Entrepreneurship
ISSN: 2738-7402
DOI: 10.37708/ep.swu.v12i1.4 *Volume: XII, Issue: 1, Year: 2024, pp. 27-39*

THE NEXUS BETWEEN FINANCIAL MECHANISMS AND ECONOMIC PERFORMANCE: EMPIRICAL EVIDENCE FROM GREECE

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Received: 05.02.2024, Accepted: 15.03.2024

Abstract

The paper aims to investigate the impact of direct and indirect financial mechanisms on the economic performance of Greece over the period 1999-2019. Employing both bivariate analysis tools and the Generalized Method of Moments (GMM) technique, the study reveals diverse interactions among key macroeconomic factors. Direct finance, exemplified by heightened stock market activity, exhibits a positive impact on economic growth. Meanwhile, lagged inflation, indirect finance, and foreign direct investment emerge as significant contributors to inflation. Unemployment dynamics reveal a robust positive influence of past rates on current levels, while economic growth exhibits a negative impact, aligning with traditional labor economics. Notably, the minimal role of indirect finance in the wake of the Greek financial crisis prompts further investigation into the causal relationship between the banking sector and economic growth in Greece. The identified results point to some deviations from international patterns, underscoring the necessity for country-specific economic policy intervention.

Keywords*: Direct Finance; Indirect Finance; Real GDP; Economic Performance; Unemployment; Inflation; Financial Development; Macroeconomic Indicators; Generalized Method of Moments; Greece*

JEL Codes: *G1*

Introduction

Modern financial mechanisms encompass the management of monetary resources, equity or debt investments, as well as various financial instruments on a global scale. In the realm of economic dynamics, the profound effect of finance cannot be ignored, since finance plays a fundamental role in shaping individual decision-making, businesses and the overall economic framework. Its primary objectives include wealth accumulation, risk mitigation and funding real economy facilitating eventually economic growth.

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At the core of the financial landscape lie two fundamental approaches: direct and indirect finance. Direct finance involves the straightforward transfer of funds from savers to borrowers without intermediaries. Savers engage directly with financial markets, investing in securities such as stocks and bonds issued by entities ranging from corporations to governments. This approach fosters a diverse range of investment options and often leads to a more efficient allocation of capital, primarily focused on long-term returns. Conversely, indirect finance relies on the intermediation of financial institutions, such as banks and credit unions, facilitating the flow of funds between savers and borrowers. While providing a safer and more convenient investment avenue, indirect finance yields higher costs compared to its direct counterpart. The optimal functioning of both capital markets and the banking industry emerges as a decisive determinant of financial development, since the allocation of capital adheres to equilibrium patterns observed in markets characterized by information symmetry.

Turning our attention to the Greek financial sector, it comprises the domestic capital markets, with Athens Stock Exchange being the epicenter of Greece's equity market, as well as the interconnected (with the ECB) banking sector. The banking sector consists of four systemic banks and a series of smaller commercial banks acting as intermediaries. Prompted by the 2010 debt crisis, Greece instituted reforms in the financial sector, aiming to bolster banking capital resilience, enhance regulatory frameworks, and reinstate investor confidence in both the Greek banking system and the broader economy. The 2010 debt crisis served as a transformative moment, propelling the nation into a prolonged recession marked by elevated unemployment rates and diminished productivity. Stringent austerity measures were introduced to curb debt-to-GDP ratios, coupled with structural reforms and negotiations with creditors. These efforts resulted in significant debt reductions through bold initiatives like "brave debt haircuts." Encouraging signs of recovery emerged in 2019, characterized by GDP growth, diminishing unemployment rates, and reduced interest rates on Greek bonds. Unfortunately, the fiscal relief was short-lived, disrupted by the unforeseen challenges brought about by the Covid-19 crisis.

Against this backdrop, this paper embarks on an investigation into the macroeconomic impact of direct and indirect finance on Greece's economy. Therefore, unraveling the intricate dynamics of financial mechanisms and their influence on macroeconomic indicators in Greece, this research seeks to provide valuable insights for future policymaking and economic considerations, particularly in navigating the complexities after the 2010 crisis and the ongoing challenges posed by the Covid-19 pandemic.

1. Literature Review

Numerous studies globally have sought to uncover the complex relationship between direct and indirect financial development and its impact on the economy. The international literature presents a rich tapestry of studies, revealing diverse

outcomes and a lack of consensus regarding the causal link between finance and the real economy. While there is widespread acknowledgment of a two-way relationship, the debate persists on whether positive advancements in the financial industry can unequivocally lead to economic growth. This lack of consensus is attributed to variations in factors, econometric models, and theoretical approaches used across studies, as well as the diverse economic contexts and time frames examined.

By the late 1990s, however, it became evident that the growing financial sector, whether direct or indirect, was intricately linked with real economic indicators such as GDP, employment, and inflation. Levine's seminal work in 1996 establishes a positive correlation between financial development and economic growth, underscoring the roles of both direct (equity markets) and indirect (banking) financial sectors. Moreover, Levine (1996) suggests that the level of financial advancement can serve as a predictor of future economic growth, leading to increased capital accumulation, stable inflation rates, and optimal employment levels. Moreover, Rajan and Zingales (1998) conducted an investigation into the impact of financial dependence on economic growth, employing time series data from the United States and globally. Their study underscored the significance of both direct and indirect finance in facilitating investment and innovation. Furthermore, the observed disconnection between economic growth and the tourism sector planning in Greece (Bozkova, 2022) presents a unique opportunity for future research, about their connection axes. Thiel (2001) replicated Levine's methodology, adapting it to the European Union's financial sector. Thiel's results indicate that finance plays a pivotal role in promoting economic growth, particularly during the initial phases of economic activity. Notably, initial findings suggested that stock markets (direct finance) exhibit a more robust relationship with growth compared to variables associated with banking activities (indirect finance). However, Thiel did not find compelling evidence supporting the consistent outperformance of market-based financial industries over bank-based ones. In a 2019 study, Kapidani and Luci delved into the connection between advancements in the financial sector and innovation. Their research revealed a positive impact of increased lending from banks on patent applications. In contrast, credit mobilization by non-banking institutions or equity markets demonstrated a weaker effect, with some instances showing negative consequences on patent applications. Additionally, nations with superior education systems displayed a heightened commitment to innovation, fostering the development of inventive methods. In advance, Stavrova (2020) describes the need of use artificial intelligence in the finance industry and as Kyurova et al. (2023) point out that digital technologies play a decisive role.

Despite the prevailing narrative of a positive relationship between finance and economic growth, not all research aligns with this viewpoint. Arcand et al. (2012) challenged this relationship, introducing the concept of a threshold. They posited

that beyond a certain point (estimated to be approximately 80-100% of GDP), finance starts to exert a harmful impact on economic growth. These findings held particularly strong in countries with a small or medium-sized indirect financial sector.

Law et al. (2015) verified these findings, suggesting a threshold effect within the boundaries of the relationship between financial development and economic growth. The study provided evidence that financial development positively influences growth up to a certain threshold, beyond which further development tends to have a negative impact. In line with this, Cournède & Denk's (2015) work on behalf of the Organization for Economic Co-operation and Development emphasized finance's crucial role in fostering long-term economic growth in OECD and G20 countries over the past five decades. However, it also cautioned against excessive finance, indicating that, at current levels of household and business credit, further expansion may impede economic growth instead of enhancing it.

In the case of the Greek economy a comprehensive overview exists from the early 2000s to the present. In their seminal work, Dritsakis & Adamopoulos (2004) utilized a VAR model to delve into the interconnected dynamics among GDP, financial development, and the openness of the Greek economy. Their findings revealed a notable co-integration among these variables, elucidating a substantial causal relationship between financial development and economic growth. Additionally, the degree of openness emerged as a significant influencer of economic growth in Greece, underscoring the pivotal role of international trade and policies fostering openness. Vazakidis & Adamopoulos (2009) extended the exploration by investigating the causal links between financial development, economic growth, and industrial production in Greece over the period from 1978 to 2007. Employing a Vector Error Correction Model (VECM), their research discovered distinct impacts of stock market development, bank lending, and productivity on economic growth. Notably, the study highlighted the symbiotic correlation between economic expansion and advancements in both the stock and credit markets, emphasizing the crucial role of financial progress in tandem with economic growth in Greece. Addressing a broader spectrum of factors influencing economic dynamics, Isik, Kasımatı, & Ongan (2017) delved into dynamic causalities between economic growth, financial development, international trade, tourism expenditure, and CO2 emissions from 1970 to 2014. By applying Zivot-Andrews unit root tests and ARDL models, their research unveiled co-integration among economic growth, financial development, international trade, tourism expenditure, and CO2 emissions. The study particularly underscored the environmental challenges arising from the tourism sector, a dominant force within the Greek economy. Notably, the findings emphasized the imperative for policymakers to address the adverse impacts of tourism on the natural environment, recognizing the need for a balanced approach that considers both economic

significance and environmental sustainability. According to Filipova and Yuleva-Chuchulayna, it is a well-known fact that European integration and policies contribute to sustainable development that meets the needs and requirements of the current generation without affecting future generations and their ability to meet their needs. In addition, there are a number of challenges that are essential and urgent, putting at risk the well-being and economic prosperity of any country. (Filipova & Yuleva-Chuchulayna, 2023)

Collectively, these studies contribute to a nuanced understanding of the intricate relationship between finance and macroeconomic growth in Greece. The findings not only highlight the causal links between financial development and economic expansion but also emphasize the multifaceted influences of factors such as international trade and the environmental consequences of dominant industries.

2. Research Methodology

The study utilizes time-series data from 1999-2019 comprising diverse online data sources such as the World Bank, International Financial Statistics, IMF, OECD and Statista. In order to evaluate the impact magnitude of finance on the economy the study employs a combination of financial proxies and key macroeconomic indicators, which significantly influence the trajectory of an economy. As for the macroeconomic variables the study focuses on real GDP rates (GR), Consumer Price Index (INF), and unemployment rates (UEMP). Financial development is dissected into direct finance (DF) and indirect finance (IF), encompassing stock market indicators and liquid liabilities, among others. The inclusion of these financial variables aims to ensure a comprehensive analysis of both direct and indirect financial aspects, enhancing the reliability of outcomes. The study also incorporates control variables such as Real Effective Exchange Rate (REX), Wage and Salaried Workers (WAG) index, general government final consumption expenditure (GEXP), and Foreign Direct Investment (FDI). These variables collectively capture dynamic effects and contribute to a comprehensive understanding of the intricate economic landscape.

The Generalized Method of Moments (GMM) is an econometric statistical technique employed for parameter estimation in diverse economic models. It proves especially valuable in scenarios where traditional methods like ordinary least squares (OLS) regression face challenges, such as when dealing with endogeneity, measurement errors, or heteroscedasticity. GMM offers a versatile framework for parameter estimation without requiring stringent distributional assumptions about the underlying data. Therefore, the present study mirrors the dynamic panel data analysis conducted by Wen J., Mahmood H., Khalid S., and Zakaria M. (2021).

The model is composed of three autoregressive equations organized as follows:

$$GR_t = \alpha_0 + \alpha_1 GR_{t-1} + \alpha_2 INF_t + \alpha_3 UEMP_t + \alpha_4 DF_t + \alpha_5 IF_t + \alpha_6 GEXP_t + \mu_t \quad (1)$$

$$INF_t = \beta_0 + \beta_1 INF_{t-1} + \beta_2 GR_t + \beta_3 UEMP_t + \beta_4 DF_t + \beta_5 IF_t + \beta_6 GEXP_t + \beta_7 REX_t \beta_8 FDI_t + \lambda_t \quad (2)$$

$$UEMP_t = \gamma_0 + \gamma_1 UEMP_{t-1} + \gamma_2 GR_t + \gamma_3 INF_t + \gamma_4 DF_t + \gamma_5 IF_t + \gamma_6 WAG_t + \varepsilon_t \quad (3)$$

Thus the model comprises three autoregressive equations focusing on economic growth (GR), inflation (INF), and unemployment (UEMP). The equations include various variables such as direct finance (DF) and indirect finance (IF), both composite indices. These indices are constructed from three individual proxies each, standardized to ensure uniformity. The standardization process involves transforming the original values using the formula
$Z(i) = (X(i) - \mu) / \sigma$, where Z is the standardized value, X is the original value, μ is the mean, and σ is the standard deviation. The composite indices DF and IF are then represented as weighted sums of the standardized values of their individual proxies. Subsequently, we assign weights to each of the standardized values according to the significance they yield for the scope of analysis. This comprehensive approach is pivotal for ensuring the validity, accuracy, and ultimately, the robustness of the implemented model.

Therefore, variables DF & IF can be denoted as:

$$DF_t = w_1 \times Z_1(DF) + w_2 \times Z_2(DF) + w_3 \times Z_3(DF) \quad (4)$$

$$IF_t = w_1 \times Z_1(IF) + w_2 \times Z_2(IF) + w_3 \times Z_3(IF) \quad (5)$$

where $w = (w_1, w_2, w_3)$ represent the weights assigned to each proxy.

Concerning DF we allocate weights to the proxies as follows:

- Stock market capitalization relative to GDP: 0.4
- Annual returns percentage in the stock market: 0.3
- Total value traded in the stock market relative to GDP: 0.3

Regarding IF we assign weights to the indices as follows:

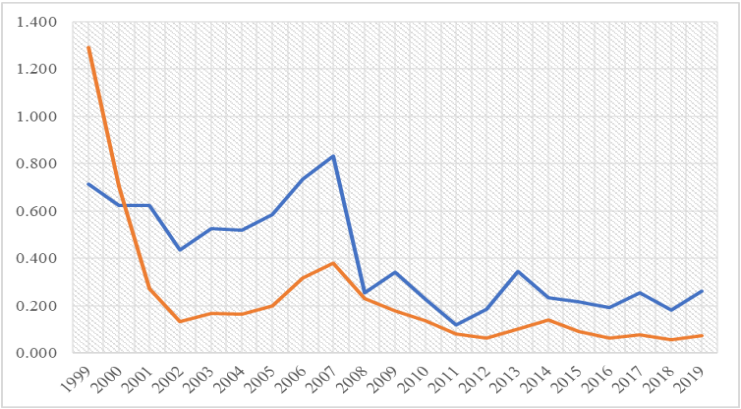
- Domestic credit to the private sector relative to GDP: 0.4
- Bank capital to assets ratio percentage: 0.3
- Liquid liabilities relative to GDP: 0.3

3. Analysis

It is of great importance to provide some statistical findings regarding direct and indirect financial markets in Greece for the time frame of interest. In terms of stock capitalization, on average, the total value of stocks in the market represents

around 40% of the country's Gross Domestic Product (GDP). It's noteworthy that the highest market capitalization ever recorded was 83% of GDP in 2007, while the lowest observed ratio was 11% in 2011. Greek stock markets faced various challenges that diminished overall investment returns. On average, investing in Greek corporate stocks yielded minor positive returns at 0.5%. However, investors also experienced significant losses, reaching up to -38%, due to recapitalization reforms implemented in 2012 following Greece's second bailout package in the midst of the financial crisis. After 2000, both market capitalization and total value traded as a percentage of GDP exhibited a similar downward trend. This decline followed exceptionally high values observed in 1999, where the Athens Stock Exchange faced significant volatility. By the end of 1999, stock prices crashed, leading to a substantial decrease in total market capitalization, revealing systemic issues in Greece's financial and regulatory framework. In Figure 1, the blue line represents stock market capitalization, while the orange line depicts the total value traded in the stock market during the specified period. Notably, between 1997 and 1999, the total value traded in stocks surpassed both the country's economic performance (approximately 130% of GDP) and the overall stock market capitalization, signaling an unusual scenario.

Figure no. 1 Stock Market Capitalization vs Total Value Traded as % of GDP



Source: Standard & Poor's

The bank capital-to-assets ratio, a critical metric for assessing the banking sector's stability, averages around 6%, with a median value of 4% for Greek financial institutions. This ratio fell into negative territory during the 2012 financial crisis but showed improvement post-reforms, reaching its maximum value in 2019. In terms of liquid liabilities, the mean value is below the country's overall economic performance at 0.96, but the liquid liabilities-to-GDP ratio consistently exceeded GDP levels, indicating the Greek banking system's significant liquidity compared to the size of the economy. For the given time period, the Greek banking sector, on average, granted financial resources equivalent to 86% of the country's GDP to corporations and other entities.

Turning our attention to the core empirical analysis, various determinants of economic growth, inflation, and employment were incorporated to address specification bias, while a lag term of the dependent variable was introduced to capture dynamic impacts. The two-step System GMM technique was employed for the estimation of this simultaneous equation model as already described in research methodology section. Table 1 reports the calculated values for equation (1), where economic growth rate is the dependent variable. The intercept coefficient is positive and statistically significant at the 1% level, suggesting a baseline real GDP growth of 2.4%. The positive lagged coefficient indicates a strong relationship between past and current economic growth. Inflation is positively associated with economic growth in the short run; the results show that a percentage change in inflation is linked to a 0.3% increase in short-term economic growth, with a 5% significance level, on average, all else being unchanged (ceteris paribus). Direct finance shows a notably favorable influence on economic growth at the 5% significance level, while indirect finance also has a positive impact, though with weaker statistical significance. This implies that heightened financial activity within Greece's banking sector is associated with an increase in economic growth rates. Both findings not only confirm but also complement the results of Papapetrou et al. (2004), supporting the idea of a mutually beneficial relationship between finance and both long and short-term economic growth.

Table no. 1. Estimated parameter values for equation (1)

Variables	Coefficient	Std. Error	t-value
C	0.024***	0.003	8.03
GR t-1	0.999***	0.005	199.80
INF	0.003**	0.001	2.99
UEMP	-0.043*	0.008	-5.38
DF	0.331**	0.001	551.67
IF	0.164*	0.002	82.00
GEXP	0.256	0.007	36.57
R-squared	1.000		
Durbin-Watson Stat	2.095		

Source: Author's calculations with Eviews

Note:.***. ** and * implies that the value is significant at the 1%, 5% and 10%

No significant relationship was found between government consumption expenditure and economic development. The model's R-squared value indicates explanatory power, and the Durbin-Watson statistic suggests uncorrelated errors.

Table 2 presents the estimation results for equation (2) with the inflation rate as the dependent variable. The findings reveal that lagged inflation has a positive influence on current inflation, but the statistical significance is marginal at the 10% level, indicating a positive impact of past inflation on current rates. In contrast, economic growth shows a negative but statistically insignificant effect on inflation,

suggesting that inflation and economic growth in Greece move in different directions in terms of percentage changes. Unemployment and direct finance also exhibit no statistically significant impact on inflation, implying that changes in employment and stock market variability do not influence price changes in Greece.

It's crucial to note that the model focuses on the cause-and-effect relationship between stock market activity and inflation, rather than exploring specific inflationary expectations held by investors. This distinction is important, as many studies often concentrate on the connection between stock market returns and investors' inflationary expectations. The results indicate a positive and statistically significant effect of indirect finance on inflation, with an approximately 2% increase in inflation rates corresponding to a rise in banking activity. Commercial banks, serving as essential monetary intermediaries, prompt short-term impacts on inflation through alterations in factors such as interest rates, liabilities, or total credits to the private and public sectors.

Table no. 2. Estimated parameter values for equation (2)

Variables	Coefficient	Std. Error	t-value
C	15.616	34.790	0.449
INF t-1	0.355*	1.435	0.247
GR	-3.164	7.099	-0.446
UEMP	0.199	1.109	0.179
DF	0.000	0.036	0.000
IF	0.017*	0.053	0.321
GEXP	0.221	1.479	0.15
REX	0.760	1.767	0.43
FDI	-0.009*	0.023	-0.39
R-squared	0.967		
Durbin-Watson Stat	1.809		

Source: Author's calculations with Eviews
Note:. ***. ** and * implies that the value is significant at the 1%, 5% and 10%

While GEXP and REX coefficients lack statistical significance, foreign direct investment appears to be negatively correlated with inflation, albeit weakly at the 10% significance level. In simpler terms, an increase in foreign capital investments in the country may potentially lead to a slight decrease in short-term inflation rates. Lastly, the R-squared value is 0.967, indicating that the model explains 96.7% of the variability in the inflation rate, and the Durbin-Watson statistic is 1.809, suggesting no significant issue of serial correlation in the residuals.

Table 3 outlines the results of the estimation for equation (3), where the unemployment rate is the dependent variable. Lagged unemployment significantly and positively influences current unemployment levels, with statistical significance at the 1% level. This indicates a strong positive impact of past unemployment rates on present ones. Conversely, economic growth has a statistically significant negative effect on unemployment, suggesting that, from a dynamic perspective,

unemployment and economic growth in Greece move in opposite directions in terms of percentage changes. This aligns with traditional labor economics conclusions, where increased production leads to an increase in labor supply or, put differently, a decrease in unemployment rates signaling the end of an economic recession.

Table no. 3. Estimated parameter values for equation (3)

Variables	Coefficient	Std. Error	t-value
C	32.97	178.841	0.184
UEMP t-1	0.53***	2.575	0.207
GR	-0.617**	3.360	-0.184
INF	0.032**	0.250	0.128
DF	0.009**	0.115	0.078
IF	-0.052**	0.184	-0.286
WAG	-0.389***	0.131	-2.969
R-squared	0.862		
Durbin-Watson Stat	1.772		

Source: Author's calculations with Eviews

Note:. ***. ** and * implies that the value is significant at the 1%, 5% and 10%

However, inflation and direct financial factors appear to positively affect unemployment. Specifically, a percentage change in inflation is associated with a 3.2% increase in unemployment, and a percentage change in stock market-related factors in the short run leads to a 0.9% increase in unemployment, both at the 5% significance level, all else being equal. In contrast, there seems to be an inverse correlation between indirect finance and the proportion of salaried workers with unemployment rates. An increase in indirect financing (banking) activity is linked to a significant short-term decrease in unemployment, reflecting a similar effect when the number of paid employees in the economy rises. Both outcomes are statistically significant, with significance levels of 5% and 1%, respectively. It's noteworthy that the estimated parameters for equation (3) differ from those for equations (1) and (2) in the context of financial development analysis using two-step system GMM.

4. Conclusions and Recommendations

The study reveals the intricate intercorrelation effects between direct and indirect finance and various macroeconomic indicators in Greece, covering the period from 1999 to 2019. A distinctive feature of this research lies in its novel approach, employing both bivariate analysis tools and the system Generalized Method of Moments (GMM) technique, the first in Greek scientistic literature.

The results provide deeper insights into the temporal and dynamic aspects of the relationships under scrutiny. Lagged coefficients emphasize the lasting impact of past economic performance on current economic growth. Inflation is positively associated with economic growth in the short run; the results show that a percentage change in inflation is linked to a 0.3% increase in short-term economic growth. The

positive influence of direct finance, evidenced by heightened stock market activity, underscores the symbiotic relationship between financial markets and economic growth. GMM results also illuminate factors influencing inflation, with lagged inflation, indirect finance, and foreign direct investment emerging as significant contributors. The model's high explanatory power underscores the relevance of these factors in capturing variability in inflation rates. Examining unemployment as the dependent variable, GMM analysis reveals a robust positive influence of past unemployment rates on current levels. Economic growth exhibits a statistically significant negative impact on unemployment, aligning with traditional labor economics. However, the positive effects of inflation and direct financial factors on unemployment underscore the complex web of relationships shaping employment dynamics in Greece.

These diverse outcomes underscore the complexity of economic relationships in Greece over the past two decades, emphasizing the necessity for careful and selective policy interventions suitable for the Greek economy after the 2010 economic crisis. Inconsistencies with global patterns highlight the importance of considering country-specific factors in economic policymaking in Greece.

In essence, this paper contributes significantly to the evolving literature on the interplay between finance and macroeconomic indicators in Greece. By combining bivariate analysis with advanced econometric techniques like GMM, we provide a nuanced and comprehensive perspective, laying the groundwork for future research and policy considerations tailored to the unique dynamics of the Greek economy. Policymakers should consider the observed complexities and unique patterns in their decision-making, recognizing the need for targeted interventions and acknowledging the specificities of the Greek economic landscape. The study's findings suggest avenues for further investigation and offer valuable insights for shaping effective economic policies in Greece.

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