

FINTECH AND MACROECONOMIC DYNAMICS: THEIR IMPACT ON GROWTH DURING ECONOMIC UNCERTAINTY

S. LIÇI

Sindi Liçi

Epoka University, Albania

<https://orcid.org/0009-0002-5301-4871>, E-mail: slici23@epoka.edu.al

Abstract: *This study examines the role of FinTech integration, financial leverage, investment and inflation in growth during economic disruption. The empirical framework employs a multiple regression model estimated using Ordinary Least Squares on a balanced panel dataset of 29 countries from 2016 to 2024, incorporating a dummy variable to capture crisis consequences. Fintech-driven solutions play an essential role in managing excessive debt and investment allocation under uncertainty. The findings show that financial leverage has a significant detrimental effect on economic growth distinctly from the favorable influence of investment alongside moderate inflation supporting macroeconomic stability. Digital finance enhances economic growth through financial inclusion and investment efficiency, fostering development. The severe contractionary impact of pandemic crisis is reflected by the dummy variable. Findings emphasize the importance of FinTech adoption in finance, investment and growth policy insights.*

Keywords: *financial leverage, FinTech, growth, investment, economic disruption*

1. Introduction

The relationship between financial development and macroeconomic stability has been a widely studied topic to incorporate into government policies and long-term planning strategies in order to accomplish growth expansion according to economic circumstances. According to Akinci and Queralto (2022), the banking sector was identified as a critical component of the financial sector, with its primary technique being the management of loans given to consumers or other financial institutions through the use of leverage. Leveraging has the potential to improve loan availability, but if financial institutions manage it poorly, it can become detrimental to the economy.

However, numerous research have shown that the cost of debt is dominated by predicted advantageous returns due to investment opportunities made possible by financial leverage (Arcand et al., 2015). Even while investments have the ability to increase productivity and strengthen the economy, debt levels should not be exceeded in order to avoid unfavorable effects from future growth, especially during recessions. Inflation's help in determining its relationship to GDP growth and forecasting economic deterioration, such as a pandemic era, is necessary to maintain a balance between debt and investment. As previously stated, gross fixed capital formation, which includes contributions to tangible assets in the pursuit of output and demonstrates a nation's economic potential, is the primary growth driver.

Understandably, the impact of these components is the indicator for economic growth trend interpretation and justification. Issues related to the strategy for achieving economic growth still continue due to the fact that many countries suffer from financial management or macroeconomic instability. *However, aim of this paper is investigation of the influence of independent variables in economic development in accordance with economic downturns and moderating effect of the interaction between FinTech and investment.*

Additionally, through risk assessment and investment allocation, FinTech integration has lately been incorporated into financial development. Even if it is still in its infancy, the application of technology in finance has shown revolutionary outcomes in the management of debt structure and investment profitability. Additionally, an analysis of their impact is used to determine their link with the dependent variable in order to guarantee efficiency. Interpretation of the analysis helps in clarifying disparate assumptions that do not match statistical findings. Considering those nexuses between variables and the diverging results so far, *this study defines the following research questions:*

- *RQ1: What are the dynamics of independent variables in growth along with the contractionary impact of pandemic crisis?*
- *RQ2: How FinTech integration shapes economic growth through the mediation it makes on fixed capital accumulation?*

2. Literature review

2.1 Financial Sector Leverage role in Driving Economic Expansion

Several authors have examined the economic effects of financial leverage using a combination of panel data and theoretical analysis. Economic dynamics are influenced by financial leverage, according to conclusions derived from empirical data and rigorous interpretation. Numerous studies, especially in this area, have indicated support for leverage in banking and investment activities. However, taking on more debt than is necessary might have negative consequences and cause financial strain. Long-term valuation may be lowered by excessive debt, which would slow economic growth. Furthermore, only when capital structure restrictions are taken into account, economic stability can be established. According to Gertler and Kiyotaki (2015), leverage variations and the financial sector's inclination have a sufficient impact on macroeconomic development.

The 2008 global financial crisis severely hampered real GDP growth because of the unpredictability surrounding the banking system and its reliability. According to Zettelmeyer et al. (2008), the banking system's ambition to boost loan activity through debt improves credit availability to households or other institutions but has significant detrimental consequences on economic growth.

Financial development during the pandemic had a significant impact on the economy; however, in order to smooth the financial activity of institutions, especially in the banking system, investments had to be handled by a specific amount of debt (Demirgüç-Kunt et al., 2016). Leverage promotes economic growth, but it has a detrimental effect during economic downturns when there are few investment prospects. Real economic growth is stifled by the detrimental effects of a capital structure marked by excessive debt and as such, this study raises the first hypothesis as follow:

H₁: Higher financial leverage negatively affects economic growth

2.2 Gross Fixed Capital Formation as a Measure of Investment Opportunities in Economic Growth

The purchase of produced assets that boost investment prospects and productivity is included in gross fixed capital formation. Due to economic conditions like to the pandemic crisis, which are characterized by a decline in real GDP growth and a lack of investment possibilities, investment needs to be carefully supported and managed in order to promote resilient economic growth. The rationale for investment transformation into future growth in panel datasets was undoubtedly enhanced by the results presented, which were supported by high-level research on the impact of investment on economic growth (McGrattan & Prescott, 2014).

Findings that explain the close relationship between investment and economic growth support the conclusion that it has a favorable impact on growth (Gutiérrez & Philippon, 2017). For economic complexity, capital weight and growth investment are crucial (Bils et al., 2021). Investment lucrative cycle patterns determine growth. Even while the surge in corporate investment characterizes economic peaks, its beneficial effects account for variations in GDP growth across time. Multiple regressions based on panel datasets show that capital accumulation has a significant beneficial impact and is a driving force behind economic progress (Cerra & Saxena, 2007), as such the next hypothesis is:

H₂: Increased gross fixed capital formation positively affects economic growth

2.3 *Inflation Dynamics and Price Stability Fluctuations in Economic Growth*

Although the intricacy of their relationship is frequently discussed, economic growth is positively impacted by moderate and stable inflation, whereas excessive rates impede it. Because of the excessive demand in accordance with equilibrium, which is closely related to the situation, the central bank takes crucial steps to achieve stability. Theories suggest that high inflation is necessary for economic velocity, despite the fact that it leads to growth volatility, confusion in assessing the cost of debt, and deceptive circumstances regarding economic advancement. Inflation dynamics in macroeconomic growth are explained along with its interaction with real GDP (Reis, 2023). The positive impact of inflation, particularly the stable or moderate one in economic growth is defended by its empirical findings.

In regression analysis using panel datasets, this interaction is highly useful for identifying trends in economic growth (Hazell et al., 2022). Previous research has thoroughly examined patterns that have the potential to positively impact economic growth (Ascari & Sbordone, 2014). According to Gopinath (2017), the inflation threshold clearly outlines its beneficial effects up to the highest point of economic growth. Empirical findings from 2020 and beyond demonstrate how COVID-19 affected inflation trends (Senhadji & Khan, 2000). In order to give answer to the research question, the other hypothesis of this study is:

H₃: Moderate increases in inflation positively influence economic growth.

2.4 *The Pandemic 2020 and Its Impact on Economic Growth*

According to the macroeconomic studies model, a dummy variable must be included to the regression equation in order to capture the pandemic's effects in 2020. Specific empirical findings employing panel data models demonstrated the detrimental effects of pandemic implications on economic growth (Guerrieri et al., 2022). For an organized research and investigation of its impact, macroeconomic pandemic shocks were isolated during empirical findings (Eichenbaum et al., 2021). The pandemic year caused long-lasting effects that must be supported in a regression model, particularly for economic growth (Deb et al., 2020).

The relationship between the pandemic crisis and economic growth was evaluated rigorously, with regions that must be taken into account for growth fluctuations (Baqae & Farhi, 2020). These macroeconomic studies all support the addition of an economic dummy variable. According to Jordà et al. (2021) research, the overall effect of the pandemic crisis' long-term effects was determined. To capture once again the effect of pandemic with other macro variables the following hypothesis is raised:

H₄: Economic crisis exerts a significant negative effect on GDP growth.

2.5 *FinTech Adoption and Its Impact on Economic Growth*

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In times of economic instability, FinTech integration has been widely discussed as a means of assessing the risks associated with financial leverage, evaluating borrowing opportunities, and assisting in the allocation of investments for lucrative returns. FinTech solutions have the necessary criteria to be employed as efficient emergency tools, especially during a pandemic when the economy is characterized by financial losses, a decline in total output, a collapse of the labor market, and the need for profit or leverage to finance projects. A new area for digital financial intermediation in the economy has been created by FinTech integration in corporations and banks, which has recently produced profitable prospects from risk prediction and investment in particular assets. Additionally, by easing collateral requirements and assisting customers in investing in priceless tangible assets, FinTech lending has significantly expanded bank credit. FinTech integration, which promotes economic growth through two mechanisms—economies will rely more on digital capital, which consequently increases investment efficiency, and multiple financial facilities in underserved economies, which improve macroeconomic performance—is mentioned in this study in relation to financial inclusion (Isayev, 2025). Through credit channels derived from digital banking transactions that result in investment efficiency and risk assessment, financial inclusion boosts economic growth (Demirgüç-Kunt et al., 2016). By incorporating FinTech integration into the model to investigate its dynamic implications during economic disruption, this study supports these concepts and raises the following hypothesis:

H₅: Higher FinTech adoption positively affects economic growth.

2.6 The Synergistic Effects of FinTech Integration and Fixed Capital Accumulation on Financial Efficiency and Economic Performance

Estimating and analyzing the relationship between FinTech integration and investment is part of this study's contribution in order to produce well-organized empirical findings. Asymmetric information and transaction costs are reduced by using technology in finance. The usage of digital platforms that produce data for credit evaluation and allocation is made easier by digital banking activities. Loans and investment capital are distributed to successful projects, promoting efficiency (Beck et al., 2000). Despite its difficulties, the role of FinTech adoption as determined by digital access to financial services and products has been the focus of recent economic research studies (Aduba et al., 2023).

According to the literature review, every aspect mentioned has a major impact on economic growth. The additional research contribution carried out in this paper is defined by the inclusion of a dummy variable to clarify and interpret the effects of the pandemic crisis, taking into account that the estimated interaction of FinTech integration in investment allocation is underexplored. The model is interpreted using both financial and macroeconomic analysis, however the majority of the articles have approached them in a different way. FinTech integration significantly moderates the relationship between investment and economic growth which improves capital allocation and suggests better financial functioning, as follow:

H₆: FinTech integration strengthens the relationship between investment and economic growth by improving capital allocation and financial efficiency

3. Methodology

3.1 Model specification

To guarantee reliable findings, empirical research examines the connection between macroeconomic variables and FinTech integration in boosting economic growth using panel data estimate methodologies. Pooled OLS is used by Xing et al. (2025) to investigate the dynamic effects of independent variables as a baseline model. Pooled OLS can have econometric problems including heteroskedasticity and serial correlation, despite

its simplicity of interpretation. These problems can be resolved by using robust or clustered standard errors. Many research employ sophisticated models, such as fixed or random effects, with the Hausman test as a demonstration for proper implementation in order to overcome these restrictions. However, pooled OLS is sufficient as a baseline specification for determining the changes in the response variable arising from explanatory variables. Due to the focus in the long-term integration of financial technology and macroeconomic stability between countries, this study will use pooled OLS with clustered standard errors over one-way fixed effects analyzing within-country variation. Furthermore, the two-way fixed effect model absorbs the dummy variable because does not change over time which is one of the research objectives of this study.

In order to account for unobserved country-specific features that remain consistent across time, Cerra and Saxena (2007) employs a fixed effects model. The FE model enhances its validity and contributes to research questions and hypotheses by eliminating time-invariant heterogeneity and reflecting within-country differences. Conversely, the random effects model implies that there is no correlation between variables and that unobserved individual effects are distributed randomly. To better explain macroeconomic analysis, Deb et al. (2020) uses a fixed over random effects model. In light of these methodological strategies, a pooled OLS method with clustered standard errors will be used in this work to account for serial correlation and heteroskedasticity even though endogeneity and reverse causality remain strong limitations of this study. The conclusions about the models used in the literature review are presented in Table 1.

Table 1. *Models of the literature review*

<i>Estimation methods</i>	<i>Authors</i>
<i>Pooled OLS as a baseline</i>	<i>Xing et al. (2025)</i>
<i>Fixed effects model</i>	<i>Cerra and Saxena (2007), Deb et al. (2020)</i>

(Table 1) refers to specific models used from authors in the literature review.

3.2 Data and variable measurement

The objective of this research is to interpret financial leverage and FinTech integration in conjunction with macroeconomic consequences while anticipating economic situations from pandemic crises. For organized research and secondary data gathering, reliable sources are utilized. Information from the enormous databases of the IMF and OECD creates the panel configuration. The years 2016 through 2024 are taken into consideration for a thorough regression study.

The value generated by a nation's production over a given period of time and inside a specific nation is measured by the real gross domestic product. The real GDP growth indicator is the percentage growth rate for each year reported in constant prices and was adopted as a proxy for development by Akinç and Queralto (2022). Financial leverage is represented by the ratio of certain assets to total equity on the balance sheet of the financial institution. This ratio justifies interpretations regarding the capital structure and level of financial leverage for activity purposes consistent with Gertler and Kiyotaki (2015).

The contribution to physical assets comes from the accumulation of fixed capital, which is a vital engine of the economy and aims for productivity and growth, adopted as a variable by McGrattan and Prescott (2014). One of the most important macroeconomic indicators is inflation or price stability, typically given as a growth rate each year that aligns with the variable of Reis (2023) and Gopinath (2017). In order to understand how inflation's volatility is directly related to economic growth and support the dataset's stationarity, this study has to apply first differencing.

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With strong support from the model analysis, the inclusion of the dummy variable for pandemic belongings supported by Eichenbaum et al. (2021) and Guerrieri et al. (2022), strengthened the relationship and variance explained by COVID-19. By providing a clear explanation of their interrelated consequences, FinTech integration—represented through a proxy of digital banking transactions—and interaction with fixed capital buildup enhanced the model and were implemented in the studies of Isayev (2025) and Beck et al. (2000). In pursuance of a broad explanation related to variables and their measurements, a summary is provided in Table 2 as follows:

Table 2. Description of the variables

Variables	Expected Effect	Measurement	Source of data
Real GDP growth	Dependent	As a percentage (%)	OECD
Financial leverage	Negative (-)	Ratio	OECD
Gross fixed capital formation	Positive (+)	% of GDP	OECD
Changes in inflation	Positive (+)	As a percentage (%)	OECD
Dummy variable for 2020	Negative (-)	Binary indicator	OECD
FinTech integration	Positive (+)	% of GDP	IMF/World Bank
Interaction term between FinTech and gross fixed capital formation	Negative (-)	% of GDP	IMF/World Bank

3.3 Model diagnostic tests

Use of multiple regression analysis enhanced interpretation of independent variables impact in economic growth and estimation of regression equation in favor of accurate derived results and empirical insights. Improved regression equation, with the aim of completing standard rules ended up the sample with 261 observations. After first differencing of inflation in order to achieve stationarity, observations fell to 232. Type of data and sources are mentioned accurately (Table 2). OLS assumption fulfillment requires diagnostic tests application:

- **Normality:** Kolmogorov test in order for a normal distribution and statistical credibility.
- **Linearity:** Based on linearity detection, Ramsey test definition of independent variables by linearity is crucial for model validity.
- **Multicollinearity:** According to VIF detection test, independent variable should not be correlated with each other for multicollinearity.
- **Heteroskedasticity:** In order to ensure reliability of the model in any presence of heteroskedasticity, it should have reliable parameters according to Breusch Pagan and clustered standard errors.
- **Stationarity and serial correlation:** Data should be stationary according to ADF test. Furthermore, serial correlation is tested through Durbin Watson and Breusch Godfrey. OLS estimation method will be used for this regression equation that is presented in a correct form below:

$$\text{Real gdp growth}_{it} = \beta_0 + \beta_1 \text{financial leverage}_{it} + \beta_2 \text{GFCF}_{it} + \beta_3 \Delta \text{inflation}_{it} + \beta_4 \text{dummy}_{it} + \beta_5 \text{fintech}_{it} + \beta_6 \text{fintech}_{it} * \text{GFCF}_{it} + \varepsilon_{it} \quad (1)$$

The regression equation is based on studies of different author that analyze each of the independent variables to test their impact on dependent variable and significance of the relationship. Dilemma about the pandemic shock in economic models is clarified through several econometric theories (Deb et al., 2020).

With a methodology characterized by a strong focus in maintaining efficiency and reliable results, this paper achieves precise and accurate interpretation.

4. Results and discussion

4.1 Main findings

The dispersion of data has a huge importance to interpret the results according to the respective methodology. To determine the interconnected effects of independent variables, a summary of descriptive statistics is provided in Table 3.

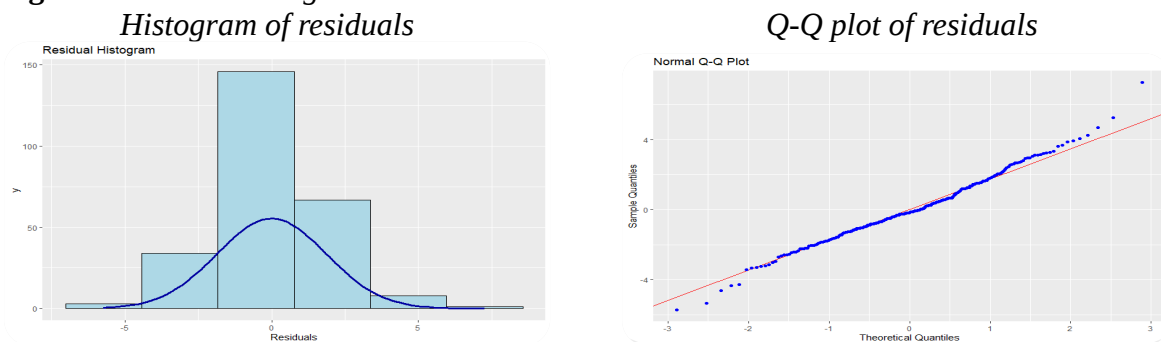
Table 3. Descriptive statistics

Statistic	Observations	Mean	Standard deviation	Sample variance
Real GDP growth	232	2.113	3.343	11.175
Financial leverage	232	17.836	11.891	141.403
Gross fixed capital formation	232	2.816	6.386	40.784
Δ inflation	232	4.115	7.334	53.791
FinTech integration	232	396.977	579.701	33.605

Econometric analysis accompanied by discussions about coefficients, tests for validity and their significance will be covered by this section. The author will derive conclusions from results about whether these variables significantly impact the dependent variable.

Moderate levels with immense volatility define economic growth that is typical for this indicator according to the summary. As shown in Table 3, requirement to capture extreme macroeconomic and financial disturbances is a consequence of fat tail characteristics beneficial to model's interpretation and analysis. Representation of economic growth by real GDP growth demonstrates the need for precise analysis conduction and determination of the relationships between variables. According to the result of the Kolmogorov test, p-value is equal to 0.2651. The fulfillment of normality condition is a consequence of failing to reject null hypothesis at 5% significance level. In order to illustrate the normality condition, residuals histogram and plot are provided in Figure 1:

Figure 1. Residuals diagnostic



As it is presented in Figure 1, the graphical presentations confirm residuals normality. To ensure that multicollinearity is not a challenge for the model, VIF results are presented in Table 4.

Table 4. Variance Inflation Factors

Independent variables	VIF test
Financial leverage	1.057
Gross fixed capital formation	2.004
Δ inflation	1.012
Dummy variable	1.12
Fintech integration	1.17
Interaction term	1.885

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As it is shown in Table 4, values less than 5 for VIF test are acceptable and disappear multicollinearity complications. Disclosure of model specification or nonlinear relationships among variables is checked through linearity or Ramsey's Reset test. According to a p-value exceeding 0.05, we conclude linearity in the model. Homoskedasticity can be proved through Breusch Pagan test and clustered standard error tests which are more conservative.

Rejection of null hypothesis in favor of alternative one at 5% level of significance concludes heteroskedasticity ($p\text{-value} < 0.05$). Redefining variables is unsuitable by means of percentage expressions and presence of negative values. In furtherance of dependability in the presence of heteroskedasticity, robust standard errors tests are necessary and presented in Table 5.

Table 5. Regression output after robust standard errors

Variables	Coefficient	Standard error	t-value	p-value	Significance
Intercept	2.193	0.2627	8.346	4.714e-15	***
Leverage	-0.0248	0.01057	-2.349	0.01961	*
GFCF	0.28	0.02983	9.539	-2.2e-16	***
Crisis dummy	-5.46	0.5304	-10.296	< 2.2e-16	***
Δ inflation	0.116	0.04093	2.364	0.01885	*
FinTech	0.000643	0.00022212	2.909	0.00395	**
Interaction term	-0.00012	0.00004246	-2.794	0.0056	**

$p < 0.001$ ***, $p < 0.01$ **, $p < 0.05$ *, $p < 0.1$.

Significance of independent variables accompanied by modest changes in inflation, financial leverage and interaction term respectively by presence of heteroskedasticity is concluded from the derivation of results on the second and more conservative test. *Despite of the presence of heteroskedasticity, the model ensures reliability and results are significant, so misleading situation caused by it is fixed (Table 5).* In accordance of analysis conducted in R studio, stationarity of the variables is proved through p-value smaller than 0.05. In order to be aware of inflated standard errors, examination tests particularly in serial correlation are applied. DW value and p-value confirmed the absence of first and second order serial correlation. *Focused on the regression model used in this study, estimated regression is as below:*

$$\text{real_gdp_growth} = 2.193 - 0.025 * \text{financial leverage} + 0.28 * \text{gross_fixed_capital_formation} - 5.461 * \text{dummy} + 0.12 * \Delta \text{inflation} + 0.000643 * \text{fintech integration} - 0.00012 \text{fintech integration} * \text{GFCF} + \varepsilon \quad (2)$$

4.2 Discussion of results

Financial leverage negatively affects economic development

Financial leverage is symbolized from significant negative influence on economic growth with the help of its capacity to develop harmful effects affecting the economy, as obviously specified in the literature review. Transformation of convenient investments into unpaid debt balances is a cause of its costs outweighing benefits. The economy suffers from insufficient capabilities to return excessive debt that leads to economic deterioration with extreme losses of real GDP. A 1 unit increase in the financial leverage ratio will decrease economic growth by 0.025 percentage points, holding other factors constant. While some studies conclude negative effects of financial leverage in the economy, others support their positive relationship through growth-focused findings. The ability of debt to

support economic activity and loan management from banking system explains its small negative effect on growth (Levine, 2003). As a consequence, enhancement of economic velocity and growth is achieved. However, boundaries of leverage should be handled effectively if it is a requirement for the economy. Similar results are presented through the connection of excessive debt and financial deterioration or cut in growth rates (Xing et al., 2025).

Fixed capital accumulation impacts positively economic development

As a contribution in physical assets to boost productivity, investment results in positive outcomes of growth. Approval for this statement is underlined from insights and conclusions derived from different papers. Gutiérrez and Philippon (2017) analyzed the effect of capital accumulation on economic growth by referring to fixed capital formation approach in economic advancements. Furthermore, investment has a crucial effect on GDP growth and a long term sustainability goal of each respective country. Related to the interpretation of this variable, a 1% increase in fixed capital accumulation growth rate, increases economic growth by 0.28 percentage points, holding other factors constant. Meaningful opportunities offered by investment to achieve economic and financial growth are expressed through its positive impact. By being a crucial part of the financial sector, rise of mobilization savings and efficiency in capital allocation is executed by investment in physical assets that flattens critical fluctuations in corporate activity. Conclusively, lending capacity of banks and other financial institutions is enhanced, furthering future economic growth.

Changes in inflation influence positively the economic development

Representing macroeconomic stability, expression in moderate levels helps in growing the economy through its significant and positive impact. The same conclusion was considered about moderate inflation effect in economic growth during studies about the evolution of inflation dynamics (Reis, 2023). According to the first differencing transformation, a 1 percentage point increase in changes of inflation increases economic growth by 0.12 percentage points, holding other factors constant. General increase in prices defined by tiny amounts is linked to economic activity and extended demand through its consistency which is explained by econometric theory. Due to the fact that moderate inflation adjusts economic growth and tremendous levels frustrate it, the effect is positive but small. Reis (2023) interprets the positive relationship between inflation and growth with the argument of not surpassing the threshold of inflation which in most cases is 3% for regular circulation of the economy. Therefore, this finding is closely associated with our idea in this study. In contrast, Khan and Senhadji (2000), Ascari and Sbordone (2014), and Gopinath (2017) argued that high levels of inflation further the decline in output and result in economic recessions.

Pandemic crisis during 2020 affects negatively the economic development

Guerrieri et al. (2022) and Eichenbaum et al. (2021) explain supply-demand downward spiral which was caused from rising infection rates and decline in income, avoiding economic surrounding for maintaining stability in welfare. Deb et al. (2020) describe the follow up effect when restrictions were dropping, supporting growth but the positive effect was smaller in magnitude than the initial negative impact in economy. On the contrary, Jordà et al. (2021) and Baqaee and Farhi (2020) described the persistent consequences of the pandemic crisis. The interpreted financial structure and economic deterioration was represented by crisis and involvement of a dummy variable to outline negative consequences consistent with Cerra and Saxena (2007). Based on the interpretation, economic growth is 5.46 percentage points lower during pandemic crisis than other years, holding other factors constant.

FinTech adoption positively affects economic growth

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Digital banking transaction or digital financial intermediation as a proxy for fintech adoption tends to have a significant positive impact on economic growth due to reduction in transaction costs and financial inclusion. Furthermore, strengthens financial intermediation that connects savers with investors by improving credit allocation and efficiency of financial markets. Isayev (2025) focuses in the effect of FinTech on growth, particularly in countries where this field is still underexplored while Beck et al. (2000) suggest that fixed capital accumulation remains the crucial channel implemented by financial technology growth accomplishments. Furthermore, the alteration in the marginal effect of investment from the integration of digital finance is shown through the negative interaction term concluded by Beck et al. (2000) and Isayev (2025). Adequate evidence is provided for the FinTech impact on allocative over quantitative efficiency. As a result, higher levels of FinTech adoption are associated with a rise in real GDP growth and productivity. According to the empirical results, 1 % increase in FinTech integration increases economic growth by 0.00064%, holding other factors constant.

Fintech integration significantly moderates the relationship between investment and economic growth which improves capital allocation and suggests better financial functioning

Results are consistent with theory because the negative interaction between FinTech integration and investment explains the decrease in marginal growth effect of investment. This expresses improved allocative efficiency, reduction of misallocated investment and better financial functioning through greater reliance on digital rather than traditional capital (Md. Mominur Rahman, 2024). According to the empirical results, 1 % increase in the use of financial technology decreases the marginal effect of fixed capital accumulation in growth by 0.00012%, holding other factors constant. Results are consistent with theory because negative interaction of FinTech integration and investment explains the decrease in marginal growth effect of investment. This expresses improved allocative efficiency through reduction of misallocated investment and better financial functioning.

5. Conclusions

The effect of financial activity and macroeconomic stability integration in growth insights is analyzed by this paper. The domination of pandemic crisis needed observation in order to justify interpretation of results in the manner of literature review. Since there are not many studies that incorporate dummy variables to capture pandemic crisis and explain moderating effect of the interaction term, these will help in becoming novelties for the study. Real GDP growth, as the dependent variable, in agreement with empirical insights and descriptive analysis is expressed by multiple trends and volatility. The idea of balanced financing in order for structured future economic growth is confirmed by negative impact of leverage. Furthermore, determination of real GDP growth from leverage demonstrates the volatility as a result of inadequate risk management. Gross fixed capital formation enhances economic opportunities representing huge contributions in physical assets for productivity. Incorporation of leverage to support investment and higher returns results in expressive conclusions.

Price stability defined by moderate levels, encourages growth by reporting macroeconomic stability in the model. FinTech adoption positively affects economic growth through financial inclusion and well structured markets. The negative impact of interaction term implies a decrease in marginal growth of investment that indicates better capital allocation. To conclude, appropriate involvement of pandemic crisis, eliminates confusing situations from the model. Economic growth is illustrated from their impact in order for innovative policy constructions that enable groundbreaking improvements.

Considering that many independent variables are narrowly reported to cover longer periods, the limitation of this study was mainly lack of data for previous years. Moreover, integration of some countries in political challenges caused their absence in the regression analysis. Furthermore, inclusion of other variables as a proxy for leverage could be taken into consideration assuming that trustworthy sources did not appear missing values. Regarding the inflation, other crucial variables defined by lower volatility can be used incorporated for improved future work. To avoid heteroskedasticity barriers, use of another dataset can be applied though the model is correctly specified with reliable statistical inference.

However, variables possess high significance and explain approximately 70% of the variation in the model. Concerning complexity challenges, logarithmic transformation can be taken into consideration in the future while using data with dissimilar units of measure. In the case of economic growth, the crucial drivers of real GDP growth are applied for regression analysis but expansion of the model can be done to further research studies for improved future work. Application of fixed effect model in an adequate level of future work will enhance econometric analysis.

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