the financial stability is to be considered absolute. If $\Delta OCA < 0$, and the rest of the indicators are more than 0, the financial stability is to be considered normal. If $\Delta OCA < 0$ and $\Delta OFLD < 0$, while $\Delta WK > 0$ – financial stability is to be considered unstable. If all of the indicators are below zero, the financial stability is to be considered critical.

Due to a significant number of outliers, the data by industry for 2006–2020 was aggregated both as average and as median. Out of 195 observations there are none, which would adhere to absolute or normal financial stability conditions. Instead, on average, there were 146 observations (137 observations, if median is used instead), which adhere to critical financial stability conditions, 35 (38) more adhere to unstable financial stability conditions, and the rest –

13 (20) do not adhere to any conditions, predicted by the methodology. An example of the latter case would be an observation, which has ΔOCA and ΔWK over 0, yet ΔOFLD – below it. Such observations are marked as "abnormal" and they are the result of violation of ratios, on which the methodology is based, namely the basic equation of finance: non-current assets + current assets=balance equity + short-term debt + long-term debt. This equation is breached due to, for instance, negative book equity and/or lack of long-term and short-term debt. The current and non-current assets tend not to have obvious abnormalities. **Table 6.1** demonstrates the dynamics of improvement or deterioration of financial stability by industry. In order to make it more readable, critical financial stability was marked as "C", unstable – as "U", and abnormal – as "A".

● **Table 6.1** Aggregated financial stability of Ukrainian firms by industry, 2006–2020

Year	ISIC												
	A01	B	C10	C17	C19	C20	C21	C23	C24	C26–30	D35	H	G
2006	C	A	C	C	C	C	C	A	C	C	C	C	U
2007	C	A	C	C	C	C	C	C	C	C	C	C	U
2008	U	C	C	C	C	C	C	C	C	C	C	C	U
2009	C	C	C	C	C	A	C	C	C	C	C	C	U
2010	U	A	C	C	C	C	C	C	C	C	C	C	U
2011	U	A	C	C	C	C	C	C	C	C	C	C	U
2012	U	A	C	C	C	C	C	U	C	C	C	C	U
2013	A	C	C	C	C	C	C	U	C	C	C	C	U
2014	A	C	C	C	C	C	A	U	C	C	C	C	U
2015	A	A	C	C	C	C	A	U	C	C	C	C	U
2016	A	C	C	C	C	C	C	C	U	C	C	U	U
2017	A	C	C	C	U	C	C	C	U	C	C	U	A
2018	U	C	C	C	U	C	C	C	U	C	A	C	U
2019	U	A	C	C	U	C	C	C	U	C	A	U	U
2020	U	A	C	C	U	C	C	C	U	C	C	U	U

Note: The representative sample consists of 286 mostly large industrial firms of Ukraine, as well as firms of the agricultural, trade, and construction industries and firms engaged in electricity and gas supply for 2006–2020. The share of total assets and revenues in the general industry, which fell on sample firms, was at least 20 % over different years.
Source: developed by the author based on data [195]

The majority of industries the norm is critical financial stability, which began to "improve" to unstable beginning from 2016–2017 (**Table 6.1**). The most stable industries were: agriculture with only 2 years of average critical financial stability, trade industry with no such years at all,

metallurgy with 5 years of "unstable" financial stability, as well as coke-chemical industry and other non-metallic production with 4 such years each.

Thus, the majority of industries were financially unstable, with their inventory exceeding their working capital and their debt, corrected for non-current assets. Inventory includes firms' assets, which during the year (or operational cycle) were planned to be sold or used in production. An important notice here would be that if, for instance, goods, were planned to be sold, but ended up not being sold, they can remain a part of the inventory for indefinite time. This can lead to accumulating significant quantities of de-facto illiquid assets, which, however, allow for (and require) corresponding increase in liabilities. Thus, a share of firm's resources, immobilized into inventory, creates a lot of potential liquidity problems, as well as indicates problems with sales. Nevertheless, the normal volume of inventory differs from industry to industry (for instance, mechanical engineering tends to have more inventory than trade industry), and aggregated data tends to overlook the impact of "healthy" firms (especially if they are not numerous), however, the aggregated financial stability across the sample indicates, that the most stable industries were the main export-oriented ones (i.e. those, which have currency income) and the trade industry (which naturally tends to have little inventory).

Profitability of industrial firms

Due to extreme volatility of profitability, the *return on equity* ratio among the big industrial firms in Ukraine has a significant number of outliers (**Table 6.2**). It is worth mentioning that the data for industry-wide indicators for each year was aggregated based on median, and not average values, because of it. However, there are still observations up to –196 % in the table, which in turn skews average profitability. For instance, on average, during 2006–2020, 54.5 % of industries show positive returns on equity (the highest value observed for mining – 18.3 %), and the rest show negative returns on equity (the lowest value observed for glass industry – –17.8 %). If the median values are used instead, 63 % of industries show positive aggregated profitability during 2006–2020 (the highest value was still observed for mining – 17.6 %, while the lowest value was observed for metallurgy – –10.9 %). The dynamics of average return on equity ratio by year indicate downward trends in 2006–2010, 2011–2014, 2015–2016 and 2018–2020, while during certain years the average combined return on equity across all industries dropped to less than –12 %. If median values are used instead, a clear downward trend only exists in 2007–2009 and 2011–2014. A significant number of negative aggregated observations is caused by the abundance negative equity and accumulated net loss instances.

The analysis of *return on assets* of big industrial firms (**Table 6.3**) allows for additional conclusions. Comparing to return on assets, the average number of negative observations goes down from 53 to 46 due to the firms with negative balance equity, yet positive revenue (which usually belong to coke-chemical and chemical industries). The average aggregated return on equity across all industries during 2006–2020 is 69.7 % higher, than the average aggregated return on their assets, due to higher volatility, even though the yearly ratio oscillates from –17.6 %

to 176.8 %. The biggest difference between these ratios (over 100 %) was observed in 2010, 2012, 2013 and 2015. The median aggregated return on equity across all industries during 2006–2020 is 55 % higher, than the aggregated median return on their assets. Median and average returns on equity and assets per industry differ substantially: for instance, average return on equity during 2006–2020 for paper industry was –16.4 %, while average return on assets – 0.5 %; this happened due to an outlier in 2010, when one of the two firms in the subselection ("ZHTSPK" PJSC) had simultaneously high levels of negative book equity and uncovered losses, which, in turn, caused return on equity to plummet to –368 %.

● **Table 6.2** Return on equity of big industrial firms in Ukraine, 2006–2020, %

Year	ISIC										
	A01	B	C10	C17	C19	C20	C21	C23	C24	C26–30	D35
2006	1.4	3.0	14.0	15.9	5.2	2.3	8.2	16.5	18.4	1.7	3.5
2007	0.0	15.9	6.8	10.8	–6.2	6.3	13.0	–0.5	18.5	5.8	3.6
2008	8.7	33.6	1.0	–32.3	–7.8	15.8	13.0	2.9	–6.2	0.8	3.7
2009	2.2	0.0	2.4	–53.4	–8.7	–5.6	11.4	–0.4	–21.0	0.4	11.9
2010	11.7	24.6	11.2	–165.2	–0.1	–19.4	8.0	–8.4	–8.7	2.1	10.0
2011	13.4	26.5	10.1	3.0	–5.7	–14.4	7.4	1.2	–5.7	6.8	13.9
2012	11.2	17.5	12.0	–25.7	–19.2	–5.5	13.0	–16.3	–23.3	3.4	10.1
2013	19.5	17.6	10.3	–5.0	–3.6	–62.0	12.6	–0.6	–25.7	4.4	10.6
2014	0.2	17.9	0.6	–19.5	–14.4	–38.8	19.4	–13.1	–86.5	–3.6	3.0
2015	9.2	3.1	0.7	8.4	–5.8	–1.6	15.2	–40.4	–29.4	–2.6	4.4
2016	7.5	8.7	–0.7	–2.8	–0.4	–5.6	14.2	–196.4	–26.3	1.4	6.4
2017	1.7	34.8	1.6	13.2	–0.8	–2.4	7.4	–12.7	–9.6	3.4	4.5
2018	4.8	37.8	0.8	16.0	0.0	–0.4	8.7	13.7	3.6	2.7	5.2
2019	10.6	14.6	1.0	7.2	–9.2	0.0	14.9	5.2	–12.3	0.0	2.9
2020	1.3	–	–	–	–	–	–	–	–	–	2.9

Source: developed by the author based on data [195]

The dynamics of average return on assets per industry is similar to the dynamics of average return on equity per industry: they both peak in 2007 and in 2012, and show growing trend from 2018. The difference lies in the absence of positive dynamics in return on assets during 2009–2011. In other words, using return on assets results in more smooth graphs due to lesser volatility of the ratio, and less observations with below zero values, which makes the return

on assets a better choice as a profitability indicator to be used for calculation of financial ratios in Ukrainian practice.

Table 6.3 Return on assets of big industrial firms in Ukraine, 2006–2020, %

Year	ISIC										
	A01	B	C10	C17	C19	C20	C21	C23	C24	C26–30	D35
2006	2.21	4.76	5.30	11.32	2.72	1.59	4.15	8.90	10.53	1.03	1.60
2007	0.00	13.18	2.80	7.78	–2.52	4.03	7.34	21.05	9.91	3.74	2.07
2008	4.23	20.93	0.39	–13.71	–6.90	8.26	7.32	1.96	–2.52	0.85	2.51
2009	0.78	0.00	1.13	–0.21	–4.13	–3.19	5.69	0.35	–6.31	0.17	4.38
2010	4.21	15.05	2.99	–0.11	0.07	–6.28	3.57	–6.77	–4.77	0.90	2.90
2011	7.55	15.18	2.85	8.03	–2.68	–0.27	3.71	–0.08	–2.60	4.34	2.05
2012	5.96	6.62	4.60	–3.29	–5.80	0.02	5.64	–6.62	–6.43	1.83	5.41
2013	8.34	14.37	3.80	–3.18	–1.59	–12.79	6.19	–1.67	–4.75	1.78	6.31
2014	2.46	13.35	0.20	–9.77	–2.66	–9.81	7.70	0.38	–8.15	–1.63	1.32
2015	6.69	1.03	0.20	0.73	–0.91	–0.58	5.68	–5.59	–5.39	0.01	2.41
2016	3.18	5.20	–0.05	–12.24	–0.09	–16.45	6.77	–9.75	–5.63	0.86	2.98
2017	0.44	27.77	1.14	13.58	–0.41	4.45	4.14	–6.76	–0.89	3.15	1.72
2018	2.24	19.97	1.27	7.99	0.00	2.04	4.43	4.01	2.68	2.92	1.86
2019	5.94	15.13	1.51	–0.27	–0.35	5.72	7.63	0.50	–2.32	2.51	0.66
2020	0.61	–	–	–	–	–	–	–	–	–	0.59

Source: developed by the author based on data [195]

Thus, the returns on both assets and equity are relatively low for big industrial firms in Ukraine, and reach negative values for 32.12 % of observations of return on equity and 27.88 % of observations of return on assets due to negative book equity and/or uncovered losses. On average, the return on equity oscillates between –17.8 % and 18.3 %, while return on assets oscillates from –1.9 % to 12.3 %.

6.2 BANK LOANS TO INDUSTRIAL FIRMS IN UKRAINE

Loans to non-financial corporations

The capital structure of Ukrainian firms is advisable to estimate based on aggregation of hand-picked primary financial statements due to a number of peculiarities, that tend to skew

estimations, based on macroeconomic data. For instance, when a representative sample is selected, it is necessary to pick firms, whose aggregated indicators cover at least 25 % of the corresponding total industry indicators. This brings up a question: *whether one should form a selection out of dozens of thousands small firms, a couple of hundreds of medium firms or a couple dozens of big firms* (for instance, "Motor Sich" PJSC alone in 2017 accounted for 10 % of total assets and 20 % of total revenue of mechanical engineering industry) *or to pick some sort of mix of the mentioned options?* Since the resources for each research are limited, forming a sample based on small firms tends to be impossible, and yet the inclusion of medium and big firms tends to skew the end results in their favour.

In particular, the sample used, which consists of 286 of mostly big Ukrainian industrial firms, shows a heightened fraction of firms with negative balance equity and zombie firms. A previous research, based on a 212 firms-strong sub-sample of it, indicates, that 34.9 % of industrial firms in Ukraine in 2006–2019 had negative balance equity (for comparison, – the corresponding share in the US was less than 4 % in 1980s, while in EU in the beginning of 2010s – less than 6 %), while at the same time up to 42 % of big industrial firms in Ukraine couldn't afford to repay their debts for 3 years in a row or longer, which makes them eligible to be called "zombie firms" by the World Bank methodology (for comparison – the corresponding share in the EU in 2016 was only 12 %) [196].

So many firms with negative balance equity leads to average industrial balance equity dropping below zero during some of the time periods under observation. Hence the bad financial reports of a few big industrial firms manage to eclipse an unknown number of "healthy" small and medium firms, thus making them effectively invisible. In order to minimize this effect, any firm with below zero balance equity was counted as if it had 100 % of debt and 0 % of equity (**Table 6.4**).

In the majority of industries, *firms increased their share of debt*. The exception would be the power industry, which had its debt to total assets ratio reduced from 63 % in 2006 to 42.8 % in 2020 and trade industry, which had the ratio reduced from 78.8 % to 73.5 % within the same time scale.

The reverse trend is much more common – increase in fraction of debt is observed for the rest of the industries of the sample, while increasing more than twice as much for chemical and paper industries. Industry average for balance equity for the latter was zero for 2015–2019; the likely reason being relatively small size of the subsample. Thus, the increase of fraction of debt is mainly the result of decrease in balance equity. As is shown by the calculation without replacing negative equity with zeroes, industry averages for balance equity take negative values for paper industry in 2013–2020, for coke-chemical industry in 2019–2020, for chemical industry in 2015–2020, for other non-metallic production in 2006 and 2019, for metallurgy in 2016–2020 and for mechanical engineering in 2019. Such dynamics is also indicative of reduction of creditworthiness of the firms under observation, which leads to their inability to take loans under market conditions.

● **Table 6.4** Debt to total assets in Ukraine, by industry, 2006–2020, %

Industry	Number of firms	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Agriculture	27	44.2	52.9	58.9	64.6	62.7	53.6	47.8	53.1	55.5	62.8	59.2	56.4	54.6	57.1	59.2
Mining	17	35.9	37.9	40.4	41.7	45.3	46.1	45.9	42.3	39.3	44.7	48.8	51.4	53.8	52.4	39.0
Food	52	50.5	52.5	57.2	59.3	56.7	59.8	57.7	54.4	52.4	60.0	61.9	64.2	62.7	62.0	53.2
Paper	2	34.6	38.3	47.1	72.2	73.7	73.2	78.4	77.7	78.3	100.0	100.0	100.0	100.0	100.0	76.6
Coke-chemical	12	51.0	54.3	53.2	51.9	53.8	52.6	57.0	64.6	65.9	72.9	73.8	75.6	75.1	78.3	77.7
Chemical	12	37.2	42.3	43.0	47.8	62.0	70.7	74.4	74.9	79.9	78.5	77.3	78.3	76.6	78.5	74.1
Pharmaceutical	4	43.6	38.5	39.7	44.6	46.1	52.1	53.0	50.8	45.6	41.1	43.2	41.9	41.7	45.8	49.4
Other non-metal mineral production	4	61.2	68.5	60.6	56.8	36.3	64.9	65.3	68.6	64.4	70.6	79.8	82.4	83.0	83.7	69.9
Metallurgy	16	46.1	50.2	52.5	62.3	60.9	68.1	71.2	74.7	75.9	80.9	81.6	83.3	80.5	79.3	79.4
Mechanical Engineering	57	46.1	47.9	51.0	59.7	58.5	59.9	56.6	58.4	57.9	63.8	67.1	70.9	74.6	78.3	72.5
Power	20	63.0	59.3	55.7	58.2	57.8	56.6	50.4	44.8	45.7	49.0	48.7	48.2	46.0	47.9	42.8
Construction	31	66.8	72.2	69.3	74.8	71.8	76.6	77.2	76.9	76.6	79.0	81.0	75.5	74.8	75.1	73.7
Trade	32	78.8	81.6	78.6	78.5	83.1	80.2	80.2	80.1	75.5	74.7	76.3	73.6	78.4	73.5	73.5

Source: developed by the author based on data [195]

Debt is a broader concept than loans, and includes different kinds of accounts payable, as well as outstanding and refinanced liabilities from the previous time period. The share of loans in total assets is, in general, rather insignificant. The average ratio of short- and long-term loans to total assets oscillated during 2006–2020 from 5.9 % to 21.3 % and from 3 % to 8.7 % respectively, while the share of total loans to total assets in average never reached above 27.5 %. If median values were to be used instead of the average ones, which is advisable to do in order to minimize the impact of the outliers on the end results, the corresponding indices are changed as follows: median short-term loans to total assets ratio oscillates from 5.6 % to 10.4 %, median long-term loans to total assets ratio lies within 3 % to 9 %, while median share of total loans to total assets ratio does not rise above 20.1 %. The rest of the debt is divided between different kinds of accounts payable. Prior researches allow to conclude that relatively high fraction of accounts payable are balanced out by primarily accounts receivable, often – overdue ones. In other words, *Ukrainian firms are more dependent on commercial (inter-firm) credit than on bank loans*, that also indicates insufficient creditworthiness of significant part of mentioned firms.

Average short-term loans to total assets ratio of 188 %, seen in 2008 for mining industry, is a result of an outlier is a result of an outlier. Ukrnaftoburinnya PrJSC, which had negative balance equity in 2008 due to compounded net loss, managed to secure a short-term loan 28 times bigger than its total assets. This example is unique in its scope, but not in principle: consistently loss-making firms, which have negative book equity, continue to function normally or even manage to secure bank loans, are somewhat common within the sample. Since at the time the firm in question was clearly not creditworthy, it could only receive a loan from a related party, based on insider information. Such occurrences we see as arguments for *existence of quasi-risk financing model existing among such firms*. According to this model, the firms, which belong to the same proprietor, are divided into centres of revenues, which are situated in the offshores, and the centres of losses, which remain in Ukraine. Such loss centres are sustained in minimally functional conditions, and are refinanced via loans from related parties; such loans are in all but name the profits earned in Ukraine, relayed to the offshores, only to return as loans when the need arises. This financing model performs a dual role:

1) if the firm, which uses it, is formally state-owned, it allows to transfer some of the expenses of the business group to state budget, simultaneously reducing the cost of the firm, situated in Ukraine, in case it is needed for discounted privatization;

2) if the firm is formally independent, it allows to minimize the taxation (due to overstating loses using overpriced loans from related parties), and makes hostile acquisition of mentioned firms unfeasible, since once the link with related party is severed, the remaining firm becomes simply an over-leveraged firm with an overpriced debt.

One can conclude about the *non-market nature of loan process in Ukraine*. In addition, *the average loans to total assets ratio is likely to be overstated due to extremely large individual loans, taken by a small number of firms*. The latter is especially for short-term loans.

All in all, *Ukrainian firms prefer short-term loans over long-term ones*: while the average short-term loans to total assets ratio grew throughout 2006–2020, the long-term loans to total

assets ratio peaked in 2016, and began to plummet; by 2020 it was 2.5 times smaller than it was in 2006. Certain industries, such as pharmaceutical, metallurgy and mechanical engineering, increased their short-term loans to total assets ratio throughout 2006–2020; the majority of industries, however, had this index peak in 2015, and then gradually diminish. The dynamics of the long-term loans to total assets ratio was mostly negative for the majority of industries during 2006–2020, with positive trends usually ending in 2016–2017.

The industries, that have *the highest loans to total assets ratio, are trade industry* (38 %), agriculture (11 %), power industry (8.6 %) and food industry (7.6 %) (**Table 6.5**). The absolute majority of loans used are short-term and mid-term ones; the exceptions are construction, metallurgy and power industry, where about half of the loans are long-term ones; it is worth mentioning, that these industries rely on foreign currency loans, while the rest of the industries mostly use loans denominated in UAH. On average, the majority of loans issued are short-term loans (55.9 % and 45.5 % of total loans in UAH and foreign currency respectively); the second-biggest category of issued loans are the mid-term loans (38.9 % of UAH loans and 36.4 % of foreign currency loans), the rest of the loans are long-term ones (5.1 % of UAH-denominated loans and 18.2 % of foreign currency-denominated loans).

● **Table 6.5** Loans to non-financial corporations in Ukraine, by currency and term, as of January 2022, %

Industry	Loans per industry to total loans issued						
	Total	short-term (<1 year)		mid-term (from 1 to 5 years)		long-term (>5 years)	
		in UAH	in foreign currency	in UAH	in foreign currency	in UAH	in foreign currency
Agriculture	11.0	43.0	50.8	53.2	40.1	3.8	9.1
Mining	1.3	61.4	18.2	32.4	69.3	6.2	12.5
Food	7.6	67.9	44.2	28.4	53.1	3.6	2.7
Paper	0.5	40.2	54.2	59.1	35.5	0.7	10.3
Coke-chemical	0.0	51.8	100.0	48.2	0.0	0.0	0.0
Chemical	0.7	45.2	56.6	53.5	42.7	1.3	0.6
Pharmaceutical	0.1	76.0	54.7	23.4	31.9	0.6	13.4
Other non-metal mineral production	0.7	38.4	25.2	55.8	60.8	5.9	14.0
Metallurgy	1.2	48.1	13.3	51.4	38.3	0.6	48.4
Mechanical Engineering	4.6	52.1	82.6	30.6	13.1	17.4	4.3
Power	8.6	55.1	19.2	42.5	33.5	2.4	47.3
Construction	3.0	56.4	13.9	25.3	25.7	18.3	60.4
Trade	38.9	83.7	62.4	13.5	26.0	2.8	11.6
Other	21.9	63.5	40.4	28.0	39.8	8.5	19.9

Source: compiled by the author based on data [126]

This dynamic serves as an additional argument for already formulated conclusions about Ukrainian firms preferring short-term loans, and allows to expand them by stating that they also prefer loans denominated in UAH. Out of 13 industries, 6 have more loans denominated in foreign currency, than loans in UAH: namely, mechanical engineering (4.6 times), power industry (2.4 times), chemical industry (1.9 times), metallurgy (1.8 times), paper industry (1.3 times) and food industry (1.06 times). It is worth mentioning that all of these industries, except for food industry and power industry, had the highest number of negative balance equity firms in the sample, which can be used as an indirect proof for quasi-risk financing model theory. *The fact that the majority of firms still prefer short-term loans in UAH can be explained by both negative experience of using foreign currency-denominated loans due to persistent devaluation of UAH*, starting in 2008, *and by lesser availability (and higher cost) of long-term and foreign currency-denominated loans*.

Specifically, out of the total loans, given to business entities, 3.8 % are NPLs (**Table 6.6**).

● **Table 6.6** NPLs to total loans issued in Ukraine, by industry and by currency, as of March 2022, %

Industry	ISIC	Share of NPLs		
		Total	In UAH	In foreign currency
Agriculture	A01	3.8	4.1	3.0
Mining	B	3.9	4.2	3.6
Food	C10	14.3	11.5	17.0
Paper	C17	0.6	1.3	0.0
Coke-chemical	C19	0.1	0.2	0.0
Chemical	C20	1.8	3.5	0.0
Pharmaceutical	C21	0.8	0.0	2.4
Other non-metal mineral production	C23	1.2	2.0	0.0
Metallurgy	C24	45.2	14.3	57.8
Mechanical Engineering	C26–30	36.9	25.4	43.0
Power	D35	2.4	4.2	1.7
Construction	F	43.9	43.8	44.3
Trade	G	44.6	53.2	8.8
Total		28.5	34.9	16.4

Note: The data was calculated as a ratio of balances of NPLs to balances of loans, given to business entities, separately by total, and by currency, and thus they cannot be added to a 100 % total.
Source: compiled by the author based on data [126]

Out of all of the loans denominated in UAH, 4.1 % are NPLs, and out of all of the loans, denominated in foreign currency, 3 % are NPLs. The most NPLs have the industries, which take loans in foreign currency: mechanical engineering (36.9 %), metallurgy (45.2 %), food industry (14.3 %), as well as the industry, which takes the most loans – trade (44.6 %). A considerable amount of NPLs in construction (43.9 %) can be explained by the stagnation of real estate market,

which began before the full-scale invasion, yet have been exacerbated by it. It is also worth mentioning, that the *structure of NPLs by currency is generally proportional to currency structure of the total loans given by banks*.

To conclude:

1. The firms of all industries, except for mining, pharmaceutical and power industry, are relying mainly on debt. Out of this debt relatively insignificant amount – up to 27.5 % on average – is accounted for by loans, both short-term and long-term ones. The rest of the debt is distributed among different kinds of accounts payable, i.e., commercial (inter-firm) credit.

2. The dynamics of the share of debt in total assets of big industrial firms indicates their loss of creditworthiness during 2006–2020: the firms with negative balance equity account for a significant share of the sample used, which in turn results in overall negative average balance equity for a number of industries. The reason for it is generally chronic loss-making (i.e., accumulated uncovered losses which exceed balance equity).

3. The firms in Ukraine mostly depend on short-term loans, even though the rather high average share of such loans is a result of statistic outliers, caused by non-creditworthy firms, which somehow manage to secure loans. Along with generally low creditworthiness of big industrial firms, this indicates the existence of non-market elements in credit relations in Ukraine. Diminishing dynamics of shares of short-term and long-term loans in total assets of firms indicates that the majority of mentioned firms have problems with obtaining loans. Those firms, that do not have such problems, tend to increase the share of short-term loans in their assets. Such dynamics can be explained using the quasi-risk model of financing hypothesis, along with increase in risks of investments into Ukraine from 2014.

4. The structure of loans, given by banks, by term and by currency, allows to draw a conclusion, that Ukrainian firms prefer short-term loans in national currency. The majority of loans are concentrated in trade (38 %), agriculture (11 %), power (8.6 %) and food (7.6 %) industries, while the majority of those loans are short-term and mid-term ones, denominated in national currency. The exceptions are construction, metallurgy and power industry, which have around half of their loans denominated in foreign currency and being of the long-term variety.

5. Almost half of the industries observed (6 out of 13), have more loans in foreign currency, than they have in national currency. These are mechanical engineering, power, chemical, paper and food industries, as well as metallurgy. This list corresponds to 2/3 of the list of industries, which had negative balance equity on average during the period of observation, and to a half of the list of the industries, which had the majority of NPLs. In other words, those industries are riddled with zombie firms, which could not pay off their debts during the period of observation, or firms, which used quasi-risk financing model.

Acceptability of the cost of loan from borrower's and lender's perspectives

Expected cost of equity is the cost, which potential investors expect to receive from investing their money into firm's equity, via either direct or portfolio investments. It has to cover the risks

of such an investment, and thus must exceed the risk-free rate and account for the main risks of operating in the country, industry and the risk of the firm itself. Due to extreme volatility of data from Ukrainian industrial firms, the standard calculation of ratio of individual risk β results in a significant number of outliers. Normal values for β coefficient lie from –5 to 5, which is interpreted as high inverse or direct correlation between firm profitability and average market profitability dynamics. However, practical calculations tend to result in values over 10 or even 100; especially this is true for the years of crises, when a significant number of firms receive extreme losses. The difference between distribution of expected cost of equity (ERi), based on what values of β coefficient were discarded as outliers (**Fig. 6.1**).

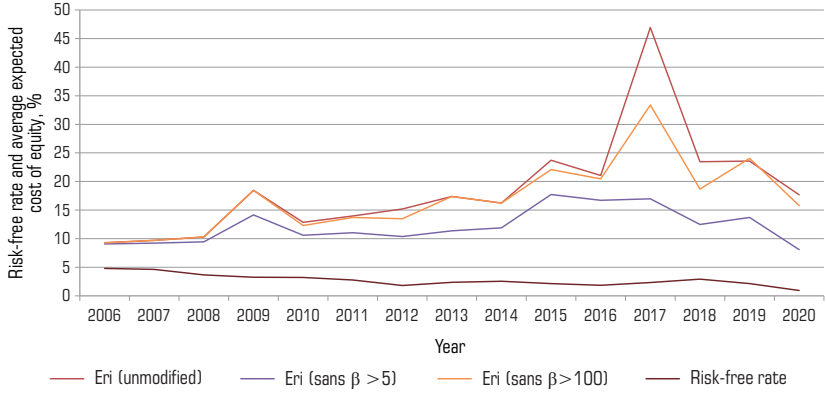

Fig. 6.1 Risk-free rate and average expected cost of equity – unmodified, sans β>100 and sans β>5 in Ukraine, 2006–2020, %
Source: developed by the author based on data [126, 195, 197, 198]

Up until 2011 there were no observations with β coefficient over 100 among the sample firms, and so the graphs coincide (**Fig. 6.1**). In 2017, however, the number of such observation's peaks. Such extreme values of β coefficient reflect onto the expected cost of equity, which soars up to 46.9 % (if the unmodified β coefficient is used) and up to 17.7 % for the most "normalized" indicator, which does not account for β coefficients over 5 (that is, with 13.7 % of 3080 observations being excluded). For even better normalization of data rows and minimization of outlier influence on them, the median values of expected cost of equity should be used (**Table 6.7**).

During 2006–2020 average expected cost of equity decreased from 9.1 % to 8.1 %, while over 2009–2019 this indicator increased from 14 % to 17 % (**Table 6.7**). The highest average values of expected cost of equity during 2006–2020 were observed among firms of paper, glass and metallurgy industries – 15.8 %, 16.4 % and 16.1 % respectively. The lowest average values were observed among the firms from agriculture, mining and chemical industries – 8.6 %,

7.7 % and 10 % respectively. In other words, the firms, which on average earned from –17.8 % to 18.3 % on each UAH of their invested capital, had to earn from 7.7 % to 16.4 % on each UAH of invested capital, in order for potential investors to even consider such an investment. This finding suggests that, only relatively few firms indeed meet this requirement – based on the averages, it would be firms from mining and pharmaceutical industries.

Table 6.7 Median values of expected cost of equity (sans $\beta>5$), by industry, 2006–2020, %

	A01	B	C10	C17	C19	C20	C21	C22	C23	C24	C26–30	D35
2006	6.51	6.38	7.51	6.82	10.13	8.63	14.43	7.45	9.90	8.03	13.03	10.32
2007	7.80	6.36	8.13	6.91	13.82	7.84	10.71	7.00	10.90	9.30	11.89	10.13
2008	7.80	5.72	7.29	7.20	12.76	10.38	10.96	7.85	13.44	12.69	9.80	7.45
2009	12.80	9.00	11.00	10.44	10.19	11.75	15.81	13.46	11.58	28.82	20.82	14.22
2010	8.89	7.83	8.35	10.35	10.71	11.13	14.32	6.69	7.88	15.39	13.33	12.42
2011	7.66	9.43	9.35	9.57	12.02	15.47	8.79	8.53	17.87	11.30	11.51	11.09
2012	5.42	6.42	7.26	11.33	12.46	14.29	7.82	10.39	17.04	10.30	10.02	11.64
2013	8.29	9.59	6.83	14.37	10.95	8.31	7.68	15.01	12.97	13.83	16.56	12.29
2014	9.00	6.79	14.39	16.23	11.33	12.46	7.41	13.38	10.58	14.77	11.71	14.48
2015	12.28	7.61	17.67	28.16	21.12	12.62	10.37	27.50	25.70	15.74	12.28	21.65
2016	13.05	7.51	10.37	36.90	10.46	7.92	12.40	24.21	37.18	14.40	11.28	14.72
2017	9.76	6.29	14.40	24.38	15.11	7.48	12.82	31.22	41.97	19.65	8.39	12.26
2018	7.11	7.43	13.56	18.87	16.97	7.16	12.16	11.98	10.80	26.84	7.15	9.99
2019	6.46	14.21	12.64	22.08	26.68	9.88	15.44	4.48	12.05	22.66	8.78	8.96
2020	5.40	4.26	4.62	14.49	4.76	3.90	15.54	8.23	5.35	17.68	7.02	5.77

Source: developed by the author [126, 195, 197, 198]

For the rest of the firms the only source of financial resources was the loans, provided that they met the basic creditworthiness criteria (**Fig. 6.2**). More specifically, non-negative balance equity is one of such criteria, and thus at least one third of the sample firms are not creditworthy by this metric alone.

The average return on equity during 2006–2020 never reached the level of the average cost of credit – even though the return on equity reached higher values than return on assets (**Fig. 6.2**). In other words, *the average industrial firm in Ukraine did not earn enough in 2006–2020 to afford a loan*. Moreover, it was only after 2017, when the return on equity (and return on assets) exceeded the risk-free rate – that is the conditions for potential acquisition of loans on market conditions were met, – if the creditor would risk investing into the firms, which demonstrated average profitability of –17.6 %.

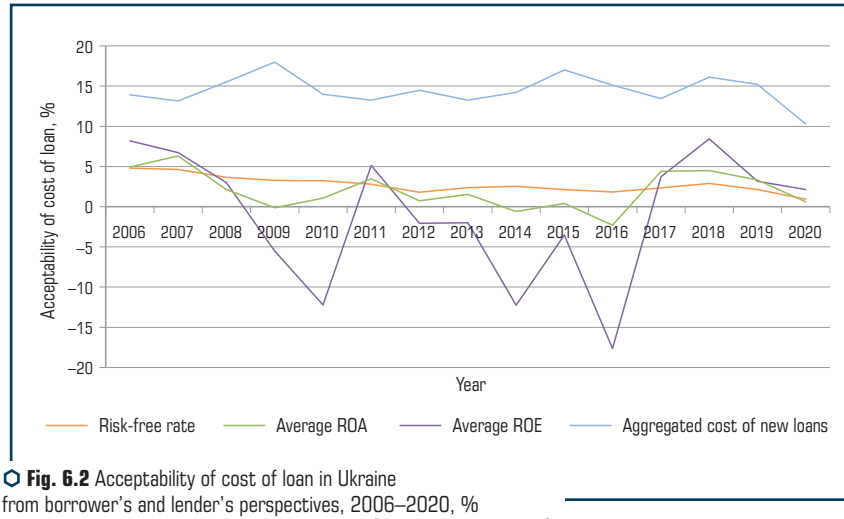

Fig. 6.2 Acceptability of cost of loan in Ukraine from borrower's and lender's perspectives, 2006–2020, %
Source: compiled by the author based on data [126, 195, 197, 198]

To conclude:

1. The average indicators of financial stability show that the majority of sample firms are financially unstable. Firms of trade and agriculture industries are generally an exception, and show "unstable" financial stability instead. This indicates that there are very few financially stable firms in the sample (as the sample covers at least 25 % of the industries, it represents by assets and revenues for the whole country as well).

2. The sample firm's inventory exceeds both their own working capital and the debt they are able to attract, which can be interpreted as having too much inventory, and indicative of problems with both sales and liquidity.

3. The analysis of returns on equity and assets of the sample firms indicates chronic problems with profitability: the fraction of observations with negative values amounts to 27.88 % for return on assets and to 32.12 % for returns on equity, which is caused by negative balance equity and/or uncovered losses. The dynamics of both of these indicators during 2006–2020 shows extreme volatility of profitability of firms.

4. High volatility of profitability, in turn, is reflected in extreme risk, which can be traced via the individual β risk coefficients of the sample firms. This, in turn, transforms into higher expected cost of equity, and reduces the availability of investments for corresponding firms on market conditions. The extreme volatility in profitability, as well as enough of negative equity and uncovered losses to lower the corresponding average and median industry values below zero, are sufficient grounds to establish low average creditworthiness. There are firms with high creditworthiness, especially in mining, agriculture, trading and food industries.

5. Based on average values, only the firms from mining industry had enough profitability to pay off loans during 2006–2020. Even so, the cost of credit on average does not exceed the unmodified expected cost of equity and is less than expected cost of equity, calculated based on $\beta<5$. This finding suggests that for the firms with "normal" levels of risk, the loans are still too expensive, while for the riskier firms the loans cost less than their expected cost of equity, yet they are not creditworthy.

6.3 ESTIMATION OF BANK LOANS IMPACT ON ECONOMIC GROWTH IN UKRAINE

The correlation and regression analysis is employed to characterize interrelation between economic growth and the indicators of lending process during 2006–2020. The model is constructed based on the expected relation, depicted as follows:

$$EG = f(P;ER;CR;PC;PD), \tag{6.7}$$

where *EG* is the economic growth, *P* – profitability, *ER* – expected cost of equity, *CR* – cost of credit, *PC* – median fraction of loans in total assets; *PD* – median fraction of debt in total assets.

As a metric for economic growth, the real GDP per capita, denominated in UAH, was used. Median return on equity was used as a metric for profitability. Expected cost of equity was calculated, based on β sans values over 5, and aggregated, using median values. As a metric for cost of credit, the average cost of new loans for corresponding years was used. Median shares of debt and loans in total assets were calculated, based on data from the sample (**Table 6.8**).

Table 6.8 List of dependent variables

Factor	Indicator	Denotation	Source
Economic growth	Real per capita GDP, denominated in UAH, %	EG	World Bank
Profitability	Median ROE of the sample firms, %	P	SMIDA, NBU, SSSU
Expected cost of equity	Median expected cost of equity of the sample firms, %	ER	SMIDA, NBU, SSSU, Damodaran Online datasets
Cost of credit	Average cost of new loans, %	CR	SMIDA, NBU
Share of loans	Median share of loans (short-term and long-term ones) in total assets of the sample firms, %	PC	SMIDA, NBU
Share of debt	Median share of debt (loans and accounts payable) in total assets of sample firms, %	PD	SMIDA, NBU

Source: developed by the author

Since the median values (**Table 6.9**) were calculated, based on a representative sample of firms, they are comparable to macroeconomic indicators, taken from other sources. The timescale of the study is constricted by the data, available in the sample.

Table 6.9 Descriptive statistics

Indicator	Minimum	Maximum	Average	Standard deviation
Real per capita GDP (EG)	12076	100400	45220	29187
Median sample ROE (P)	–3.64	6.81	2.62	2.76
Median sample ER	5.59	16.71	11.03	2.60
Average country CR	13.06	19.38	16.85	2.02
Median sample PC	9.03	20.15	14.69	2.81
Median sample PD	46.13	75.10	63.78	9.34

Source: developed by the author

The first iteration of the model looks like this:

$$EG = 777.96P - 1432.62ER + 807.91CR - 2588.97PC + \\ + 2550.5PD - 80052.3. \quad (6.8)$$

Adjusted R^2 for this model is 0.89, and F-statistics significance exceeds its p-value.

The model is fitting for interpretation. Out of 6 variables, 3 are significant, not counting the constant:

1) median share of debt in total assets (significant within 99 % confidence interval), which has directly proportional effect on economic growth;

2) median share of loans (significant within 95 % confidence interval), which has inversely proportional effect on economic growth;

3) median expected cost of equity (significant within 90 % confidence interval), which has inversely proportional effect on economic growth.

Median return on equity and average cost of new loans turned out to be non-significant. Durbin-Watson statistic of 1.88 indicates that there is an insignificant autocorrelation, while the correlation matrix (**Table 6.10**) indicates that there is no risk of collinearity. In other words, the estimation of model's parameters is sufficiently accurate and the model can be used for forecasting. Ramsey test indicates that functional form of the model is set correctly.

If average cost of credit is to be replaced with two linked variables (either cost of short-term and long-term loans or cost of loans, denominated in UAH and foreign currency), the number of significant values in the model does not increase.

If cost of credit is split by terms, the share of loans and the share of debt become significant within 99 % confidence interval, cost of equity – within 95 % confidence interval, and cost of short-term loans – within 90 % confidence interval. The latter indicator has directly proportional effect on economic growth.

Table 6.10 Correlation matrix of the dependent variables

	P	ER	CR	PC	PD
P	1	–0.557	–0.333	–0.575	–0.355
ER	–	1	0.206	0.458	0.766
CR	–	–	1	–0.365	–0.253
PC	–	–	–	1	0.587
PD	–	–	–	–	1

Source: developed by the author

If cost of credit is split by currencies, the shares of loans and debt in total assets retain their significance (within 95 % confidence interval), as well as the expected cost of equity (within 90 % confidence interval). Among the newly included indicators, the cost of loan, denominated in foreign currency, is the significant one (within 95 % confidence interval), and its effect on economic growth is inversely proportional.

If the most significant indicator of the first model (i.e., median share of debt in total assets) is to be removed, the second indicator of liabilities' structure (i.e., median share of loans in total assets) takes its place with significance within 95 % of confidence interval, and the model itself loses some of its explaining power with adjusted R^2 decreasing from 0.89 to 0.6.

If the non-significant indicators are removed instead, all of the remaining indicators (the shares of debt and loans in total assets and the expected cost of equity) become significant within 99 % confidence interval, and the adjusted R^2 increases to 0.93 (**Table 6.11**).

Based on the regressions in **Table 6.11**, the median expected cost of equity retained its significance in 5 out 6 models, while median shares of debt and loans in total assets retained significance in all of the models, they were a part of.

This means their highest explaining power, and thus their most definitive effect on the dependent variable. The direction of influence of median shares of debt and loans in total assets remained the same across all of the regressions built, while the less significant variables tended to change their direction of influence, based on the layout of the model. Despite the low significance of median cost of new loans, the indicators derived from it, namely, the average cost of new long-term loans and average cost of new loans, denominated in UAH, were significant in the regressions they were included in.

● **Table 6.11** Regressions on the interconnection between economic growth, liabilities' structure and cost of financial resources

Indicator	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Adjusted R^2	0.886	0.928	0.97	0.609	0.895	0.931
Median ROE	777.956	–50.67	–133.149	987.46	–	–
Median expected cost of equity	–1432.62*	–3353.14**	–1442.19*	7428.39***	–1557.1	–2292.95***
Median cost of new loans	807.91	–	–	1847.23	–15.82	–
Median share of debt in total assets	2550.5***	2550.16***	1524.94***	–	2558.75***	2715.23***
Median share of loans in total assets	–2588.97**	–3145.13***	–1842.86***	–6345.53***	–3113.66**	–2981.87***
Cost of new long-term loans	–	–1520.21	–	–	–	–
Cost of new short-term loans	–	2769.39*	–	–	–	–
Cost of new loans, denominated in foreign currency	–	–	–6903.68***	–	–	–
Cost of new loans, denominated in UAH	–	–	483.98	–	–	–

Notes: * significant within 90 % confidence interval;
** significant within 95 % confidence interval;
*** significant within 99 % confidence interval.

Source: developed by the author

Thus, the increase in debt of real sector firms positively correlates with economic growth, while the increase in loans and in expected cost of equity (which in turn should also stimulate growth in debt and/or loans), negatively correlates with economic growth. While the impact of expected cost of equity on economic growth is negative, its significance remains lower than the significance of the first two indicators. The return on equity is insignificant, and the direction of its influence is positive in regressions, which include the median cost of loan, and negative – in regressions, which split this indicator by time periods or by currencies. The median cost of new loans

is not significant in all of the regressions; however, its derivative indicators are. In other words, the impact of cost of new loans, denominated in foreign currency, and of cost of new short-term loans is significant, if these indicators are included separately, but loses significance, if they are united into a composite index. Overall, the final hierarchy of factors, included into the considered regressions, goes as follows:

1) the most significant factors are: the median share of debt in total assets (positive impact), the median share of loans in total assets (negative impact), expected cost of equity (negative impact);

2) conditionally significant factors are: cost of new loans, denominated in foreign currency (negative impact); cost of new short-term loans (positive impact);

3) the insignificant factors are: median return on equity and median cost of new loans.

Therefore, the increase in economic growth during 2006–2020 correlated positively with increase of share of debt (which includes both conditionally free accounts payable and loans proper); decrease in share of loans; decrease in cost of new loans, denominated in foreign currency; increase in cost of new short-term loans; decrease in expected cost of equity. It is the reflection of the trends of the time period under observation (economic decline along with growth of debt with simultaneous decrease in loans, sustained partly by new short-term loans, partly by restructuring existing foreign currency-denominated loans), and thus correlation and regression analysis could not have achieved any other results. The reasons for this were already covered in the paragraph on the debt structure and cost of loan for big industrial firms in Ukraine, and are linked to chronic non-profitability of the majority of them. The lack of profitability, in turn, led to decrease of share of equity in total assets (due to uncovered losses being subtracted from equity at the end of the corresponding period), which is reflected in loss of significance by expected cost of equity. Another result of the chronic loss-making is the decline in creditworthiness (and therefore – the increase in cost of new loans), and problems with paying off the loans already taken. Generally, some of the firms retained their creditworthiness (some of them even while having negative book equity, which indicates attracting loans by non-market principles), but the new loans, which they could afford, tended to be short-term ones, denominated in UAH in order to minimize currency risks. Firms, which were a part of trans-national corporations (TNCs), and those, who had income in foreign currency, could afford new loans, denominated in foreign currency, which, however, affected their growth negatively later, when the currency exchange rate dropped from 5 UAH per USD to 8, and then to 27 UAH per USD. In other words, the negative impact of loans, denominated in foreign currency, was much more potent than the positive impact of other loans.

Constructing a number of regressions to explain the oscillations of the share of loans in total assets of sample firms, indicates that the most significant factor for it is per capita GDP, while depending on the layout of the model, expected cost of equity and cost of credit may be significant as well. The quality of such models is usually insignificant (adjusted R^2 is less than 0.67), which indicates that there are likely to be major omitted variables. The results of the best-considered regressions are presented in the **Table 6.12**.

● **Table 6.12** Coefficients of regressions of share of loans in total assets of industrial firms from costs of loans and equity

Indicator	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Adjusted R^2	0.426	0.668	0.421	0.622	0.602	0.648
Per capita GDP (UAH)	–6.58e–05***	–6.52e–05***	–6.17e–05**	–5.42e–05*	–7.05e–05**	–3.6e–05
Median ROE	–	–0.156	–	–0.348	–	–
Median expected cost of equity	–	0.320	–	0.55*	–	–
Average cost of new loans	–	0.324	0.822**	–	–	–
Median cost of loans of sample firms	–	–	0.057	–0.588	–	–
Cost of new long-term loans	–	–	–	–	–0.24	–
Cost of new short-term loans	–	–	–	–	0.73**	–
Cost of new loans, denominated in foreign currency	–	–	–	–	–	0.37
Cost of new loans, denominated in UAH	–	–	–	–	–	0.542***

Notes: * significant within 90 % confidence interval;
** significant within 95 % confidence interval;
*** significant within 99 % confidence interval.

Source: developed by the author

According to the **Table 6.12**, in 5 out of 6 regressions the per capita GDP is a significant indicator, and the most significant it is in models 1 and 2. Splitting the indicator of cost of new loans by time periods and by currencies decreases the quality of the model, while among the indicators, derivative to cost of new loans, only the cost of new loans, denominated in foreign currency, and the cost of new short-term loans (which, by the way, have a mutual correlation of 0.95) ever gain significance. Other indicators, which gained significance, were the average cost of new loans and median expected cost of equity. Both of these indicators are more significant, than the median cost of new loans, which, along with reversal of the impact of this latter indicator in models 3 and 4, may indicate that the firms of the sample are not representative of the process of loan attraction in the country.

As for the direction of the influence, there's a negative correlation between economic growth and share of loans in total assets, and expected cost of equity. *There is a positive correlation between economic growth and cost of credit in Ukraine during 2006–2020. The only exception to this interrelation is the negative economic growth-cost of new long-term loans nexus, which is the result of significant reduction in long-term loans during 2006–2020*. Additionally, the share of loans in firms' total assets depend on their cost (in particular, concerning loans, denominated in UAH and short-term loans), while the direction of the relationship indicates that the share of loans of the total assets has reduced despite loans' cost-cutting. As it was determined in the analysis of loans to non-financial corporations, the majority of loans are indeed short-term and denominated in UAH, and the firms are usually not profitable enough to attract and pay off new loans, regardless of the stimuli used.

CONCLUSION TO SECTION 6

1. Mutual dynamics between the economic growth and lending volumes in Ukraine during 2006–2020 has a number of abnormal correlations, namely, the inversely proportional relationship between lending volumes and economic growth, in light of directly proportional relationship between economic growth and cost of new loans. In other words, the more is the share of loans in the firms' total assets and the cheaper are those loans, the less economic growth is. Such a relationship does not correspond to classical theory of finance well, since the less the loans cost, the more it is beneficial to attract them, which leads to increase in the volume of resources, available to the firm, which, in turn, has to increase economic growth. Such abnormal dynamics corresponds with the dynamics discovered, while analysing financial depth-economic growth nexus (Section 7).

2. The review of aggregated microeconomic indicators allows to explain the abnormal dynamics discovered: economic crisis led to inability of the average firm to pay off its loans, which, in turn, led to commercial (inter-firm) credit replacing bank loans, or, in other words, as the per capita GDP diminished, so did the lending volumes to real sector firms. Simultaneously, the interest rate policy was directed towards minimization of cost of new loans in order to stimulate economic growth, which explains their decrease. However, de-facto even such cheap loans remained beyond the reach of an average real sector firm due to their low profitability and creditworthiness.

3. The cost of new loans and returns on equity for the sample firms do not have significant correlation with economic growth (estimated as per capita GDP), while the expected cost of equity and shares of debt and loans in total assets – do. The insignificance of new loans cost can be explained by the fact that an average real sector firm does not attract loans on market conditions: it either has access to loans from related creditors (which is indicated by attracting loans by obviously non-creditworthy firms), or it has problems with paying off their existing debts and thus refinance them. The insignificance of return on equity can be explained by the fact that

even though the sample covers (depending on the year) from 35 % to 20 % of the total revenues of corresponding industries, both the sample and total revenues decreased significantly during 2006–2020, with some of the previous winners taking the biggest hit. Hence, the non-profitable firms, used to be big in the beginning of the observed period, can now be non-representative of the economic growth due to no longer contributing to it.

4. The simultaneous significance of both the share of the debt and the share of the loans in total assets, along with their oppositely directed correlation with economic growth, is a reflection of the reduction of lending during periods of economic recession and the replacement of bank loans with commercial (inter-firm) credit due to their relatively lower cost. Expected cost of equity is likely to retain its significance because it reflects more general country trends by taking into account country risk.

7 ASSESSMENT OF FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS IN UKRAINE

ABSTRACT

The estimation of Ukraine's financial depth-economic growth nexus during 2008–2020 demonstrates that loans of banks and non-banks to non-financial corporations had a linear negative impact on economic growth, while trading volume on the securities market had a positive impact on economic growth. Therefore, the increase in lending by banking and non-banking institutions did not lead to economic growth. The inversely proportional relation between financial depth and economic growth indicates that financial depth in Ukraine may exceed its marginal values. The assessment of the impact of the export structure on financial depth and economic growth in Ukraine during 2001–2021 shows a positive correlation between the majority of export entries and economic growth. The trends of raw materials exports increase and high-tech exports decrease during 2001–2021 is noted. The correlation between financial depth and both exports and external debt constituents was symmetrical and inversely proportional to corresponding correlations between mentioned factors and economic growth.

KEYWORDS

Bank, non-bank, loan, GDP, stock market, external debt, export, correlation.

7.1 ESTIMATION OF FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS

The research of influence of financial institutions' economic activity indicators on economic growth in Ukraine was focused on the correlation and regression analysis based on yearly data for 2008–2020. The main restrictive factor for the model is the data availability, which is especially limited for trading volume on the securities market and loans from other (non-bank) financial corporations to non-financial. The model was built on the basis of the following equation:

$$EG = f(FD, ED, EX), \tag{7.1}$$

where EG is economic growth, FD – financial depth, ED – external debt, and EX – export.

Real per capita GDP is used as an indicator for economic growth. It captures the influence of inflation and, as a relative indicator, allows for better comparability with similar researches from other countries. Financial depth is split into three indicators (**Table 7.1**):

1. Loans from deposit-taking financial corporations to non-financial corporations to real GDP ratio was used to measure the influence of banking sector on financial depth. This ratio is a narrower

variation of domestic credit to private sector to GDP ratio, since it doesn't account for purchase of non-equity securities, trade credit and other kinds of accounts receivable, as well as the loans from non-bank entities, which are presented as a separate indicator. Additionally, it accounts for loans from state-controlled banks and inflation.

2. Loans from other (non-bank) financial corporations to non-financial corporations to real GDP ratio were used as a measurement for non-banking sector influence on financial depth. This index accounts for inflation and allows to gauge the influence of loans, given out by credit unions, pawnshops, asset management companies, insurers and the like, on economic growth.

3. Trading volume on the securities market to real GDP ratio was used as a measurement for influence of stock market on economic growth.

Table 7.1 List of dependent variables

Factor	Variable	Denotation	Source
Financial depth	Deposit-taking corporations' loans to non-financial corporations real GDP ratio, %	(BL_{rGDP})	NBU, SSSU
	Other (non-bank) financial corporations' loans to non-financial corporations to real GDP ratio, %	(NBL_{rGDP})	NBU, SSSU
	Trading volume on the securities market to real GDP ratio, %	(TV_{rGDP})	SSSU, NSSMC
External depth	Gross external debt to real GDP ratio, %	($Debt_{rGDP}$)	NBU, SSSU
Export revenue	Ferrous metal exports to real GDP ratio, %	(ExM_{rGDP})	NBU, SSSU
	Grain exports to real GDP ratio, %	(ExG_{rGDP})	NBU, SSSU

Note: Deposit-taking corporations includes the NBU and other deposit-taking corporations (banks: public, private, foreign-controlled).
Non-financial corporations include corporations engaged primarily in the production of market goods and non-financial services, and is subdivided into sub-sectors: public non-financial corporations, private non-financial corporations and foreign-controlled non-financial corporations.
Source: developed by the author

Influence of external debt is accounted for using the gross external debt to real GDP ratio. This indicator is included into the model in order to test the hypothesis that the economic agents within Ukraine compensate the lack of inner financial depth by external loans.

Influence of export revenues is accounted for using total grain exports to real GDP ratio. This indicator is included into the model due to high significance of exports for economic growth in Ukraine. Even though in the first iteration of the model the export of ferrous metals was additionally included, it was excluded in all subsequent iterations due to the unidirectional impact of these two indicators and their high mutual correlation, which cause harmful multicollinearity in the model.

The impact of inflation is accounted for by using real GDP in all suitable ratios instead of GDP. The complete set of variables is presented in **Table 7.1**.

Due to rather small number of observations per variable (12), a number of conclusions cannot be reliably made: namely, on the normality of residuals distribution (and thus whether the sample is an outlier or not). It is worth mentioning that modification of financial depth indicators makes the model results not directly comparable to previous similar study (e.g., Kondrat and Kots [80]). The descriptive statistics are presented in **Table 7.2**.

● **Table 7.2** Descriptive statistics

Variable	Minimum	Maximum	Average	Standard Deviation
Real per capita GDP ($rGDP_{PC}$)	16 604.121	87 487.191	39 242.769	22 658.944
Deposit-taking corporations' loans to non-financial corporations real GDP ratio (BL_{rGDP})	0.191	1.942	1.162	0.647
Other (non-bank) financial corporations' loans to non-financial corporations to real GDP ratio (NBL_{rGDP})	0.203	0.578	0.455	0.123
Trading volume on the securities market to real GDP ratio (TV_{rGDP})	0.009	0.017	0.012	0.002
Gross external debt to real GDP ratio ($Debt_{rGDP}$)	0.826	2.1	1.218	0.431
Ferrous metal exports to real GDP ratio (ExM_{rGDP})	0.064	0.233	0.124	0.05
Grain exports to real GDP ratio (ExG_{rGDP})	0.021	0.108	0.059	0.029

Source: developed by the author

The first iteration of financial depth-economic growth nexus model based on available data can be described by a following equation:

$$rGDP_{PC} = -2112.35BL_{rDGP} - 149178NBL_{rGDP} + 1731100TV_{rGDP} + \\ +5301.85Debt_{rDGP} - 6050.55ExM_{rDGP} + 83914.2ExG_{rDGP} + 78429.1. \quad (7.2)$$

The independent variables of this model describe 99.7 % of variation of the dependent variable, which denotes its relatively high quality. The significance of *F*-statistic (613.98) exceeds its *p*-value ($5.32e^{*}10^{-7}$), which means that the independent variables, included in the model, increase its descriptive power over a model without them. The only significant variables are the ratios of loans from other (non-bank) corporations to non-financial corporations to real GDP (inversely proportional relationship) and trading volume on the securities market to real GDP (directly proportional relationship), and their significance lie within 99 % confidence interval.

Durbin-Watson statistic of 2.558 indicates possible autocorrelation, while correlation matrix (**Table 7.3**) and collinearity analysis indicate possible multicollinearity. A combination of mutual correlation between variables over 0.9 and variance inflation factor over 10 indicates collinearity,

and generally means that such variables are not supposed to be used in one regression. Three variables match the aforementioned criteria, namely the non-bank loans ratio, the external debt ratio and the grain export ratio.

Table 7.3 Independent variables' correlation matrix

	BL_{rGDP}	NBL_{rGDP}	TV_{rGDP}	$Debt_{rGDP}$	ExM_{rGDP}	ExG_{rGDP}
BL_{rGDP}	1	0.815	–0.528	0.432	–0.214	0.169
NBL_{rGDP}	–	1	–0.602	0.722	–0.15	0.337
TV_{rGDP}	–	–	1	–0.109	0.383	0.053
$Debt_{rGDP}$	–	–	–	1	0.108	0.419
ExM_{rGDP}	–	–	–	–	1	0.856
ExG_{rGDP}	–	–	–	–	–	1

Source: developed by the author

The easiest way to get rid of multicollinearity is to exclude variables with high mutual correlation and variance inflation factor over 3.5. There are several couples of variables that meet these criteria: the ratios of loans of both deposit-taking and other (non-bank) financial corporations to non-financial corporations to real GDP, the ratios of export of grain and ferrous metals to real GDP, and, surprisingly, the ratios of gross external debt to real GDP and of other (non-bank) financial corporations' loans to non-financial corporations to real GDP. Since the constituents of financial depth are the core variables under scrutiny, only the external debt to real GDP ratio and the ferrous metals exports to real GDP ratio were excluded. The second iteration of the model is presented in the **Table 7.4.**

Table 7.4 Outputs for second iteration of regression

Variable	Coefficient	Standard error	*t*-ratio	*p*-value
NBL_{rGDP}	–78 124.2	3 7783.79	–25.02	4.16e–08***
TV_{rGDP}	1 641 130	217 238	7.555	0.0001***
BL_{rGDP}	–2 154.98	1 015.08	–2.123	0.0714*
ExG_{rGDP}	156 798	14 277.2	10.98	1.15e–05***

Notes: *** – variable is significant within 99 % confidence interval;
* – variable is significant within 90 % confidence interval.
Source: developed by the author

This model has an adjusted R^2 of 0.9969 and its *F*-statistics of 907.72 exceeds its *p*-value of 1.4–09. None of the variables in the model has a variance inflation factor over 3.5, and thus

even though the model retains Durbin-Watson statistics of 2.545, its collinearity is insufficient to skew the model's outputs. All of the variables are significant, and only the deposit-taking corporations' loans to non-financial corporations to real GDP ratio has a significance lower than that of a 99 % confidence interval. Possible cause for it may be attributed to relatively high correlation between this variable and the other (non-bank) financial corporations' loans to non-financial corporations to real GDP ratio (0.815), which in turn is a result of both of these ratios effectively being a part domestic credit to GDP ratio, and therefore having overlapping explaining power.

In order to check whether the linear function is the correct one for financial depth-economic growth nexus in Ukraine, Ramsey's RESET test was conducted, both with squared and cubed $\hat{y}$. It confirmed the linearity of connection; the distinction between the results obtained and the results of the other researchers, who confirmed or predicted non-linear financial depth-economic growth nexus (e.g., Khan and Senhaji [68]), likely stems from the length of available data set. omoscedasticity of residuals of the model is not high enough to be detrimental to model's standard errors, as shows the Breuch-Pagan test. In other words, the model's coefficients are significant, its other parameters are generally within acceptable margins, and the model's function fits its data distribution. Thus, the conclusions may be drawn based on it.

The final model can be transcribed into an equation (7.3). At a glance, financial depth appears to have mostly negative impact on economic growth in Ukraine during 2008–2020:

$$rGDP_{PC} = 1641130 * TV_{rGDP} - 142978 * NBL_{rGDP} - \\ - 2154 * BL_{rGDP} + 156798 * ExG_{rGDP} + 78124, \quad (7.3)$$

where $rGDP_{PC}$ – real per capita GDP; TV_{rGDP} – trading volume on the securities market to real GDP ratio; NBL_{rGDP} – loans from other (non-bank) corporations to non-financial corporations to real GDP ratio; BL_{rGDP} – loans from deposit-taking (bank) corporations to non-financial corporations to real GDP ratio; ExG_{rGDP} – grain exports to real GDP ratio.

Using three separate indicators for financial depth allows to estimate separate impact of banking, non-banking and capital market sectors on economic growth of Ukraine during 2008–2020. The straightforward interpretation of equation 3 would go as follows: the most impactful directly proportional factor is trading volume on the securities market, even though the whole capital market segment accounts for less than 1 % of assets of financial sector in Ukraine, and trade volumes on capital market are negligible. However, the capital market only expanded in times of massive economic growth, and thus the directly proportional relationship between their dynamics. The second most impactful directly proportional factor is the grain export revenue. According to the data, achieved from previous iteration of the model, it is possible to conclude that export of ferrous metals and even external debt have similar impact. The positive influence of export revenues stems from the transformation of export revenues into productive investments, at least for the firms, directly involved in the process. Positive impact of external debt can be indicative of attempts to cover the need for financial resources, not covered by Ukrainian financial sector, using external

loans, as is theorized by Bohdan and Lomakovych [81]. The third most impactful factor is the loans of non-financial sector, represented by the other (non-bank) financial corporations' loans to non-financial corporations to real GDP ratio, which has inversely proportional influence on economic growth. Only around 5 % of assets of Ukrainian financial system are owned by non-banking financial intermediaries or other (non-bank) financial corporations. Unlike the countries of Western Europe, Ukrainian non-state-owned pension funds are not prominent investors, and barely invest into the real sector. The weakest factor, according to the model, is the loans from deposit-taking corporations to non-financial corporation to real GDP ratio, which represents bank loans. The impact of this factor on economic growth is inversely proportional, and the obvious conclusion would be that despite owning 94 % of assets of Ukrainian financial sector, the banks, in fact, facilitate economic growth the least. This conclusion is supported by the fact that, according to the NBU, the share of bank loans to related parties in 2020, depending on debtor's size, oscillated from 64 % to 95 %. This would mean that the majority of bank loans are issued with a violation of market logic, and likely utilized for non-productive investments. Another factor, important for the weak input of bank loans into economic growth, is the fact that the banks are among the biggest buyers of state-issued bonds, and in 2020 they owned 52 % of the overall internal debt.

To summarize, *during 2008–2020 both banking and non-banking segments of Ukrainian financial sector negatively impacted the country's economic growth, while capital market and exports of goods impacted the economic growth positively*.

The most powerful factors are trading volume on the securities market and grain export, while the least powerful ones are loans from banks and non-banks. However, this conclusion may be refined by taking into account the scale and dynamics of the variables, on which the regression was built. For one, according to the model, the growth in trading volume on the securities market to real GPD ratio for p.p. results in growth in real per capita GDP of UAH 16. 641 thous.; however, at no point in time during the period under observation did the trading volume on the securities market reach value over 1.7 %, and its growth rate – more than 0.3 p.p. Therefore, the maximum growth in real per capita GDP, linked to capital market development, observed during 2008–2020, was the growth by UAH 4.923 thous. between 2018 and 2019. In other words, the extreme values of impact of trading volume on the securities market onto economic growth stem from chronically low fraction of this indicator in GDP and its lackluster dynamics.

The second most important factor of the model is the grain export to real GPD ratio; its increase for 1 p.p. has to increase real per capita GDP for UAH 1.567 thous. During 2008–2020 this variable grew up to 5 p.p. in a year, which should correspond to the UAH 7.839 thous. increase in real per capita GDP. However, there was no such an increase in the available data due to the influence of other factors in the model. The most prominent among them would be the loans of other (non-bank) financial corporations to non-financial corporations to real per capita GDP ratio, a 1 p.p. increase in which supposedly decreases real per capita GDP by UAH 1.429 thous. During 2008–2020, there were one-year changes up to 14.7 p.p., which had to transform into a real per capita GDP decrease of UAH 20.973 thous. In other words, the dynamics of loans of other

(non-bank) financial corporations to non-financial corporations to real GDP ratio makes it a de facto more powerful source of influence.

The least impactful factor in the model is the loans from deposit-taking corporations to non-financial corporations to real GDP ratio, which for every 1 p.p. increase is supposed to decrease real per capita GDP for 21.54 UAH. However, the dynamics of this indicator shows that its factual influence is a bit higher as well – its maximum change in a year reached up to 85.2 p.p., which transforms into a UAH 1. 836 thous. decrease in real per capita GDP. Thus, the most influential factor in GDP growth during 2008–2020 was loans from other (non-bank) corporations to non-financial corporation to real GDP ratio (inversely proportional influence), the second strongest – grain exports to real GDP ratio (directly proportionate influence), the third strongest – trading volume on the securities market to real GDP ratio (directly proportionate influence).

During 2008–2020, the level of financial depth in Ukraine mostly didn't exceed the 80–120 % of GDP, established by Arcand et al. [8] as the threshold values for switching of direction of financial depth's impact on economy. In other words, the "*too much finance" hypothesis does not hold for Ukraine:* by its predictions, the financial depth-economic growth nexus should be positive. It is, however, not. Even though many agree that different countries may have different individual threshold, after which financial depth begins to have a negative impact on economic growth, it is unlikely that Ukraine's individual threshold is lower than 30 %. If to assume that the financial depth-economic growth nexus is non-linear (which doesn't comply with the results of this study), another possible conclusion would be that Ukraine hasn't reached the lower threshold, after which financial depth has a positive impact on economic growth, or, in other words, Ukraine doesn't have enough economic depth. However, this theory is challenged by the fact, that during 2008–2020 there were individual years, where financial depth did reach up to 90 % (2009) without corresponding rise in economic growth; moreover, the real per capita GDP, in fact, increased, while financial depth decreased. It is possible that the entire data set, on which this research is based, is an outlier, due to the fact that it covers at least two major economic crises and a war. It was strongly restricted by the data availability: there were only 12 consecutive time periods available (mostly due to the choice to use trading volume on the securities market as one of the indicators), and the results of similar relatively short-term researches (notably, the one by Russeau and Wachtel [199]) also indicate linear and negative financial depth-economic growth nexus. The few studies, which indicate parabolic financial depth-economic growth nexus, are based on a much larger timescale. In particular, Khan and Senhaji' study [68]) was based on 40 years of observations, which may indicate that, have Ukraine had over 40 years of history as a modern market economy, its indicators might have been more in line with the world trends. In other words, even though this research affirms linear and negative interrelation between financial depth and economic growth in Ukraine, it is possible that if the time period of study is sufficiently extended, this trend may change.

The obtained findings do not correspond with the results of a similar research, conducted by Kondrat and Kots [80]. They used the standard financial depth indicator and Ukrainian statistics for 22 years, as opposed to 12 used in this research. Their conclusion was the standard linear and

directly proportional relation between financial depth and economic growth. These results are replicable, however, only if one to use all of the indicators, denominated in USD. Thus, the direction of financial depth-economic growth nexus changes based on the currency of calculations: if indicators, denominated in USD are used, the relation is positive, if, instead, the indicators are denominated in local currency – the interrelation becomes negative. Its functional form, however, remains intact. It is possible, that the reason behind this is also the period of observation, which had high inflation and currency exchange rate volatility.

Thus, the functional form of financial depth-economic growth nexus is confirmed to be linear for 12 and 22 years in Ukraine, while the studies that are based on a bigger timescale indicate the possibility of a non-linear relation. The direction of this relationship appears to change based on the currency of calculations: the USD-denominated calculations are returning positive relationship, and local currency-denominated calculations – negative one. The latter conclusion has to be further confirmed by data from other countries, since it may be a result of a uniquely turbulent time period.

To conclude:

1. During 2008–2020 loans of deposit-taking and other (non-bank) financial corporations to non-financial corporations have a linear negative impact on economic growth. The impact of trading volume on the securities market on economic growth is positive. Overall impact of financial depth (using domestic credit to private sector to GDP ratio) in Ukraine for the same period is negative. Therefore, in order to maximize economic growth, the main effort must be concentrated on capital market development, while the support of both banking and non-banking financial institutions can be safely reduced.

2. The hierarchy of influence of the factors, included in this study, on the economic growth in Ukraine during 2008–2020 goes as follows:

– the most influential factor is the loans of other (non-bank) financial corporations to non-financial corporations to real GDP ratio, i.e., loans of non-bank financial institutions; it affects economic growth inversely proportionally;

– the second most influential factor is the grain exports to real GDP ratio, i.e., export revenue; it affects economic growth directly proportionally;

– the third most influential factor is the trading volume on the securities market to GDP ratio, i.e., the stock market capitalization; it affects economic growth directly proportionally;

– the fourth most influential factor is the loans of deposit-taking corporations to non-financial corporations to real GDP ratios, i.e., bank loans; it affects economic growth inversely proportionally.

3. This research indicates that current functional form of financial depth-economic growth nexus in Ukraine is linear. This conclusion needs additional confirmation using longer timescale of research, since the researches, based on 40 and more years of observations, tend to show parabolic dependence between these two variables.

4. The inversely proportional relation between financial depth and economic growth indicates that financial depth in Ukraine may exceed its marginal values – i.e., there's either not enough or too much of it, depending on the theory one relies on. Since non-linearity of financial depth-economic

growth nexus on time scale over 40 years requires additional verification, other explanations may be possible: for instance, that positive financial depth-economic growth nexus is not a universal rule.

Estimation of economic growth impact on financial depth

Domestic credit to private sector to GDP ratio (which roughly corresponds to the sum of loans from deposit-taking and other (non-bank) financial corporations to non-financial corporations to real GDP ratio) is used as a dependent variable for this regression. In order to maintain consistency in other indicators, independent variables, such as gross external debt, grain and ferrous metals export, were given as ratios to unmodified GDP. Inflation is accounted for using GDP deflator as an additional factor. Per capita GDP is used for economic growth. Thus, the model is based on yearly data, and can be transcribed into this linear equation:

$$EG = f(FD; ED; EX; I), \tag{7.4}$$

where EG – economic growth, FD – financial depth, ED – external debt, EX – export, and I – inflation.

Regressing financial depth against economic growth and other abovementioned factors results in a model (**Table 7.5**).

Table 7.5 Financial depth from economic growth regression output

Variable	Coefficient	Standard deviation	*t*-ratio	*p*-value
GDP_{PC}	–8.6203e–06	2.015e–06	–4.278	0.0052***
ExM_{GDP}	–0.3637	0.092	–0.3951	0.7064
ExG_{GDP}	1.7025	3.7493	0.4541	0.6657
$Debt_{UAH}/GDP$	–0.1102	0.2399	–0.4592	0.6623
Infl	–0.0007	0.0025	–0.2810	0.7882

Notes: *** – variable is significant within 99 % confidence interval.
Source: developed by the author

Quality of this model is lower, than that of the previous ones, which reflects in adjusted R^2 of 0.8819, as well as in the fact that there's only one significant variable – per capita GDP, which represents economic growth. *F*-statistics significance of the model (17.4298) exceeds its *p*-value (0.0016), which confirms that the model is valid. Ramsey's RESET test indicates that the functional form is chosen correctly. However, Durbin-Watson criterion of 1.1297, as well as presence of variables with variance inflation factor of over 3.5 (namely for ExG_{GDP} (15.662), $Debt_{UAH}$/GDP (12.253) and GDP_{PC} (5.552), which were already mentioned as variables that interfere with each other), indicate that the model has multicollinearity problem. Unlike the previous models, removing interfering variables does not increase model's quality, and does not increase number of significant variables in it. Multicollinearity lowers the precision of coefficient estimates in the regression,

however, it does not affect variable significance or estimates of direction of the interrelations in the model. Therefore, this model can be used to confirm inversely proportional relation between financial depth and economic growth in Ukraine in 2008–2020. The model also indicates the lack of impact from grain and ferrous metals exports, as well as from external debt and inflation onto financial depth in Ukraine during this period. In other words, these factors are complementary for economic growth, but not financial depth. Comparably low quality of the model also indicates that there are major omitted factors, which account for at least 12 % of distribution of values of dependent variable.

Thus, an inversely proportional relationship exists between financial depth and economic growth. This conclusion is complementary to the previous model's statements, since the only constituent of financial depth with positive impact on economic growth is trading volume on the securities market, and it is not accounted for in this model. It is worth underlining that the inversely proportional relationship between financial depth and economic growth is unlikely to be causal; it does represent the mutual historical dynamics of these indicators in Ukraine during 2008–2020.

Therefore, even if the number of observations in the model is to be artificially increased by breaking down the data from 2008–2020 by quarters, or even by months, the direction and nature of relationship between financial depth and economic growth will not change, and some of the variables used will become unusable due to lack of quarterly or monthly data. The variables for this and previous models were chosen mostly based on data availability. In other words, if yearly data is used, the intercept of the available observations across all of the variables used, lies within 2008–2019 time period, i.e., no more than 12 observations per variable. The main restricting variables are loans from other (non-bank) financial corporations to non-financial corporations, the data on which is not available before 2008, and the trading volume on the securities market, which as of September 2022 is still not available after 2020. These variables cannot be dropped from the research, due to them being the best variables to represent financial depth of non-bank financial intermediaries and capital market respectively, – two out of three main constituents of financial depth. This, in turn, significantly decreases the number of indicators, which can be included into regression, due to the need to maintain minimum number of degrees of freedom in order to build a functioning regression. It is important to note, that with the bare minimum of degrees of freedom the regression doesn't have much explaining power. That's why, for instance, instead of including sets of variables for estimating impact of external trade (top-5 or top-10 biggest export positions by volume), the top-2 were used, one of which had to be dropped due to its high correlation with other indicators. For the same reasons, the change in structure of external trade were not accounted for, since it would require to break the time period under consideration into at least two, and build separate regressions for them, which would have to include a set of biggest export positions before and after the point in time when the trends in export changed. Or, in other words, it would not only require reducing the number of periods of each individual regressions, but also increasing the number of variables per regression.

In addition to a model based on yearly data, it is possible to build a model based on quarter data: such a model may potentially allow to include additional variables into the equation and thus reflect,

for instance, change in external trade structure. Using semi-annual or quarterly data effectively increases the number of available data points without increasing the study period, however, it still requires additional data not readily available. Loans from other (non-bank) financial corporations and trading volume on the securities market will remain the main restricting factors, since they were not documented before 2008 and are only published in the yearly format. If shares of loans from banks and non-bank institutions, can be potentially replaced with shares of assets of banks and non-bank institutions, there is no indicator available to replace trading volume on the securities market.

Expansion of the variable set allows to analyse the impact of dynamics of export structure onto economic growth. In order to do so, the equation of dependence between economic growth and financial depth will have to be divided into two separate equations, each of which would have to describe its respective time period, namely before and after the date of breaking of the trend in economic growth. Year 2008 would be one such date, since this is a crisis year, during which the long-term trend of economic growth, which existed before, ceased to be. In addition to the existing variables, which characterize financial depth, one would have to include data on volume or price of exports by groups of goods and services, which held the highest positions before and after the breaking of economic growth trend. Before and after that point, the list of these goods and services would not fully coincide, thus it would be advisable to include top 5 goods and top 3 services exported before and after the trend-breaking point, which would amount up to 16 additional variables. It would also be expedient to use either the volume of exports of the price of export, since these two indicators are connected (the higher price, the more volume proposed), and thus represent the same process.

If available data restrictions were to be taken into account, such a model would have to be based on 2009–2020 time period, however. The oldest quarterly data, currently available from open sources, starts from year 2001, and includes such variables as real per capita GDP, gross export of goods and services, denominated in USD, as well as their structure by groups of goods and services. Volumes of loans, given out by deposit-taking and other (non-bank) financial corporations to non-financial corporations, are only available in yearly and monthly data points, starting from 2007 and 2009 respectively. Gross state and inter-firm debt are available starting from 2004. Structure of export of goods and services, in yearly data points, is available starting from 2001 and 2010 respectively. Here it is worth mentioning that due to the changes in goods and services groupings during 2001–2020, it is possible to roughly evaluate changes in structure of export of goods, but not in structure of export of services. It is also worth mentioning, that domestic credit to private sector is only published by the World bank in yearly data points, and the lacking data points cannot be appended using the sum of loans from deposit-taking and other (non-bank) financial corporations to non-financial corporations.

Therefore, the original trend-breaking point of 2008 simply is not included. The next trend-breaking point would be 2014, that also had an impact on the export structure, which would give us 20 observations before the trend-breaking point and 24 more – after it. Taking into account the number of additional variables we'd have to include, such a model would not have visible advantages

over the model, included in the previous chapter, which was based on the yearly data, and thus it would be both easier and more effective to simply add the next chapter, dedicated to export structure analysis.

To conclude:

1. The model of dependence of financial depth (sans its capital market component) on economic growth further enforces the conclusion of existence of linear inversely proportional relation between the two indicators. None of the other control variables, namely, export of goods, inflation and external debt, has a significant impact on financial depth.

2. Mutual dynamics between financial depth and economic growth in Ukraine during 2008–2020 indicates that the inversely proportional relation between them is the only possible regression result for this time period.

3. Expansion of the time series, at the expense of usage of yearly or quarterly data, will not lead to qualitatively different results; it may only allow for inclusion of additional variables into the model, utility of which is questionable.

7.2 ESTIMATION OF EXPORT STRUCTURE IMPACT ON FINANCIAL DEPTH AND ECONOMIC GROWTH

It is expedient to begin the estimation of export structure influence on economic growth and financial depth by mutual correlation of the main indicators (**Table 7.6**). Quarterly GDP per capita was used as the indicator of economic growth, GDP deflator index was used as the indicator of inflation and the sum of loans from deposit-taking and other (non-bank) financial corporations to non-financial corporations, divided by GDP, was used as an indicator of financial depth. Accordingly, the inflation was found to not correlate with any of the other indicators, with maximum amount of impact it having on the external debt. Correlation between financial depth and economic growth remains negative, which is perfectly in line with our previous conclusions based on yearly data. This means that if regression is made using these parameters, the direction and nature of interconnection between these two factors would remain intact. It is also worth noting, that all of the indicators, save for inflation, have a high correlation with economic growth.

Available data allows to divide the general indicators of external debt and gross exports, and thus disaggregate their impact on economic growth and financial depth. For instance, the correlation between economic growth and gross external debt is 0.857, between economic growth and external debt of public administration sector – 0.907, while correlation between economic growth and external inter-firm debt is 0.916. This finding suggests that the aggregate influence of the external debt of the rest of the sectors (central bank, deposit-taking corporations, other sectors) decreases the correlation between external debt and economic growth, which can serve as an argument for usage of more specialized indicators for modelling, if available data allows it.

Table 7.6 Correlation matrix of the main indicators

	Per capita GDP	Inflation, %	Financial depth, %	Gross external debt, UAH mn	Gross goods exports, UAH mn	Gross exports of services, UAH mn
GDP per capita	1	–0.025	–0.938	0.857	0.951	0.954
Inflation, %	–	1	0.054	0.302	0.099	0.063
Financial depth, %	–	–	1	–0.786	–0.892	–0.912
Gross external debt, UAH mn	–	–	–	1	0.940	0.925
Gross goods exports, UAH mn	–	–	–	–	1	0.974
Gross exports of services, UAH mn	–	–	–	–	–	1

Source: developed by the author

Since the general structure of external trade of goods includes around 116 entries, top-5 entries were chosen by the volume of exports. These 5 entries did not remain unchanged during 2001–2021; for instance, the fraction of export of knives in the overall export decreased from 3.35 % in 2002 to 0.5 % in 2003 and remained that way for the rest of the time period; another example is the export of machinery and equipment, which decreased throughout the time period under observation from 7.68 % in 2001 to 3.12 % in 2021. The general trends discovered were as follows:

1) *increase in the aggregate fraction of raw materials exports in total exports*: despite decrease in fraction of ferrous metals exports from 30.6 % in 2001 to 20.9 % in 2021, there was a major increase in exports of ore, slag and ash (from 2.63 % in 2001 to 10.46 % in 2021), grain (from 2.97 % in 2001 to 18.13 % in 2021) and seeds and fruits of oil-producing plants (from 0.95 % in 2001 to 3.58 % in 2021);

2) *decrease in the aggregate fraction of processed materials in total exports*: besides the already mentioned machinery and equipment, instruments and knives, as well as ferrous metals, there was a significant decrease in exports of railway trams and locomotives (from 0.92 % in 2001 to 0.45 % in 2021), ferrous metals produce (from 3.99 % in 2001 to 1.9 % in 2021) and even fertilizers (from 2.25 % in 2001 to 0.91 % in 2021).

Both of these trends are the continuation of the previous historical trends, which began back in 1991. *Ferrous metals export retains its leading position among the exports of goods by volume during 2001–2021* with the exception of 2019 and 2020, when this position was overtaken by the grain exports. The second entry by volume was taken by different commodity groups in different points of time: machinery and equipment (2001), mineral oil and its produce (2002–2006, 2008, 2010–2011), grain (2009, 2012–2018, 2021) and ferrous metals (2020). Therefore, it is possible to conclude that Ukraine remained the exporter of predominantly raw materials

up to 2021. Overall, during 2001–2021, 12 unique commodities occupied the top-5 of commodity exports by volume.

Examining export of goods by commodity groups returns similar trends, although there are fewer unique entries into the top-5 (**Fig. 7.1**). *The fraction of technological export,* namely the machinery and equipment, transport and road equipment, as well as chemical industry produce *decreases, while the fraction of plant-based produce and oil-related products increases.*

The correlation between economic growth and the top constituents of commodity exports can be characterized as follows: 75 % of entries show positive correlation, while 58 % entries have correlation over 0.8. Exports of ore, slag and ash shows the highest positive correlation with economic growth (0.953), while exports of instruments and knives – the lowest (0.575). Other exports with high positive correlation with economic growth include ferrous metals (0.948), electric machinery and equipment (0.929) and seeds and fruits of oil-producing plants (0.916). Export of fuel (–0.302), railway and freight locomotives (–0.348) and fertilizers (–0.386) show negative correlation with economic growth.

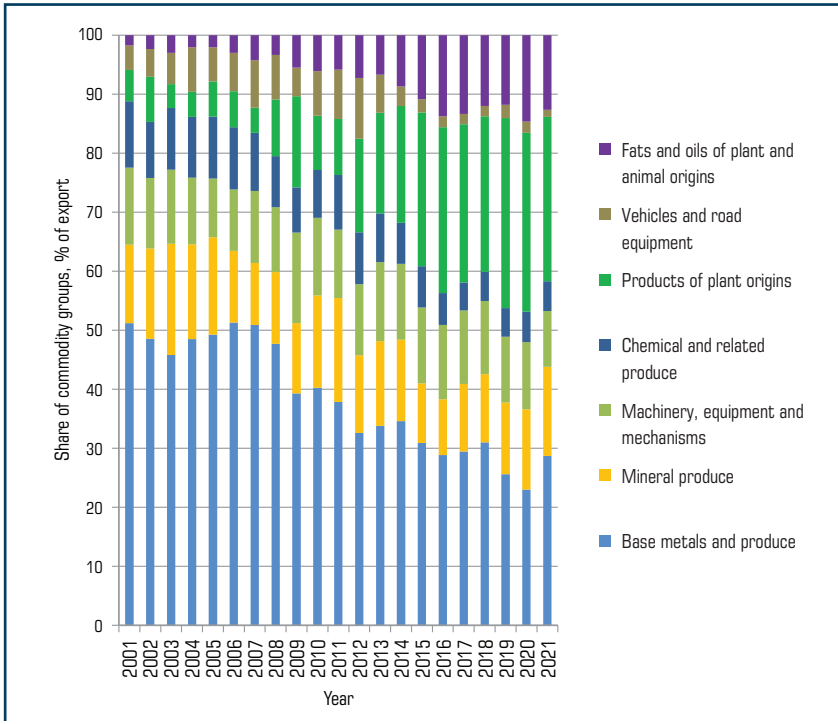

Fig. 7.1 Ukraine's external trade, 2001–2021, %
Source: compiled by the author based on data [127]

Correlation between the top export commodity groups with financial depth is symmetrical to their correlation with economic growth: all of the goods, that correlate positively with economic growth, correlate negatively with financial depth and vice versa. For instance, the highest negative correlation with financial depth has export of electric machinery and equipment (–0.882), ferrous metals (–0.878), grain (–0.865) and ore, slag and ash (–0.865), while the highest positive correlation with financial depth have exports of fuel (0.198), railway and freight locomotives (0.26) and fertilizers (0.368).

The gaps in statistics and drastic changes in the methodology of grouping of services during 2010–2021 do not allow to formulate a representative correlation matrix between the constituents of exports of services, financial depth and economic growth. The general trend, which can be inferred from the available data, goes as follows: *slow re-orienting of Ukrainian export of services from mostly transport services* (including the services of pipeline, railroad, air and sea transport – in total these position occupied 67.4 % of the aggregate export of services in 2010, and only 40.4 % in 2021) *to* the professional services, namely *telecommunications* (increase from 3 % in 2010 to 29.3 % in 2021) *and computer-related* (growth from 3.1 % in 2010 to 23.1 % in 2021).

CONCLUSION TO SECTION 7

1. During 2008–2020 the dynamics of economic growth was directly proportional to financial depth of capital market, and inversely proportional to financial depth of both banking and non-banking sectors. The highest impact on the economic growth belonged to non-banking sector, the second highest – to financial depth, and the least impactful constituent of financial depth was financial depth of banking sector. It is important to note, that data availability restricts the research period up to 12 years, which were unusually turbulent and corresponded to the period of inversely proportional dynamics between financial depth and economic growth. Therefore, the direction of interrelation between the financial depth and economic growth in Ukraine over 2008–2020 may be the result of an abnormal period of this research. The length of the period, available for research, does not allow to confirm long-term non-linearity of financial depth-economic growth nexus, and thus to define the thresholds of financial depth for Ukraine. The nature of financial depth-economic growth nexus does not change based on their permutation in a regression between the positions of dependent or independent variables. Instead, the direction of the interrelation appears to change based on the currency of estimation of the factors like GDP, volumes of external debt, export or loans from different financial institutions, even if they are all ultimately converted to relative ratios.

2. Estimation of economic growth impact and on financial depth, of export structure impact on financial depth and economic growth concludes the following. Firstly, economic growth is only inversely proportionate to financial depth and inflation. All kinds of external debt and export have a positive impact on economic growth. Secondly, public sector debt and inter-firm debt (direct

investment) have stronger correlation with economic growth than the aggregated indicator of gross external debt. Thirdly, the trends in commodity exports structure in Ukraine during 2001–2021 signify the growth in raw materials exports and decrease in high-tech exports. The exceptions from these general trends include minor growth in exports of electrical machinery and equipment (from 2.86 % in 2001 to 4.63 % in 2021). The only export entry with a higher correlation with economic growth, than gross exports, is the export of ore, slag and ash. The majority of export entries examined have a positive correlation with economic growth, except for exports of fuel, fertilizers and railway and freight locomotives. Overall, the correlation between financial depth and both exports and external debt constituents was symmetrical and inversely proportional to corresponding correlations between said factors and economic growth.

8 FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS IN UKRAINE UNDER WAR

ABSTRACT

This section, detecting the shifts from the pre-war practices of the banking system's functioning, capital market and industrial firms, substantiates that in the post-war period, the financial depth and economic growth nexus will depend on credit and investment security improvement at the expense of foreign aid and changes in the business models of industrial firms. For further beneficial financial deepening in Ukraine, it is recommended to focus on large industrial firms reforming via the reduction of zombie firms' number through liquidation or large-scale reorganisation and legalization of firms that use a quasi-risky financing model; to reorientate banks from short-term investments in securities to the real sector of economy lending; to enhance the capital market infrastructure and non-banking institutions' digitalization. Among the financing priorities of economic recovery, there are defined direct agreements regarding grants or loans with low-interest rates and longer maturities, and prioritization of state investment projects.

KEYWORDS

Credit, budget deficit, firm, economic recovery, international financial assistance.

8.1 WARTIME FINANCIAL DEPTH CONSTRAINTS

Russia's large-scale war in Ukraine has in fact put an end to lending, bank and non-bank, as well as trading in the capital market. The economy has shifted to manual management, and a large proportion of firms are forced to stop working – temporarily or permanently. That is, the conditions of the *banking* system's functioning do not provide for a normal credit process – not because of an administrative ban, but due to the sudden increase in risk (and therefore a proportional increase in the price of credit). *In wartime, government lending are the only instruments available. Corporate and retail lending is suspended. Short-term loans dominate the structure of loans*.

The share of NPLs is expected to increase due to force majeure circumstances, which will lead to significant transformations in the capital structure of banks and create the need for their state support. In order to minimise the negative impact, the NBU has introduced for bank and non-bank intermediaries a temporary loosening of the requirements for the leading indicators of their operation. However, it is unrealistic to expect their pre-war lending practices to be restored until the war is over. In turn, an increase in NPLs could further reduce the number of banks. As a result, it is seemingly that the consolidation and centralisation of the banking system will contin-

ue. A significant number of businesses that were able to maintain their existence before the war are losing that capacity, which could lead to new businesses not burdened by old debts. Banks will receive a creditworthy demand for loans, which will require a corresponding shift in current monetary policy.

Since the beginning of the war, many *non-banking* institutions were forced to suspend or reduce their activities due to the increase in "bad" loans, losses of assets and working capital, and the tightening of the NBU's requirements to non-banks. In addition, the solvent demand for non-bank financial services decreased significantly.

The *capital market* continues to function as a market for government bonds, but the range of counterparties and securities admitted to trading has been reduced due to the restrictions introduced when the full-scale invasion began. War bonds have also been added to the DGBs, representing most of the volume of trade in recent years (Section 3.2). However, the trend (as of September, 2022) of the distribution of DGBs mainly between the NBU (50 %) and commercial banks (40 %), which often served as their primary issuers, remained. The risks of martial law do not contribute to restoring foreign investors' interest in domestic debt instruments (until February 24, 2022, DGBs were the only liquid asset available to foreigners in Ukraine).

In 2022, the *budget deficit* will be covered mainly through international and monetary financing (funding the budget deficit through the purchase of war DGBs by the NBU). Thus, during January-August 2022, the NBU has financed the state budget for UAH 315 bn. This represents approximately one third of the total funding of the state budget during this period. *Against the risk of missile strikes, the NBU's participation in the direct financing of the budget deficit is fully justified since tax revenues have fallen sharply, and expenditures to support the country's defence capabilities have increased*. The central bank is forced to supply the market with liquidity in the economic crisis, since it is the only institution authorised to issue. The problem is the large volume and long-term involvement of the NBU in financing the military budget deficit.

In 2022, the high budget deficit and it's mainly monetary financing led to a rapid state debt soaring. In August 2022, the state and guaranteed debt increased by UAH 45.4 bn to UAH 3.584 tn or by $1.24 bn to $98.03 bn. In August 2022, the state debt of Ukraine decreased in dollar terms equivalent (due to recalculation at the exchange rate of UAH 36.6/$ decreased by 8 %). Since the currency exchange rate is fixed, the growth rates in hryvnia and dollar terms were the same and amounted to 1.3 %. Compared to the end of February 2022, the debt increased by 1.3 times in the hryvnia equivalent. If, at the end of 2021, the debt burden was 49 % of GDP, then in 2023 it is expected to be at 100 % of GDP. In August 2022, the government restructured the external commercial debt with deferred payments until 2024. However, these Eurobonds accounted for only 20 % of the total public debt (at the end of 2021). Accordingly, *restructuring a small part of the public debt does not solve the problem of a high level of debt burden*. In September 2022, the government signed an agreement to suspend foreign debt payments, with international partners in the G7 and the Paris Club ($3.1 bn). In general, restructuring external commercial debt and GDP warrants minimized the risks in servicing and repaying the public debt until 2024. However, in the

long run, the need to postpone payments or write off external debts will rise again in the light of a reduction in grant funding from international partners.

The growth of lending from creditors' perspective, i.e., banking and non-banking institutions, is limited by the low creditworthiness of Ukrainian firms. Based on the wide range of requirements for their activities, as well as the high share of NPLs (NPL, 28 % as of March 2022), it is not possible to count on the fact that banks will agree to lend. For example, an average metallurgical firm lost equity at –10.9 % for 2006–2020 (Section 6). Moreover, those banks that can be administratively forced to lend to the industry as part of various state development programs (i.e., state banks) accumulated 70 % of the total portfolio of NPLs in 2021. It should also be noted here that the absolute majority of state programs have chronic financing problems and therefore prefer mechanisms of administrative influence and guarantees, the provision of which is entrusted to state institutions. As a result, *banks cannot be expected to lend to frankly insolvent firms, and forcing them to do so (or easing creditworthiness requirements) only creates additional problems in the future*. Understanding of this issue exists at the state level as the current state aid measures include various options for partial risk offsetting for creditors. For example, the state guarantees of the obligations of firms on collateral, which allows for easing the requirements for debtors without increasing the risk for banks, because the risks transfer to the state. An additional possible tool to solve the problem of low-quality borrowers in the country may be the partial offset of the loan interest rate. However, such benefits are costly and risky enough to limit their use by small number of firms. Possible criteria for inclusion in it may be the social and strategic significance of the firm, the presence of direct state levers of influence on its management (for example, in the form of a majority stake in the firm in state ownership or the existence of public-private partnership relations).

However, the potential for state credit to firms is currently quite limited. The review of state investment projects (Section 5.1) indicates a chronic lack of budget funds for their implementation, which in turn leads to the delay in the performance of such projects, their increase in price, freezing and replacement by newer projects. For instance, the list of projects still includes individual building renovation projects, which began in 1986 and still need to be completed. This is because of the lack of predictable sources of budget revenue in the long run. The unpredictability of future revenues makes it much more challenging to include a credit component for government programs because it is impossible to predict the availability and sufficiency of funds to repay debts in the future. In addition, it imposes strict time constraints on the implementation of the project, while the usual practice is obvious to postpone them. Against this background, it seems paradoxical that the increase in public debt in the form of DGBs, as well as borrowing by local self-government bodies, is not carried out with the same caution (Section 5.2). The increase in external debt, recorded in 2020, accelerated due to war in 2022. In the near future, *foreign lending and borrowing will be the sole source of Ukraine's financial resources.* That raises questions as to the efficiency of the use of these loans. Even if these projects are implemented, they will not increase government revenues, as most of them are social. In particular, in 2020, of 77 registered projects, only 21 received

funding, while new infrastructure projects received 63 % of total funding (Section 5.1). Since the terms of these projects exceed the cadence of the political force that initiated them, there is a high probability that projects will also not be completed, despite its economic feasibility. State aid must therefore be segregated from the political cycle in the country.

From the firm's perspective, *loans remain too expensive* (Section 6). During 2006–2020, the average return on equity for large industrial firms ranged from 17.8 % for glass industry firms to 18.3 % for mining industry firms. Meanwhile, the aggregate industry-wide return on equity amounted to 1.25 %. In other words, negative profitability was the norm, and the amount of negative profitability exceeded the amount of positive. This rate of return is lower than the risk-free rate for the corresponding period, which ranged from 4.8 % in 2006 to 0.94 % in 2020 (the average rate for the period is 2.76 %), and therefore, at such rates, most firms obviously could not serve loans at 10–18 % rate. As the analysis of sample firms shows, they did not service them, evidenced by the high share of zombie firms (i.e., that cannot service debt for three years or longer) in the industry at 34.9 %. This is also illustrated by the small share of loans in their total liabilities of 27.5 %. On the other hand, a greater share of liabilities relates on commercial (inter-firm) credit. Firms in the agricultural, mining, food, pharmaceutical and trade industries and firms supplying gas and electricity are the exception to the general trend towards unprofitable activity. In other words, firms that supply goods and services for which there is an inelastic demand and export-oriented firms. As a result, large industrial firms in Ukraine are generally not profitable enough to be borrowers on market conditions. Therefore, they do not use any loans or use commercial credits from counterparties with inside information. The profitability of firms, providing goods and services with unreasonable demand (food, basic necessities, utilities), and exporting firms (foreign exchange income) is the result of a consistently negative external environment of functioning (in particular, a volatile national currency, war and related investment risks).

Low profitability and sales issues (Section 6.1) are indicators related to the quality of business management. Meanwhile, the state has a very narrow set of tools for influencing them. The solution to inefficient management problems is the bankruptcy procedure: more effective companies are gradually replacing those that cannot compete. However, large industrial firms fail not primarily because they are inefficient, but because of factors that have no connection with economic activity. Based on the analysis of sample firms for 2006–2020 (Section 6), firms of financial and industrial groups are 23.9 % less likely to go bankrupt than a regular firm, while firms with offshore capital have a higher chance of going bankrupt (in particular, the share of offshore capital over 50 % increases this opportunity almost twice). None of the companies, which were part of a transnational corporation, went out of business during that period. At the same time, the production indicators of firms (the number of stocks, equity, net cash flow from operating activities, etc.) influence minor the probability of bankruptcy. Thus, *companies that belong to financial and industrial groups do not go out of business regardless of the quality of their operation*. This non-market component is explained by the quasi-risky financing model, which assumes that the firm uses credit resources from the related firm (often with a joint owner or ultimate beneficiary), located offshore.

The *capital market* (Section 3.2) remains the de facto government bond market, and real sector firms have only a formal relationship with it. Firms almost do not participate in stock market trading. The most widespread instruments, with the help of which firms attract financial resources on the stock exchanges, like promissory notes, shares and bonds of firms, are characterized by a volume reduction. The main traded type of securities is DGBs, but firms are hardly involved in their purchase. *Firms,* therefore, *do not consider the capital market as a source of attracting financial resources, and its influence on economic growth is limited.*

The availability of alternative, risk-free sources of income for banks provides an opportunity to minimize participation in high-risk, low-income production loans. The banks keep a significant part of their liquidity hryvnia in the NBU's certificates of deposit. The banking system is characterized by a significant structural surplus of liquidity in the correspondent accounts of banks. More than UAH 300 bn is placed in the deposit certificates, which is almost 5 times more than the minimum reserve requirements (as of September 2022). In other words, the banking system has the financial resources to increase lending support to the economy. A sharp increase in the discount rate to 25 % did not stimulate banks either to lend or to actively invest in war DGBs, while it is possible to invest excess liquidity in deposit certificates at a higher interest rate. As of September 2022, there was a slight increase in interest rates on bank deposits and DGBs (3–5 p.p.). Demand for government domestic securities remained weak. In other words, it is necessary to adjust the interest rates of the certificates of deposit, with the assistance of which the NBU could stimulate the banks to lend.

Therefore, there is a closed circle: *industrial firms are mostly unprofitable. They are not developing because they cannot access funding. However, potential creditors do not provide financial resources, as industrial firms are chronically unprofitable.*

8.2 FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS IN UKRAINE: WHAT NEXT?

Until February 24, 2022, the relationship between financial depth and economic growth in Ukraine was characterised as follows:

1. From the lender's point of view: the poor financial performance and low solvency of an average industrial company make their loans incompatible with the market logic of maximizing profits and minimizing risks. In addition, for banks, lending to these companies could contravene the regulations regarding NPLs in the portfolio.

2. From the borrower's perspective: there are two main types of firms whose financial condition makes it impossible to attract loans and investments: zombie firms and firms that use a quasi-risky financial model. The former are chronically in deficit because of their inability to adapt and function in the Ukrainian economy and deserve little attention because of their low expected life expectancy. The second is a company where owners prefer to protect their assets over maximizing profits.

3. The capital market has functioned almost exclusively as a public debt market, where only the NBU and banks trade, and thus has practically no influence on the financial resources of industrial companies.

4. The budget does not have long-term projected sources of revenues that could be used to finance any state aid to stimulate investment and credit provision of firms.

After February 24, 2022, russian military aggression only exacerbated existing problems and created new ones. The rapidly rising investment risk in Ukraine has increased the already high cost of financial resources from the point of view of the company. A large number of companies have suspended or completely shut down their normal production activities, resulting in a loss of profitability and, consequently, solvency. In addition, the disruption of the regular production activity of firms, together with the destruction of their property, will lead to the deepening of problems with servicing existing debts and, therefore, problems with NPLs for banks. At the same time, mass destruction requires additional funding to restore production facilities, sometimes urgently.

As a result, the capacity of the Ukrainian financial sector to sustain economic growth has generally declined in 2022 relative to 2020. *At the same time, even between 2006 and 2020, the financial system could not be used as a driving force for industrial development.* Until February 24, 2022, as shown by the simulation (Section 7) on the relationship of financial depth distributed by components, the banking and non-banking sectors did not positively impact economic growth in 2006–2020. The impact of the capital market was positive in the direction but insignificant in magnitude. In other words, attempts to increase credit as a result of reduced costs have not led to economic growth, and the capital market has not affected it. Thus, both *the banking system and the capital market in the pre-war state are unlikely to sustain post-war reconstruction*. In addition, a positive link between credit growth and economic growth will depend on debtors' ability to generate value.

Despite the loosening of numerous requirements for both bank and non-bank lenders, it does not seem possible to maintain previous credit levels. For the *banking system*, it will be necessary to shift from easy risk-free income in the form of DGBs to the development of lending by transferring part of the risk to the state. For example, by using the mechanism of partial compensation of the interest rate, ensuring solvent demand for loans by facilitating the procedure for creating a new business and providing such firms with exemptions.

To restore the *non-banking institutions*' activity, it is necessary to strengthen the ability to provide online services to embrace finance access of the population in territories with destroyed financial infrastructure due to the war.

The capital market will require a revision of its regulatory practice to European standards. *The capital market will have more problems because Ukrainian firms have never seen it as a source of financial resources or a mechanism for attracting them, which is reflected in the structure and frequency of trading*. Businesses considered registration and disclosure requirements to be additional obligations and were often characterized as excessive. The peculiarities of the functioning of the domestic capital market have resulted in particular practices for Ukraine. In particular, the

usual practice for early-stage companies is to attract initial investment through an IPO and to finance an already developed company by issuing bonds. Ukrainian practice was an entirely different one. Infant firms tried to draw resources through the issue of bonds. In contrast, mature companies conducted IPOs at the same time, mainly on foreign exchanges (in particular, the Warsaw Stock Exchange). Therefore, to create a positive influence of the financial depth of the capital market on economic growth during the period of post-war reconstruction, the review of the rules of the functioning of the domestic capital market and its transformation from a government borrowing market to an efficient capital market will be necessary.

In the post-war period, the budget's reliance on emissions financing must be optimized. In particular, the targeted direction of monetary support should be strengthened to stimulate investments in the real sector and finance credit programs to transfer the emission of money from the military to the consumer market. At the same time, any measures aimed at expanding lending – state loan guarantees, partial compensation of interest rates, or direct lending of individual firms to state banks – will require additional budget expenditures. The same applies to measures which stimulate capital market development.

The reduction in the profitability of firms, together with significant economic and human losses, has reduced budgetary revenues and the possibility of offsetting market failures at the expense of state aid. Currently, the majority of fiscal expenditures are funded by government bonds (27 %) and obligations of local self-government bodies (14 %), as well as grants from foreign governments. The final cost of reconstruction ranges from € 200 bn to € 1 bn. Moreover, the cost of these resources is also critical, as Ukraine will have to repay these increasing debts in the future. The most crucial issue is how much money the Western partners will irrevocably give and how much in credit (and under what conditions). First, the *economic recovery calls for grants, not loans*. In the latter case, there is a risk that the money received will be spent on old debts and not on the needs of the economy. Secondly, *loans should be relatively favourable*: with low interest rates and longer maturities (about 30–40 years) and with a prolonged period when payments on these loans are not provided. Thirdly, the *trade finance guarantees of developed countries* will assist Ukrainian companies to continue their operations, and counterparties will not refuse to cooperate with them. International partners may issue state guarantees to their businesses in order to raise funds for investments in Ukraine. These guarantees will make it easier to invest in industrial and infrastructure projects in Ukraine. Fourthly, *russian assets frozen abroad* should be used to contribute to and repair Ukraine's economy. Creating a fund at the expense of international financial institutions will provide long-term free loans for civilian infrastructure rebuilding, and will allow Ukrainian firms to take preference loans to restore their capacities completely. Meanwhile, donors should be able to monitor the cost-effectiveness of their investments. Overall, the amount of financial aid to Ukraine will depend on its transparent use.

Thus, due to the accumulated problems in the functioning of the financial sector, which are worsened by the war, the *financial depth and economic growth nexus will depend on attempts to*

solve the most destructive challenges at the expense of foreign grants and loans. The real Ukrainian sector can no longer exist as it used to. Chronically unprofitable companies (zombie firms) and ones that optimize taxation and protection from the potential hostile acquisition due to loss of solvency do not have the resilience needed. This could lead to the creation of new companies which will be managed taking into account the most recent global practices. However, their operation will call for a more transparent institutional environment.

CONCLUSION TO SECTION 8

For further beneficial financial deepening in Ukraine, the following is vital:

1. To reform large industrial firms, there is a need in:

1.1. Reduction of zombie firms' number through liquidation or large-scale reorganisation. The circumstances of the war will force creditors to institute insolvency proceedings against bad debtors. Government support for individual strategic companies can be ensured, but by attracting new leaders, having a clear business plan and measurable performance targets. At least partial state control over such firms is also necessary.

1.2. Legalization of firms that use a quasi-risky financing model or similar schemes. The owners of such firms must be provided with guarantees for protecting property rights within the country while simultaneously reducing the possibility of receiving financial resources from offshore, possibly even through administrative methods. Reducing the ability to finance businesses within the group (at the expense of related foreign lending) will force businesses to maintain financial statements that are more attractive to creditors.

1.3. Establishing priorities across industry branches for modernization. Although economic recovery largely depends on rebuilding infrastructure, housing, agro-industrial facilities, and the defence and medicine industries, integration into modern production chains will stimulate technology transfer. That will be beneficial for industrial modernization, specifically in processing raw materials into finished products and the decarbonization of Ukraine's economy.

2. Reorientation of banks to lending of the real sector. Reducing the possibility for banks to use DGBs, as well as the normalisation of financial statements of potential borrowers, should lead financial resources to the real sector. A temporary access to foreign credit and grants from partner countries as part of the post-war rebuilding plan should make this easier.

3. Enhancing the capital market activities as a source of financing for the economy. At the moment, their efficiency is limited by the competence of its regulator, the quality of internal rules and the legal framework. In addition to solving internal organisational problems, the capital market can be activated by the exit of Ukrainian firms to foreign markets or the entry of foreign strategic investors into Ukrainian trades. This can be achieved in the context of post-war recovery. That will allow Ukrainian firms to attract financial resources, even if the functioning of the Ukrainian capital market is interrupted. The main constraint is the refusal or inability of the companies themselves

to comply with the listing conditions. The main limitation for Western investors regarding activity in Ukrainian capital market is the lack of understanding of local specifics.

The issue with the lack of budget funds will deepen soon. However, the current situation makes it possible to extend external loans under a similar Marshall Plan for Ukraine. It is necessary to focus primarily on the following:

– encouragement of direct agreements between foreign creditors and Ukrainian borrowers: minimizing the number of intermediaries will potentially reduce transaction and corruption costs and make it easier to track how financial resources are used;

– prioritization of profitability in state investment projects. The state lacks predictable medium- and long-term sources of budget revenues, and therefore they must be created. Using loans from international organizations and partner countries as a source of financing means increased requirements for the self-sufficiency of projects implemented at their expense.

The priority of Ukraine's economy transformation within the framework of post-war reconstruction should be focused on overcoming imbalances in the financial deepening at the expense of:

– digitalization of banking and non-banking sector, which will contribute to the expansion of financial access and financial inclusion (due to the launch of the Ukrainian regulatory sandbox of the NBU, the transition of the SEP to the international standard ISO 20022, which will correspond to the EU's payment systems, the introduction of open banking). In turn, the digitalization of financial services will lead to the overall development of the domestic IT sector, which provides foreign currency income at a level equal to the remittances to Ukraine;

– the activation of bank lending and secondary capital market (by adjusting interest rates on short-term securities and development of the green bond market).

CONCLUSION

1. The financial depth of the economy is a parameter of financial relations, the value of which reflects the ability of the financial system to redistribute financial resources and influence the national economy in terms of not only its liquidity, but also the formation of debt liabilities. Although the traditional quantitative indicators of financial depth are the ratios of domestic credit provided by financial institutions to the private sector to GDP, assets of financial intermediaries to GDP, money supply to GDP, and stock market capitalization to GDP, these common indicators of financial depth only partially cover various functions of financial resources. At the same time, the indicator of domestic credit provided by financial institutions to the private sector to GDP is the most relevant because it usually has the highest significance in the GDP or GDP per capita regression. In general, the nexus between the financial depth and economic growth declares itself when: on one hand, the financial development via the financial deepening (financial institutions and financial markets, firms and households) forms the supply of financial products and services, and, on the other hand, economic development expands the demand for them.

2. The reverse aspect of the relationship between financial depth and economic growth is reflected in the change of the financing structure, as well as ofeconomy's openness (capital movements liberalization) and institutional environment. The existing indicators allow to draw a conclusion about the sufficient or insufficient level of institutional development for financial deepening. Currently, the harmonization of Ukraine's financial legislation with European integration is at the stage of advanced regulatory convergence and the beginning of practical implementation.

3. According to existing theoretical concepts, the relationship between economic growth and financial depth tends to be wave-like and weakens at high levels of financial depth. Financial depth positively affects economic growth when it is within 45 %–70 % of GDP but has no effect or even a negative when it is outside this range. While empirical studies based on international statistics from 1960–1980 show a linear and directly proportional relationship, those using more recent statistics do not support this relationship. The potential nonlinearity of the relationship is due to the presence of thresholds of financial depth, at which the influence of financial depth on economic growth changes direction. Meanwhile, the negative relationship between financial depth and economic growth signals that a significant share of financial resources is directed to ineffective investments (for example, debt servicing), thereby not contributing to economic growth. Another manifestation of the influence of financial depth on economic growth is the pace of financial deepening: high volatility of financial depth correlates with the high volatility of inflation and GDP growth, i.e., accelerated financial deepening is usually associated with increased economic instability. Accordingly, a low level of financial depth threshold does not necessarily indicate the need to increase financial depth. As financial development without economic growth can lead to financial instability, increasing financial depth should be associated with optimal indicators of economic development.

4. Defining the financial prerequisites of economic growth allows to:

a) narrow the potential scope of variables for analysing the dependence of economic growth on financial development;

b) establish their hierarchy and the place of financial depth in it;

c) justify the use of financial depth as an indicator of overall financial development.

Based on the standard Cobb-Douglas production function, the influence of financial factors on GDP is traced through their formation of consumption and savings. Thus, financial depth, expressed as the share of loans to GDP, indicates the ability of the financial system to transform consumption into savings. The analysis of GFC demonstrates a change in the nature of the relationship between financial depth and economic development, particularly in terms of the shift of the tendency towards a direct-proportional relationship between them, which prevailed since the 1960s. The statement about the positive impact of financial deepening on economic growth results from a unique crisis-free period in history and the lack of fundamental long-term research on the topic. The GFC led to a weakening and, in some cases, a reversal of the influence of financial deepening on economic growth. The GFC suggests the imperfection of existing estimates of the relationship between financial deepening and economic growth. After the first major crisis since the Great Depression, this relationship weakened significantly and, at certain time intervals, even changed its direction. Additionally, a number of common factors of economic growth have lost significance, potentially implying the need for better indicators to characterize labour force and human capital growth. In addition, the GFC actualizes the critical issue of distinguishing credit growth that leads to a crisis from credit growth that leads to economic growth.

5. As predictors of the crisis, significant jump-like growth of specific indicators of financial depth (by 30 % or more) during a short period, and the value of financial depth over 100 % of GDP can mean that the economy is overburdened with loans. Also, about a third of all credit booms lead to a crisis, but most of these are short-term, do not have systemic signs, and have less severe consequences. It is also apparent that only financial depth is not enough to distinguish between positive and negative lending growth. In particular, an essential factor is the growth of real production. The adverse effects from non-financial factors, for example, the reduction of foreign trade, remain significant for reducing economic growth regardless of the level of financial depth of the economy. Moreover, the low level of integration into the global financial markets also means that access to credit resources becomes more complicated during the crisis due to the priority from borrowers from developed countries to their closer counterparties.

6. An essential condition for the positive relationship between financial openness and high-quality financial deepening is the proper development of market institutions and the stability of state regulation. The movement towards financial openness should be subordinated to the pace of formation of a structurally full-fledged financial sector of the country. Therefore, the policy of financial openness should be derived from the country's economic development policy in a strategic and systemic sense. This can be especially relevant if the economic development policy includes structural reforms and eliminating economic inequality.

7. On a global scale, assets and liabilities, domestic credit to private sector, stock market capitalization, debt to GDP have increased despite the slowdown in GDP during the GFC and pandemic crisis in 2020. Higher monetization is characteristic of advanced economies, as it is associated with a higher economic growth rate. At the same time, this shows a dangerous disproportion towards the financial sector, as the rapid pace of financial deepening could bring about an economic slowdown.

8. The banking sector, to a greater extent, and the non-banking sector, to a lesser extent, form the financial depth of the Ukrainian economy (taking into account growth rates and the ratio of assets and liabilities to GDP). There is no activity on the capital market except for transactions with government debt securities, which does not contribute to the effective use of available financial resources.

9. The financial deepening of Ukraine's economy was observed during 2000–2008 due to economic stabilization (there was a trajectory of steady economic growth after the financial crises of 1998, 2008–2009). Deposit mobilization and foreign capital inflows ensured the growth of the volume of loans in non-crisis periods. Although the higher use of bank loans until 2009 was supposed to boost economic activities, credit support for Ukrainian firms was significantly limited. This is explained by the fact that during periods of financial deepening of the economy, financial resources were not directed to the technological modernization of industrial firms. Financial deepening related to corporate lending of highly profitable economic activities (in particular, trade) and consumer lending; carrying out transactions with government securities (DGBs and the NBU's certificates of deposit).

10. Under post-war recovery, it is crucial to develop the secondary market of securities, and not only the trade of DGBs on the primary market, because there is a diversion of credit resources of banks in the national currency to finance the deficit of the state budget. At the same time, sustained, large-scale government bond purchases of Ukraine's government toolbox in 2022, what one might call excess monetization, are motivated by public finance sustainability objectives and macroeconomic wartime instability.

11. Economic growth slows down when the macroeconomic impact of financial deepening is offset by additional debt pressure. The economy can both rise and fall – depending on the ratio of marginal effectiveness of financial deepening and the corresponding rise in the debt burden. Therefore, the additional debt burden, associated with financial deepening, should be lower than its marginal effectiveness. If an economic slowdown starts, a gap emerges between debt and financial deepening: the level of the former rises sharply, while the latter stagnates or decreases. This is because the volume of available finances during a crisis is always less than the supply, especially under increasing debt pressure, which causes financial drying up.

12. Redistribution of investment resources via the public sector is one of the critical sources of economic development. State guarantees, which have not been fully used in the pre-war structure, can serve as one of the additional sources of the revitalization of economic activity. Meanwhile, the currency structure of the state credit requires greater concentration in the national currency to minimize currency risks.

13. The increase in total volume of loans, taken by the local self-governing bodies, indicates economic growth during 2015–2021, since attracting loans by such entities requires increase in both developmental budgets' volumes and local budgets' income. However, the 4-fold increase in 7 years can potentially create problems with further expansion and the local debt servicing.

14. The dynamics of all the kinds of state debt and state-guaranteed debt in Ukraine, during 2010–2021, has been ascending, that points the acceleration of debt burden and/or refinancing of old debts by taking new ones. This trend will result in debt servicing constraints, at least in short-term and medium-term perspectives due to the increase in DGBs and cessation of the normal functioning of the economy due to war.

15. The financial performance of most of the investigated firms is in crisis, i.e., sample firm's inventory exceeds both their own working capital and the debt. This means the accumulation of significant volumes of de facto illiquid indicates problems with sales and liquidity. The exceptions were certain firms belonging to the primary exporting industries (i.e., those with foreign exchange income, for example, agriculture) and the trade industry, which traditionally has a small share of stocks. The return on capital and assets among the studied Ukrainian firms is low. On average, the return on capital of large Ukrainian firms varies from minus 17.8 % to 18.3 %, and the return on assets minus 1.9 % to 12.3 %.

16. Firms of all industries, except mining, pharmaceutical and energy, rely primarily on borrowed funds, only up to 27.5 % of which are loans. Large Ukrainian firms lost their creditworthiness during 2006–2020 due to the increase of the share of firms with negative equity. The quasi-risk model of their financing explains the continued attraction of loans by some insolvent firms. Specifically, most Ukrainian firms prefer short-term loans denominated in the national currency. The exceptions are the construction, metallurgical and energy industries, about half of which debt is accounted for by long-term loans. Meanwhile, loans denominated in foreign currency are available to firms with foreign exchange income (exporters) and zombie firms (with negative equity and debt service problems). Finally, high volatility of profitability increases the riskiness of the studied firms, which increases the cost of resources for them, attracted through the banking and non-banking sectors, as well as through the capital market. During 2006–2020, only mining industry firms had sufficient profitability to service loans. At the same time, the cost of loans for firms with "normal" levels of credit risk is too high, while for firms with an increased level of risk – it is attractive. However, such firms themselves do not form effective demand.

17. Crisis phenomena in Ukraine during 2008–2020 led to the inability of medium-sized firms to service their loans. The policy of minimizing the cost of loans to stimulate the economy turned out to be a failure, since most of the investigated firms' profitability was insufficient even to service such loans. It is noted, that the cost of new loans and the return on equity (profitability) of the sample firms do not have a significant correlation with economic growth, while the expected cost of equity, the shares of loans and debt in total assets do. This indicates that such firms use a quasi-risky financing model or ignore loans taking. In addition, the share of debt and the share of loans in industrial firms' assets are significant. The first indicator contributes to economic growth,

while the second is the opposite. This demonstrates a reduction in lending volume during economic recession and the replacement of bank loans by commercial (inter-firm) credit due to their relatively lower value.

18. There is a significant linear relationship between financial depth and economic growth indicators in Ukraine during 2008–2020. The impact of bank and non-bank loans is negative, which potentially means that the economy is oversaturated with loans at this stage and the inability of further credit expansion to contribute to economic growth. The influence of the trading volume on the securities market is positive, which means the expediency of stimulating its development in order to stimulate economic growth. It is found that the direction of the influence of bank and non-bank loans changes depending on the currency of the GDP/capita estimate (which is used as an indicator of economic growth). Although none of the other control variables, namely commodity exports, inflation, and external debt, significantly impact financial depth, there is:

a) an inversely proportional relationship between economic growth, financial depth, and inflation;

b) a directly proportional relationship between economic growth and all types of external debt and exports.

19. The trends in the foreign trade commodity structure in Ukraine during 2001–2021 demonstrate the growth of raw materials export and the minimization of high-tech exports. The exception is a small rise in exports of electrical machinery and equipment. Generally, most exports are positively linked to economic growth, with the exception of exports of fuel, fertilizer, rail locomotives and freight. The direction of the connection of financial depth to debt and external trade factors reflects the direction of their connection to economic growth.

20. During wartime, the banking system operates almost exclusively as a tool to finance the fiscal deficit, and there are few active players capital market. In other words, the channels of influence of financial depth on economic growth have temporarily ceased to operate, and economic growth itself has stopped and changed the vector in opposite. The financial depth and economic growth nexus will depend on attempts to reconstruct the Ukrainian economy by the financial international aid. In the meantime, the real industry cannot exist as it did before 2022. Businesses that are chronically unprofitable and those that optimize tax and protection against the potential proxy battle due to solvency loss, lack the resilience needed. There is a need to reduce administrative obstacles to business development and only then to create conditions for the development of new businesses to be managed, taking into account the latest global practices. Their operation will require a more transparent and functional institutional environment.

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Edited by
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FINANCIAL DEPTH-ECONOMIC GROWTH NEXUS IN UKRAINE

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Monograph

Technical editor I. Prudius
Desktop publishing T. Serhiienko
Cover © PC TECHNOLOGY CENTER

PC TECHNOLOGY CENTER
Published in December 2022
Enlisting the subject of publishing No. 4452 – 10.12.2012
Address: Shatylova dacha str., 4, Kharkiv, Ukraine, 61165
