Hellenic Association of Treasurers

Σύνδεσμος Ελλήνων Χρηματοοικονομολόγων

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GREECE'S BALANCE OF PAYMENTS (BOP)

FINANCIAL & QUANTITATIVE ANALYSIS

Period of Reference 2002 – 2024

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ABOUT THE HELLENIC ASSOCIATION OF TREASURERS

The Hellenic Association of Treasurers (HAT), a nonprofit organization, is the official National Treasury and Finance Association of Greece and Cyprus representing the corporate treasury and financial leadership community of Greece, Cyprus and the Hellenic Diaspora.

Established to elevate the role of treasury in both the public and private sectors, HAT fosters a culture of strategic financial stewardship, ethical governance, and operational excellence. With a rapidly growing membership base that spans multinational corporations, financial institutions, public enterprises, and advisory firms, the Association serves as a hub for professional development, regulatory dialogue, and cross-industry collaboration.

HAT is deeply committed to bridging the Hellenic Treasury practice up to the global standards, offering its members access to high-impact events, executive education, research initiatives, and international partnerships.

With a presence in 23 countries and strong affiliations with leading global treasury associations, HAT plays a critical role in shaping the future of finance by equipping treasurers and CFOs with the tools, insights, and networks required to thrive in a complex, interconnected financial world.

ABOUT THE RESEARCH GROUP

HAT Research Group was formed in November 2024 and it's the most recent Working Group of the Hellenic Association of Treasurers. The need for the creation of the Group, came from the fact that there is a gap between academic research and real-world professional expertise, so the main scope of the Group was to bridge this gap by offering applied research conducted by professionals. It is worth mentioning that the Group's primary focus is to offer understandable analysis for everyone who will read our findings. The Group neither aims to replicate the pure academic research which is being conducted by universities or research bodies nor to replace it. The main focus is to offer an applied approach which will be understandable from an average economics reader.

The team was formed by young professionals with past experience in research and academic associations, along with the advisory of well established professionals and PhDs. It is the first time in Greece that a research team is being created by professionals, not for academics or professional researchers, and this is a true evidence of the Association's intention to innovate and to have a meaningful impact to the greek economy, and society as well.

ABOUT THE AUTHORS

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Dimitra Kavalieraki-Foka

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Dimitris Bithas

Dimitris Bithas is a multi-certified finance professional with a passion for financial analysis, financial markets, and research with a demonstrated ability to thrive in fast-paced environments. He is motivated by his constant desire to learn, improve, and innovate in the dynamic field of finance and by the challenge of finding solutions and insights for complex financial problems. He has a proven track record of successfully managing a trading portfolio with proprietary firms' funds and own equity. Currently, Dimitris is a Financial Analyst in the Group Finance of Eurobank, a leading Bank in Greece, while he is serving as Head of Research Group at the Hellenic Association of Treasurers. He has a solid academic background, holding a BSc in Economics from the University of Peloponnese, an MSc in Shipping (Finance Specialization) from the University of Piraeus, an MSc in Financial Engineering (MScFE) from WorldQuant University, and a few professional certificates

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Maria Gurabardhi

Maria is a finance professional with a Bachelor's degree in Accounting and Finance from the Athens University of Economics and Business. She has developed a well-rounded skill set through roles in accounting and audit, both in Greece and Luxembourg, where she currently works as an auditor in serving a diverse portfolio of clients across sectors ranging from investment funds to commercial enterprises. Combining hands-on experience with a strong academic foundation, she continuously seeks to deepen her understanding of financial systems, policy, and market dynamics.

Beyond her technical expertise, Maria is driven by a genuine passion for economic research and a strong sense of duty towards Greece. She is particularly motivated to engage in projects that shed light on the country's economic challenges, viewing them as opportunities to apply her knowledge in the service of meaningful progress.

Stergios Alexandridis

Stergios holds a BSc in Accounting and Finance from the University of Macedonia, with a specialization in Finance. He has a strong interest in valuation and business strategy, with a particular focus on data-driven approaches to problem-solving. While completing his studies, he began his career in internal audit working for UK clients. After graduating, Stergios advanced into the field of complex securities and portfolio valuations, where he applied methods such as Monte Carlo simulations, option pricing models, and other advanced valuation techniques to assess financial instruments for clients in the US. Currently, he is working in Grant Thornton as an associate at the Deals department, with focus on business valuation amd business planning, delivering high quality services to clients in Greece.

Michail Spanos

Michail holds a BSc in Economics from Aristotle University of Thessaloniki and, over the past few years, has been involved in several consulting projects focusing on M&A deals for major investment institutions. Passionate about creating value through consulting services, he is dedicated to understanding businesses and providing actionable insights that support better decision-making. He is currently working at Dialectica as an Insights Associate and Private Equity Editor, where, in collaboration with senior ex-MBB consultants, he contributes to the creation of high-quality insight content for clients. Beyond his technical expertise, he is driven by a genuine passion for economic research and the pursuit of insights that can address real-world business challenges. He views such challenges as opportunities to apply his knowledge in ways that deliver meaningful and lasting value, driven by a constant pursuit of uncovering the underlying truths behind complex business dynamics.

George Kallioras

George Kallioras is an MBA candidate majoring in Finance and Accounting at the Athens University of Economics and Business, with a prior academic foundation in Agricultural Science from the University of Patras. He has gained hands-on experience in financial operations, accounting, and reconciliation through internship roles in the finance departments of the energy sector.

Deeply interested in economic research, corporate finance, and sustainability, George actively contributes to the research activities of the Hellenic Association of Treasurers as a member. He is committed to continuous learning and aims to leverage his multidisciplinary perspective to support meaningful, data-driven analysis.

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EXECUTIVE SUMMARY

The balance of payments (BoP) is a comprehensive record of a nation's economic transactions with the rest of the world. For Greece, understanding the dynamics of the Current Account and the Goods and Services Balance is critical for evaluating international competitiveness, the sustainability of external debt, and the formulation of macroeconomic policy. This study applies rigorous time series econometric techniques—including SARIMA modeling, correlation analysis, and component decomposition—to examine the structural behavior of these aggregates. The dataset includes monthly observations of Greece's Goods Balance, Services Balance, and Current Account from 2002 to 2024. The data was graciously provided by the Hellenic Statistical System (ELSS) and is seasonally adjusted and expressed in millions of euros.

The main objective of the study is to identify the dominant forces shaping Greece's BoP, determine whether the imbalances are structural or cyclical, and project future trajectories based on historical trends. Key findings highlight the presence of long-term equilibrium relationships, regime-dependent dynamics, and dominant low-frequency cyclical trends. Significant cointegration among Goods, Services, and Current Account balances was detected, along with asymmetric impulse transmission and strong predictive power in multivariate VAR systems. Forecasts for the next decade suggest that the current imbalances—particularly the chronic Goods Balance deficit—are likely to persist unless significant structural changes are implemented.

From a macro-financial perspective, the study reveals that Greece's BoP position remains structurally vulnerable. The Goods Balance alone accounts for a negative contribution of nearly 194% to the Current Account, while the Services Balance, mainly driven by tourism and shipping, contributes positively by approximately 109%. Although the service sector provides crucial inflows, it remains insufficient to fully offset the trade deficit. The Primary and Secondary Income Balances play a limited role, reflecting low levels of net investment income and constrained remittance flows. These findings indicate that Greece's external deficits are not merely the result of short-term volatility but are deeply embedded in its economic structure.

Such imbalances have important implications for the country's external economic position. Greece's large and persistent trade deficits elevate its country risk premium, affect credit ratings, and complicate access to affordable international financing. The negative Net International Investment Position (NIIP), which remains above –130% of GDP, reflects long-standing reliance on foreign borrowing and external capital flows. These vulnerabilities pose risks not only for public debt sustainability but also for corporate treasurers who must navigate high borrowing costs, FX volatility, and capital flow restrictions. The findings underscore the need for comprehensive reforms aimed at enhancing domestic production capacity, diversifying exports beyond tourism, and accelerating the transition to renewable energy in order to reduce exposure to external shocks.

Policy recommendations emerging from the study include the implementation of industrial strategies that promote value-added manufacturing and reduce import dependency; the facilitation of foreign direct investment (FDI) through improved governance and regulatory stability; and the strengthening of treasury and risk management frameworks within the corporate sector. The study also suggests that continued monitoring and scenario-based forecasting of the BoP are essential tools for policymakers and financial strategists seeking to anticipate external pressures and guide long-term economic planning.

INTRODUCTION

Greece's Balance of Payments

Greece's balance of payments (BoP) has been a central issue in the country's economic trajectory, influenced by its integration into the Eurozone, external trade imbalances, and structural weaknesses. This literature review synthesizes key studies on Greece's BoP, focusing on trade deficits, current account sustainability, capital flows, and policy interventions to ensure macroeconomic stability.

The adoption of the euro significantly impacted Greece's trade balance, leading to persistent deficits. Magoulios and Athianos (2013) identify the loss of competitiveness and the country's reliance on imports as major contributors to BoP imbalances. Higher inflation rates relative to trading partners led to the appreciation of the real exchange rate, further weakening exports. However, Oxford Analytica (2019) notes that recent improvements in Greece's export revenues signal an increased role of external demand in economic growth, though this dependency makes the economy vulnerable to external shocks.

Greece's current account deficit has been a persistent challenge, raising concerns over external sustainability, and is largely driven by a large Goods Balance deficit due to high import dependence of exports and low export specialization, with industry and medium-skill-intensive industries lagging the other Euro Area countries. Closing this gap necessitates Greece reorganizing its productive structure and reviving domestic production (Konstantakopoulou, 2024). Brissimis et al. (2011) analyze the factors shaping Greece's current account, concluding that financial liberalization plays a stabilizing role. Bardakas (2016) differentiates between cyclical and structural components, emphasizing that long-term structural issues, such as weak export performance and high import dependency, are the primary determinants of Greece's BoP imbalances. Bragoudakis (2023) highlights the need for policies that enhance price competitiveness and reduce import reliance to improve the current account balance.

The economic adjustment programs implemented post-2010 aimed at addressing Greece's external imbalances. Anastasatos and Hardouvelis (2014) argue that while labor cost

reductions improved price competitiveness, underlying productivity issues remained unaddressed. Backinezos et al. (2020) assess the correction of Greece's current account, concluding that 60% of the adjustment was structural, indicating a more sustainable BoP improvement. The shift towards an export-driven economy is viewed as a key factor in long-term external stability.

Foreign direct investment plays a crucial role in stabilizing Greece's balance of payments. Kalkitsa and Lazaridou (2024) explore the relationship between governance quality and FDI inflows, noting that corruption control and regulatory stability significantly influence foreign investment patterns. Greece's struggle to attract FDI, compared to more competitive Eurozone economies, underscores the need for structural - and politically compromised - reforms to enhance investor confidence and ensure steady capital inflows.

The oil sector has played a vital role in improving Greece's trade balance. Bardakas et al. (2019) highlight the importance of investment in oil refining infrastructure, which has boosted export revenues. Even during periods of declining refining margins, productivity improvements and strategic shifts toward international markets have sustained positive contributions to the BoP. The findings suggest that targeted investment in high-value-added industries can enhance long-term external stability.

The reviewed studies emphasize the need for structural reforms to ensure a sustainable balance of payments. Key policy recommendations include:

- Enhancing price and non-price competitiveness through trade policy and institutional improvements (Anastasatos&Hardouvelis, 2014; Bragoudakis, 2023).
- Encouraging investment in export-oriented industries and reducing dependence on imported goods (Oxford Analytica, 2019; Bardakas et al., 2019).
- Strengthening governance frameworks to attract stable FDI inflows and support BoP stability (Kalkitsa& Lazaridou, 2024).

Greece's balance of payments has been shaped by deep-rooted structural issues, requiring comprehensive policy interventions. While recent improvements in exports and external balances suggest progress, sustainable BoP management depends on continued reforms

in trade policy, capital inflows, and governance. Actions and policies should focus on identifying sector-specific strategies to enhance resilience against external shocks and maintain external equilibrium.

Purpose of the Study

The purpose of this study is to critically examine the structural and cyclical factors influencing Greece's balance of payments and explore how these dynamics affect macroeconomic stability, investment strategies, and financial decision-making.

In particular, the BoP trajectory has direct implications for the role of corporate treasurers, who must navigate heightened country risk premiums, constrained access to interbank liquidity, and growing complexity in managing intercompany funding flows.

A country's balance of payments reflects its international financial health—specifically, whether it consistently runs current account deficits (spending more abroad than it earns) or capital account weaknesses (failing to attract stable inflows). When these imbalances persist:

- Credit rating agencies and investors perceive higher macroeconomic risk.
- As a result, the country risk premium rises, meaning any investment or loan in the country must offer a higher return to compensate for the added risk.

Corporate treasurers use intercompany facilities—loans, cash pooling, guarantees—to fund local subsidiaries and optimize group liquidity. However, a high-country risk premium due to BoP concerns affects these in several ways:

1. Treasury departments often apply risk-adjusted transfer pricing for intercompany loans.

2. A higher country risk premium increases the internal interest rate charged to subsidiaries in high-risk jurisdictions like Greece (during periods of BoP stress), making intercompany debt more expensive.

3. Persistent BoP deficits can lead to capital controls, foreign exchange restrictions, or currency convertibility risks.

These conditions discourage intercompany lending or upstreaming of funds, as repatriation becomes uncertain or costly.

Tax authorities may question high intercompany interest rates resulting from country risk pricing, triggering BEPS (Base Erosion and Profit Shifting) audits. Treasurers must balance arm's length pricing with the economic reality of the risk environment.

If external shocks (e.g., commodity spikes or export declines) worsen the BoP, FX reserves may shrink, and local banking stress may increase. This forces treasurers to reassess local liquidity buffers, possibly increasing reliance on local cash pools or third-party funding.

Persistent current account deficits and vulnerabilities in capital inflows elevate Greece's perceived sovereign and transfer risk, which in turn raises borrowing costs and therefore reduces local profitability for corporates and limits access to competitively priced international financing. Treasury departments are often required to manage foreign exchange volatility and liquidity mismatches across jurisdictions, especially for multinationals with regional treasury centers or subsidiaries operating in Greece.

The uncertainties around BoP sustainability also shape counterparty risk assessments in the interbank market, compelling treasurers to diversify funding sources and establish conservative cash buffers. Moreover, regulatory developments linked to external imbalances, such as capital controls or repatriation rules, further complicate intercompany funding structures, requiring treasurers to design flexible, tax-efficient frameworks that ensure intra-group liquidity while maintaining compliance.

Thus, understanding and advocating in favour of constantly improving the balance of payments is not merely a macroeconomic concern—it is a fundamental input to national treasury strategy, risk mitigation, and financial resilience in the Greek corporate landscape. The Hellenic Association of Treasurers, the National Treasury Community of Greece, and the Hellenic Diaspora is at the forefront of policy advocacy with regards to strengthening further the balance of payments and therefore enabling Treasurers in Greece to elevate further the added value to the Greek corporates.

The study focuses on major questions:

What are the main structural and cyclical components driving Greece's balance of payments between 2002 and 2024?
– This question aims to identify which sub-accounts (e.g., goods, services, income balances) have the most significant and persistent impact on the country's external position.

To what extent do the components of the current account (goods, services, income) offset or reinforce each other over time?
– This explores the interaction and asymmetry between the trade deficit and the service surplus, and how they shape the net current account balance.

Are the observed imbalances in Greece's balance of payments driven by structural or cyclical factors?
– Through time series modeling and spectral analysis, the study examines whether long-term trends or short-term shocks dominate Greece's BoP dynamics.

What are the forecasted trends in Greece's balance of payments for the coming decade (2024–2034), and how stable are they?
– Using SARIMA modeling, the study projects the evolution of the BoP and evaluates the statistical robustness of future patterns.

What are the implications of the balance of payments performance for Greece's external economic position, country risk, and investment climate?
– The findings are used to assess Greece's exposure to external vulnerabilities and the impact on corporate treasury operations, intercompany financing, and sovereign credibility.

Definition of Key Terms

Balance of Payments

The Balance of Payments is a comprehensive record of all economic transactions between a country and the rest of the world over a specific period. It consists of three main components: the current account (covering trade in goods and services, income, and transfers), the capital account, and the financial account. The Balance of Payments provides insights into a country's economic relations with other countries and serves as an indicator of its financial stability.

Current Account Balance

The Current Account Balance represents the sum of the trade balance (the difference between exports and imports of goods and services), net primary income (such as interest and dividends), and net secondary income (including remittances and foreign aid).

Balance of Trade

The Balance of Trade reflects the difference between the monetary value of a country's exports and imports of goods.

Services Balance

The services Balance reflects the difference between the monetary value of services exported to other countries and the monetary value of services imported, such as transportation, travel, and insurance.

Primary Income Balance

Primary Income Balance reflects the net flow of income earned by a country's residents from investments and labor abroad (such as interest, dividends, reinvested earnings, and wages), minus the income earned by foreigners from investments and labor within the country.

Secondary Income Balance

Secondary Income Balancereflects the net value of current transfersthat don't involve the exchange of goods, services, or financial assetbetween residents and non-residents of a country, such as workers' remittances, personal transfers, and grants.

Capital Account Balance

The Capital Account Balancere presents the net value of capital transactions involving non-produced, non-financial assets between a country's residents and non-residents. It indicates whether a country is a net recipient or a net provider of such capital flows.

Financial Account Balance

The Financial Account Balance reflects the net flow of financial assets and liabilities between a country and foreign counterparts. It comprises transactions such as foreign direct investments, portfolio investments, and adjustments in reserve assets. This balance demonstrates whether a country is increasing its financial claims abroad or incurring financial obligations to external parties.

Time Frame selection and commenting

The timeframe of 2002 – 2024 was selected in order to have a significant large sample of multidimensional data, as we have included the pre-crisis era (2002 – 2007), the crisis (2008), the capital controls (2015), the covid era (2019 – 2021) and the post – covid years as well. During these 22 years a lot changed in the greek economy, a few key events to mention was the country's adoption of Euro as its main currency, the crash of the stock exchange was still in effect, and later on, there was the big crisis with the effect of NPLs from home loans etc. and all these took place while the political scene was also very volatile with the mix of the parties which were form the Government to change constantly.

Throughout these years, significant transformations have taken place in the Greek economy. Among the most important events are: the adoption of the euro as the national currency, the lingering effects of the stock market crash, the sovereign debt crisis and its impact on non-performing loans (particularly from home mortgages), and prolonged

financial instability. These economic shifts occurred alongside persistent political volatility, with frequent changes in government coalitions and party dominance. By selecting this comprehensive timeframe, the study is able to examine the Greek economy under multiple structural and external pressures. Monthly data were used for all the aforementioned years, allowing for a detailed and nuanced temporal analysis.

The year 2019 serves as a particularly important benchmark within this period. First, it marks the last year before the COVID-19 outbreak, reflecting a relatively stable economic environment that offers a reliable basis for comparison. Second, it represents the full lifting of capital controls, which restored normal financial flows and had a marked effect on the balance of payments (Hazakis, 2021).

The years 2020 and 2021 were characterised by severe economic and social shocks due to the pandemic. Including this phase is essential for analysing the immediate disruptions in financial transactions and their broader implications for the balance of payments. Comparing these data with pre-crisis levels enables a more accurate assessment of the Greek economy's resilience and the effectiveness of the policy measures implemented during the crisis (Economides et al., 2021).

Finally, the 2022–2024 period was chosen to reflect the stage of recovery and structural adjustment. During this phase, the impact of reforms, international economic developments, and institutional changes can be evaluated, offering insights into short- and long-term trends in Greece's external sector (Petrakis et al., 2023).

Particular emphasis is placed on the most recent five years (2019–2024), as this sub-period encapsulates a unique sequence of transformative developments. It begins with the full removal of capital controls and continues through the unprecedented economic disruption caused by the COVID-19 pandemic, followed by a period of fiscal restructuring and recovery efforts. These years reflect a critical turning point for the Greek economy, as they offer rich empirical data to assess the country's capacity for economic adaptation, resilience, and policy effectiveness under conditions of global uncertainty and domestic reform. This focus

allows for an in-depth understanding of contemporary challenges and the direction of future economic trajectories.

Over the period 2021 to 2023, Greece's Balance of Trade has persistently shown a significant deficit, reflecting structural economic challenges and external shocks. Several key factors explain this trend, highlighting Greece's continued reliance on imports.

1. Persistent Goods Trade Deficit:

The Balance of Trade has been negative for years, with a particularly large deficit recorded between 2021 and 2023. This reflects the fact that Greece imports far more goods than it exports, a pattern rooted in its economic structure and industrial capacity.

2. Impact of the COVID-19 Pandemic and Supply Chain Disruptions:

The global pandemic severely disrupted production and logistics worldwide. Greece, like many countries, increased imports of critical goods such as medical supplies and food. At the same time, export activities were hampered due to factory shutdowns and logistical bottlenecks, worsening the deficit.

3. Rising Energy and Raw Material Prices:

Since 2021, sharp increases in energy prices - especially oil and natural gas- as well as the cost of raw materials, have inflated the value of imports. Greece, heavily dependent on imported energy, faced higher import bills that further expanded the trade deficit.

4. Surge in Post-Pandemic Import Demand:

As pandemic restrictions eased, domestic demand rebounded strongly. This led to a rapid increase in imports, which outpaced export growth. The accelerated consumption of imported goods reflects Greece's structural dependence on external supply chains for many essential products.

5. Geopolitical Instabilities and Their Economic Effects:

The war in Ukraine and related geopolitical tensions exacerbated global supply challenges and caused commodity prices to spike. These developments

disproportionately affected countries like Greece that rely on imports for energy and raw materials, deepening the goods trade deficit.

The persistent Balance of Trade deficit highlights Greece's ongoing dependence on imports to meet domestic demand and sustain its economy. Structural limitations in domestic production and energy sourcing make this reliance difficult to reverse in the short term. To improve its goods balance, Greece must enhance its export capacity, diversify its energy sources, and strengthen supply chain resilience. Until these measures take effect, the country remains vulnerable to external shocks impacting global trade and commodity prices, underscoring the importance of strategic economic planning and international cooperation.

The war in Ukraine caused a fundamental global price shock and supply uncertainties that Greece could hardly control, significantly raising the cost of imports, especially energy. However, domestic market structures and business practices also influence how much of these increased costs are passed on to consumers. Thus, while external factors drove much of the price surge, internal market dynamics play a critical role in shaping the economic impact on Greece.

In conclusion, the selection of the 2002–2024 period enables a holistic and multidimensional analysis, combining pre- and post-crisis periods, moments of stability and shock, and phases of deep structural reform. This comprehensive time trajectory highlights the evolution of the Greek balance of payments and the adjustment mechanisms that have shaped the country's current economic landscape (Petrakis & Kostis, 2020).

Please note that monthly data were used from the years mentioned earlier.

METHODOLOGY

Research approach

The primary focus of the research was the quantitative analysis of time series data to identify patterns and examine the interrelationships among the accounts of the Balance of Payments (BoP). The study aimed to assess how each component influences the overall balance, as well as how they influence each other. Advanced statistical methods were employed, along with Python programming and Microsoft Excel software, to develop a SARIMA model capable of forecasting potential future trends in the BoP. Additionally, simple mathematical models were applied to evaluate the contribution of each account to the total balance and determine whether its impact on the country's cash flows is positive or negative.

SARIMA modeling

ARIMA (Autoregressive Integrated Moving Average) models are a foundational tool in time series forecasting, combining autoregression (AR), differencing (I), and moving average (MA) components. SARIMA (Seasonal ARIMA) extends this framework by incorporating seasonal components, making it especially suitable for monthly or quarterly data exhibiting cyclical behavior.

In this study, SARIMA was selected over ARIMA due to the monthly resolution of Greece's Balance of Payments (BoP) data and the presence of clear annual seasonal patterns. Seasonal differences with a 12-month lag is required to remove persistent yearly cycles (such as consistent credit to BoP during summer months due to tourism), which classical ARIMA cannot accommodate. Following, the basic workflow of the Box-Jenkins methodology for fitting a time series model is employed.

We applied the Augmented Dickey–Fuller (ADF) test to the raw BoP series (2002–2024). The test statistic (–1.13) and high p-value (0.7015) indicated non-stationarity, necessitating transformation.

To achieve stationarity, we applied:

- First-order differencing (to remove trend)
- Seasonal difference with lag = 12 (to remove annual cycles)

A second ADF test on the transformed series yielded a test statistic of –7.94 ($p \approx 0$), confirming stationarity and suitability for SARIMA modeling.

Analysis of the autocorrelation function (ACF) and partial autocorrelation function (PACF) plots informed the structure of the models.

- PACF: spikes at lags 1, 2, and 4–7 suggested the presence of short-term autocorrelation
- ACF: significant negative spike at lag 1 and a seasonal component at lag 12

These supported the inclusion of both MA(1) and seasonal MA(1) terms, along with 1–2 AR terms. The seasonal lag of 12 was chosen to reflect the clear annual periodicity observed in the monthly data, consistent with the known economic seasonality of balance of payments variables. Based on this, we tested the following candidate models, which differ in the amount of AR terms they use:

1. Model A: SARIMA(1,1,1)(0,1,1)[12]
2. Model B: SARIMA(2,1,1)(0,1,1)[12]
3. Model C: SARIMA(3,1,1)(0,1,1)[12]

All models were fitted using maximum likelihood estimation. Residuals were confirmed to be approximately white noise. Model comparison metrics are shown below:

Model	AIC	BIC	Log-Likelihood
SARIMA(1,1,1)(0,1,1)[12]	**3952.75**	**3966.82**	–1972.37
SARIMA(2,1,1)(0,1,1)[12]	3954.41	3972.00	–1972.21
SARIMA(3,1,1)(0,1,1)[12]	3955.74	3976.84	**–1971.87**

SARIMA(1,1,1)(0,1,1)[12] achieved the lowest Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) among the models tested, indicating that it provided the optimal balance between model goodness-of-fit and complexity. The AIC is a widely used metric that evaluates models based on the tradeoff between their likelihood (i.e., how well they explain the data) and the number of parameters used. A lower AIC suggests a better model, but it does not heavily penalize complexity. Conversely, the BIC includes a stronger penalty for model complexity, favoring more parsimonious models when differences in fit are small. In both criteria, SARIMA(1,1,1)(0,1,1)[12] outperformed the more complex alternatives.

Although the SARIMA(3,1,1)(0,1,1)[12] model produced a slightly higher log-likelihood, this gain in fit was marginal and came at the cost of significantly more parameters, resulting in a higher AIC and BIC. SARIMA(2,1,1)(0,1,1)[12] provided intermediate performance but did not yield any statistical advantage over the simpler SARIMA(1,1,1)(0,1,1)[12].

Therefore, applying the principle of parsimony—which favors the simplest model that adequately captures the underlying data-generating process—SARIMA(1,1,1)(0,1,1)[12] was selected as the most appropriate model for long-term forecasting. It is not only statistically valid but also interpretable and efficient, minimizing the risk of overfitting while maintaining strong predictive capability (Box & Jenkins, 1976; Hyndman & Athanasopoulos, 2021; Brockwell & Davis, 2016; Shumway & Stoffer, 2017; Wei, 2006).

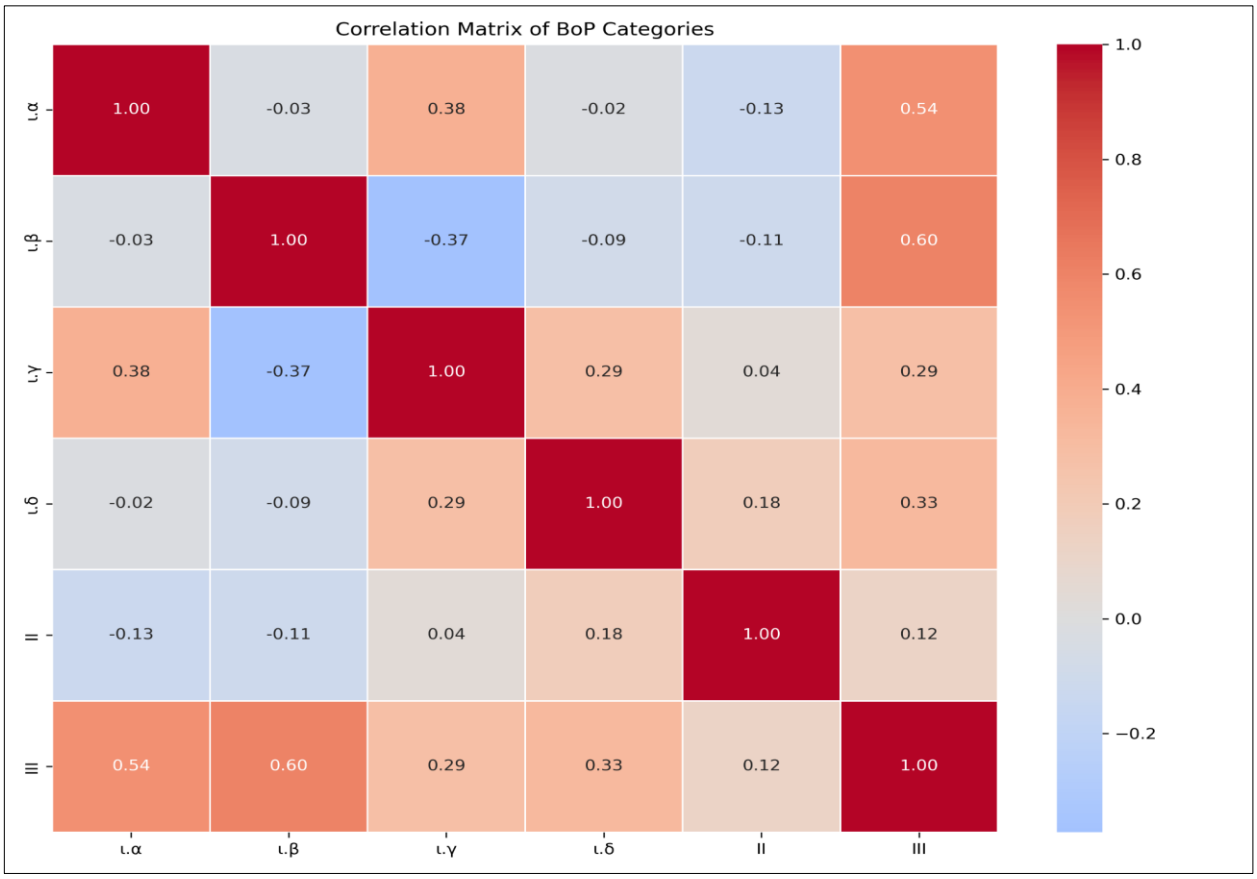
RESULTS

Correlation Analysis of Greece's Balance of Payments Components

In this analysis, we conducted a correlation study of the main components of Greece's Balance of Payments (BoP) to explore potential linear relationships between its sub-accounts. The correlation matrix (see Figure) illustrates pairwise Pearson correlation coefficients among the following categories: Goods Balance (I.α), Services Balance (I.β), Primary Income Balance (I.γ), Secondary Income Balance (I.δ), Capital Account (II), and Financial Account (III).

Our findings reveal a moderate positive correlation between the Financial Account (III) and both the Goods Balance (I.α) (0.54) and the Services Balance (I.β) (0.60), suggesting that changes in trade and service flows are associated with corresponding financial movements—possibly due to capital inflows or outflows linked to trade activity. In contrast, there is a negative correlation between the Primary Income Balance (I.γ) and the Services Balance (I.β) (-0.37), which may reflect that periods of strong service income coincide with increased outflows related to investment income or labor payments. The Secondary Income Balance (I.δ) shows relatively weak correlations with the other components, indicating it operates largely independently within the BoP structure. Similarly, the Capital Account (II) shows only low correlations with the other categories, underscoring its marginal role in Greece's external position relative to the financial and current account flows.

Figure 1: Statistical Correlations between Greece's Balance of Payments' Components (2002-2024)



Source: Authors' elaboration

Contribution of each component to the Current Account

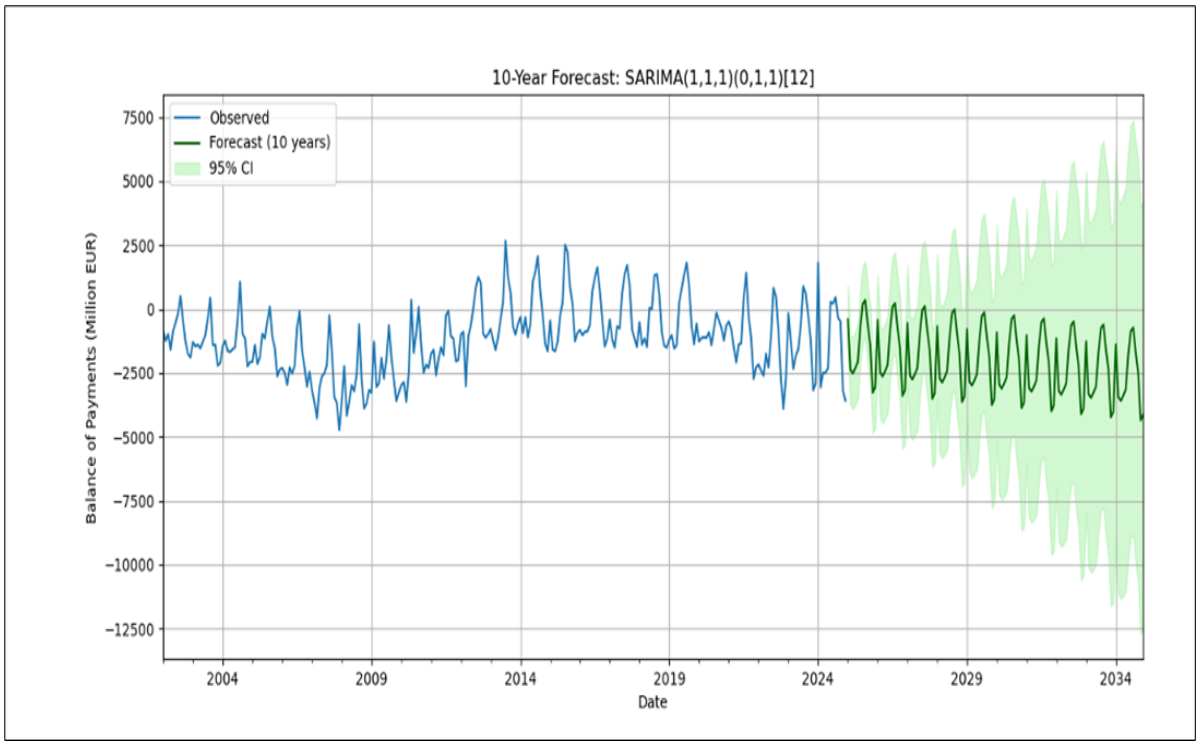
The Current Account (I) is the sum of four main components: the Goods Balance (I.α), the Services Balance (I.β), the Primary Income Balance (I.γ), and the Secondary Income Balance (I.δ). We performed a statistical analysis on the time series data to calculate the average contribution of each component to the overall current account. The results indicate that the Goods Balance (I.α) has the largest positive contribution (deficit), amounting to 193.81%, suggesting that goods trade dominates the current account. The Services Balance (I.β), on the other hand, shows a significant negative contribution of -108.86% (credit), reflecting a structural asymmetry between the two components: they have opposite signs, with the

magnitude of the goods balance being nearly double that of services. The Primary Income Balance (I.γ) contributes positively with 16.68%, while the Secondary Income Balance (I.δ) has a small negative impact, averaging -1.63%. The analysis covers a 24-year period (2002-2024), encompassing both growth and crisis phases, thereby capturing structural trends in the Greek economy.

SARIMA results (forecasting)

Using the selected model, we forecasted monthly BoP values for the next 10 years (2025–2035). The model accurately reproduces both short-term dynamics and annual seasonality. Forecast intervals widen progressively, reflecting expected uncertainty over time. Importantly, no structural anomalies or explosive behavior were observed. The resulting forecast is statistically consistent with the historical data, but it is still just one of the many possible pathways Greece's BoP could follow. The forecast output, including a 95% confidence interval, is visualized below.

Figure 2: 10-Year Forecast (2025-2035) for Greece's Balance of Payments



Source: Authors' elaboration

DISCUSSION

BoP commenting

As shown from the analysis, the Balance of Payments (BoP) is influenced mostly by two main accounts, the Balance of Goods (BoG) and the Balance of Services (BoS). The first one acts as the main source of Debit for BoP, where the second one acts as the main source of Credit. This is due to the fact that in BoG during the years, Exports < Imports, and with a contribution of 193.81% on the BoP, debits it by that percentage, where in the BoS the Inflows > Outflows and it credits the BoP by 108.86%. Note that in the BoS, the main component is tourism as the primary service Greece offers. The comparative figures reflect a long-standing imbalance between the Balance of Goods and the Balance of Services: while the two components have opposite signs, the deficit in goods is consistently larger, nearly twice as large—than the surplus in services. The Balance of Goods shows a deficit equivalent to approximately 194% of the total Current Account deficit, highlighting it as the main driver of the negative overall position. This disproportionately high percentage indicates that the issue lies primarily in Greece's heavy reliance on imported goods. In contrast, the Balance of Services is in surplus and contributes positively to the Current Account, with credits representing around 109% of the total balance. This means that revenues from services—such as tourism, shipping, and transport—partially offset the negative balance of goods. Therefore, there is a systemic imbalance: although the Balance of Services performs positively, it is insufficient to counterbalance the excessively negative Balance of Goods, which outweighs the surplus in services by nearly double. Over time, the Balance of Goods consistently shows a significant deficit, as imports are nearly twice the value of exports. The average import-to-export ratio is 2:1, indicating a structural dependence of the Greek economy on imported goods.

The above statements, show that no matter how good tourism performs, the negative effect the imports have on the BoP are almost double than the positive effect of the tourism, which leads to a conclusion that it is important for Greece to start producing in order to increase its exports, in order to offset this negative effect, and to balance it with the positive effect from tourism. Lastly, the Balance of Primary Income and the Balance of Secondary Income

have very low contributions to the BoP. This shows that Greek citizens, on average, don't have a competitive (by Western international standards) salary, so they don't have adequate savings, and thus they do not invest. Spectral analysis revealed strong low-frequency components, suggesting persistent long-term trends. Short-term fluctuations were minimal, indicating that external balances are predominantly driven by structural rather than cyclical forces. Johansen tests revealed two cointegrating vectors. A VECM was estimated, confirming that deviations from long-run equilibrium are corrected. This supports the economic hypothesis that Goods, Services, and Current Account balances move together over time.

Implications for Greece's External Economic Position

The findings underscore that Greece's external position remains fragile due to its systemic reliance on imports, limited domestic production capacity, and overdependence on a narrow base of service exports. Although services, particularly tourism, offer strong inflows, they cannot fully counterbalance the heavy outflows from goods imports.

Such structural imbalances undermine external sustainability, increase the country's sovereign and transfer risk, and raise the country risk premium, making it more costly for corporates to secure financing and repatriate funds. These factors limit investment attractiveness and elevate exposure to global price shocks (e.g., energy and commodities).

CONCLUSIONS AND WAYS FORWARD

Summary of Main Findings

This report has analyzed the structure and evolution of Greece's Balance of Payments (BoP) between 2002 and 2024, using advanced econometric modeling (SARIMA), correlation analysis, and time-series decomposition. The main findings are as follows:

Persistent Goods Deficit: The Goods Balance has consistently exerted a significant negative pressure on the Current Account, contributing approximately 193.81% of the total deficit. This structural imbalance reflects the Greek economy's long-standing dependence on imports.

Compensating Role of Services: The Services Balance, driven mainly by tourism, provides a strong positive contribution of –108.86%, partially offsetting the deficit in goods. However, the magnitude is insufficient to fully balance the negative external position.

Limited Impact of Income Accounts: Both the Primary and Secondary Income Balances have relatively minor effects on the overall BoP, indicating limited net investment income and constrained remittance flows.

Structural, Not Cyclical Nature of Imbalances: Spectral and cointegration analysis confirms that the BoP imbalances are primarily structural. The observed trends are persistent and not significantly affected by short-term shocks.

Forecast Stability: The SARIMA model forecasts suggest no explosive future behavior but rather the continuation of existing patterns, reaffirming the need for long-term, structural policy interventions.

Initial Policy Recommendations

To strengthen Greece's BoP and external resilience, the following strategic actions are proposed:

- Boost Domestic Production: Invest in manufacturing and high-value-added industries to reduce import dependency and expand export capacity.
- Diversify Exports: Promote export diversification beyond tourism and shipping, targeting technology, pharmaceuticals, and agri-food sectors.
- Support Energy Transition: Accelerate investment in domestic and renewable energy production to limit vulnerability to imported fuel price shocks.
- Enhance FDI Attractiveness: Streamline governance frameworks, reduce regulatory uncertainty, and actively promote sectors with comparative advantage.
- Treasury & Financial Infrastructure: Encourage innovation in corporate treasury practices to manage BoP-related risks, such as foreign exchange volatility and capital flow constraints.

Future Research Directions

While this study has provided valuable insights, further research is needed to deepen understanding and guide more targeted interventions:

- Sectoral Contribution Analysis: Break down BoP components by sector (e.g., tourism, energy, industrial exports) to assess their long-term viability and volatility.
- Political Economy Dimensions: Investigate how political cycles and institutional quality impact capital flows and investor confidence.
- Impact of ESG & Green Investment: Analyze how the green transition and sustainability-linked investments affect Greece's external balance and attractiveness to foreign capital.
- Treasury-Level Microdata: Incorporate survey-based data from corporate treasurers to assess real-time responses to BoP pressures (e.g., cash pooling adjustments, hedging behavior).

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