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Effects of Mood and Optimism on Economic Cycles and Stock Market Performance: Evidence from the European Union

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Abstract

This dissertation explores how mood and optimism influence economic cycles and stock market performance across the European Union (EU). Challenging the traditional view of perfectly rational markets, we adopt a behavioral finance perspective to explore how exogenous factors —specifically weather patterns, sports victories, and political events—shape investor sentiment and, in turn, affect economic and financial activity.

The analysis uses quarterly panel data from 2000 to 2024 for the 27 EU member states and two European Free Trade Association (EFTA) countries (Iceland and Norway). Methodologically, Tobit models were used to analyze economic expansions and contractions, and OLS models to assess stock market performance. The independent variables account for demographic, socioeconomic, and industrial controls, alongside mood and optimism indicators - *i.e.,* indicators of temperature and proxies for investor sentiment derived from sports outcomes and political developments.

Our findings reveal that expansions and stock market performance are stronger, and contractions are weaker in the EU countries where individuals are more optimistic. Notably, among mood indicators, only weather-related variables, particularly temperature and its nonlinear effects, consistently impact economic cycles. Sports and political sentiment proxies show inconsistent influence, though political events occasionally affect stock returns. Importantly, the effects vary across the EU countries. For example, mood boosts support economic growth in Finland and Italy, but have adverse or negligible effects in countries like France, Spain, and Portugal. Similarly, positive sentiment benefits stock markets in Germany and Poland, while Portugal and Spain may respond negatively. Robustness checks confirm the validity of these results, though the global financial crisis altered some relationships.

In summary, this dissertation contributes to behavioral finance by emphasizing the importance of mood and optimism in shaping economic and market trends across the EU. It also highlights the necessity for policymakers and investors to consider psychological and contextual factors in fostering resilient and well-functioning economies.

Keywords: economic cycles; expansions; contractions; stock market performance; mood and optimism; weather; sports outcomes; political outcomes; European Union

JEL Classification: G41; G15; E32; E44; E71; C23

Sumário

Esta dissertação analisa como o humor e o otimismo influenciam os ciclos económicos e o desempenho dos mercados de ações da União Europeia (UE). Desafiando a visão tradicional de mercados perfeitamente racionais, adotamos uma perspetiva de finanças comportamentais, e exploramos como fatores exógenos – nomeadamente o clima, vitórias desportivas, e eventos políticos – moldam o sentimento dos investidores e, por sua vez, afetam a atividade económica e financeira dos países.

A análise utiliza dados em painel trimestrais de 2000 a 2024 para os 27 Estados-membros da UE e dois países da Associação Europeia de Comércio Livre (EFTA) (Islândia e Noruega). Metodologicamente, utilizamos modelos Tobit para analisar expansões e contrações económicas, e modelos OLS para avaliar o desempenho do mercado bolsista. As variáveis independentes incluem controlos demográficos, socioeconómicos e industriais, para além dos indicadores de humor e otimismo: indicadores de temperatura, e *proxies* derivadas de resultados desportivos e do contexto político do país.

Os resultados demonstram que as expansões e o desempenho do mercado acionista é mais forte, e as contrações mais fracas nos países da UE em que os indivíduos são mais otimistas. Dentro dos indicadores de humor, apenas os relacionados ao clima -particularmente a temperatura e os seus efeitos não lineares-, influenciam consistentemente os ciclos económicos. As *proxies* dos eventos desportivos e políticos têm um efeito inconsistente, embora os eventos políticos afetem ocasionalmente os retornos acionistas. Estes resultados variam entre os países: o humor apoia a economia na Finlândia e Itália, enquanto na França, Espanha e Portugal apresenta efeitos adversos ou nulos. Nos mercados, o sentimento positivo beneficia a Alemanha e a Polónia, mas pode prejudicar Portugal e Espanha. Testes de robustez confirmam a validade dos resultados, apesar de a crise financeira global ter alterado algumas relações.

De forma geral, esta dissertação contribui para as Finanças Comportamentais, ao reforçar a importância do humor e do otimismo nos ciclos económicos e nos mercados de ações da UE, e da importância dos fatores comportamentais na formulação de políticas económicas e decisões de investimento na UE.

Palavras-chave: ciclos económicos; expansões; contrações; desempenho do mercado de ações; humor e otimismo; clima; resultados desportivos; resultados políticos; União Europeia

Classificação JEL: G41; G15; E32; E44; E71; C23

List of Abbreviations and Acronyms

AD	Antidepressant Drugs
AI	Economic Activity Index
CPI	Consumer Price Index
DDDs	Defined Daily Doses
EFTA	European Free Trade Association
EMH	Efficient Market Hypothesis
EU	European Union
FE	Fixed Effects
GDP	Gross Domestic Product
MPT	Modern Portfolio Theory
OLS	Ordinary Least Squares
POLS	Pooled OLS
RE	Random Effects
SAD	Seasonal Affective Disorder
US	United States
VIF	Variance Inflation Factor

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1. Introduction

Finance has traditionally been dominated by paradigms of rationality and efficiency, portraying markets and economies as perfectly coherent systems, shaped by rational decision-making and macroeconomic fundamentals as the main drivers of economic cycles (Jensen, 1978; Fama, 1970). However, an emerging body of research has underscored the role of behavioral and emotional factors as crucial -yet understated- conductors of economic activity and financial markets (*e.g.,* Shiller, 2003; Rashid *et al.,* 2022; Barberis *et al.,* 1998). Remarkably, behavioral finance has consistently shown that mood and optimism may cause significant deviations from rational market behavior, affecting overall market stability (De Bondt & Thaller, 1985; Shiller, 2003). For instance, the works by Arellano & Bond (1991) -who used a dynamic panel estimation approach across the OECD- and by Nowzohour & Stracca (2017) -who analyzed business confidence indicators across the EU countries-, concluded that mood and optimism are significant drivers of economic cycle fluctuations. In the context of stock market performance, the study carried out by, *e.g.,* Smales (2017) - who employed sentiment indices derived from news and social media to examine investor behavior- concluded that heightened optimism impacts positively stock market returns, particularly during periods of economic uncertainty. In this context, our research focuses on how mood and optimism affect the EU economic cycles and stock market performance, emphasizing their vital roles.

This study is inspired by the research of Chhaochharia *et al.* (2020), who explored the relationship between mood and optimism indicators and economic activity in the US. Specifically, we adapt and extend their research to the European Union (EU) context (offering a broader, transnational perspective, and allowing to assess the universality of the US-based results within the EU). Additionally, we expand the analysis to explore whether there is also an impact of mood and optimism on the EU stock market performance. Finally, we identify differences in the influence of mood and optimism across the EU countries, and assess the extent to which local demographic and socioeconomic characteristics moderate these behavioral effects in the EU. Although the literature on investor sentiment is extensive, there remains a notorious gap in literature that integrates non-economic factors (*e.g.,* weather, sports results and political outcomes) and the EU context, which motivated this research. Moreover, we selected Chhaochharia *et al.* (2020) as our anchoring study due to its methodological rigor and relevance.

The analysis compiles a quarterly panel dataset, spanning from 2000 to 2024, for the 27 EU

member states, and 2 additional European Free Trade Association (EFTA) countries (Iceland and Norway). The dataset includes varied information regarding weather, sports and political outcomes, along with a comprehensive set of control variables, which capture demographic, socioeconomic and industrial differences across the EU. To test our hypotheses, we employ Tobit models to analyze the relationship between mood indicators and the economic cycles (*i.e.,* expansion vs. contraction) and OLS regression models to analyze the relationship with stock market performance.

A key methodological concern that guided this dissertation is ensuring the exogeneity of the mood indicators– *i.e.,* the variables that influence mood and optimism should not be themselves influenced by the economy or the stock markets -to avoid endogeneity issues and biased estimations. In this sense, in order to isolate the effect of mood in the economy and financial markets, weather-related variables, sports outcomes and the political climate were chosen as proxies of mood and optimism, due to their likely independence from the economic cycles and stock market performance.

Our empirical results support the hypothesis that mood and optimism significantly impact economic cycles and stock market performance in the EU -with expansions and stock returns being stronger, and contractions weaker, in countries where individuals are more optimistic. Specifically, it was found that the temperature and its non-linear effects significantly influence the EU expansions and contractions, with favorable weather conditions promoting economic expansions and weakening contractions. In the context of stock markets, a comparable non-linear relationship is observed, whereby moderate increases in temperature enhance returns while further increases eventually result in adverse effects. Moreover, political outcomes revealed to be insignificant drivers of economic cycles, yet significant drivers of stock returns, with right-wing governments being associated with lower returns. In contrast, sports outcomes were not consistently significant in impacting either the economic cycles or stock market performance.

The results also reveal a notorious regional heterogeneity across the EU, with the impact of mood and optimism indicators varying considerably across regions, with local demographics and socioeconomic conditions moderating their effects. For instance, the results exposed that an older population enhances the positive effects of favorable weather on EU expansions and stock returns, and to reduce the negative impacts observed during contractions; higher social trust levels mitigate this effect, etc. At the national level, the economic cycles

of countries such as Finland and Italy would benefit from mood boosts, whereas in France the effects may be adverse, and in countries like Spain and Portugal, negligible. Similarly, the impact of mood and optimism on national stock markets varies, with mood boosts benefiting stock returns in countries like Germany and Poland, whereas markets such as Portugal and Spain could face negative effects, with Italy remaining largely unaffected. These findings highlight the importance of local socioeconomic and institutional contexts that influence the impact of behavioral factors in economic and financial performance across the EU.

Robustness checks further validated our findings: specifically, the nonlinear effect of temperature on economic cycles and stock returns is robust and not driven by sample characteristics, endogeneity, etc.; sports outcomes remain largely nonsignificant, whereas political outcomes -particularly the right-wing majority indicator- consistently drives stock returns.

This work contributes to the growing body of behavioral finance literature, by unveiling how behavioral factors may impact the economic cycles and stock market performance in a diverse and dynamic landscape such as in the EU, thereby supporting the universality of the US findings. Finally, this dissertation offers valuable insights for policy makers and investors, uncovering the importance of considering demographic and institutional contexts in moderating behavioral effects, and when designing economic policies. Considering this cautiously when tailoring regional approaches will ultimately enhance economic resilience and market stability. Moreover, investors may benefit from incorporating behavioral indicators into risk assessment and portfolio management frameworks, thereby refining predictions and strategies in diverse economic environments.

Along with this introductory chapter, this dissertation is comprised of four more chapters, organized as follows: Chapter 2 presents a comprehensive literature review, reviewing both traditional and behavioral finance theories, and focusing on literature regarding the relationship between non-economic determinants of economic cycles and stock market performance. Chapter 3 includes the core hypotheses that guide this dissertation, a description of the sample, data collection processes, variable construction, and econometric models employed; Chapter 4 presents and interprets the empirical findings on the impact of mood and optimism on economic cycles and stock market performance, including analysis of regional heterogeneity and direct indicators of mood and optimism. Finally, Chapter 5 summarizes the key findings of this dissertation, discusses their implications for different stakeholders, and outlines the limitations of the study. It also presents proposals for future research.

2. Literature Review

This chapter reviews key theories and empirical findings being structured as follows: firstly, we delve into traditional and behavioral finance theories, providing a foundation regarding how psychological and emotional factors may influence financial choices and market dynamics (Section 2.1.); secondly, we focus on economic cycles and stock market performance, addressing their relevant macroeconomic drivers (Section 2.2.); finally, we explore the influence of mood - proxied by weather-based variables, sports victories and political outcomes- in shaping economic cycles and stock market performance (Section 2.3.).

2.1. Behavioral Finance

Traditional finance relies significantly on the *Efficient Market Hypothesis (EMH)*, which posits that all available information is completely incorporated into asset prices, leaving no opportunity for investors to outperform the market through publicly available data (Jensen, 1978; Fama, 1970; Malkiel, 2003). Based on principles of rationality and market efficiency, it relies heavily on mathematical and statistical models to value assets, build diversified investment portfolios and assess *risk-return trade-offs* of different assets (Rashid *et al.,* 2022). A prominent example of a traditional finance theory underlying the EMH is the *Modern Portfolio Theory* (MPT) by Markowitz (1952), which suggests that rational investors base their portfolio selection decisions on two parameters: the expected return and variance, diversifying to optimize their portfolios. However, real-world observations often oppose to these assumptions, with investors frequently under-diversifying, violating the principles of expected utility, or displaying inconsistent risk preferences (*e.g.,* Katsikopoulos & Gigerenzer, 2008; Cubitt *et al.*, 2010; Sahi, 2012).

These inconsistencies have led to the emergence of *behavioral finance theory*, which integrates insights from Psychology and Sociology, offering a more comprehensive and realistic view of the financial markets, as it acknowledges that investors are not always rational, and that asset prices may be influenced by emotional and behavioral factors (Shiller, 2003). Statman (1995) explained this phenomenon, arguing that investors are "normal" people, who are influenced by emotions and cognitive biases, instead of the perfectly rational "*homo economicus"* concept proposed by traditional finance. Complementarily, Shiller (2003) stated that EMH is a limited theory, being unable to fully explain the behavior of financial markets.

In this sense, several behavioral finance models have been developed, dropping the assumption of perfect rationality, incorporating factors such as overconfidence, loss aversion, and herding behavior into traditional economic models, leading to an investor behavior that is more consistent with that observed in empirical studies (Sapra & Zak, 2008; Rashid *et al.,* 2022; Kanapickienė *et al.,* 2024). Barberis *et al.* (1998), in their study, concluded that psychological biases lead to stock market over- and underreactions, largely driven by exogenous factors influencing investor sentiment, namely the weather or political events. Supporting this, Saunders (1993) and Kamstra *et al.* (2000) claim that stock market prices are influenced by non-economic factors that can affect the psychological state of investors. Akerlof & Shiller (2010) provide a foundational framework in behavioral economics and finance, stating that psychological factors such as mood can cause economic expansions and contractions, regardless of fundamentals. In fact, many scholars have found that economic mood can, in fact, drive business cycles and predict economic activity (*e.g.,* Golinelli & Parigi, 2004; Beaudry *et al.*, 2011; Nam & Wang, 2018). These papers highlight the importance of mood and optimism in shaping business cycles.

Furthermore, Loewenstein *et al.* (2001) examined the neuroeconomic foundations of the impact of mood on decision making. Their findings suggest that emotional states, driven by external conditions, change risk and time preferences, influencing economic behavior and asset prices.

2.2. Economic Cycles, Stock Market Performance and their Drivers

Economic cycles, characterized by alternating phases of expansion and contraction, are vital to understanding the dynamics of regional and national economic dynamics, (Fisher, 1925; Burns & Mitchell, 1946). The literature often represents economic cycles as a result of a *Markov* process, wherein economies switch stochastically between two discrete states (expansions and recessions), with the probability of a country switching from expansions to contractions and vice-versa not depending on the length of the cycle (Hamilton, 1989; Castro, 2011). Zhao & Zhang (2024) emphasize the nonlinear and uncertain nature of these fluctuations. Chhaochharia *et al.* (2020) build on this, by incorporating state-level economic cycles analysis to explore the rich geographical variation in economic cycles and the level of optimism across the US.

Composite indices have been widely used to capture economic activity. For instance, Stock

& Watson (1999) illustrated the effectiveness of this method, by combining indicators like employment, income, production, among others, in order to create a single and cohesive measure of economic performance. Their methodology laid the foundation for state-level analyses, demonstrating the utility of composite measures in identifying cyclical patterns. Similarly, Chhaochharia *et al.* (2020), following Korniotis & Kumar (2013) and Beaudry & Koop (1993), applied the *state-level economic activity index*, which consolidates state-level measures of income growth, relative unemployment, and housing collateral, to differentiate between expansion and contraction phases. This approach allows us to explore how regional economies may respond differently to external shocks due to variations in demographics, industrial composition, and policy environments (Carlino & Sill, 2001).

Several factors have been found to drive economic cycles. Carlino & Sill (2001) found that regions with higher social capital and risk-sharing mechanisms are more resilient to economic shocks, and underscore the need to include localized factors when examining cyclical trends. Similarly, Asdrubali *et al.* (1996) support the usage of structural variables – namely agriculture, mining, and manufacturing – as key cycle determinants, with larger agricultural sectors usually impacting negatively economic cycles, and larger mining and manufacturing sectors positively. In Europe, Palenzuela *et al.* (2024) identified GDP, housing prices, real wages, consumption, among other factors as major cycle drivers, finding that similarities in sectoral composition among the EU countries mainly explain business cycle synchronization, and emphasize the interconnectedness between the EU and the US economic cycles.

Global influences also play a vital role. Agnello *et al.* (2020) broadened the focus of business cycle studies to include global elements, discovering that macroeconomic factors -such as inflation and economic policy- have a significant impact on economic cycles, namely their duration and severity, with high inflation slowing down economic growth, while well-designed fiscal and monetary policies can support economic stability and growth. Basu & Taylor (1999) emphasize the significance of trade openness, financial integration, and institutions as drivers of synchronized cycles.

The relationship between business cycles and stock market performance is well-documented throughout the literature, which inspired the addition of stock market performance as a variable of interest in this dissertation. For instance, the studies of Fama (1981) and Uzum *et al.* (2021) demonstrated that stock market returns are significantly influenced by macroeconomic variables. Goyal (2009) highlighted the importance of the inclusion of demographic

variables in stock market performance studies, finding that population structures, changes in population age, and international demographic changes influence the stock market. Likewise, Gao *et al.* (2019) support the importance of also considering demographic variables and stock market conditions, on top of macroeconomic factors. The inclusion of stock-market specific variables is also extensively defended (*e.g.,* Fama & French, 1989; Higgs & Worthington, 2005; Gao *et al.,* 2019). Likewise, Kose & Terrones (2015) further found that credit booms and global liquidity conditions significantly impact market valuations, which supports the findings of Palenzuela *et al.* (2024), which highlighted the role of financial systems in transmitting shocks across regions. Collectively, these strands of literature underscore the interconnectedness of financial markets and economic activity, demonstrating how the financial factors driving business cycles also impact stock market performance.

2.3. Influence of Mood and Optimism on the Economic Cycles and Stock Market Performance

The literature has been extending the drivers of economic cycles and financial performance beyond traditional factors, with psychological factors playing a vital role in the economies and financial markets (*e.g.,* Akerlof & Shiller, 2009; Ciccone, 2011; Krugman, 2009). For instance, Blanchard & Fischer (1989) postulate that exogenous shocks and endogenous behaviors -such as consumer sentiment- are key indicators shaping the path of economic cycles. Chhaochharia *et al.* (2020), referencing Shiller (2010), state that "business recessions are caused by a curious mix of rational and irrational behavior. (…) Negative feedback cycles, in which pessimism inhibits economic activity, are hard to stop." (p. 245). Optimism, by contrast, can reduce perceived risk and spur economic growth, and may lead investors to overestimate future earnings and overvaluation of assets, which results in higher stock prices and potential economic booms, as well as higher consumer spending and investment (Shiller, 2010; Golinelli & Parigi, 2004).

A natural implication of Shiller's (2010) observations is that the mood of individuals within a state would be an important determinant of state-level business cycles. Numerous authors argue that mood is a vital driver of economic cycles' fluctuations (*e.g.,* Arellano & Bond, 1991; Nowzohour & Stracca, 2017). Specifically, Beaudry *et al.* (2011) argue that mood swings account for over a half of business cycle fluctuations, whereas Nam & Wang (2018) estimate that it is responsible for nearly 30% of the fluctuations. Likewise, Borisov (2022) has found

a statistically significant relationship between confidence and economic growth. In this context, Chhaochharia *et al.* (2020) support the usage of mood indicators -on top of traditional macroeconomic fundamentals, such as demographic and industry variables- as key factors driving business cycles. Furthermore, numerous studies highlight the significant impact of investors' mood on stock market returns as well (*e.g.,* Cao & Wei, 2005; Yuan *et al.*, 2006). For instance, Smales (2017) and McGurk *et al.* (2019) scraped millions of tweets in order to construct sentiment indexes that capture the mood of investors, and found that the mood influenced significantly -and even predicted- equity returns.

The mood effects tend to vary demographically. For instance, Chhaochharia *et al.* (2020) suggest that in the US, economic recessions tend to be weaker, and expansions tend to be stronger where local individuals are more optimistic, and that the relation between local mood and the local economy remains strong, even after accounting for the immediate impacts of weather on the local economy. They stress that these results appear to be robust and not period specific. Additionally, the authors also concluded that local optimism exerts a greater influence on state-level business cycles of smaller states and regions with low levels of risk sharing, which complement the research conducted by Carlino & Sill (2001) mentioned previously. Conversely, the incremental effects of local optimism tend to be weaker in states where individuals are younger, and more socially connected. States with larger concentration of minorities and urban population appear to exhibit lower sensitivity to variations in mood and optimism. Similarly, Baker & Wurgler (2006) showed that investor sentiment drives anomalies during periods of uncertainty, which aligns with the findings of Chhaochharia *et al.* (2020) that local optimism positively influences economic cycles.

However, this view is not unanimous. For instance, Shmeling (2009), using data of 18 industrialized countries, stated that although investor sentiment might have predictive power in some countries, the overall effect appears to be statistically insignificant, thereby suggesting that the sentiment might not influence, for instance, stock market returns globally. Durand *et al.* (2013) were unable to find that mood systematically affects stock market performance. Finally, some literature emphasizes that the effect of mood on stock markets is observed in the short term, but that it is insignificant in the long term (*e.g.,* Brown & Cliff, 2005). This lack of consensus presents an opportunity for further inquiries and motivated this dissertation, as it underscores the need to evaluate the impact of mood and optimism under different economic and institutional contexts, such as in the EU.

Establishing a causal link between optimism and the economic environment is challenging, as these variables are, themselves, connected to the economic climate. Frasquilho *et al.* (2016) asserted that economic recessions and its drivers -*e.g.,* unemployment, income decline, etc.-, are significantly associated with poor mental wellbeing, higher rates of common mental disorders, substance-related disorders, and suicidal tendencies, identifying a relationship between increased mental health problems and economic recessions. Additionally, Nofsinger (2010) states that the general level of optimism in society is reflected by the emotions of the financial decision-makers which are interconnected among economic participants. The author concludes that "social mood determines the types of decisions made by consumers, investors, and corporate managers alike (…) Extremes in social mood are characterized by optimistic (pessimistic) aggregate investment and business activity" (p. 144).

To isolate the mood effects, Chhaochharia *et al.* (2020) advocate for using exogenous mood indicators (*e.g.,* based on weather, political environment and sports outcomes) that are unrelated to the economic climate, as it is hard to argue that changes in the economic environment could affect these optimism measures. Agnello *et al.* (2020) extended the analysis of macroeconomic and environmental factors to the stock markets, concluding that rising temperatures and other global environmental conditions impact the stock market performance, by influencing investor sentiment and economic productivity. This extends on their earlier findings that environmental drivers also impact the duration of economic expansions, revealing a parallel between long-term economic cycles and financial market dynamics.

Weather-related variables are widely used as *proxies* for mood and optimism. Chhaochharia *et al.* (2020) justify their choice of weather as an indicator of mood and optimism with psychology evidence, which shows that nearly 40% of mood variations can be attributed to local weather, with sunny, warm and low humidity conditions being associated with positive moods and higher levels of optimism, thereby enhancing local economic activity (Persinger & Levesque, 1983; Cunningham, 1979; Howarth & Hoffman, 1984). Likewise, Saunders (1993) and Hirshleifer & Shumway (2001) argue that the weather may affect the behavior of market traders and, consequently, would reflect on stock returns. Similarly, Beute & Kort (2018) have found positive effects of nature and daylight on affect and stress levels of individuals. More specifically, Denissen *et al.* (2008), after examining the effect of six weather parameters at a multilevel analysis, found that factors such as temperature, wind power and sunlight have a significant influence on mood. Additionally, pleasant weather is unlikely to have an extreme impact

on mood and optimism. Likewise, Agnello *et al.* (2020) found that a rise in average temperature tends to increase the length of economic growth periods. Unpleasant weather, on the other hand, tends to have negative effects on economic cycles. For instance, Felbermayr *et al.* (2022) have found that unfavorable weather (*e.g.,* storms, excessive precipitation and cold weather) tend to reduce economic growth. Other indicators, such as temperature, temperature amplitude have been documented to appropriately capture mood, as it proxies the average cloudiness of the sky (Karl *et al.,* 1993; Kass & Frich, 1995).

As for stock market performance, many studies highlight the importance of weather on stock market returns (*e.g.,* Chang *et al.* 2008; Saporoschenko, 2011). Jacobsen & Marquering (2008) found that temperature, sunshine, and rainfall consistently impact stock market performance, even when accounting for additional economic variables. Saunders (1993), who studied the relationship between New York's weather patterns and stock market performance (through major stock indexes) reached similar conclusions. The results showed that the economic effect produced was surprisingly large, taking into consideration that the weather event affecting psychological mood was such a minor one. Hirshleifer & Shumway (2003), found a robust positive correlation between daily sunshine and stock market returns across 26 countries, suggesting that weather-induced mood fluctuations systematically influence investor behavior, leading to quantifiable market effects. Chang *et al.* (2008), who examined the relationship between the weather in New York City, intraday returns and trading returns of NYSE stocks, concluded that weather has a significant influence on stock returns, with returns being lower in cloudier days. These findings highlight the significance of including weather as an exogenous factor influencing markets and larger economic trends. Other studies suggest that weather affects investor behavior, including trading volume and risk appetite (Cao & Wei, 2005; Goetzmann & Zhu, 2005), with unfavorable weather significantly decreasing trading volumes, and elevated temperatures leading to decreased stock returns, which is ascribed to diminished risk tolerance in excessively warm times.

However, some authors show opposing views. For instance, Pardo & Valor (2003) studied the possible relation between weather and market index returns in Spain, and found no empirical evidence of an influence of weather on stock returns, independently of the trading system. Others found that although weather might influence stock markets and economic growth, it might not always be a decisive factor, nor universally affect economic cycles (Baker & Wurgler, 2007; Dell *et al.*, 2012).

The literature has also examined the association between weather and mood on a neuro-foundation basis. Chhaochharia *et al.* (2020) explain that with good weather, the body releases a neuro-transmitter serotonin, fostering happiness and vigilance, while unfavorable weather triggers the release of melatonin, leading to sleepiness and depression. Persinger & Levesque (1983) emphasized these neurochemical routes, thereby creating a connection between good weather and enhanced individual and economic outcomes.

Further literature has suggested a link between weather and mood that might be influenced by seasonal elements. Kamstra *et al.* (2003) examined how seasonal affective disorder (SAD) affects stock market returns. They documented that during periods with reduced daylight, namely in winter months, markets tend to exhibit lower returns, attributed to the heightened risk aversion among investors experiencing SAD. Contrarily, Keller *et al.* (2005) found that weather affects mood only in the Spring and only when people spend significant time outdoors. This complex relationship is also related to anecdotal evidence from informal surveys that suggest that dreary weather frequently diminishes motivation and productivity, as explained by Chhaochharia *et al.* (2020). Complementarily, Carleton & Hsiang (2016) document the extensive social and economic impacts of climate, stating that temperature, in particular, exerts remarkable influence over human systems at many social levels -*e.g.,* high heat revealed to induce mortality, incite violence, lower human productivity, trigger population movement, among others -whereas precipitation extremes have a particular harmful effect on agricultural economies. The authors' results suggest that the current trend of global warming is predicted to slow global economic growth rates by 0.28pp per year.

The influence of *sports outcomes* on economic and financial activity has also garnered significant attention in literature, particularly as a proxy for mood and optimism. Chhaochharia *et al.* (2020) support their choice of sports outcomes as an indicator of mood and optimism from the evidence found by Edmans *et al.* (2010), who concluded that a considerable portion of the variations in mood may be attributed to sports outcomes. Whitfield (2003) found that sports victories boost national morale and consumer optimism, leading to higher consumption and business activity. Conversely, defeats often lead to decreases in stock prices, especially in regions where sports have considerable cultural significance (Ashton *et al.,* 2010, Kang & Park, 2014; Graziano & Vincentini, 2017). The asymmetric nature of these effects is particularly remarkable: sport victories tend to produce larger financial benefits compared to the negative impact of losses, considering that the investors' behavior is often more

responsive to positive emotions than negative ones (Bernile & Lyandres, 2011). Additionally, the magnitude and significance of the sports event are crucial factors in determining the economic impact, with global competitions -*e.g.,* the World Cup- often producing wider and more lasting economic advantages than typical season matches. Moreover, Harjito *et al.* (2021) found that major sports events that have been hosted with international coverage may be one driver influencing how well the stock market performs.

Additionally, Ashton *et al.* (2010) examined how football match results influenced the London Stock Exchange and discovered that defeats by the English national team led to short-term decreases in stock prices, particularly during important matches. Likewise, Edmans *et al.* (2007) found significant adverse responses in the stock market after national football teams suffered defeats, highlighting the influence of mood and emotional spread on shaping investor actions. Graziano & Vincentini (2017) corroborated this in Italy, where the performance of the national football team positively impacted the stock market returns, which highlighted the profound cultural importance of the sport. Kang & Park (2014) concluded that victories by the Korean national football team in major tournaments led to positive returns on the Korean stock market, whereas losses had the opposite effect. Nwansi & Osuji (2015) discovered similar findings in Nigeria, even though these results were only found in the men's national football, while no notable effects were seen for the women's team, a situation the authors linked to possible cultural or religious biases among market participants, that may have obscured their enthusiasm in the stock market. This study also defends the usage of religiosity related variables as control variables.

Zawadzki (2013) examined major sports events and found that stock indices in host nations frequently show positive shifts on announcement days, particularly in markets where the decision to host was not anticipated. This "*pleasant surprise effect*" emphasizes the significance of market anticipations and emotions in influencing stock price changes. Finally, Kaplanski & Levy (2010) expanded on these results, concluding that soccer matches can affect markets that are neutral and whose national teams did not play.

Nevertheless, these effects are not unanimous. For instance, Klein *et al.* (2009) concluded that there is no economic reason to link sports outcomes with market returns. The authors alert that the literature might have methodological shortcomings (*e.g.,* not considering time zone variations or classifying penalty-decision matches as draws). Similarly, Gerlach (2011) discovered no reliable evidence connecting international sports results to stock market

returns, questioning the strength of earlier studies. Moreover, Reid *et al.* (2013) found that the major competitions in basketball (NBA) and baseball (MLB) did not have any correlation with the U.S stock market, stating that "there is no economic rationale for anyone to believe that there is some connection between such events and the performance of the market" (p. 26).

Literature also links extensively *political sentiment* to economic cycles and financial outcomes. Chhaochharia *et al.* (2020) support their choice of political outcomes as an indicator of mood and optimism from the evidence found by Bonaparte *et al.* (2017), which showed that investors tend to feel more optimistic about the economy if their political party is in power, motivated by the idea that the political identity of an individual is an important source of his degree of optimism towards the economy. Democracy tends to enhance human capital development (Brown & Hunter, 2004; Mankiw *et al.,* 1992), which supports long-term economic growth, although initial GDP levels may moderate this link (Helliwell, 1994).

Regarding the EU, similar conclusions have been observed. Fratzscher & Stracca (2008) discovered that the Economic and Monetary Union, although it played a role in modulating the impact of political events on the EU's member states' economies, has diminished the local impact of political shocks, but increased cross-country contagion. This interconnectedness emphasizes the broader impacts of political changes in one member state on the region as a whole. Political events (*e.g.,* elections) are found to impact fiscal behavior as well as investor confidence in the EU: Efthyvoulou (2011), using data on the 27 EU-member states from 1997 to 2008, found that electoral incentives could lead to fiscal expansion, possibly disrupting economic cycles and influencing market perceptions; Bechtel & Hainmueller (2011) found that synchronization between local political preferences and national governance enhances fiscal transfers, potentially mitigating the effects of economic contractions. Potrafke (2010) examined the evolution of annual GDP growth in 21 OECD countries from 1951 to 2006 and has found that in countries with two-party systems, there is a boost in economic growth before elections, and under left-wing governments, in the first two years of legislative period.

Stock markets are particularly responsive to political events, as they reflect investor expectations about forthcoming events (*e.g.,* economic policies or geopolitical stability). For instance, wars and international political crises are political events that the literature often links to lower stock returns (*e.g.,* Rigobon & Sack, 2005; Wolfers & Zitzewitz, 2009; Berkman *et al.,*

2011; Omar *et al.,* 2012), as well as terrorist attacks (*e.g.,* Brounen & Derwall, 2010; Drakos, 2010). Additionally, challenges to domestic leadership – for instance, in the form of protests, revolutionary movements and demonstrations – also influence stock market returns (Acemoglu *et al.,* 2014; Dube *et al.,* 2011). Among less severe political events, political speeches, proclamations, communications, etc. have also been found to influence stock market fluctuations. For instance, Wisniewski & Moro (2014), after examining communications arising from the European Council meetings, have found that using more 'positive' words (such as 'abundance', 'accomplishment', etc.) is directly correlated with higher returns on European and world stock market indices around the announcement date.

Białkowski *et al.* (2008) discovered that stock market volatility notably rises in the weeks leading up to elections, fueled by uncertainty over policy results, with emerging markets exhibiting higher volatility due to weaker institutions. Moreover, political stability has been positively linked to stock market performance, whereas political instability has a harmful effect (Baker *et al.,* 2013; Antonakis *et al.,* 2013). Mai *et al.* (2023), using MSCI indices as a benchmark for Pakistan's stock market from 1996 until 2021, concluded that political stability enhances investor confidence, thereby improving stock market returns, whereas political instability obstructs economic activities, reduces investor confidence, and elevates perceived risk. Hence, literature underscores the vital role of political sentiment in shaping financial markets and economic trends. Wisniewski (2016) has found that certain predictable patterns have been observed in the US market, with stock returns being higher during Democratic administrations, and throughout the second half of a presidential term.

Behavioral explanations for this phenomenon may include loss aversion and herding behavior. Loss aversion, a concept introduced by Kahneman & Tversky (1979), posits that investors exhibit greater sensitivity to losses compared to similar equivalent gains. Consequently, national sports teams' losses might instigate collective disappointment, resulting in heightened selling pressure and falling stock prices. Similarly, sports-induced mood variations may amplify herding behavior, in which investors with shared emotional states mimic their trading actions, raising market volatility (Kaplanski & Levy, 2010).

3. Hypotheses, Data and Methodology

This chapter is organized as follows: firstly, we present the core hypotheses that guide our research (Section 3.1.). Next, we include a description of the sample, data collection processes, variable construction (Section 3.2.), as well as the methodology and econometric models used in the analysis (Section 3.3.). Finally, Section 3.4. includes the descriptive statistics of the variables used in the empirical analysis.

3.1. Development of Hypotheses

A growing body of literature opposes to traditional finance approaches (*e.g.,* Statman, 1995; Shiller, 2003), arguing that investors are not perfectly rational, being influenced by both emotional and cognitive biases. By incorporating non-economic indicators (*e.g.* weather, sports and political outcomes as proxies of mood) into traditional economic models, researchers developed more realistic models for understanding and predicting investors' behavior, which allowed them to explain further why financial markets often deviate from the predictions of traditional theories (*e.g.,* Sapra & Zak, 2008; Rashid *et al.,* 2022; Kanapickienė et al., 2024). Existing literature has progressively acknowledged non-economic factors, such as mood and optimism to be relevant drivers of the economic cycles (*e.g.,* Bonaparte *et al.,* 2017; Nam & Wang, 2018; Agnello *et al.,* 2020). However, the role of these psychological factors within the EU remains underexplored and, given EU's structural, cultural, and institutional diversity, we believe it is crucial to study whether mood and optimism impact similarly the economic cycles across different EU countries. Thus, we aim to test the following hypotheses with this dissertation:

H1: *Mood and optimism impact the economic cycle of the EU countries (with positive mood influencing positively economic cycles, whereas adverse conditions impact negatively).*

H2: *Mood and optimism affect the economic cycles differently, with positive mood indicators boosting economic activity more intensely during contractions than during expansions.*

Beyond macroeconomic fluctuations, mood and optimism have also shown to be relevant drivers of stock market performance (*e.g.,* Agnello *et al.,* 2020; Mai *et al.,* 2023; Graciano & Vincentini, 2017; Smales, 2017; McGurk *et al.,* 2019). Thus, while Chhaochharia *et al.* (2020) focused on the effects of mood and optimism on economic cycles, it is as crucial to understand how these factors influence the stock market performance. Accordingly, our third

hypothesis states the following:

H3: *Mood and optimism impact the EU stock market performance (with positive mood leading to higher market returns, while adverse conditions will lead to lower market returns).*

Considering the well-documented heterogeneity across the EU (*e.g.,* in cultural terms, financial institutions, and market structures), we conjecture that the influence of mood and optimism on the economic cycles and stock market performance may not be the same for every country - identifying such differences would offer valuable insights and contribute significantly to literature. Therefore, our final hypothesis is formulated as follows:

H4: *There are regional differences regarding the impact of mood on the EU economic cycles and stock market performance.*

3.2. Data

Unlike Chhaochharia *et al.* (2020)'s study -that focused on data ranging from 1985 (Q1) to 2008 (Q4)-, we decided to focus on a more recent and EU-specific interval. In this sense, this research uses a quarterly dataset (compiled by hand), which ranges from 2000 (Q1) to 2024 (Q1). This timeframe was chosen due to several reasons. Firstly, the post-2000 period captures two major structural shocks that affected the EU: the 2008 global financial crisis and the COVID-19 pandemic. Secondly, this period includes the Euro Area enlargement and the deepening of financial integration, which makes the 2000-onwards period particularly relevant for an EU analysis. Although Chhaochharia *et al.* (2020) benefitted from a longer pre-2000 sample, we believe that our timeframe provides a sufficiently long period to capture the evolution of economic cycles and stock market dynamics in an EU context, while it also allows us to have enough observations for most of the variables in study. Finally, the quarterly frequency helps to capture short to medium-term variations in both macroeconomic conditions and stock market performance.

The sample includes data on all 27 members of the EU, along with 2 additional EFTA countries—Iceland and Norway (Table 7, Annex B). Using all the EU countries was primarily motivated by the scarcity of literature on this topic within an EU context. Secondly, given that the EU is characterized by substantial heterogeneity, using country-specific data enables a clearer understanding of how mood and optimism influence economic cycles and stock market performance in various national contexts. As previous studies (*e.g.,* Fratzscher &

Stracca, 2008) show, there are persistent significant differences among the EU countries, which supports using a country-level approach. Thirdly, this broader sample also helps to assess the generalization of the findings and address potential sources of heterogeneity that may be overlooked in research focused on a single region or country.

The data were retrieved from various reputable sources (*e.g.* Eurostat, OECD, World Bank, European Commission, Refinitiv DataStream, etc.). Additional variables - namely political outcomes, sports results, trust indexes, etc.- were manually collected and compiled from sources such as Our World in Data, Sky Sports, Olympics, and Nordsieck (2021). While the framework was based on the work conducted by Chhaochharia *et al.* (2020) -who studied the impact of mood and optimism on the US economic cycles, variables were adjusted to fit the EU context; some variables were removed as they were not considered adequate for an EU study, or due to the inexistence of those data in an European context.

To facilitate the analysis, we grouped the variables included in the dataset as follows: economic cycle variables, mood and optimism indicators, demographic variables, industry variables, other variables, and stock market performance variables (Annex C, Tables 8-12, respectively). Detailed definitions and the sources for each variable are included in these tables, while key assumptions underlying their construction are included in Table 13 (Annex D).

To measure the economic cycle of each EU country, a *country's economic activity index (AI)* was constructed using three country-level economic variables: income growth, relative unemployment, and housing (Table 8, Annex C), following the methodology adopted by Chhaochharia *et al.* (2020). The AI is obtained using equation (3.1):

$$AI = \frac{Normalized\ Income\ Growth\ + Normalized\ Housing\ -\ Normalized\ Relative\ Unemployment}{3} \quad (3.1)$$

In which the normalized value of each variable at the country level (denoted by x) is defined according to equation (3.2):

$$N(x) = \frac{x - x_{min}}{x_{max} - x_{min}} \quad (3.2)$$

where x_{min} represents the lowest cross-sectional value of x, and x_{max} the highest. The rationale of employing this index stems from the belief that, as explained by Chhaochharia *et al.* (2020), this would represent a more accurate indicator of country-level expansions and contractions compared to its individual components, since "it captures multiple aspects of

state-level economic activity" (p. 249). This index is expected to be able to reflect the local economic conditions effectively (Chhaochharia *et al.*, 2020; Korniotis & Kumar, 2013). Furthermore, by aggregating these variables, the AI ought to capture the cyclical characteristics of economic activity (*i.e.,* reflecting both expansions and contractions). Hence, to differentiate between the distinct economic phases, the method proposed by Beaudry & Koop (1993) was used in order to construct the *expansion* and *contraction* indices. To obtain these indices, the formula specified in equation (3.3) was used:

$$\Delta AI_t = AI_t - AI_{t-1} \tag{3.3}$$

where AI_t denotes the AI for a given quarter t, and AI_{t-1} the AI from the previous quarter. If the difference [equation (3.3)] is positive, then the expansion variable will be given by the value of the difference. On the other hand, if the difference is zero or negative, then the expansion variable will be assigned a value of 0 (zero). As for the contraction variable, if the difference is zero or negative, then the contraction variable will assume the value of the difference. If it is positive, then the contraction variable is assigned a value of 0 (zero).

As for the measurement of *stock market performance*, the quarterly closing prices of the main stock market index of each EU country were retrieved (Table 7, Annex B), as these indexes are representative of the overall stock market performance of each country. This decision also aligns with the objective of examining regional differences in stock market behavior across the EU. Then, using the close price evolution, the logarithmic returns were calculated, according to (3.4):

$$Log\ Returns = \ln\left(\frac{Close\ Price_t}{Close\ Price_{t-1}}\right) \tag{3.4}$$

where $Close\ Price_t$ represents the closing price of each index in a given quarter, and $Close\ Price_{t-1}$ the closing price in the previous quarter. As for the volatility of stock returns, the daily closing prices of each index were retrieved, then using the previous equation (3.4.), the daily logarithmic returns were calculated, and finally, the standard deviation of each quarter was computed using formula (3.5):

$$Standard\ Deviation = \sqrt{\frac{\sum (x - \bar{x})}{(n-1)}} \tag{3.5}$$

in which x represents the (logarithmic) return in a given day, $\bar{x}$ represents the average logarithmic return, and n represents the size of the sample (*i.e.,* each quarter represents a different

sample).

3.3. Methodology

Following Chhaochharia *et al.* (2020), we used a panel data approach, which was structured to separately examine the impact of mood and optimism on economic cycles (distinguishing between expansion and contraction phases), and stock market performance. We estimate the economic cycle regressions through Tobit regression models. Tobit models (Tobin, 1958) belong to a class of econometric techniques traditionally regarded as "censored regression models" (Wooldridge, 2002), as these are designed for situations where the dependent variable is censored (*i.e.,* has a known limit) and data points below that limit are either truncated or set to a constant value -here, expansion and contraction are censored at 0 (zero)-, making Ordinary Least Squares (OLS) inappropriate due to the censoring. Tobit Models can be specified according to (3.6):

$$y^* = X'\beta + \varepsilon \mid X \sim N(0, \sigma^2), \qquad \text{with } y = y^* \text{ if } y^* > 0, \text{and } y = 0 \text{ otherwise.} \tag{3.6}$$

where y is the observed variable of interest, and y^* is the latent variable. Equation (3.6) states that the expected effect of X on y^* is monotonic, that the residuals follow a normal distribution, and that the dependent variable is left-censored (Amore & Murtinu, 2019). Additionally, OLS regressions are employed to model stock market performance, due to the continuous nature of the dependent variable. Moreover, fixed effects are included to control for country-specific factors.

One of the main challenges of this dissertation is to identify determinants of mood and optimism that are exogenous to the economic environment – *i.e.,* variables that influence mood and optimism should not be themselves influenced by the economy – as endogeneity risks reverse causality and biased estimates. This determination is vital, since if the mood and optimism indicators are affected by economic conditions, it would be difficult to separate the relationship of *bidirectional causality* between them -*i.e,* it would be hard to understand if the mood is influencing the economy, or if the economy is influencing the mood. Thus, it is vital to identify exogenous indicators, as it improves the quality of the causal inference and minimizes biases in the estimation. To isolate the effect of mood and optimism on the economy, three plausibly exogenous proxies are used -weather, sports outcomes, and political environment-, each shown in the literature to impact mood independently of economic conditions.

The analysis will be conducted in three stages, progressively incorporating additional factors to capture the role of mood and optimism more comprehensively.

In the first stage, the primary focus will be on assessing the influence of mood and optimism on the economic cycles and on the stock market performance, with the mood and optimism being firstly captured by country-level temperature (average temperature, temperature-squared, and temperature amplitude were considered as proxies of the weather). The weather was chosen as an exogenous indicator as it is a natural phenomenon that is independent of economic activity and stock market performance, that the literature has found to significantly impact the investors' sentiment and economic decision-making (*e.g.,* Hirshleifer & Shumway, 2001; Denissen *et al.,* 2008, Beute & Kort, 2018). The baseline regression models for the economic cycles are specified in (3.7), and for the stock market performance in (3.8):

$$Economic\ Cycle\ Phase_{it} = \beta_0 + \beta_1 Temp_{it} + \sum_{k=2}^{K} \beta_k X_{it} + \epsilon_{it} \tag{3.7}$$

$$Returns_{it} = \beta_0 + \beta_1 Temp_{it} + \beta_2 SD_{it} + \beta_3 Volume_{it} + \sum_{k=4}^{K} \beta_k X_{it} + \epsilon_{it} \tag{3.8}$$

where $Economic\ Cycle\ Phase_{it}$ is bounded by 0 (zero), and may represent if country i at time t is experiencing an economic expansion or contraction. $Returns_{it}$ represent the stock market performance, proxied by the stock market logarithmic returns. $Temp_{it}$ is the main determinant of mood, captured by the weather-related variables. SD_{it} represents the volatility of the logarithmic returns, measured by its quarterly standard deviation. $Volume_{it}$ represents the volume of transaction of the stock index i at time t. X_{it} represents a vector of socioeconomic control variables (*e.g.,* median age, male-female ratio, population characteristics, among others). Finally, ϵ_{it} represents the error term.

In the second stage, we expand the previous models, in order to explore some interactions between mood (proxied by the temperature) and some country-specific attributes. We carry this out to assess if the impact of mood and optimism varies based on structural and institutional differences across the EU countries. In this sense, the previous models, including new interaction effects, are specified according to (3.9) and (3.10):

$$Economic\ Cycle\ Phase_{it} = \beta_0 + \beta_1 Temp_{it} + \sum_{k=2}^{K} \beta_k X_{it} + \sum_{m=1}^{M} \gamma_m (Temp_{it} * Z_{it}) + \epsilon_{it} \tag{3.9}$$

$$Returns_{it} = \beta_0 + \beta_1 Temp_{it} + \beta_2 SD_{it} + \beta_3 Volume_{it} + \sum_{k=4}^{K} \beta_k X_{it} + \sum_{m=1}^{M} \gamma_m (Temp_{it} * Z_{it}) + \epsilon_{it} \quad (3.10)$$

Where Z_{it} represents the country-specific attributes, such as population, median age, education, among others. $(Temp_{it} * Z_{it})$ captures the interaction terms between weather-based indicator of mood and these country-specific factors. This interaction term allows us to assess regional heterogeneity in the EU, measuring whether mood effects differ across the EU countries, given to their economic structures, financial development, etc. (See **H4)**. Moreover, fixed effects will be incorporated to further isolate regional variations, allowing for comparisons between the countries.

Finally, in the final stage, the analysis will be extended into incorporating the two additional proxies for mood and optimism: firstly, the inclusion of *sports optimism*, captured by national sports victories in football and Olympics competitions, is introduced, motivated by the existing literature that suggests that sports results significantly impact investors' mood (*e.g.,* Kang & Park, 2014; Graciano & Vincentini, 2017), and since EU countries have strong national and regional affiliation to sports -mainly football and the Olympic Games. Secondly, the inclusion of political optimism -captured by the political party in majority (*i.e.,* right or left) in country i at time t is introduced since, although political changes affect the long-term economic policies, the truth is that they are not a direct result of economic or financial performance, as these are a reflection of the voter preferences rather than short-term economic fluctuations. This choice was stemmed by the existing literature, which states that political outcomes are relevant indicators of mood (*e.g.,* Bonaparte *et al.,* 2017). The introduction of interaction terms between these is also included. In this sense, the complete model specifications are set according to (3.11) and (3.12):

$$Economic\ Cycle\ Phase_{it} = \beta_0 + \beta_1 Temp_{it} + \beta_2 SportsOptimism_{it} + \beta_3 PoliticalOptimism_{it} + \\ + \beta_4 SportsOptimism_{it} * PoliticalOptimism_{it} + \sum_{k=5}^{K} \beta_k X_{it} + \epsilon_{it} \quad (3.11)$$

$$Returns_{it} = \beta_0 + \beta_1 Temp_{it} + \beta_2 SportsOptimism_{it} + \beta_3 PoliticalOptimism_{it} + \\ + \beta_4 SportsOptimism_{it} * PoliticalOptimism_{it} + \beta_5 SD_{it} + \beta_6 Volume_{it} + \sum_{k=7}^{K} \beta_k X_{it} + \epsilon_{it} \quad (3.12)$$

where $SportsOptimism_{it}$ and $PoliticalOptimism_{it}$ capture the impact of the additional mood

indicators, and $SportsOptimism_{it} * PoliticalOptimism_{it}$ captures the interaction terms between them. The first two models will allow us to understand whether mood and optimism impact the economic cycles of the EU countries (see **H1**). Moreover, the comparison between the coefficients of the betas between the expansion and contraction regressions will allow us to assess whether mood and optimism have different effects during economic downturns and, or upturns (see **H2**). Finally, the third model will enable us to understand if these indicators have an influence on the stock market performance (see **H3**).

This progressive modelling approach is adopted, as by first isolating temperature effects, then incorporating interactions with country attributes, and finally extending the analysis to additional mood proxies, we will be able to provide robust empirical evidence on the behavioral determinants of economic cycles and stock market performance in the EU.

Moreover, in terms of control variables, some country-level demographic (*e.g.,* median age, male-female ratio, population, religiosity, etc.), industrial characteristics (*e.g.,* agricultural and manufacturing weights), etc. were included in all the regressions specified above, with the aim of isolating the effect of mood and optimism on both the economic cycles and the stock market performance, and in order to ensure that the results accurately reflect the relationship between the mood and optimism indicators included and the economic and the financial activity. Accounting for these is crucial as without these variables, the observed relationship between mood and economic activity could be mistaken by other factors.

3.4. Descriptive Statistics

In this section, we outline the dataset used and discuss summary descriptive statistics. To maintain clarity and conciseness, the complete set of tables and figures are provided in the Annex (Figures 8-9, Annex A; Table 15-18, Annex E)

Figure 8 (Annex A) illustrates the evolution of the AI across EU countries, revealing notable differences in economic cycle dynamics. While countries like Austria, Belgium and France display relatively stable cycles, countries such as Portugal, Germany, and Spain present slower variations, and others such as Romania and Croatia exhibit pronounced fluctuations.

We decomposed the AI into two distinct phases: expansions and contractions [equation (3.3)]. Table 15 (Annex) reveals that there are more contractions (2,815) than expansions (2,415) in this sample, suggesting that economic downturns were more frequent during the

selected period. Both variables present higher within- than between-country variation, suggesting that there is more variation coming from within the countries, rather than over time.

Table 16 (Annex) presents descriptive statistics for the *mood indicators*, which include weather-related variables, sports results and political outcomes, and reveals substantial variation, especially over time, reflecting diverse climatic conditions across the EU -while some countries experience little variation in temperature extremes over time, others have some extreme temperature differences. The *political outcomes* reflect a right-leaning trend in the EU, with about 75.5% of country-quarters governed by right-wing parties. It is also perceived that some countries are always governed by the right-wing, some always by the left, and some switch (even though this is not frequent). Finally, regarding the *sports results*, it is perceived that the Olympics performance fluctuates much more than football results.

Table 17 (Annex) summarizes key *control variables,* including *demographic* (*e.g.,* median age, male-female ratio, population, religiosity, etc.), *industry variables* (*e.g.,* agricultural and manufacturing weights) and *other variables*. There is considerable variation across countries over time, which underscores the importance of controlling for broader socioeconomic conditions of the EU countries: *e.g.,* the average country's population was 15.4 million, with wide regional differences; most EU countries have more women than men (average male-female ratio of 105.06), and religious affiliation is predominant. Manufacturing weight varies both regionally and temporally, whereas agricultural weight remains relatively stable, differing between regions.

Finally, Table 18 (Annex) summarizes the *stock market performance variables.* Average quarterly *logarithmic returns* were 0.89%, with the different countries having average returns that are relatively close to each other, fluctuating mostly over time. The *standard deviation* of the returns was, on average, 1.12%, varying more over time than across countries. Finally, *transaction volumes* are significantly volatile, with large differences between countries and overtime.

To better reflect national conditions, each country's main stock market index was used as a proxy of the stock market performance rather than a single EU-wide benchmark. Figure 9 (Annex) displays the evolution of the logarithmic returns for the stock markets of each EU country from 2000 (Q1) to 2024 (Q1). The results exhibit significant quarterly variability and highlight the heterogeneity of the EU countries – *e.g.,* countries such as Austria, Italy and Denmark present quite similar evolutions of returns, while countries such as Iceland, Hungary, Romania and Lithuania show much more variability over time.

4. Empirical Results and Discussion

This section presents all the empirical results obtained. A detailed description of all variables included in the regressions, along with their sources, is introduced in Annex C (Table 8-13). For ease of reading, only the key variables relevant for each subsection are displayed in the main text. The complete results are included in the Annex (Table 20-26). The period for all the regressions is 2000(Q1)-2024(Q1). All models were subject to overall significance testing, in which the results revealed that all models are relevant.

4.1. Preliminary Tests

To ensure the robustness and consistency of the econometric models, various preliminary tests were conducted prior to the estimation[1], with the aim of assessing the adequacy of model specifications and the validity of the assumptions underlying the econometric techniques selected. However, preliminary testing of panel Tobit models (*i.e.,* the expansion and contraction models) is inherently limited. Although Tobit models are widely used in empirical research, researchers recognize the restrictive nature of these models and their notable limitations (Acerenza *et al.*, 2024). Amore & Murtinu (2019) note that even in the cases where Tobit models are suitable, their use and interpretation are often compromised by various critical issues, namely the misclassification of zero outcomes (in their study regarding research works published in the five top management journals from 1980 to 2015, the authors discovered that approximately 47% of the published articles suffer from potentially misleading assumptions about the nature of zeros), selection bias, and potential violations of normality and homoscedasticity in the distribution of residuals. Bearing all this in mind, conducting the preliminary tests for the Tobit models was particularly challenging.

The first preliminary test conducted was the *specification test,* to assess if the chosen model adequately represents the data, including the choice of relevant variables and its correct functional form. To test model specification, the *Ramsey RESET test* -typically used to detect omitted variables and functional form misspecification- was not available for panel Tobit models. Instead, a *Link test* was used. The results suggest that *the specified economic cycle models are not perfectly specified.* Nevertheless, given their theoretical relevance and the importance of

[1] For all the tests performed in this dissertation, a statistical significance level of 5% was assumed. All the tests and outputs presented in this chapter were obtained using Stata 18.0.

maintaining consistency with the study carried out by Chhaochharia *et al.* (2020), these models are retained. As for the *stock market performance model*, as it is specified as an OLS, the *Ramsey RESET test* is applicable. The results show no indication of misspecification, with a *p-value* considerably higher than the significance level, which suggests that *the stock market performance model has no omitted variables.* This supports the adequacy of the model, which is particularly interesting, as this specification was proposed by us, and thereby it may be an important contribution to literature since it captures the drivers of stock market performance.

The second preliminary test performed was the *multicollinearity test*, in which *Variance Inflation Factors (VIF)* were computed. This allows us to assess if two or more predictor variables in a multiple regression model are highly correlated or not. If they are, this can lead to unstable and inconsistent coefficients, making it harder to predict the unique effect of the independent variable in the desired dependent variable. Some authors defend that VIFs below 10 are acceptable (Vittinghoff, 2005), while others advocate stricter thresholds, recommending lower VIFs, *e.g.,* below 5 (James *et al.,* 2013; Menard, 2001). Thus, VIF values below 5 were aimed. All models reported VIFs that were around 2.7, which suggests that *the models of economic cycles and stock market performance are not affected by issues related to multicollinearity.*

Then, given the panel nature of the data, model selection involved determining what the most suitable estimator among (1) *pooled OLS (POLS)*, (2) *Fixed Effects Model (FE)* and (3) *Random Effects model (RE)* was. The usual approach is to apply both the *Breusch-Pagan Lagrange Multiplier Test* (to assess if POLS is preferred to RE) and the *Hausman Test* (to assess if FE is preferred to RE). However, since these tests are not available for panel Tobit Models, RE was selected as the most appropriate model, as this is the standard practice for censored panel data[2]. As for the *stock market performance model,* both tests were feasible. The results indicated that *RE* was the most appropriate, suggesting that the unobserved heterogeneity across countries is not correlated with the regressors, making RE a more efficient estimator.

Then, *endogeneity tests* were applied. The presence of endogeneity arises when explanatory variables are correlated with the error term, which may bias results. Testing for endogeneity in nonlinear panel models, such as Tobit, is more complex than in OLS models, as there are no standard tests directly applicable to test for endogeneity in panel Tobit models. Hence, endogeneity tests were employed, assuming the typical approach and later augmented for

[2] Since FE models rely on within-individual variation over time, the censored nature of Tobit models challenges this. Moreover, FE is not directly supported in '*xttobit*' (*i.e.,* the Stata function responsible for regressing Tobit models in a panel data context).

Tobit models. In the *expansion* model, no endogeneity was detected. Contrarily, in the *contraction* model, the variable $Population_{it}$ and in the *stock market performance* model, $Minority_{it}$ and $Trust_Index_{it}$ turned out to be endogenous[3]. The endogenous variables were corrected by using their lagged versions as instruments, which proved both strong and valid.

Testing for *heteroskedasticity* is also vital, as it occurs when a model is characterized by a non-constant variance of the residual term, leading to biased and inconsistent estimates and to incorrect inference. As for panel Tobit Models the standard approach of *Modified Wald test* is unavailable, this test was particularly complex. However, this test is especially crucial for Tobit models, since as explained by Amore & Murtinu (2019), neglecting potential violations of normality and homoscedasticity in the distribution of residuals is problematic once "Tobit models crucially hinge on these assumptions" (p. 333), which would result in unreliable inference. In their study, the authors found that nearly 53% of the reviewed studies did not account for these issues, which is problematic. Following Chester & Irish's (1987) methodology -which is considered the key reference in the area of residual analysis and model's fit in Tobit models -*heteroskedasticity was detected in both Tobit models*. Regarding the *stock market performance model*, *heteroskedasticity was detected* by running the *Modified Wald test*. Thus, as heteroskedasticity was found in all models, it was necessary to correct it. This is usually done by defining a robust model (*i.e.,* applying robust standard errors). While using robust standard errors is the standard approach (and was applied in the OLS model), this is not supported for panel Tobit models in Stata. Thus, we addressed this issue through bootstrapping: by bootstrapping 200 replications (a considerable number of replications was aimed, as it promotes higher accuracy, although it requires considerable computation time), the estimation generated robust standard errors, correcting not only for heteroskedasticity, but also addressing non-normality and handling model misspecification.

The last preliminary test computed was the *autocorrelation check*, which was applied using the *Wooldridge test*. This issue must be tested, since serial correlation may violate model assumptions and bias standard error, as there will be unobserved factors that are correlated with both the dependent variable and the error term. Every model tested *did not present autocorrelation issues*.

[3] It is sometimes stated that standard deviation and the returns of the stock market may be endogenously related. Nevertheless, when endogeneity was tested with the lagged version of the overall standard deviation of the period (which revealed to be a strong instrument, through the first stage F-statistic), endogeneity was not detected. In this sense, it is assumed that standard deviation can be considered as exogenous in these models.

4.2. Evidence of Geographical Heterogeneity across the EU

This research uses a rich dataset composed by country-level characteristics to explore heterogeneity among EU countries. Key statistics and mean correlations between country-level AI and corresponding measures of economic and financial activity of each EU country highlighted notable heterogeneity in the EU (Table 19, Annex E).

As reported in the first column, it is perceived that the *correlation between country-level economic activity and the EU overall economic activity* varies significantly across the EU countries, suggesting distinct levels of integration with the broader EU economic cycle. While countries like Austria, Czechia, Denmark and Poland reveal a strong alignment with the EU-wide business cycles, others, such as Italy, present lower correlations, indicating that lower economic integration. As for the *temperature*, it also presents significant variation across the EU countries, varying widely, from Greece's warmth to Finland's cold climate. In terms of political optimism (captured by *FootballPoliticalOptimism* and *OlympicsPoliticalOtimism),* these too present considerable fluctuations. The socio-demographic variables also vary significantly across the countries -*e.g.,* Slovenia and Romania are far more rural population than Belgium.

Stock market performance indicators reveal further disparities, with countries such as Belgium and Denmark showing positive average returns, while countries such as Portugal and Italy show, on average, negative returns. Regarding the volatility of the stock market (*QuarterlySD*), countries such as Greece present higher volatility, while countries as Czechia present considerably lower volatility. As for the *volume* of transactions, it varies considerably, with countries such as Italy and Spain having hundreds of millions of stocks traded, whereas Luxembourg reports notably low transaction volumes.

In sum, these results reflect *considerable heterogeneity across the EU countries*, suggesting that the EU cycles and stock market performance can be influenced by a variety of local factors. Subsequent empirical analysis will examine these differences, and control for unobserved regional attributes to ensure robust results.

4.3. Results: Economic Cycles

This section presents the results of the Tobit regression models that aim to examine the impact of local mood and optimism on the EU economic cycles. Firstly, we analyze the impact of weather-induced mood (Section 4.3.1.); followed by the analysis of the role of

local demographics in moderating temperature effects (Section 4.3.2.), and finally the impact of other mood and optimism proxies -sports and political outcomes (Section 4.3.3.).

4.3.1. Weather-Induced Mood and the Economic Cycles

The empirical analysis begins with the estimation of Tobit models of country-level expansions and contractions, using average marginal effects (Table 1) to quantify how *weather-based mood proxies* influence the latent propensity for expansions [Models (1)-(3)] and contractions [Models (4)-(6)]. As Tobit model's coefficients cannot be interpreted in terms of magnitude[4], instead of presenting them, we preferred to present the average marginal effects here, as using the latter allows us to understand the magnitude and direction of the impact. Nevertheless, the coefficients may be consulted in Table 20 (Appendix).

Table 1 –Average Marginal Effects of the Impact of Weather on the Economic Cycles of the EU Countries

	Economic Cycle					
	Expansion			**Contraction**		
VARIABLES	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Population	-0.000001***	-0.000001***	-0.000001***	-0.000001	-0.000001	-0.000001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Religiosity	0.00001	0.00001	0.00001	0.00001	0.00001	0.000001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MedianAge	0.00234***	0.00210***	0.00220***	0.00258**	0.00204**	0.00279**
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
MaleFemaleRatio	-0.00010	-0.00002	-0.00007	-0.00001	0.00010	-0.00033
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Minority	-0.000001	-0.000001	-0.000001	-0.000001	-0.000001	-0.000001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RuralPopulation	0.00010	0.000001	0.00003	0.00033	0.00012	0.00038
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
TrustIndex	-0.01539	-0.01109	-0.01146	-0.01436	-0.00730	-0.00939
	(0.010)	(0.010)	(0.009)	(0.021)	(0.019)	(0.019)
AgriculturalWeight	0.00302*	0.00320**	0.00318*	0.00790**	0.00946***	0.00937***
	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)
ManufacturingWeight	0.00042	0.00048	0.00047	0.00088	0.00097	0.00082
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Temperature		0.00041**	0.00043***		0.00062**	0.00081***
		(0.000)	(0.000)		(0.000)	(0.000)
TemperatureSq		0.00001*	0.00001*		0.00004***	0.00003**
		(0.000)	(0.000)		(0.000)	(0.000)
AmpTemperature			0.00005			0.00037**
			(0.000)			(0.000)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,115	1,155	1,155	1,155	1,155	1,155
Number of countries	18	18	18	18	18	18

[4] As many observations are censored at 0, the effects observed are "diluted". Thus, the coefficients reflect only the direction of the relationship, providing insights regarding if the independent variable increases (*i.e.* leading to stronger expansions/less severe contractions) or decreases the latent propensity for expansion/ contractions.

Note: Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1, obtained through 200-replication bootstrapping. See Table 20 (Annex) for full coefficient estimates.

Table 1 introduces gradually the weather-based variables, with Model (1) and (3) including only *socio-demographic control variables*. The results reveal that population is consistently statistically significant in the expansion models, although the magnitude of this effect is negligible. Median age is also consistently significant in both expansion and contraction models, with a 1-year increase in the median age of the population leading to expansions 0.21pp to 0.23pp stronger, *ceteris paribus*, and contractions 0.20pp to 0.28pp less severe, which suggests that older populations may exhibit more stable economic behavior, which may be related to having more experience. A higher share of agricultural weight also proved to be significant, leading, on average, to expansions 0.003 units stronger, and contractions 0.008 to 0.009 units less severe, holding everything else constant.

With the addition of the weather variables in the subsequent models, it is perceived that *weather* exerts a statistically significant influence on local economic cycles, in which warmer temperatures are positively associated with expansions, and negatively associated with the severity of contractions. Specifically, a 1ºC increase in temperature is associated, on average, with expansions approximately 0.00042 units stronger, and to a reduction in contraction severity of 0.00062 to 0.00081 units, *ceteris paribus*. Even though these results may appear insignificant when considered alone, they are non-negligible when considered over several quarters and across various EU countries. These findings suggest that warmer weather, which is associated with improved mood and optimism in literature (*e.g.,* Hirshleifer & Shumway, 2001; Denissen *et al.,* 2008, Beute & Kort, 2018), can positively influence economic sentiment and activity in the EU.

Moreover, the temperature squared is also consistently statistically significant, indicating a nonlinear effect of temperature on economic cycles. This implies that while moderate increases in temperature are beneficial, the marginal positive effect diminishes at higher levels. This may be associated with the concept of an optimal comfort range, beyond which the impact on mood and optimism -and, consequently, economic activity-, taper off.

Finally, the amplitude of temperature is found to significantly reduce the severity of contractions, although it does not have a detectable impact on expansions, which may indicate that while stable and predictable weather patterns contribute to less severe contractions, they do not necessarily stimulate economic growth, suggesting an asymmetric influence on mood.

The model fit improved with the inclusion of temperature and its squared term [(Model (2) and (4)], as evidenced by the increase in the log-likelihood statistic (Table 21, Annex), whereas the addition of temperature amplitude [Model (3) and (6)] leads to a marginal improvement, suggesting that incorporating this variable does not significantly improve the fit, *ceteris paribus*.

Comparing our results to those found in the US by Chhaochharia *et al.* (2020), important regional differences were found. While both the US and the EU economic cycles revealed to be significantly influenced by weather, the main drivers of economic cycles are distinct: in the EU, demographic factors such as population size, age, and agricultural weight revealed to be significant drivers, whereas in the US, economic cycles are significantly driven by social capital and religiosity, neither of which has a significant effect in the EU. This emphasizes regional heterogeneity between the US and the EU.

In sum, the empirical evidence supports our main conjecture that weather-induced mood exerts a meaningful influence on the economic cycles of the EU countries, and the consistency of these results with the ones found in the US reinforces the idea that weather is a robust exogenous determinant of economic mood and optimism. These results are in line with the literature linking weather to mood states and, consequently, economic cycles (*e.g.,* Carleton & Hsiang, 2016; Beute & Kort, 2018; Agnello *et al.*, 2020; Felbermayr *et al.,* 2022;), thereby validating H1 (Section 3.1.).

4.3.2. The Impact of Local Demographics on Influencing Temperature Effects on Economic Cycles

To explore whether demographic factors moderate the influence of weather-induced mood on economic cycles, we re-estimated the baseline Tobit models, including interaction terms between temperature indicators – specifically temperature (first and third column of Table 2) and temperature amplitude (second and fourth column) - and the key country-level demographic variables. Average marginal effects are introduced here, facilitating the comparison of how these interactions alter the strength of temperature's impact on expansions and contractions. For ease of reading, only the interactions terms are included in Table 2. The full regression results may be consulted in Table 21 (Annex), as well as the full coefficients (Table 22, Annex).

Table 2 – Average Marginal Effects of the Role of Local Demographics on the Economic Cycles

	Economic Cycle			
	Expansion		Contraction	
VARIABLES	Int. Temperature	Int. Amp. Temperature	Int. Temperature	Int. Amp. Temperature
Int. Population	-0.000001	-0.000001	0.000001	-0.000001
	(0.000)	(0.000)	(0.000)	(0.000)
Int. MedianAge	0.00012***	0.00001	0.00012*	0.00009
	(0.000)	(0.000)	(0.000)	(0.000)
Int. MaleFemaleRatio	-0.00003	0.00005	-0.00003	0.00004
	(0.000)	(0.000)	(0.000)	(0.000)
Int. Minority	-0.000001	0.000001	-0.000001	0.000001*
	(0.000)	(0.000)	(0.000)	(0.000)
Int. RuralPopulation	0.00001	-0.00001	0.00002*	0.00001
	(0.000)	(0.000)	(0.000)	(0.000)
Int. TrustIndex	-0.00140**	-0.00024	-0.00111	-0.00087
	(0.001)	(0.001)	(0.001)	(0.002)
Region FE	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes
Observations	1,155	1,155	1,155	1,155
Number of countries	18	18	18	18

Note: This table reports the average marginal effects from the panel regressions, in which the dependent variables are Expansion and Contraction. The interaction variables use one of the country's variables (specified in rows) and one of the two weather-based mood indicators (specified in columns). Robust standard errors were obtained through bootstrapping the models 200 times and are in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Regarding the *temperature interactions*, a 1-year increase in median age amplifies the effects of temperature on expansion and lessens contraction severity by 0.00012 units, all else equal. This implies that older populations amplify the positive effects of favorable weather on the EU expansion and suffer less from adverse conditions. Conversely, in countries with higher levels of trust, the effect of temperature on expansions becomes weaker, suggesting that higher trust levels weaken the boost from favorable weather in the EU countries. One interpretation is that in high-trust societies, economic resilience is already high, and thus incremental mood gains from warmer weather may confer a smaller marginal benefit. With a larger rural population, the effect of temperature on contractions becomes weaker, with a higher proportion of rural population softening the impact of adverse weather on economic contractions in the EU.

Regarding the *temperature amplitude*, the interaction with minorities is significant, although negligible, which may suggest that with larger minority proportions, countries may experience slightly less severe contractions, when faced with greater temperature variability.

Comparing these results with the ones observed in the US by Chhaochharia *et al.* (2020), heterogeneity is evidenced. While in the US the median age does not influence weather effects, it is significant in the EU. As for rural population, it negatively impacts the effect of

temperature on the economic cycles of the US, and positively on the EU. Similarly, higher levels of social trust impacted positively the US, and negatively the EU expansions, underscoring different institutional dynamics. Finally, minorities impact positively economic cycles in the US, while in the EU the effect is negligible, yet significant.

In sum, these results suggest that the impact of local mood on the country-level economic cycles are strongly affected by demographic attributes of the EU countries. By recognizing this heterogeneity, governments and policymakers may implement targeted policies that foster resilience to weather-related mood shocks, thereby smoothing expansions and contractions across the heterogeneous landscape of the EU.

4.3.3. The Impact of Weather, Sports and Political Outcomes on Economic Cycles

Our analysis is now extended to integrate additional *mood proxies* – namely sports victories and political outcomes, alongside weather variables. Table 3, presented below, reports the average marginal effects for 6 model specifications. Models (1) and (4) introduce a composite sports optimism index capturing both football and Olympic victories, Models (2) and (5) add political optimism measures (which capture majority party and right-left ratio of each country) and Models (3) and (6) include their interaction term. Models (1)-(3) capture the effect of these variables on expansions, while Models (4)-(6) capture the effect on contractions.

Table 3 – Average Marginal Effects of the Impact of Mood and Optimism on Economic Cycles

	Economic Cycle					
	Expansion			Contraction		
VARIABLES	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Temperature	0.00043***	0.00045***	0.00045***	0.00081***	0.00087***	0.00087***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TemperatureSq	0.00001*	0.00001	0.00001*	0.00003***	0.00002**	0.00002**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AmpTemperature	0.00004	0.00002	0.00003	0.00037**	0.00034**	0.00035**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FootballOptimism	0.00315	0.00305	-0.00923	0.00106	0.00140	-0.01867
	(0.005)	(0.005)	(0.014)	(0.008)	(0.008)	(0.027)
OlympicsOptimism	-0.00023	-0.00021	-0.00009	-0.00013	-0.00022	-0.00061
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.034)
RightLeftRatio		0.00055	0.00056		0.00045	0.00044
		(0.000)	(0.000)		(0.001)	(0.001)
PoliticsMajority		0.00002	0.00027		0.00043	0.00055
		(0.001)	(0.002)		(0.002)	(0.003)
Football*RightLeftRatio			0.01612			0.02456
			(0.012)			(0.029)
Football*PoliticalMajority			-0.01055			-0.01338
			(0.011)			(0.020)
Olympics*RightLeftRatio			-0.00002			0.00047
			(0.001)			(0.001)
Olympics*PoliticalMajority			-0.00016			-0.00031
			(0.001)			(0.034)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,155	1,098	1,098	1,155	1,098	1,098
Number of countries	18	16	16	18	16	16

Note: The complete results are introduced in the Annex. Robust standard errors were obtained through bootstrapping the models 200 times and are in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

The results suggest that only weather-based variables are significant drivers of the EU economic cycles, retaining their statistical significance and magnitudes across all 6 models. The results indicate that a 1ºC rise in temperature increases the expansion propensity by nearly 0.00043-0.00045 units, while reducing contraction severity by 0.00081-0.00087 units, *ceteris paribus*. The quadratic-temperature term remains significant, confirming the nonlinear relationship, with warmer conditions having an accelerating positive impact on the expansion and contraction measures, *ceteris paribus*. Temperature amplitude exhibits again a non-significant impact on expansions, although consistently mitigating contractions by 0.00034-0.00037 units per 1ºC of temperature variability.

As for *sports and political outcomes*, none revealed to be statistically significant. The absence of a significant effect of sports diverges from the findings of Edmans *et al.* (2007); Bernile & Lyandres (2011) and Harjito *et al.* (2021), who documented that sports outcomes would be significant drivers of economic cycles. Likewise, the non-significance of political outcomes goes against the evidence of Potrafke (2010), Bechtel & Hainmueller (2011) and Bonaparte

et al. (2017), as those suggested that they would be significant drivers of the economic cycles.

Contrarily to the results found by Chhaochharia *et al.* (2020) in the US -which indicated that political outcomes would significantly influence expansions (but not contractions)- our results suggest that political outcomes are insignificant in both phases of the economic cycles across the EU countries. This divergence of results may reflect the EU's more complex, multi-party systems and the supranational nature of its political institutions. Similarly, the interaction terms were significant in the US, but meaningless in the EU, suggesting that, unlike in a polarized US context, the sports victories in the EU are driven more by regional or national pride, rather than by political sentiments. Additionally, the US federal structure may allow state-level politics to directly influence economic conditions, which may be a dynamic that is absent in more centralized frameworks, such as in the EU.

In sum, and despite the lack of significance of sports and political outcomes, weather-based mood variables remained robust predictors of both expansions and contractions in the EU, which allows us to confirm the key conjecture of this dissertation (see **H1**) that *local mood and optimism affect the EU economic cycles*, while also providing assurance that the results obtained are not driven by omitted regional characteristics. Specifically, we conclude that *expansions are stronger, and contractions weaker in the EU countries where individuals are more optimistic*. Moreover, when comparing the effects of mood and optimism on the different phases of the economic cycles, it is perceived that the impact of temperature is nearly the double during contractions comparatively to expansions, the quadratic term is small in expansions and strengthens in contractions, and the temperature amplitude only impacts significantly contractions. Thus, the *mood (proxied by weather variables) appears to influence more intensely contractions than expansions*, which allows us to confirm the different impact of mood and optimism in the economic cycles (see **H2**),

However, as endogeneity was detected in the contraction model, an instrumental estimation was conducted. As this procedure does not currently exist in Stata for panel Tobit models, we needed to assume a cross-sectional sample (rather than a panel data one) for the correction to be possible. As this is a strong assumption, it is not possible to ensure that the results obtained in the endogeneity-corrected regressions are the exact ones. Nevertheless, although this adjustment slightly alters some coefficients—rendering population size and manufacturing share marginally significant—it does not overturn the core findings: weather remains the sole robust exogenous mood proxy for EU economic cycles (see Table 25, Annex). These

results reaffirm both **H1** and **H2**, demonstrating that weather-induced mood consistently influences both expansions and contractions throughout the EU.

4.4. Results: Stock Market Performance

Building upon the analysis of economic cycles, we now assess whether mood and optimism also influence stock market performance in the EU. While traditional finance highlights macroeconomic fundamentals as the main drivers of stock returns, recent evidence in behavioral finance suggests that the investor mood—shaped by exogenous factors such as weather, sports and political outcomes—plays a crucial role in determining stock market returns (*e.g.,* Ciccone, 2011; Smales, 2017; McGurk *et al.*, 2019; Kanapickienė *et al.,* 2024).

To capture how the mood and optimism indicators influence the stock market performance, panel OLS regressions are estimated in the following sections, in which the dependent variable are the quarterly logarithmic returns (see Equation 3.4). Unlike the Tobit framework (used for the economic cycles' analysis), OLS allows a direct interpretation of coefficients, removing the need for marginal-effects calculations. Contrary to previous studies that often rely on specific regions (*e.g.,* the US), this research focuses on the national stock markets of the EU countries, utilizing each country's main stock market index data as a proxy of the overall stock market of that country (Appendix B, Table 7). This decision allows us to have a more granular analysis of the heterogeneity in investor behavior across the EU.

4.4.1. Testing Economic Cycle Variables in the Stock Market Regressions

To assess whether the explanatory variables used in the economic cycle models are equally suitable for the stock market performance regressions, the OLS models were subject to specification tests (see Section 4.1.). Notably, unlike the economic cycle models (which exhibited evidence of misspecification), the stock market regressions passed the test, confirming that *no key regressors have been omitted*. These results validate the use of the economic cycle variables as a coherent foundation for analyzing stock market performance across the EU. Moreover, using a common set of variables is useful, as it allows us to ensure consistency of the impact of mood and optimism on both economic cycles and stock market performance.

The literature further supports this unified approach. Studies of mood and optimism and stock market performance emphasize the need of controlling for demographic and socioeconomic factors (*e.g.,* Goyal, 2009; Gao *et al.*, 2019; Uzum *et al.*, 2021). Additionally, when adapting the economic cycle models to equity markets, the latter were augmented with two macroeconomic controls - GDP growth and Consumer Price Index (CPI) –, and two stock market-specific measures - trading volume and standard deviation -, to capture liquidity and risk dynamics, as these additional factors are widely documented in the literature as relevant drivers of stock market returns (*e.g.,* Worthington & Higgs, 2004; Gao *et al.,* 2019). These variables were not included previously, as the AI already captured the macroeconomic framework of the EU, and since financial markets have a distinct nature, in which liquidity and volatility are key drivers of investor behavior. As for the mood and optimism indicators included, it is well documented in the literature that the weather has influence in the investor mood and consequently stock market performance (*e.g.,* Chang *et al.* 2008; Saporoschenko, 2011). As for the relationship between political outcomes and stock market performance, this is mentioned in studies such as the ones from Białkowski *et al.* (2008) and Mai *et al.* (2023). Likewise, the relevance of sports outcomes has been documented in studies such as those by Ashton *et al.* (2010), Edmans *et al.* (2007) and Graziano & Vincentini (2017).

Thus, the combined set of economic cycle variables and the additional market controls yield a well-specified model, providing a comprehensive and methodologically sound basis for assessing how mood and optimism influence stock market returns across the EU countries.

4.4.2. Weather-Induced Mood and Stock Market Performance

The multivariate regression analysis for the stock market performance (Table 4) will follow the same structure as the economic cycle ones: we will start by using only weather-based variables as the main determinant of mood and optimism. Model (1) includes only the control variables, Model (2) introduces the temperature, and the temperature squared, and Model (3) introduces the temperature amplitude.

Table 4 - Baseline Regression Model, and the Impact of Temperature on the Stock Market Performance

	Stock Market Performance		
	(Logarithmic) Returns		
VARIABLES	Model (1)	Model (2)	Model (3)
GDPGrowth	-0.02703	-0.00679	-0.00711
	(0.040)	(0.040)	(0.041)
CPI	-0.00167**	-0.00192**	-0.00204**
	(0.001)	(0.001)	(0.001)
Population	0.000001	0.000001	0.000001
	(0.000)	(0.000)	(0.000)
Religiosity	-0.00016***	-0.00014***	-0.00014***
	(0.000)	(0.000)	(0.000)
MedianAge	0.00328	0.00408	0.00390
	(0.004)	(0.003)	(0.004)
MaleFemaleRatio	-0.00128	-0.00215	-0.00217
	(0.005)	(0.005)	(0.005)
Minority	-0.000001***	-0.000001***	-0.000001***
	(0.000)	(0.000)	(0.000)
RuralPopulation	-0.00373*	-0.00382*	-0.00407*
	(0.002)	(0.002)	(0.002)
TrustIndex	0.06243	0.05598	0.05882
	(0.080)	(0.083)	(0.088)
AgriculturalWeight	0.00116	-0.00075	-0.00118
	(0.011)	(0.011)	(0.011)
ManufacturingWeight	-0.00143	-0.00159	-0.00157
	(0.002)	(0.002)	(0.002)
StandardDeviation	-9.28731***	-9.30951***	-9.34609***
	(0.900)	(0.897)	(0.937)
Volume	-0.000001	-0.000001	-0.000001
	(0.000)	(0.000)	(0.000)
Temperature		0.00126	0.00114
		(0.001)	(0.001)
Temperature_Sq		-0.00010**	-0.00009**
		(0.000)	(0.000)
AmpTemperature			-0.00030
			(0.001)
Region FE	Yes	Yes	Yes
Observations	1,155	1,155	1,155
Number of countries	18	18	18
Pseudo R^2	0.2633	0.2690	0.2692

Note: This table reports the estimates from the panel regressions, in which the dependent variable are the quarterly logarithmic returns. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Across all specifications, higher inflation (CPI) leads to significantly lower returns by nearly 0.17-0.20pp per unit increase, which was expected, as higher inflation levels typically erode real stock returns, while higher return volatility carries a strongly negative effect of about 9.3pp, *ceteris paribus* -reflecting the classical *risk-return trade-off*. Religiosity, although statistically significant, has a small impact on stock market returns, reflecting a more conservative savings behavior or lower participation in stock markets among high religious populations. Larger rural populations lead to returns nearly 0.4pp lower, which suggests that the EU countries with larger agrarian sectors have less developed capital markets, leading to lower returns.

Regarding *weather-based variables*, their impact on the EU stock markets does not appear to be as strong as on the economic cycles, with neither the average temperature nor its amplitude being significant in linear form. The squared temperature term, however, is statistically significant, revealing a nonlinear relationship: moderate warming initially boosts returns, but beyond a threshold of nearly 6.3ºC, further increases diminish returns, all else constant. Thus, while weather-induced mood influences stock market performance, its effect is conditional on temperature intensity.

This nonlinear relationship has been explored by scholars: for instance, Hancock & Vasmatzidis (2003) found that warmer temperatures may worsen performance, with temperatures above 30ºC leading to diminished cognitive capacity; Pilcher *et al.* (2002) found that both hot and cold environments significantly impair cognitive performance, with the largest effects observed for tasks requiring complex decision-making and sustained attention (*e.g.,* trading), with extreme heat leading to slower reaction times and increased error rates. Additionally, these results align with behavioral finance literature, that attest that weather-induced mood may influence investor sentiment and asset pricing (*e.g.,* Jacobsen & Marquering, 2008; Goetzmann & Zhu, 2005), contradicting the vein of literature that supports that although the weather is a good proxy of mood and optimism, these do not necessarily have effect in stock market returns (*e.g.,* Pardo & Valor, 2003; Baker & Wurgler, 2007; Dell *et al.,* 2012).

These results support our main conjecture that mood and optimism impact the stock market performance (see **H3**). Moreover, the inclusion of these additional weather-based variables improved the pseudo-R^2 from roughly 26% to 27%, suggesting higher explanatory power and that these are not irrelevant factors.

4.4.3. The Impact of Local Demographics on Influencing Temperature Effects on Stock Market Performance

As explained in Section 4.2.3., the effects of temperature may not be uniform across the EU countries, being likely influenced by demographic factors. Thus, to explore whether demographic factors moderate the influence of weather on stock market returns, the previous panel OLS models were re-estimated, including interaction terms between temperature and its amplitude, and key country-level variables. The results are summarized in Table 5 (the complete results are included in Table 26, Annex).

Table 5 – Results of the Role of Local Demographics on the Baseline Regression Models regarding Stock Market Performance

	Stock Market Performance	
	(Logarithmic) Returns	
VARIABLES	Interaction Temperature	Interaction Amplitude Temperature
Interaction Population	0.000001**	-0.000001
	(0.000)	(0.000)
Interaction MedianAge	0.00057***	-0.00059***
	(0.000)	(0.000)
Interaction MaleFemaleRatio	-0.00049***	0.00007
	(0.000)	(0.000)
Interaction Minority	-0.000001**	0.000001
	(0.000)	(0.000)
Interaction RuralPopulation	-0.00001	-0.00012***
	(0.000)	(0.000)
Interaction TrustIndex	-0.00888***	-0.00925*
	(0.003)	(0.005)
Region FE	Yes	Yes
Control Variables	Yes	Yes
Observations	1,155	1,155
Number of country	18	18
Pseudo R^2	0.2660	0.2792

Note: This table reports the estimates from the panel regressions, in which the dependent variable are the quarterly logarithmic returns. The interaction variables use one of the country's variables (specified in rows) and one of the two weather-based mood indicators (specified in columns). The complete results are introduced in the Annex. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

All *temperature-by-demographics* interaction terms (except for rural share) proved significant. Specifically, as population increases, the positive effect of temperature on returns is slightly enhanced, suggesting that larger markets may transform mood boosts more effectively into higher returns. Each 1-year increase in median age amplifies the positive impact of temperature on returns by, on average, 0.00057, *ceteris paribus*, indicating that older populations are more responsive to favorable weather, in terms of mood and optimism. Conversely, a higher female-to-male ratio diminishes temperature's beneficial impact, which may reflect gender differences in risk attitudes or market participation. Increased minority shares also slightly attenuate weather effects (although negligible). Finally, a one unit increase in the levels of institutional trust reduces the effect of temperature on stock returns by 0.00888, *ceteris paribus*.

Then, regarding the *temperature amplitude*, we found that variability exerts a more pronounced negative effect on returns in older and more rural populations and in high trust countries. Specifically, each additional year in median age worsens the contractionary impact of temperature fluctuations, suggesting that although older groups benefit from moderate warmth, they are more vulnerable to unpredictable weather. A higher rural population significantly exacerbates the negative effect of temperature amplitude on stock returns, which may be due to agricultural or less diversified economies being more exposed to climatic fluctuations.

Elevated trust again dampens the sensitivity of markets to these shocks.

These results suggest that the impact of local optimism on the EU stock market performance is not uniform across all countries, being moderated by demographic factors. Therefore, policymakers and market participants should therefore consider these factors when assessing the vulnerability or resilience of national equity markets to climate-driven sentiment shocks.

4.4.4. The Impact of Weather, Sports, and Political Outcomes on Stock Market Performance

In the next set of regressions, proxies for sports and political optimism are included, following the same structure used for economic cycles (see Section 4.3.4) – Model (1) introduces the sports optimism measures, Model (2) adds the political optimism ones, and Model (3) includes their interaction terms. The final column re-estimates Model (3) using an endogeneity correction. The results are summarized in Table 6 (complete results in Table 27, Annex).

Table 6 - Impact of Mood and Optimism on Stock Market Performance

	Stock Market Performance			
	(Logarithmic) Returns			
VARIABLES	Model (1)	Model (2)	Model (3)	Model (3) (End. Corrected)
Temperature	0.00112	0.00095	0.00093	0.00087
	(0.001)	(0.001)	(0.001)	(0.001)
Temperature_Sq	-0.00009**	-0.00008**	-0.00008**	-0.00008*
	(0.000)	(0.000)	(0.000)	(0.000)
AmpTemperature	-0.00030	-0.00035	-0.00048	-0.00050
	(0.001)	(0.001)	(0.001)	(0.001)
FootballOptimism	0.03400	0.03776	0.07372	0.05724
	(0.031)	(0.033)	(0.065)	(0.097)
OlympicsOptimism	0.00050	-0.00011	-0.00356*	-0.00349
	(0.001)	(0.001)	(0.002)	(0.004)
RightLeftRatio		0.00062	0.00049	0.00208
		(0.003)	(0.003)	(0.003)
PoliticsMajority		-0.02295***	-0.03117***	-0.03160***
		(0.006)	(0.006)	(0.010)
Football*RightLeftRatio			-0.12754***	-0.11453
			(0.045)	(0.094)
Football*PoliticalMajority			0.18244***	0.17631**
			(0.066)	(0.079)
Olympics*RightLeftRatio			0.00191*	0.00178
			(0.001)	(0.002)
Olympics*PoliticalMajority			0.00215	0.00232
			(0.003)	(0.004)
Region FE	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes
Observations	1,155	1,098	1,098	1,098
Number of countries	18	16	16	16
Pseudo R^2	0.2699	0.2725	0.2771	0.2874

Note: The last column includes Model (3) corrected for endogeneity. The complete results are introduced in the Annex. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Across all specifications, the *quadratic temperature term* remains the sole consistently significant weather variable, which reaffirms the nonlinear relationship previously found – in which moderate warming initially boosts returns, but beyond approximately 6ºC, the effect turns negative. As for the other *weather-based variables*, these are statistically insignificant, suggesting that only the curvature of the *temperature-return function* is robust in an EU context – *i.e.,* EU stock markets are not sensitive to absolute warmth or day-to-day volatility, but to deviations from an optimal temperature range.

Sports outcomes (either measured by football or Olympics) are statistically insignificant in most models – although the uncorrected Model (3) shows a weakly negative coefficient on Olympics outcomes, this disappears after addressing endogeneity, which implies that *sports outcomes do not systematically drive EU stock market performance* Although some literature defends that sports outcomes may be important drivers of stock market performance (*e.g.,* Edmans *et al.*, 2007; Bernile & Lyandres, 2011; Graziano & Vincentini, 2017), these results cannot support these, being, however, aligned with the body of literature that states that there is no economic reason to link sports outcomes with stock market returns (*e.g.,* Klein *et al.,* 2009; Kaplanski & Levy, 2010; Gerlach, 2011; Reid *et al.,* 2013).

Contrarily, *political outcomes* exert a pronounced and statistically significant impact. The majority-party indicator is highly significant, with right-wing governments leading to 2.3-3.2pp lower quarterly returns, comparatively to left-wing governments, *ceteris paribus*. This effect persists through the endogeneity correction and is in line with the literature supporting that stock markets are influenced by political outcomes (*e.g.,* Białkowski *et al.*, 2008; Wisniewski, 2008; Acemoglu *et al.,* 2014; Mai *et al.*, 2023).

The *interaction terms* reveal that the interplay between sports and politics further conditions market reactions – prior to the correction, a significant *interaction between football victories and right-left ratio* suggested that in more right-leaning countries, even positive sports outcomes were associated with decreased returns, which may suggest contrarian sentiment when nationalist fervor is high; as for the *interaction of Olympics outcomes and right-left ratio*, it suggests that under right-wing influence, the effect of Olympic performance on stock returns becomes slightly more positive. After the correction, only the i*nteraction between football and majority-party* is significant, indicating that with right-wing governments, football victories

coincide with marginally higher returns.

Finally, the progressive inclusion of these *mood proxies* steadily increases the goodness-of-fit measure (from 27.0% to 28.7%), confirming that nonlinear temperature effect and political outcomes jointly improve the model's explanatory power.

In sum, the results suggest that *mood and optimism do have an impact on the EU stock market performance*, *with stock market performance being stronger in the EU countries where individuals are more optimistic,* which validates **H3** -specifically, weather-induced mood plays a nuanced role, with only the nonlinear effect of temperature being significant, sports outcomes lack robust influence, and political outcomes emerge as the dominant mood driver of EU stock market performance.

4.5. The Impact of Mood and Optimism on the Economic Cycle: Evidence from each EU Country

While the previous *pan-EU* (see Section 4.2.) analysis revealed that the *weather and political outcomes are key drivers of EU economic cycles* -with sports outcomes having a non-significant effect-, the strength and direction of these relationships vary significantly at a national level (Figures 1-4). To explore EU's heterogeneity and regional differences of the impact of mood and optimism on EU's economic cycles, the models specified in Section 4.2.4 were re-run for each EU country[5]. Figures 1-2 illustrate the results of the *impact of mood and optimism on the expansions of each EU country* (complete results in Table 28, Annex), while Figures 3-4 illustrate the impact of the same variables on the *contractions of each EU country* (Table 29, Annex)

[5] Some countries are excluded, due to: convergence not being achieved when bootstrapping the Tobit models, omitted coefficients, or not having available observations after dropping missing values.

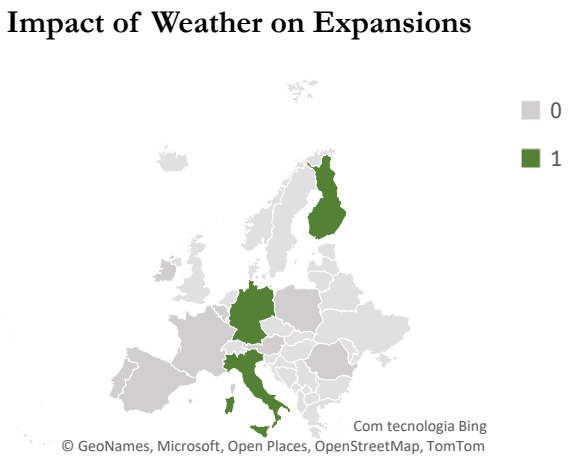


Figure 1 - Impact of Weather on Expansions

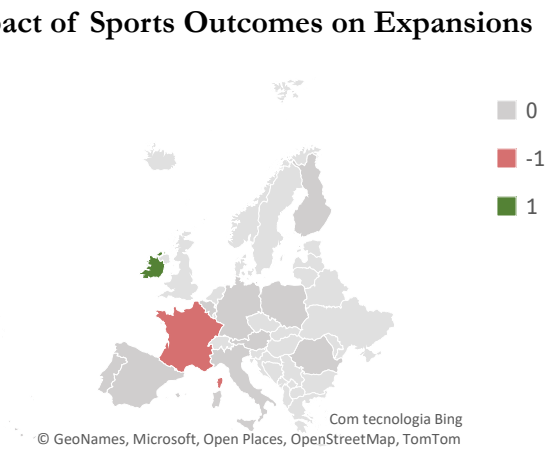


Figure 2 - Impact of Sports Outcomes on Expansions

The figures highlight that *the effects of mood and optimism on expansions vary considerably across the EU countries*. Specifically, it is perceived that in Finland, Germany and Italy, warmer temperature significantly enhances expansions, while in Mediterranean economies, such as Portugal and Spain, temperature is not significant -which may be related to a greater reliance on tourism and services, which respond differently to weather. *Sports outcomes* also exhibit country-specific effects: while in Ireland they boost expansions, in France they modestly weaken growth, whereas in the remaining countries the effect cannot be inferred.

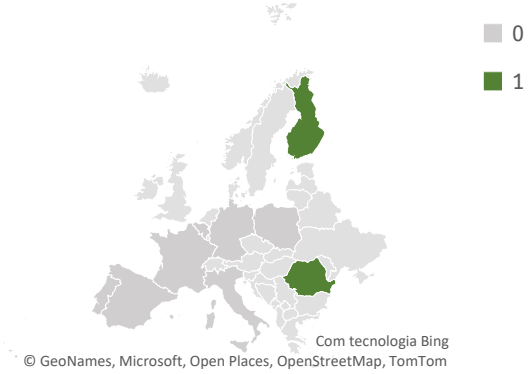


Figure 3 - Impact of Weather on Contractions

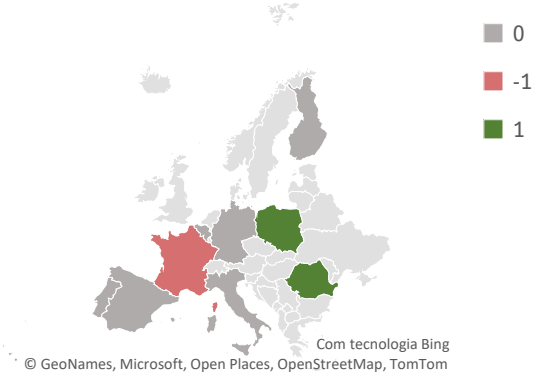


Figure 4 - Impact of Sports Outcomes on Contractions

Figures 3-4 highlight that *the effects of mood and optimism on contractions vary considerably across the EU countries*. In countries as Finland and Romania, favorable weather mitigates contraction

severity -underlining the restorative power of good mood in more temperate or climatically volatile economies-, whereas in the remaining countries, weather reveals no significant relief on contractions. *Sports outcomes*, again, display mixed results: in countries such as Poland and Romania, national teams' sports victories tend to weaken contractions -likely due to sustaining local confidence-, while in countries such as France they tend to have adverse effects on contractions. As for *political outcomes*, these remained uniformly insignificant at the country level for both expansions and contractions.

Overall, these divergent trends underscore the need for regionally tailored policy responses: while mood boosts could be beneficial in some countries (*e.g.,* Finland and Italy), it could be detrimental to other countries (*e.g.* France) -thereby governments should avoid overreliance on sentiment-based interventions in these countries, and could instead prioritize, *e.g.,* structural reforms or targeted fiscal measures. These nuanced findings are in line with Fratzscher & Stracca's (2008) work, which accentuated the importance of considering local context on economic cycles. Finally, the results support **H4**, where it was hypothesized that there would be *regional differences regarding the impact of mood and optimism on the EU economic cycles*.

4.6. The Impact of Mood and Optimism on the Stock Market Performance: Evidence from each EU Country

The *pan-EU* analysis (see Section 4.3.4.) revealed that the *nonlinear temperature effect and political outcomes are key drivers of EU stock market performance* -with *sports outcomes* having a non-uniform effect. However, EU's pronounced diversity suggests that these relationships may vary by country (see **H4**). To test this, the stock performance specifications were re-estimated for each EU country. Figures 5-7 illustrate results of the *impact of mood and optimism on the stock market performance of each EU country* (complete results in Table 30, Annex).

Impact of Weather on Stock Market Performance

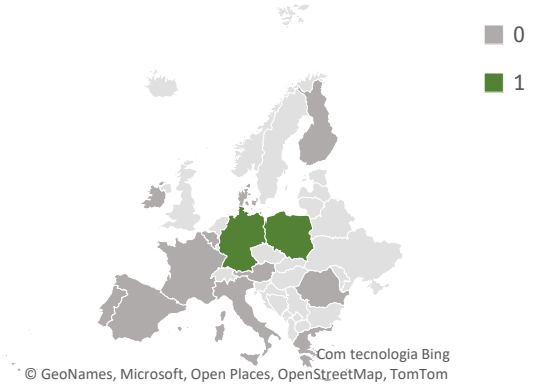


Figure 5 - Impact of Weather on Stock Market Performance

Impact of Sports on Stock Market Performance

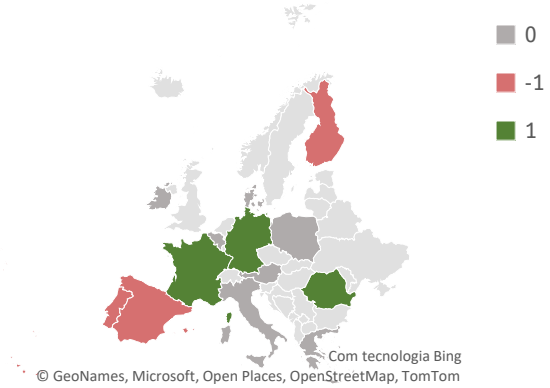


Figure 6 - Impact of Sports on Stock Market Performance

The figures emphasize, once again, the heterogeneity of the EU countries. Only a minority of markets exhibit significant temperature effects: in Germany and Poland, favorable weather enhances stock returns, which is consistent with good mood enhancing risk appetite. Conversely, the remaining countries are not impacted by weather -which may suggest that local traders either adapt to their customary climate or that country-specific factors dampen the transmission of weather-induced sentiment into equity prices.

Although some literature finds short-term market reactions to major *sports* events, this country-level analysis reveals mixed effects: in France and Romania, the stock market benefits from national team successes, potentially reflecting localized pride and consumption boosts, whereas in Finland, Portugal and Spain, they experience negative responses, which may indicate *contrarian trading* or that investors in these countries focus away from stock markets during sporting celebrations.

Regarding *political outcomes*, it is perceived that, contrary to the previous findings of uniformly negative returns under right-wing governments, these only significantly influence returns in Spain, in which right-wing governments lead to lower quarterly performance.

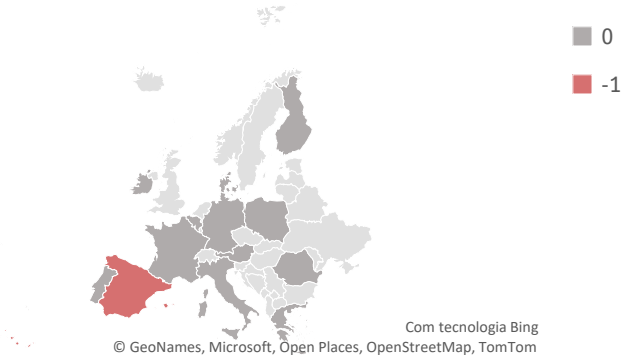


Figure 7 - Impact of Political Outcomes on Stock Market Performance

In sum, these country-level differences emphasize that the behavioral channels linking the *exogenous mood and optimism proxies* to stock market performance are heavily contingent on local market structure, culture, policy frameworks, among others. Thus, policymakers should carefully consider which mood indicators influence and how the different EU countries, deciding carefully *mood-enhancing interventions* (*e.g.*, promoting sporting leagues, construction of sports venues, etc.), as it is perceived that while some countries could benefit from *mood boosts* (*e.g.,* Germany and Poland), others could be jeopardized (*e.g.,* Finland, Portugal and Spain).

4.7. The Impact of Mental Health on Economic Cycles and Stock Market Performance

Chhaochharia *et al.* (2020) found that the *weather, sports and political proxies of mood and optimism* are correlated with *direct indicators of mood* -specifically, per-capita anti-depressants consumption and episodes of mental depression -in the US. However, due to the unavailability of comparable data in an EU context, this relationship could not be incorporated in the previous regression analysis. Nevertheless, considering that the global consumption of *antidepressant drugs* (AD) has increased dramatically over the last two decades, and that the Europeans are the largest consumers of ADs (Yanatma, 2023), this is definitely worth studying. Thus, OECD statistics on the global consumption of AD, their respective *Defined Daily Doses* (DDDs), and chronic depression prevalence will be examined, to assess how these mental-health indicators correspond to the results obtained in the previous sections.

The results of the previous sections identified Finland, Germany, Italy and Ireland as countries where *mood boosts* would foster stronger expansions, and Finland, Poland and Romania

would benefit from attenuated contractions; conversely, France would experience a worst economic performance. Accordingly, one would expect low AD usage and depression rates in these "optimistic" countries (Chhaochharia *et al.,* 2020).

However, OECD's data reveals notable inconsistencies: despite benefiting from *mood boosts* and being acknowledged as "the happiest nation" (Yanatma, 2023), Finland ranked 7th for antidepressant DDDs and Germany ranked 13th, among 24 EU countries, which contradicts the hypothesis that happier populations would consume fewer AD. France, on the other hand, whose results associated to pessimistic mood effects, surprisingly records one of the lowest AD consumption, at 16th. Concerning *chronic depression* data, it was expected that countries as Finland, Germany, Italy, Ireland, Poland, and Romania would report lower-than-average levels; however, all these nations -except for Finland- registered *chronic depression rates* below the EU-27 average.

Regarding *stock market performance*, our analysis indicated that in Germany, Poland, France, and Romania, positive *mood proxies* led to higher market returns, whereas in Spain, Portugal, and Finland, this would lead to lower returns. Here, ADs usage aligns more closely with the conclusions drawn by Chhaochharia *et al.* (2020): countries with stronger equity performance generally exhibit lower DDDs, while those with weaker markets exhibit a higher consumption. Moreover, *chronic depression rates* do not uniformly mirror these patterns, as in countries such as Germany and France, lower shares of chronic depression were anticipated (due to robust market returns), yet OECD data reveals higher-than-average levels. Similarly, for Spain, Portugal, and Finland -where higher levels of depression were expected- the findings confirmed above-average levels of chronic depression in all countries -except for Spain.

These results suggest that the relationship between mood indicators and economic and financial outcomes differs in the EU comparatively to the US (Chhaochharia *et al.,* 2020). This may be related to cultural attitudes concerning medication and healthcare accessibility, which may mediate AD use and depression reporting -thereby decoupling them from purely sentiment-driven economic outcomes. Thus, future research could integrate direct mental-health data with mood indicators, to offer a more thorough insight into how cultural and institutional factors shape these relationships.

4.8. Robustness Checks

To assess the reliability of our main findings, several robustness checks were conducted. Eight alternative estimations were explored, including: (1) endogeneity treatment, (2) exclusion of the 2 largest EU economies (Germany and France), split the sample into (3) pre- and (4) post-global financial crisis periods, introduced additional controls for (5) tax burdens, (6) migration and (7) educational attainment rates, as well as (8) time fixed effects. Table 31-36 (Annex) include the results of how each category of *mood and optimism proxies* perform under these alternative specifications.

4.8.1. Robustness of the Weather-Based Mood Proxies

Across all specifications, the core finding that *favorable temperatures strengthen expansions and alleviate contractions, subject to a modest nonlinear relationship* remains consistent. Correcting for endogeneity yields virtually identical coefficients and significance levels, dismissing concerns of reverse causality. The exclusion of dominant regions barely alters the estimates, suggesting that these results are not driven by a few dominant economies. When splitting the sample, we observe that the linear temperature effect is somewhat stronger in the pre-crisis period, whereas the post-crisis regressions emphasize the quadratic term more heavily, although maintaining statistical significance. Adding controls for tax burdens, migration flows, and education likewise leaves the temperature coefficients substantively unchanged. However, the introduction of year fixed effects substantially attenuated the expansion coefficients, which may suggest that part of the temperature relationship with economic cycles may reflect common, time-varying factors.

The *stock market performance* regressions exhibit a similarly robust nonlinear temperature-return relationship, with each alternative specification -endogeneity correction, exclusion of large economies, crisis subsamples and additional controls- maintaining the negative coefficient on the squared temperature term, as well as its significance. The absolute temperature and its amplitude reveal greater fluctuations, with pre-crisis regressions often producing positive effects, whereas post-crisis periods and time-fixed-effects specifications tend to weaken or nullify these components. Nevertheless, the nonlinear effect endures six of the specifications, which testifies its vital role in driving EU stock market performance.

4.8.2. Robustness of Sports and Political Outcomes Proxies

The robustness tests support the finding that *sports outcomes do not reliably predict expansions nor contractions*, whereas *political outcomes display occasional significance* under certain specifications – *e.g.,* the right-left ratio becomes significant in contraction models when large economies are excluded, or when education controls are included- but these effects are neither consistent not robust in the year-fixed effects specifications. Considering the *interaction terms between sports and political outcomes*, likewise, these do not have stable or significant results under alternative explanations. Consequently, our findings that *sports and political outcomes have at best context-specific and weak influence on EU economic cycles* are strongly supported by these robustness checks.

Contrarily, *political outcomes emerge as highly robust determinants of stock market performance*. Specifically, it is perceived that right-wing governments are consistently associated with 2-3pp lower quarterly returns across the majority of specifications. Regarding sports outcomes, Olympic performance retains marginal significance in some pre-crisis and time-fixed-effects specifications, while football results show significant interactions with political outcomes only in a subset of tests (exclusion of large economies and pre-crisis). However, the year-fixed effects dampen most sports-politics interactions, leaving only the interaction between football outcomes and political majority as moderately robust. Thus, the *political majority proxy stands out as the most robust non-weather mood indicator for explaining EU stock market performance.*

In sum, these robustness checks confirm our main finding - *the nonlinear effect of weather on both economic cycles and stock market performance is not driven by sample composition, endogeneity, or omitted controls*. Sport outcomes remained largely non-robust, whereas political outcomes -particularly right-wing governments- consistently drive stock market performance. Thus, policymakers and researchers should place greatest confidence in the nonlinear temperature effects and political outcomes, while being cautious regarding sports outcomes, as these may be influenced by common time trends. Moreover, special caution should be put when designing policies during crises.

5. Conclusion

The main objective of this dissertation was to investigate how mood and optimism – proxied by weather-based variables, sports victories and political outcomes - influence the economic cycles and stock market performance across the EU countries. This was motivated by the increasing recognition that traditional economic and financial models fail to account for several factors influencing market dynamics – namely those arising from behavioral aspects. Although the literature concerning the impact of investors' sentiment on economic cycles and stock market performance has grown considerably over the years, there is still a notorious gap in the literature that connects non-economic factors (as the proxies mentioned above) with the EU context.

In this sense, we sought to test whether these indicators influence EU expansions, contractions and stock market performance, and to understand how demographic and institutional differences across the EU countries moderate these relationships. This study fills the gap in the literature by extending the framework of Chhaochharia *et al.* (2020) -who explored the relationship between mood and optimism indicators and the economic cycles in the US - to an EU context: a region characterized by significant heterogeneity in political, cultural, and institutional dimensions. This approach provides a broader, transnational perspective, allowing us to evaluate the universality of mood-driven economic and financial phenomena observed in the US, and to assess whether similar trends are observed in the EU economic cycles, as well as on the stock market performance.

Hence, by employing quarterly panel data from 2000 (Q1) until 2024 (Q1), a comprehensive dataset was assembled, including various data regarding weather, sports and political outcomes, along with a wide range of control variables that reflect the demographic, socioeconomic, and industrial differences among the EU countries. With that purpose, Tobit and OLS regression models – along with interaction term analyses and robustness checks – were used to assess the impact of mood and optimism on economic cycles and stock market performance of the EU countries.

Empirical results support the main conjecture of this dissertation and indicate that *mood and optimism do have a significant impact on economic cycles and stock market performance, with expansions and equity returns being stronger, and contractions weaker in the EU countries where individuals are more optimistic*, *with positive mood influencing more intensely contractions than expansions* (supporting **H1**, **H2** and **H3**). Specifically, we found that warmer temperature strengthens expansions and

mitigates contractions -conclusion that is in line with the literature (*e.g.,* Denissen *et al.*, 2008; Beute & Kort, 2018; Felbermayr *et al.*, 2022)-, presenting a small, yet significant, nonlinear relationship (that endured robustness checks) with the economic cycles and the stock market (in line with the findings of, *e.g.,* Hancock & Vasmatzidis, 2003 and Pilcher *et al.*, 2002), in which moderate warming is beneficial, whereas excessive heat erodes both economic activity and financial returns.

Regarding political outcomes, while these have negligible effects on economic cycles (which opposes to the literature that sustained that these would be significant drivers, *e.g.,* Bernile & Lyandres, 2011; Harjito *et al.,* 2021), these revealed to have a significant impact on stock market performance [in line with the studies of, *e.g.,* Białkowski et al., 2008; Mai *et al.,* 2023), with right-wing majorities consistently leading to lower stock market returns -with this effect enduring all robustness checks. This result suggests that political partisanship may be a powerful driver of investment sentiment in the EU.

In contrast, sports outcomes do not present stable effects on neither economic cycles nor equity returns, which opposes to the literature that sustained that these would be significant drivers of economic cycles (Whitfield, 2003; Edmans *et al.,* 2010; Bonaparte *et al.,* 2017;), but, it is in line with studies suggesting little economic rationale for linking sporting events with market returns (Kaplanski & Levy, 2010; Klein *et al.,* 2009; Gerlach, 2011; Reid *et al.*, 2013).

Our results emphasize significant heterogeneity across the EU countries, with interaction-term analyses and country-by-country regressions revealing that *the impact of mood and optimism varies considerably across regions* (supporting **H4**), with local demographics and socioeconomic conditions moderating their effects -specifically, it was found that median age, rural population share and social trust levels moderate weather effects on both economic cycles and stock market performance. National-level analysis further emphasized this heterogeneity: while mood boosts may support economic cycles in countries such as Finland and Italy, they may have adverse effects in France, and negligible impacts in countries such as Spain and Portugal. Similarly, the influence of mood on national stock markets varies: while Germany and Poland stock markets would benefit from mood boosts, markets in Portugal and Spain would experience adverse effects, whereas Italy would remain largely unaffected. These findings highlight the importance of local socioeconomic and institutional contexts in shaping the role of behavioral factors in economic and financial performance across the EU.

This dissertation also delves into the relationship between direct mood and optimism

indicators (*i.e.,* mental health indicators) and behavioral mood proxies. Comparisons with OECD data on antidepressant consumption and chronic depression revealed inconsistencies between the mood proxies and the direct measures of mood and optimism -for instance, although mood boosts revealed to benefit countries such as Finland and Germany, these countries exhibit higher-than-expected AD usage, whereas France shows lower consumption despite negative mood signals. Furthermore, patterns in chronic depression rates do not uniformly correspond to the observed market performance, suggesting that cultural, healthcare, and policy factors may significantly mediate these relationships. These findings highlight the need for further research into how mental health, as part of the broader mood construct, interacts with economic and financial performance in the EU.

Robustness checks confirmed the validity of our main findings, supporting that the nonlinear effect of weather on both economic cycles and stock market performance is not driven by sample composition, endogeneity, or omitted controls, that sports outcomes remained largely non-robust, whereas political outcomes -particularly right-wing governments- consistently drive stock market performance.

Overall, our empirical findings offer valuable implications: firstly, policymakers should recognize that "one-size-fits-all" sentiment-based interventions are not perfect and will impact differently the various EU countries. In this sense, policymakers are encouraged to consider regional differences in demographic and cultural factors when designing economic policies, particularly in times of crises; additionally, tailored strategies that account for factors such as local age structures, institutional trust and political contexts are more likely to promote economic resilience and market stability. Secondly, investors should consider carefully behavioral factors to refine forecasting and strategies in diverse economic environments.

Notwithstanding its contributions to literature, we faced several limitations while conducting this dissertation. Firstly, some variables used in the US-based study -namely cloud cover, mining and industry concentration, risk sharing, and investor sophistication- could not be incorporated into our analysis, due to data unavailability in an EU context. Secondly, some variables and countries had to be excluded from our analysis, due to having too many missing values, which would have significantly reduced the sample size (*e.g.,* educational attainment, tax burden, grants). Thirdly, several adaptations were needed: for instance, the Catholic-Protestant ratio used in the US-based study was reconfigured to a religious-versus-agnostic ratio, as there was no exact data for that in an EU context; political outcomes were tailored

to reflect the EU context rather than the US partisan system. Additionally, a sizable portion of the data (namely weather, sports, political variables, trust indexes, and religiosity measures) had to be manually compiled from various sources. This procedure, combined with the different formats of retrieved data, increased the possibility of transcription and imputation mistakes. Also, when constructing the economic activity index, some missing values were detected in key components (*i.e.,* housing and relative unemployment), which would have led to a decreased sample size. Thus, some values were imputed from alternative sources, under the assumption of data comparability. Finally, given Stata's limitations with panel Tobit models, several strong assumptions were required in both preliminary tests and estimations.

These limitations allowed us to identify several avenues for future research. Firstly, assembling more comprehensive and uniform datasets, to reduce reliance on imputation and manual compilation, as well as the construction of mental-health datasets across the EU, would help achieve more reliable results and reconcile the divergences previously found. Secondly, future research could try to precisely identify the channels through which the mood and optimism affect the economic cycles and stock market performance of the different countries. Thirdly, integrating direct measures of mental health with traditional mood proxies could yield deeper insights into the mechanisms linking psychological well-being to economic outcomes. Then, comparative analyses across regions and different economic systems may further refine our understanding of the interplay between behavioral factors and macroeconomic performance. Finally, advances in econometric techniques for panel Tobit models using Stata is greatly advised, so these can be accurately studied, without relying on several assumptions.

In summary, this dissertation contributes to the literature by demonstrating that mood and optimism have a significant impact on both economic cycles and stock market performance within the EU, emphasizing the importance of considering contextual and demographic heterogeneity. The implications of these results are extensive, and underscore the critical importance of local demographic and institutional contexts in shaping economic and financial outcomes.

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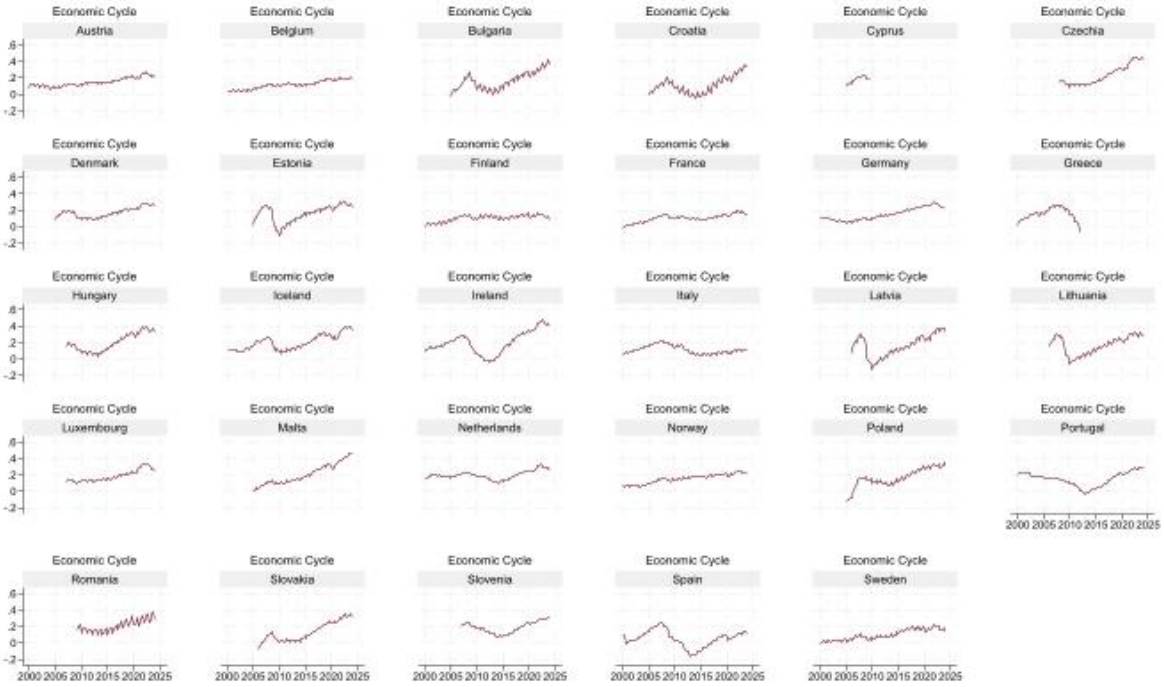
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Annex

Annex A – Graphical Evolution of AI and Stock Market Returns

Figure 8 – Evolution of Country-Level Economic Cycles [2000(Q1) – 2024(Q1)]



Note: The graphs show the evolution of the activity economic index for the EU countries studied in this dissertation (y axis). The time period ranges from 2000 (Q1) to 2024 (Q1) (x axis). Countries such as Cyprus, Greece, etc.. do not have data available for the whole period, reason why the economic cycles of these countries are not complete.

Figure 9 – Evolution of the Logarithmic Returns (%) of each Stock Market of each EU country [2000(Q1)-2024(Q1)]



Annex B – Countries Analyzed and Respective Stock Market Index

Table 7 - Countries included in the analysis, and respective stock market index

Country	Code	Index	Description
Austria	.ATX	Austrian Traded Index	Main stock market index in Austria. As most European indices, it is defined as a price index and currently consists of 20 stocks.
Belgium	.BFX	BEL 20 Index.	Benchmark stock market index of Euronext Brussels. The index consists of a minimum of 10 and a maximum of 20 companies traded at the Brussels Stock Exchange.
Bulgaria	.SOFIX	Bulgarian Stock Exchange SOFIX Index	Main stock market index in Bulgaria, which tracks the performance of the most liquid companies listed on The Bulgaria Stock Exchange.
Croatia	.CRBEX	CROBEX Index	Main stock market index in Croatia, which tracks the performance of 25 large companies listed on the Zagreb Stock Exchange.
Cyprus	.CYMNPRL	CSE General Index	Main stock market index in Cyprus, which tracks the performance of all companies listed on the Cyprus Stock Exchange.
Czechia	.PX	PX Prague SE Index	Main stock market index in Czech Republic, which tracks the performance of large companies listed in the Prague Stock Exchange
Denmark	.OMXC20	OMX Copenhagen 20 Index	Main stock market index in Denmark, which contains the 20 most-traded stocks in the Copenhagen Stock Exchange.
Estonia	.OMXTGI	OMX Tallinn_GI	Main stock market index in Estonia, including all the shares listed on the Tallin Stock Exchange.
Finland	.OMXHPI	OMX Helsinki_PI	Main stock market index in Finland, which includes all the shares listed on the Helsinki Stock Exchange; weight capped version of All-Share Index (maximum weight of one share is limited to 10% of the total market value of the index).
France	.FCHI	CAC 40 Index	Main stock market index in France, which represents a capitalization-weighted measure of the most 40 significant stocks among the 100 largest market caps on the Euronext Paris.
Germany	.GDAXI	Deutsche Boerse DAX	Main stock market index in Germany, which shows the performance of the 40 largest companies listed on the regulated market of the Frankfurt Stock Exchange.
Greece	.ATG	Athex Composite Share Price Index	Main stock market index in Greece, which tracks the performance of the shares of the companies that trade in the Big Cap segment of the Athens Exchange
Hungary	.BUX	Budapest SE Index	Main stock market index in Hungary, which tracks the performance of large, actively traded shares listed on The Budapest Stock. free floating, capitalization-weighted, total return index.
Iceland	.OMXIPI	OMX Iceland All-Share PI	Main stock market index in Iceland, which includes all the shares listed on the OMX Nordic Exchange Iceland.
Ireland	.ISEQ	ISEQ Overall Price Index	Main stock market index in Ireland, which tracks the performance of all (excluding UK registered) companies listed on the Irish Stock Exchange. It is a capitalization-weighted index.
Italy	.FTMIB	FTSE MIB Index	Main stock market index in Italy, which consists of the 40 most-traded stock classes on the Italian National

			Stock Exchange.
Latvia	.OMXRGI	OMX Riga_GI	Main stock market index in Latvia, which includes all the shares listed on the Riga Stock Exchange.
Lithuania	.OMXVGI	OMX Vilnius_GI	Main stock market index in Lithuania, which includes all the shares listed on the Vilnius Stock Exchange.
Luxembourg	.LUXX	Luxembourg SE LuxX Index	Main stock market index in Luxembourg, and it is an open index -*i.e.,* the number of eligible constituent companies is not limited. All shares issued by companies listed on the Luxembourg Stock Exchange, or with a significant activity on the Luxembourg Stock Exchange markets, or whose part of the shareholders is Luxembourg based are included in this index.
Malta	.MSE	MSE Share Index	Main stock market index in Malta, which tracks the performance of the largest and most actively traded equities listed on the exchange.
Netherlands	.AEX	Amsterdam Exchanges Index	Main stock market index in the Netherlands, which is composed by a maximum of 25 of the most frequently traded securities traded on Euronext Amsterdam.
Norway	.OBX	Oslo Stock Exchange Equity	Main stock market index in Norway, which tracks the largest and most liquid companies listed on the exchange.
Poland	.WIG	Warsaw SE WIG Poland Index	Main stock market index in Poland, which tracks the performance of all domestic companies listed on the main market of the Warsaw Stock Exchange.
Portugal	.PSI20	Euronext Lisbon PSI Index	Main stock market index in Portugal, which tracks the performance of 20 companies with the largest market capitalization and share turnover in the Euronext Lisbon Stock Exchange.
Romania	.BETI	Bucharest SE BET Index	Main stock market index in Romania, which tracks the performance of the 10 most liquid stocks listed on the Bucharest Exchange in Romania.
Slovakia	.SAX	SAX Index	Main stock market index in Slovakia, which tracks the performance of large companies listed on the Bratislava Stock Exchange. It is a capitalization weighted total return index.
Slovenia	.SBITOP	Ljubljana Stock Exchange	Only stock market index in Slovenia, which tracks the performance of the most liquid shares traded on the Ljubjana Stock Exchange.
Spain	.IBEX	IBEX 35 Index	Main stock market index in Spain, which is designed to represent the real-time evolution of the most liquid 35 stocks in the Spanish Stock Exchange.
Sweden	.OMXS30	OMX Stockholm 30 Index	Main stock market index in Sweden, which consists of the 30 most actively traded stocks on the Stockholm Stock Exchange.

Note: All this data was extracted from Refinitiv.

Annex C – Description and Sources of the Variables

Table 8- Characterization and Data Sources of the Economic Cycle Variables

Economic Cycle Variables	Description	Source
Country's Economic Activity Index (AI)	The country's economic activity index is defined using the three following country-level economic variables: income growth, relative unemployment, and housing collateral.	
Income growth	Income growth is the log difference between the country's income in a given quarter and the income in the same quarter in the prior year.	Eurostat
Relative Unemployment	The relative unemployment rate is given by the current country's unemployment rate.	Eurostat and PewResearch[6]
Housing	As a housing indicator, it was used an analytical house prices indicator with a quarterly frequency, measured in real house price indices	OECD and TradingEconomics
Expansion (Expansion)	Similar to Beaudry and Koop (1993), the expansion variable is a non-negative variable. If $\Delta AI_t = AI_t - AI_{t-1}$ is positive, then the expansion variable is the difference calculated. If ΔAI_t is zero or negative, then the expansion variable is set to zero.	Own elaboration.
Contraction (Contraction)	The contraction variable is a negative variable. If $\Delta AI_t = AI_t - AI_{t-1}$ is zero or negative, then CONTR is the difference calculated. If ΔAIt is positive, then CONTR is set to zero.	Own elaboration.
Consumer Price Index (CPI)	Measures the change over time in the prices of consumer goods and services acquired used or paid by household. Average index and rate of change of all-items HICP.	Eurostat
GDP Growth (GDPGrowth)	Measures the annual GDP growth rate.	Eurostat

[6] Eurostat had no observations for certain countries, in given years. Thus, complementary data regarding relative unemployment was retrieved from PewResearch, with the objective of making the dataset as complete as possible. The countries were Croatia, Cyprus, France, Germany, Latvia, Lithuania, Luxembourg, Malta, Slovenia and Sweden.

Table 9 - Characterization and Data Sources of the Mood and Optimism Indicators

Mood And Optimism Indicators	Description	Source
Temperature (Temperature)	In order to get the temperature index, the average of the monthly temperatures of each country's capital[7] was retrieved. Then, the quarterly average was calculated.	Kaggle (2021)[8]
Temperature Amplitude (AmplitudeTemperature)	The temperature amplitude was obtained as the difference between the maximum and minimum average monthly temperature in a country within a year, in order to capture variations in weather patterns.	Own elaboration.
Sports Optimism	The sports optimism index was based on the results of the most famous football cups within the EU (*i.e.* UEFA Champions League, World Cup, Euro) (**FootballOptimism**) and the Olympic Games (**OlympicsOptimism**). The winner countries[9] were assigned a score of 1, and the teams that enter the finals are assigned a score of 0.5.	Own elaboration with data from Sky Sports and Olympics.
Political Optimism	In order to compute the political optimism index, the percentage of seats in the government of each country was taken (and, having that into consideration, they were split in left, center-left, right, and center-right). Afterwards, a ratio between them was calculated (**RightLeftRatio**) and the majority of each country (**PoliticsMajority**).	Own elaboration with data from Nordsieck.
Sports and political optimism	Interaction terms between the sports variables and the political variables.	Own elaboration.

Table 10 - Characterization and Data Sources of Demographic Variables

Demographic Variables	Description	Source
Median Age (Age)	Median age of the country's population.	Eurostat
Education (Education)	Proportion of state residents over age 25 with a bachelor's degree or higher. This variable also serves as a proxy for investor sophistication.	Eurostat
Male-female ratio (MaleFemaleRatio)	Proportion of females per 100 males in each country.	Eurostat
Minority (Minority)	Number of immigrants living in the country.	Eurostat
Rural Population (RuralPopulation)	Proportion of the population that lives in rural areas.	World Bank
Total population (Population)	Total population of a country (on January 1).	Eurostat
Religiosity (Religiosity)	The proportion of Catholics and agnostics within a country was considered.	Own Elaboration with data from the European Commission.
Social capital (TrustIndex)	The Social Capital Index is composed of five indicators that measure the level of trust in public institutions withing a country. The levels of trust in the country's government (a), justice system (*i.e.,* courts), police, civil services and armed forces were considered (b).	(a) OECD (b) Our World in Data

[7] Except for Germany, in which the city Munich was considered, due to lack of data for the capital.
[8] Retrieved from https://www.kaggle.com/datasets/sudalairajkumar/daily-temperature-of-major-cities
[9] In the UEFA Champions League, the home country of each team was taken into consideration for the computations.

Table 11 - Characterization and Data Sources of Industry Variables

Industry Variables	Description	Source
Agricultural weight (AgriculturalWeight)	Weight of the agricultural sector in the country's GDP.	World Bank
Manufacturing weight (ManufacturingWeight)	Weight of the manufacturing sector in the country's GDP.	World Bank

Table 12 - Characterization of Data Sources of Other Variables

Other Variables	Description	Source
State migration (Migration)	Net migration.	World Bank

Table 13 - Characterization of Data Sources of Stock Market Variables

Stock Market Variables	Description	Source
Stock Market Performance (StockMarketPerformance)	Logarithmic returns computed from the quarterly price of the main national equity index of each country in euros.	Refinitiv Workspace
StandardDeviation	Standard Deviation of the logarithmic returns of the main national equity index of each country in euros.	Own Elaboration
Volume	Amount of trading activity for the specific index in its particular market, over the defined period.	Refinitiv Workspace

Annex D – Assumptions Underlying the Variables in Study

Table 14 – Assumptions Underlying the Variables in Study

Variables	Assumptions
Temperature	As the monthly temperatures were obtained, the quarterly temperature was assumed as the average of the temperatures of the 3 months of each quarter. Some extreme temperatures were considered missing values and thus, in the cases that this happened in only 1 or 2 months of the trimester, these values were not considered for the calculation of the average temperature.
Temperature Amplitude	The temperature amplitude was obtained as the difference between the maximum and minimum average monthly temperature in a country within a year, without considering extreme values.
Sports optimism	For the **UEFA Champions League**, as it typically takes place between August and May of the following year, the results were assumed in Q3 and Q4. For the **FIFA World Cup**, as it typically happens in June and July, the results were considered in Q2 and Q3 of the same year it occurred. The same quarters were assumed for the **Euro**. Teams/states that entered into the final were assigned a score of 0.5, and the winners had a score of 1. For the **Olympic Games**, it was assumed that the number of medals only occurred in Q3 of the same year it occurred. According to Bernard & Busse (2004), a score of 3 was considered for each gold medal won, 2 for each silver and 1 for the bronze medals. For the **overall sports optimism indicator**, two separated indicators were considered: one for the football, and one for the Olympic games.
Political optimism	In order to compute the political optimism index, a ratio was computed as follows: the total right proportion on the parliament of each country, over the total left. Moreover, the inclusion of a dummy for the political majority was included (that assumes the value 1 if the country is governed by the right, and 0 if by the left) was included.
Social capital	The Social Capital Index is composed of five indicators that measure the level of trust in public institutions withing a country. In this sense, the average of trust between the 5 indicators were considered.
Religiosity	The proportion of Catholics, agnostics and atheists within a country was considered. In the years there was no data available, the missing values were imputed as follows: when the missing data was between

Annex E – Descriptive Statistics

Table 15 – Descriptive Statistics of the Economic Cycle Variables

Variable		Mean	Std. dev.	Min	Max	Observations
Economic Cycle Variables						
(1) Expansion	overall	0.0093	0.0125	0	0.0700	N = 2415
	between		0.0047	0.0039	0.0223	n = 29
	within		0.0117	-0.0130	0.0697	T-bar = 83.275
(2) Contraction	overall	-0.0060	0.0131	-0.1475	0	N = 2815
	between		0.0029	-0.0125	0	n = 30
	within		0.0128	-0.1449	0.0065	T-bar = 93.833

Table 16 – Descriptive Statistics of Mood Indicators

Variable		Mean	Std. dev.	Min	Max	Observations
Mood Indicators Variables						
(3) Temperature	overall	11.275	6.7031	-16.112	30.836	N = 2698
	between		3.5840	5.2375	20.937	n = 29
	within		5.9276	-12.794	28.376	T = 93.034
(4) Temperature Amplitude	overall	17.619	9.0110	0	48.893	N = 2813
	between		6.8687	5.7227	27.639	n = 29
	within		5.9691	-2.0249	41.868	T = 97
(5) Politics Majority (Right)	overall	0.7555	0.4299	0	1	N = 2650
	between		0.3209	0	1	n = 29
	within		0.3087	-0.2241	1.4977	T-bar = 91.379
(6) Football Results	overall	0.0140	0.0674	0	0.6667	N = 2813
	between		0.0368	0	0.1443	n = 29
	within		0.0569	-0.1303	0.5535	T = 97
(7) Olympics Results	overall	0.1678	1.1419	0	16.500	N = 2813
	between		0.2287	0	0.8832	n = 29
	within		1.1195	-0.7154	15.785	T = 97

Table 17 – Descriptive Statistics of Demographic Variables, Industry Variables, and Other Variables

Variable		Mean	Std. dev.	Min	Max	Observations
Demographic Variables						
(8) Median Age	overall	40.335	2.9751	32.400	48.400	N = 2813
	between		2.2438	35.104	44.054	n = 29
	within		1.9970	35.168	45.098	T = 97
(9) Male Female Ratio	overall	105.06	4.7463	90.300	118.90	N = 2813
	between		4.6611	97.801	117.59	n = 29
	within		1.2421	96.402	108.20	T = 97
(10) Minority	overall	120,334	20,4482	35.000	2,071,690	N = 2556
	between		185,288	5,583.0	835,937.3	n = 21
	within		88,807.5	-369,387	1,356,087	T = 88.138
(11) Rural Population	overall	26.057	12.597	1.8110	49.246	N = 2716
	between		12.685	2.2961	46.883	n = 28
	within		1.8618	19.573	36.272	T = 97
(12) Population	overall	$1.54*10^7$	$21.0*10^7$	281,205.0	$83.9*10^7$	N = 2813
	between		$21.4*10^7$	326,920.3	$82.3*10^7$	n = 29
	within		726,675.8	$10.4*10^7$	$18.6*10^7$	T = 97
(13) Religious-Agnostic Ratio	overall	9.0614	37.626	0.4000	498.00	N = 2813
	between		18.340	0.8308	102.12	n = 29
	within		33.028	-77.562	404.94	T = 97
(14) Social Capital	overall	0.4689	0.1332	0	0.7653	N = 2813
	between		0.1118	0.2885	0.7633	n = 29
	within		0.0753	0.1369	0.6714	T = 97
Industry Variables						
(15) Agriculture Weight	overall	2.5326	1.7314	0.1907	13.150	N = 2688
	between		1.5280	0.3234	6.6096	n = 28
	within		0.8634	-0.4460	9.0725	T = 96
(16) Manufacturing Weight	overall	14.252	5.2403	3.5315	37.147	N = 2592
	between		4.9060	5.5507	25.468	n = 27
	within		2.0673	6.3431	25.931	T = 96
Other variables						
(17) Net Migration	overall	42,876	128107.7	-489,056	1,175,283	N = 2688
	between		83110.83	-69,153	297,231	n = 28
	within		98733.95	-743,412	976,476	T = 96
(18) Retail Sales	overall	0.2238	1.2397	-19.033	13.900	N = 2446
	between		0.1908	-0.2600	0.6005	n = 28
	within		1.2294	-19.043	13.890	T-bar = 87.3571

Table 18 – Descriptive Statistics of Stock Market Performance Variables

Variable		Mean	Std. dev.	Min	Max	Observations
Stock market performance variables						
(19) LogReturns	overall	0.0089	0.1232	-1.6978	0.5430	N = 2632
	between		0.0140	-0.0392	0.2836	n = 29
	within		0.1226	-1.6905	0..5287	T-bar = 90.7586
(20) Standard Deviation	overall	0.0117	0.0069	0.0020	0.1480	N = 2657
	between		0.0026	0.0065	0.0205	n = 29
	within		0.0065	-0.0027	0.1491	T-bar = 91.6207
(21) Transaction Volume	overall	$9.64*10^7$	$1.66*10^8$	1	$1.94*10^9$	N = 1561
	between		$1.29*10^8$	25,654	$5.74*10^8$	n = 20
	within		$9.92*10^7$	$-3.18*10^8$	$1.54*10^9$	T-bar = 78.05

Annex F – Correlations

Table 19 – Country Characteristics

Country	Corr. AI	Temp.	Amp. Temp.	Foot. Pol. Opt.	Olym. Pol. Opt.	Trust	Rural	Agric. Weight	Returns	Std. Dev	Vol.
Austria	0.977	11.981	24.547	0.000	0.062	0.520	41.861	1.207	0.011	0.012	5,764,492.70
Belgium	0.737	10.387	19.389	0.000	0.132	0.463	2.316	0.820	0.003	0.011	17,934,818.54
Czechia	0.985	11.612	11.779	-	-	0.341	26.174	1.957	-0.000	0.006	1,902,370.88
Denmark	0.952	8.477	8.477	0.000	0.185	0.734	12.394	1.158	0.032	0.011	9,458,805.32
Finland	0.594	5.759	5.759	0.000	0.051	0.661	15.849	2.290	-0.005	0.015	64,725,215.26
France	0.884	11.234	11.234	0.054	0.976	0.562	20.588	1.465	0.005	0.013	108,747,777.53
Germany	0.630	8.787	8.787	0.070	0.998	0.536	23.356	0.845	0.006	0.013	90,623,435.98
Greece	0.900	18.934	18.934	0.034	1.366	0.253	25.276	4.013	-0.039	0.016	16,902,936.58
Hungary	0.971	11.499	11.499	-	-	0.420	29.101	3.649	0.013	0.012	3,583,275.71
Ireland	0.994	8.701	8.701	0.000	0.100	0.532	39.035	1.569	0.001	0.011	35,724,516.18
Italy	0.059	16.197	16.197	0.127	0.524	0.454	31.014	1.990	-0.007	0.014	583,924,194.53
Luxembourg	0.861	11.779	11.779	0.000	0.000	0.469	10.078	0.249	-0.008	0.014	11,197.76
Netherlands	0.915	11.779	11.779	0.000	0.000	0.469	13.217	1.837	0.000	0.012	91,507,678.56
Poland	0.970	9.399	9.399	0.000	0.725	0.411	39.631	2.743	0.013	0.011	65,920,830.04
Portugal	0.689	16.912	16.912	0.025	0.030	0.500	38.706	2.152	-0.008	0.011	132,633,472.20
Romania	0.925	12.885	12.885	0.000	0.153	0.346	45.986	4.738	0.026	0.011	18,326,090.60
Slovenia	0.903	15.057	15.057	0.000	0.000	0.470	46.026	1.824	0.002	0.009	38,805.78
Spain	0.519	15.041	15.041	0.195	0.449	0.427	21.290	2.747	-0.004	0.013	195,580,062.49

Annex G – Complete Results of the Economic Cycle Regressions

Table 20 – Results of the Baseline Regression Models, and the Impact of Temperature on the Economic Cycles of the EU Countries

	Economic Cycle					
	Expansion			Contraction		
VARIABLES	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Population	-0.00001***	-0.00001***	-0.00001***	-0.00001	-0.00001	-0.00001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Religiosity	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MedianAge	0.0023***	0.0021***	0.0022***	0.0026**	0.0020**	0.0028***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MaleFemaleRatio	-0.0001	-0.00001	-0.0001	-0.00001	0.0001	-0.0003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Minority	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RuralPopulation	0.0001	0.00001	0.00001	0.0003	0.0001	0.0004
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
TrustIndex	-0.0154	-0.0111	-0.0115	-0.0144	-0.0073	-0.0094
	(0.011)	(0.010)	(0.011)	(0.021)	(0.022)	(0.019)
AgriculturalWeight	0.0030*	0.0032**	0.0032**	0.0079**	0.0095**	0.0094***
	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)
ManufacturingWeight	0.0004	0.0005	0.0005	0.0009	0.0010	0.0008
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Temperature		0.0004***	0.0004***		0.0006***	0.0008***
		(0.000)	(0.000)		(0.000)	(0.000)
TemperatureSq		0.00001**	0.00001*		0.00001***	0.00001**
		(0.000)	(0.000)		(0.000)	(0.000)
AmpTemperature			0.00001			0.0004**
			(0.000)			(0.000)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,115	1,155	1,155	1,155	1,155	1,155
Number of countries	18	18	18	18	18	18
Log Likelihood	1520.9857	1569.7859	1569.9424	783.12806	855.35211	858.89701

Note: This table reports the estimates from the panel regressions, in which the dependent variables are local expansion (Expansion) and contraction (Contraction) measures of the country-level economic activity indices. The explanation of the dependent and independent variables included above are included in the Annex. In this case, the main independent variables capture the effect of temperature; other independent variables include various demographic and industry attributes measured at the country-level. Tobit models, by default, do not display pseudo R^2 metrics (as in OLS), and therefore log likelihood is presented. Robust standard errors were obtained through bootstrapping the models 200 times, and are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The sample period is from 2000 (Q1) to 2024 (Q1).

Table 21 – Complete Regression Results of the Role of Local Demographics on the Baseline Regression Models regarding Economic Activity

	Economic Cycle			
	Expansion		**Contraction**	
VARIABLES	Interaction Temperature	Interaction Amplitude Temperature	Interaction Temperature	Interaction Amplitude Temperature
Population	-0.00001***	-0.00001***	-0.00001	-0.00001
	(0.000)	(0.000)	(0.000)	(0.000)
Religiosity	0.00001	0.00001	0.00001	-0.00001
	(0.000)	(0.000)	(0.000)	(0.000)
MedianAge	0.0004	0.0019	0.0012	0.0014
	(0.001)	(0.001)	(0.001)	(0.002)
MaleFemaleRatio	0.0002	-0.0009	-0.0001	-0.0008
	(0.001)	(0.001)	(0.001)	(0.001)
Minority	-0.00001	-0.00001	0.00001	-0.00001*
	(0.000)	(0.000)	(0.000)	(0.000)
RuralPopulation	-0.0001	0.00001	0.0001	-0.00001
	(0.000)	(0.000)	(0.001)	(0.001)
TrustIndex	0.0106	-0.0066	0.0071	0.0014
	(0.015)	(0.020)	(0.025)	(0.032)
AgriculturalWeight	0.0029*	0.0034**	0.0095***	0.0092**
	(0.002)	(0.002)	(0.003)	(0.004)
ManufacturingWeight	0.0006**	0.0004	0.0009	0.0007
	(0.000)	(0.000)	(0.001)	(0.001)
Temperature	-0.0003	0.0004***	-0.0014	0.0008***
	(0.003)	(0.000)	(0.007)	(0.000)
TemperatureSq	0.00001	0.00001	0.00001**	0.00001***
	(0.000)	(0.000)	(0.000)	(0.000)
AmpTemperature	0.0001	-0.0055	0.0004***	-0.0070
	(0.000)	(0.006)	(0.000)	(0.009)
Interaction Population	-0.00001	-0.00001	0.00001	-0.00001
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction MedianAge	0.0001***	0.00001	0.0001*	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction MaleFemaleRatio	-0.00001	0.0001	-0.00001	0.00001
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction Minority	-0.00001	0.00001	-0.00001	0.00001*
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction RuralPopulation	0.00001	-0.00001	0.00001*	0.00001
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction TrustIndex	-0.0014**	-0.0002	-0.0011	-0.0009
	(0.001)	(0.001)	(0.001)	(0.001)
Region FE	Yes	Yes	Yes	Yes
Observations	1,155	1,155	1,155	1,155
Number of countries	18	18	18	18
Log Likelihood	1578.1861	1571.3369	865.03774	864.40177

Table 22 - Complete Average Marginal Effects Results of the Role of Local Demographics on the Baseline Regression Models regarding Economic Activity

	Economic Cycle			
	Expansion		Contraction	
VARIABLES	Interaction Temperature	Interaction Amplitude Temperature	Interaction Temperature	Interaction Amplitude Temperature
Population	-0.000001***	-0.000001***	-0.000001	-0.000001
	(0.000)	(0.000)	(0.000)	(0.000)
Religiosity	0.00001	0.00001	0.00001	-0.00001
	(0.000)	(0.000)	(0.000)	(0.000)
MedianAge	0.00039	0.00193*	0.00116	0.00139
	(0.001)	(0.001)	(0.001)	(0.002)
MaleFemaleRatio	0.00021	-0.00092	-0.00013	-0.00084
	(0.001)	(0.001)	(0.001)	(0.002)
Minority	-0.000001	-0.000001	0.000001	-0.000001*
	(0.000)	(0.000)	(0.000)	(0.000)
RuralPopulation	-0.00013	0.000001	0.00007	-0.00002
	(0.000)	(0.000)	(0.001)	(0.001)
TrustIndex	0.01064	-0.00664	0.00708	0.00135
	(0.014)	(0.019)	(0.025)	(0.035)
AgriculturalWeight	0.00291*	0.00337**	0.00951***	0.00918***
	(0.002)	(0.002)	(0.003)	(0.003)
ManufacturingWeight	0.00058*	0.00040	0.00094	0.00070
	(0.000)	(0.000)	(0.001)	(0.001)
Temperature	-0.00031	0.00043***	-0.00143	0.00082***
	(0.003)	(0.000)	(0.007)	(0.000)
TemperatureSq	0.00001	0.00001*	0.00002*	0.00003***
	(0.000)	(0.000)	(0.000)	(0.000)
AmpTemperature	0.00005	-0.00548	0.00040***	-0.00701
	(0.000)	(0.006)	(0.000)	(0.009)
Interaction Population	-0.000001	-0.000001	0.000001	-0.000001
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction MedianAge	0.00012***	0.00001	0.00012*	0.00009
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction MaleFemaleRatio	-0.00003	0.00005	-0.00003	0.00004
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction Minority	-0.000001	0.000001	-0.000001	0.000001*
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction RuralPopulation	0.00001	-0.00001	0.00002*	0.00001
	(0.000)	(0.000)	(0.000)	(0.000)
Interaction TrustIndex	-0.00140**	-0.00024	-0.00111	-0.00087
	(0.001)	(0.001)	(0.001)	(0.002)
Region FE	Yes	Yes	Yes	Yes
Observations	1,155	1,155	1,155	1,155
Number of countries	18	18	18	18

Table 23 – Complete Regression Results of the Impact of Mood and Optimism (captured by weather, political environment and sports outcomes) on Economic Activity

	Economic Cycle					
	Expansion			Contraction		
VARIABLES	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
Population	-0.00001***	-0.00001***	-0.00001***	-0.00001	-0.00001	-0.00001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Religiosity	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MedianAge	0.0022***	0.0024***	0.0025***	0.0028***	0.0030***	0.0031***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MaleFemaleRatio	-0.0001	-0.0002	-0.0002	-0.0003	-0.0006	-0.0007
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Minority	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RuralPopulation	0.00001	0.0001	0.0002	0.0004	0.0005	0.0005
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
TrustIndex	-0.0112	-0.0130	-0.0139	-0.0093	-0.0119	-0.0121
	(0.010)	(0.010)	(0.010)	(0.020)	(0.019)	(0.020)
AgriculturalWeight	0.0032**	0.0023	0.0023	0.0094***	0.0085**	0.0084**
	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)
ManufacturingWeight	0.0005*	0.0006*	0.0006*	0.0008	0.0009	0.0009
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Temperature	0.0004***	0.0004***	0.0005**	0.0008***	0.0009***	0.0009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Temperature_Sq	0.00001*	0.00001*	0.00001	0.00001**	0.00001**	0.00001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AmpTemperature	0.00001	0.00001	0.00001	0.0004***	0.0003**	0.0004**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FootballOptimism	0.0032	0.0031	-0.0092	0.0011	0.0014	-0.0187
	(0.005)	(0.005)	(0.013)	(0.008)	(0.008)	(0.028)
OlympicsOptimism	-0.0002	-0.0002	-0.0001	-0.0001	-0.0002	-0.0006
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.058)
RightLeftRatio		0.0005	0.0006		0.0004	0.0004
		(0.000)	(0.000)		(0.001)	(0.001)
PoliticsMajority		0.00001	0.0003		0.0004	0.0005
		(0.001)	(0.002)		(0.002)	(0.002)
Football*RightLeftRatio			0.0161			0.0246
			(0.012)			(0.028)
Football*PoliticalMajority			-0.0106			-0.0134
			(0.011)			(0.020)
Olympics*RightLeftRatio			-0.00001			0.0005
			(0.000)			(0.001)
Olympics*PoliticalMajority			-0.0002			-0.0003
			(0.001)			(0.058)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,155	1,098	1,098	1,155	1,098	1,098
Number of countries	18	16	16	18	16	16
Log Likelihood	1570.39	1474.6377	1475.4594	858.9287	841.17801	841.79572

Note: This table reports the estimates from the panel regressions, in which the dependent variables are local expansion (Expansion) and contraction (Contraction) measures of the country-level economic activity indices. Other independent variables were included, but for brevity, only the interaction terms are included here. The complete results are introduced in the Annex. Robust standard errors were obtained through bootstrapping the models 200 times and are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The sample period is from 2000 (Q1) to 2024 (Q1).

Table 24 - Complete Average Marginal Effects Results of the Impact of Mood and Optimism (captured by weather, political environment and sports outcomes) on Economic Activity

	Economic Cycle					
	Expansion			**Contraction**		
VARIABLES	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
Population	-0.000001***	-0.000001***	-0.000001***	-0.000001	-0.000001	-0.000001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Religiosity	0.00001	0.00001	0.00001	0.000001	0.000001	0.000001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MedianAge	0.00218***	0.00239***	0.00250***	0.00278**	0.00302***	0.00310***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MaleFemaleRatio	-0.00006	-0.00016	-0.00017	-0.00033	-0.00063	-0.00067
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Minority	-0.000001	-0.000001	-0.000001	-0.000001	-0.000001	-0.000001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RuralPopulation	0.00002	0.00014	0.00019	0.00038	0.00046	0.00050
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
TrustIndex	-0.01125	-0.01298	-0.01391	-0.00931	-0.01188	-0.01210
	(0.010)	(0.010)	(0.011)	(0.019)	(0.021)	(0.022)
AgriculturalWeight	0.00322*	0.00235	0.00232	0.00938***	0.00849**	0.00840**
	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)
ManufacturingWeight	0.00048*	0.00055*	0.00056*	0.00082	0.00094	0.00094
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Temperature	0.00043***	0.00045***	0.00045***	0.00081***	0.00087***	0.00087***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Temperature_Sq	0.00001*	0.00001	0.00001*	0.00003***	0.00002**	0.00002**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AmpTemperature	0.00004	0.00002	0.00003	0.00037**	0.00034**	0.00035**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FootballOptimism	0.00315	0.00305	-0.00923	0.00106	0.00140	-0.01867
	(0.005)	(0.005)	(0.014)	(0.008)	(0.008)	(0.027)
OlympicsOptimism	-0.00023	-0.00021	-0.00009	-0.00013	-0.00022	-0.00061
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.034)
RightLeftRatio		0.00055	0.00056		0.00045	0.00044
		(0.000)	(0.000)		(0.001)	(0.001)
PoliticsMajority		0.00002	0.00027		0.00043	0.00055
		(0.001)	(0.002)		(0.002)	(0.003)
Football*RightLeftRatio			0.01612			0.02456
			(0.012)			(0.029)
Football*PoliticalMajority			-0.01055			-0.01338
			(0.011)			(0.020)
Olympics*RightLeftRatio			-0.00002			0.00047
			(0.001)			(0.001)
Olympics*PoliticalMajority			-0.00016			-0.00031
			(0.001)			(0.034)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,155	1,098	1,098	1,155	1,098	1,098
Number of countries	18	16	16	18	16	16

Table 25 – Economic Cycle Models corrected for Endogeneity

	Contraction
VARIABLES	IV Model
Population (end. detected)	-0.000001*
	(0.000)
Religiosity	0.000001
	(0.000)
MedianAge	0.00305***
	(0.001)
MaleFemaleRatio	-0.00060
	(0.001)
Minority	-0.000001
	(0.000)
RuralPopulation	0.00044
	(0.001)
TrustIndex	-0.01114
	(0.015)
AgriculturalWeight	0.00773***
	(0.003)
ManufacturingWeight	0.00088*
	(0.001)
Temperature	0.00086***
	(0.000)
Temperature_Sq	0.00002**
	(0.000)
AmpTemperature	0.00036**
	(0.000)
FootballOptimism	-0.01696
	(0.028)
OlympicsOptimism	-0.00056
	(0.001)
RightLeftRatio	0.00074
	(0.001)
PoliticsMajority	0.00039
	(0.002)
Football*RightLeftRatio	0.02312
	(0.029)
Football*PoliticalMajority	-0.01224
	(0.021)
Olympics*RightLeftRatio	0.00046
	(0.001)
Olympics*PoliticalMajority	-0.00030
	(0.001)

Annex H – Complete Results of the Stock Market Performance Regressions

Table 26 - Complete Regression Results of the Role of Local Demographics on the Baseline Regression Models regarding Stock Market Performance

	Stock Market Performance	
	(Logarithmic) Returns	
VARIABLES	Interaction Temperature	Interaction Amplitude Temperature
GDPGrowth	-0.0187	-0.00967
	(0.043)	(0.040)
CPI	-0.0019**	-0.00198**
	(0.001)	(0.001)
Population	0.00001	0.000001
	(0.000)	(0.000)
Religiosity	-0.0001***	-0.00013***
	(0.000)	(0.000)
MedianAge	-0.0044	0.01711***
	(0.004)	(0.004)
MaleFemaleRatio	0.0049	-0.00438
	(0.006)	(0.006)
Minority	0.00001	-0.000001**
	(0.000)	(0.000)
RuralPopulation	-0.0043*	0.00133
	(0.002)	(0.002)
TrustIndex	0.1840**	0.25181*
	(0.089)	(0.143)
AgriculturalWeight	-0.0031	-0.00145
	(0.012)	(0.013)
ManufacturingWeight	-0.0014	-0.00272
	(0.002)	(0.002)
StandardDeviation	-9.4167***	-9.51267***
	(0.953)	(0.907)
Volume	-0.00001	-0.000001
	(0.000)	(0.000)
Temperature	0.0344*	0.00105
	(0.019)	(0.001)
Temperature_Sq	-0.0001**	-0.00009**
	(0.000)	(0.000)
AmpTemperature	-0.0003	0.02520
	(0.001)	(0.031)
Interaction Population	0.00001**	-0.000001
	(0.000)	(0.000)
Interaction MedianAge	0.0006***	-0.00059***
	(0.000)	(0.000)
Interaction MaleFemaleRatio	-0.0005***	0.00007
	(0.000)	(0.000)
Interaction Minority	-0.00001**	0.000001
	(0.000)	(0.000)
Interaction RuralPopulation	-0.00001	-0.00012***
	(0.000)	(0.000)
Interaction TrustIndex	-0.0089***	-0.00925*
	(0.003)	(0.005)
Region FE	Yes	Yes
Control Variables	Yes	Yes
Observations	1,155	1,155
Number of country	18	18
Pseudo R^2	0.2766	0.2686

Table 27 - Complete Regression Results of the Impact of Mood and Optimism (captured by weather, political environment and sports outcomes) on Stock Market Performance

	Stock Market Performance		
	(Logarithmic) Returns		
VARIABLES	Model (1)	Model (2)	Model (3)
GDPGrowth	-0.00673	-0.00845	-0.00944
	(0.041)	(0.047)	(0.047)
CPI	-0.00208**	-0.00208**	-0.00218**
	(0.001)	(0.001)	(0.001)
Population	0.000001	0.000001	0.000001
	(0.000)	(0.000)	(0.000)
Religiosity	-0.00014***	-0.00015***	-0.00016***
	(0.000)	(0.000)	(0.000)
MedianAge	0.00409	0.00455	0.00328
	(0.004)	(0.003)	(0.003)
MaleFemaleRatio	-0.00217	-0.00093	-0.00154
	(0.005)	(0.005)	(0.005)
Minority	-0.000001***	-0.000001***	-0.000001**
	(0.000)	(0.000)	(0.000)
RuralPopulation	-0.00412*	-0.00349*	-0.00424**
	(0.002)	(0.002)	(0.002)
TrustIndex	0.06058	0.07687	0.08559
	(0.088)	(0.083)	(0.083)
AgriculturalWeight	-0.00118	0.00161	-0.00142
	(0.011)	(0.012)	(0.012)
ManufacturingWeight	-0.00158	-0.00288	-0.00304
	(0.002)	(0.002)	(0.002)
StandardDev	-9.33666***	-9.34362***	-9.39909***
	(0.937)	(0.940)	(0.964)
Volume	-0.000001	-0.000001	-0.000001
	(0.000)	(0.000)	(0.000)
Temperature	0.00112	0.00095	0.00093
	(0.001)	(0.001)	(0.001)
Temperature_Sq	-0.00009**	-0.00008**	-0.00008**
	(0.000)	(0.000)	(0.000)
AmpTemperature	-0.00030	-0.00035	-0.00048
	(0.001)	(0.001)	(0.001)
FootballOptimism	0.03400	0.03776	0.07372
	(0.031)	(0.033)	(0.065)
OlympicsOptimism	0.00050	-0.00011	-0.00356*
	(0.001)	(0.001)	(0.002)
RightLeftRatio		0.00062	0.00049
		(0.003)	(0.003)
PoliticsMajority		-0.02295***	-0.03117***
		(0.006)	(0.006)
Football*RightLeftRatio			-0.12754***
			(0.045)
Football*PoliticalMajority			0.18244***
			(0.066)
Olympics*RightLeftRatio			0.00191*
			(0.001)
Olympics*PoliticalMajority			0.00215
			(0.003)
Region FE	Yes	Yes	Yes
Observations	1,155	1,098	1,098
Number of countries	18	16	16
Pseudo R^2	0.2699	0.2725	0.2771

Annex I – Country-by-Country Impact of Mood and Optimism on the Economic Cycles and Stock Market Performance

Table 28 – Complete Results of the Impact of Mood and Optimism Indicators on the Expansion Phase of Each EU Country

Country	Temp.	Temp. Sq.	Temp. Ampl.	Sports Foot.	Sports Ol.	Right-left Ratio	Political Majority
Austria	Negative	Positive	Negative	-	Negative	-	-
Belgium	Negative	Positive	Negative	-	Negative	Positive	-
Finland	**Positive (*)**	Negative	Positive	-	Positive	Positive	Negative
France	Positive	Negative	Negative	Positive	**Negative (*)**	Negative	Positive
Germany	**Positive (*)**	Negative	**Negative (*)**	Positive	Negative	Negative	Positive
Ireland	Negative	Positive	-	-	**Positive (*)**	-	-
Italy	**Positive (*)**	**Negative (*)**	Positive	Positive	Negative	Positive	Negative
Poland	Negative	Positive	Negative		Positive	Positive	-
Portugal	Positive	Negative	Positive	Positive	Negative	Positive	Negative
Romania	Negative	Positive	Negative	-	Negative	Positive	Negative
Spain	Positive	Negative	Positive	Positive	Positive	Positive	Negative

Note: This table reports the sign of the estimates from the panel regressions (as in Tobit models the coefficients cannot be interpreted in magnitude, only the relationship was interpreted), in which the dependent variable is local expansion (Expansion) measure of the country-level economic activity indices. Other independent variables were included, but only the mood indicators are represented. Each regression was bootstrapped 200 times. The sample period is from 2000 (Q1) to 2024 (Q1).

Table 29 – Complete Results of the Impact of Mood and Optimism Indicators on the Contraction Phase of Each EU Country

Country	Temp.	Temp. Sq.	Temp. Ampl.	Sports Foot.	Sports Ol.	Right-left Ratio	Political Majority
Belgium	Negative	Positive	Negative	-	Negative	Positive	-
Finland	**Positive (*)**	Negative	Positive	-	Positive	Negative	Positive
France	Negative	Positive	Negative	Positive	**Negative (*)**	Negative	Positive
Germany	Positive	Positive	Negative	Positive	Negative	Negative	Positive
Italy	Positive	Positive	Positive	Negative	Positive	Negative	Positive
Poland	Negative	Positive	Negative	-	**Positive (*)**	Negative	-
Portugal	Negative	Positive	Positive	Positive	Negative	Positive	Negative
Romania	Negative	**Positive (*)**	Positive	-	**Positive (*)**	Positive	Negative
Spain	Negative	Positive	Positive	Negative	Positive	Negative	Negative

Note: This table reports the sign of the estimates from the panel regressions (as in Tobit models the coefficients cannot be interpreted in magnitude, only the relationship was interpreted), in which the dependent variable is local contraction (Contraction) measure of the country-level economic activity indices. Other independent variables were included, but only the mood indicators are represented. Each regression was bootstrapped 200 times. The sample period is from 2000 (Q1) to 2024 (Q1).

Table 30 – Complete Results of the Impact of Mood and Optimism Indicators on the Stock Market Performance of Each EU Country

Country	Temp.	Temp. Sq.	Temp. Ampl.	Sports Foot.	Sports Ol.	Right-left ratio	Political Majority
Austria	Positive	Negative	Negative	-	-	Negative	-
Belgium	Negative	Positive	Positive	-	Negative	Negative	-
Denmark	Positive	Negative	Positive	-	Negative	Negative	Positive
Finland	Positive	Negative	Negative	-	**Negative (*)**	Negative	Positive
France	Positive	Negative	Positive	Negative	**Positive (*)**	Negative	Positive
Germany	**Positive (*)**	Negative	Positive	**Positive (*)**	Positive	Positive	Negative
Greece	Positive	Negative	Positive	-	Negative	Negative	Negative
Ireland	Positive	Negative	Positive	-	-	Negative	-
Italy	Negative	Positive	Negative	Negative	Negative	Negative	Positive
Poland	**Positive (*)**	**Negative (*)**	Positive	-	Positive	Positive	-
Portugal	Negative	Negative	Negative	Negative	**Negative (*)**	Positive	Negative
Romania	Negative	Negative	Positive	-	**Positive (*)**	Positive	Negative
Spain	Negative	Positive	Negative	Negative	**Negative (*)**	**Negative (*)**	**Positive (*)**

Annex J – Robustness Tests Results

Table 31 – Robustness checks of weather variables as mood indicators (Economic Cycle Regressions)

	Weather variables as mood indicators – Economic Cycle Regressions					
	Expansion			Contraction		
	Temp.	Temp. Sq.	Amp. Temp	Temp.	Temp. Sq.	Amp. Temp
Model (3)	0.00045***	0.00001*	0.00003	0.00087***	0.00002**	0.00035**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(1) Endogeneity Corrected	0.00045***	0.00001*	0.00003	0.00086***	0.00002**	0.00036**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(2) Remove 2 Large Economies	0.00045**	0.00001	-0.000001	0.00090***	0.00002*	0.00013
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(3) Pre-financial crisis	0.00066***	-0.000001	0.00015	0.00093***	0.000001	0.00019
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(4) Post-financial crisis	0.00031	0.00002**	0.000001	0.00078**	0.00004**	0.00030*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(5) Control for taxes	0.00028***	0.000001	0.00008	0.00075***	0.00001	0.00019
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(6) Control for migration	0.00044***	0.00001	-0.00001	0.00085***	0.00002**	0.00014
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(7) Control for education	0.00027	0.00002**	0.00001	0.00065*	0.00004**	0.00033*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(8) Time fixed effects	0.00004	0.00001	0.00007	0.00058**	0.00001	0.00016
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Note: This table summarizes the results from various robustness checks. Other independent variables were included, but for brevity, only the mood indicators are included here (in this case, the weather-based variables). Robust standard errors were obtained through bootstrapping 200 times, are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The sample period is from 2000 (Q1) to 2024 (Q1). In (5), (6) and (7), observations number is significantly lower.

Table 32 - Robustness checks of weather variables as mood indicators (Stock Market Performance Regression)

	Weather variables as mood indicators – Stock Market Perf. Regression		
	Stock Market Performance		
	Temp.	Temp. Sq.	Amp. Temp
Model (3)	0.00093	-0.00008**	-0.00048
	(0.001)	(0.000)	(0.001)
(1) Endogeneity Corrected	0.00087	-0.00008*	-0.00050
	(0.001)	(0.000)	(0.001)
(2) Remove Large Economies	0.00116	-0.00010***	0.00077*
	(0.001)	(0.000)	(0.000)
(3) Pre-financial crisis	-0.00145	-0.00004	0.00301***
	(0.001)	(0.000)	(0.001)
(4) Post-financial crisis	0.00153	-0.00009*	-0.00061
	(0.001)	(0.000)	(0.001)
(5) Control for taxes	0.00113*	-0.00008***	0.00141
	(0.001)	(0.000)	(0.001)
(6) Control for migration	0.00115	-0.00012***	-0.00032
	(0.001)	(0.000)	(0.000)
(7) Control for education	0.00115	-0.00012***	-0.00032
	(0.001)	(0.000)	(0.000)
(8) Time fixed effects	0.00015	-0.00003	0.00066*
	(0.001)	(0.000)	(0.008)

Note: This table summarizes the results from various robustness checks. Other independent variables were included, but for brevity, only the mood indicators are included here (in this case, the weather-based variables). Robust standard errors were obtained through bootstrapping 200 times, are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The sample period is from 2000 (Q1) to 2024 (Q1).

Table 33 - Robustness checks of sports and political variables as mood indicators (Economic Cycle Regressions)

	Sports and political variables as mood indicators – Economic Cycle Regressions							
	Expansion				**Contraction**			
	Sports		**Political**		**Sports**		**Political**	
	Football Results	Olympic Results	Right-Left Ratio	Political Majority	Football Results	Olympic Results	Right-Left Ratio	Political Majority
Model (3)	-0.00923	-0.00009	0.00056	0.00027	-0.01867	-0.00061	0.00044	0.00055
	(0.014)	(0.001)	(0.000)	(0.002)	(0.027)	(0.034)	(0.001)	(0.003)
(1) Endogeneity Corrected	-0.00923	-0.00009	0.00056	0.00027	-0.01696	-0.00056	0.00074	0.00039
	(0.014)	(0.001)	(0.000)	(0.002)	(0.028)	(0.001)	(0.001)	(0.002)
(2) Remove 2 Large Economies	-0.01159	0.00022	0.00049	0.00071	-0.04251	0.00017	0.00127**	-0.00248
	(0.018)	(0.002)	(0.000)	(0.002)	(0.038)	(0.148)	(0.001)	(0.003)
(3) Pre-financial crisis	-0.00659	-0.00042	0.00003	-0.00059	-0.03564	-0.00034	0.00250*	-0.00003
	(0.049)	(0.012)	(0.001)	(0.003)	(0.123)	(0.061)	(0.001)	(0.004)
(4) Post-financial crisis	0.01233	-0.00015	0.00061*	0.00239	0.00293	-0.00066	0.00107	0.00064
	(0.022)	(0.001)	(0.000)	(0.002)	(0.039)	(0.141)	(0.001)	(0.003)
(5) Control for taxes	0.00970	0.00010	0.00022	0.00126	0.02940	0.00181	0.00114	0.00203
	(0.016)	(0.004)	(0.000)	(0.001)	(0.055)	(0.090)	(0.001)	(0.003)
(6) Control for migration	-0.00362	-0.00014	0.00042	0.00141	-0.02987	-0.00055	0.00103*	-0.00057
	(0.016)	(0.001)	(0.000)	(0.001)	(0.029)	(0.006)	(0.001)	(0.002)
(7) Control for education	0.01194	0.00003	0.00067**	0.00103	-0.00435	-0.00064	0.00111*	-0.00013
	(0.023)	(0.005)	(0.000)	(0.002)	(0.037)	(0.558)	(0.001)	(0.004)
(8) Time fixed effects	-0.00214	0.00005	0.00030	0.00134	-0.02437	-0.00005	0.00091*	0.00098
	(0.015)	(0.000)	(0.000)	(0.001)	(0.024)	(0.007)	(0.001)	(0.002)

Table 34 - Robustness checks of sports and political variables as mood indicators (Stock Market Performance)

	Sports and political variables as mood indicators – Stock Market Perf.			
	Sports		**Political**	
	Football Results	Olympic Results	Right-Left Ratio	Political Majority
Model (3)	0.07372	-0.00356*	0.00049	-0.03117***
	(0.065)	(0.002)	(0.003)	(0.006)
(1) Endogeneity Corrected	0.05724	-0.00349	0.00208	-0.03160***
	(0.097)	(0.004)	(0.003)	(0.010)
(2) Remove 2 Large Economies	0.10533***	-0.00277	0.00115**	-0.03009***
	(0.031)	(0.002)	(0.001)	(0.007)
(3) Pre-financial crisis	0.14220**	-0.00736***	-0.00156	-0.01593
	(0.065)	(0.001)	(0.004)	(0.018)
(4) Post-financial crisis	0.07697	0.00074	-0.00045	-0.02829***
	(0.071)	(0.001)	(0.001)	(0.006)
(5) Control for taxes	0.01602	-0.00082	-0.00506*	-0.02520***
	(0.155)	(0.005)	(0.003)	(0.006)
(6) Control for migration	0.06130	0.00013	0.00025	-0.01669***
	(0.055)	(0.001)	(0.001)	(0.005)
(7) Control for education	0.06130	0.00013	0.00025	-0.01669***
	(0.055)	(0.001)	(0.001)	(0.005)
(8) Time fixed effects	0.00795	-0.00250**	0.00078	-0.01330***
	(0.018)	(0.001)	(0.001)	(0.003)

Table 35 - Robustness checks of sports and political interactions as mood indicators (Economic Cycle)

	Sports and political interactions as mood indicators – Economic Cycle Regressions							
	Expansion				Contraction			
	Football*RightLeft Ratio	Football*PoliticalMajority	Olympics*RightLeft Ratio	Olympics*PoliticalMajority	Football*RightLeft Ratio	Football*PoliticalMajority	Olympics*RightLeft Ratio	Olympics*PoliticalMajority
Model (3)	0.0162	-0.01055	-0.00002	-0.00016	0.02456	-0.01338	0.00047	-0.00031
	(0.012)	(0.011)	(0.001)	(0.001)	(0.029)	(0.020)	(0.001)	(0.034)
(1) Endogeneity Corrected	0.0162	-0.01055	-0.00002	-0.00016	0.02312	-0.01224	0.00046	-0.00030
	(0.012)	(0.011)	(0.001)	(0.001)	(0.029)	(0.021)	(0.001)	(0.001)
(2) Remove 2 Large Economies	0.01724	-0.00464	0.00013	-0.00145	0.03806	0.00504	0.00118	-0.00298
	(0.017)	(0.013)	(0.001)	(0.002)	(0.045)	(0.032)	(0.003)	(0.148)
(3) Pre-financial crisis	0.00700	0.00173	0.00025	-0.00075	0.03184	-0.00514	0.00033	-0.00131
	(0.051)	(0.017)	(0.013)	(0.042)	(0.130)	(0.031)	(0.083)	(0.050)
(4) Post-financial crisis	-0.01184	0.00866	-0.00030	0.00050	-0.01712	0.02783	0.00051	0.00072
	(0.026)	(0.020)	(0.001)	(0.001)	(0.046)	(0.037)	(0.004)	(0.147)
(5) Control for taxes	0.00154	-0.00893	-0.00075	0.00046	0.01363	-0.04951	-0.00332	0.00237
	(0.014)	(0.012)	(0.003)	(0.002)	(0.045)	(0.045)	(0.074)	(0.080)
(6) Control for migration	0.00771	-0.00582	0.00003	-0.00016	0.01756	0.00930	0.00074	-0.00067
	(0.015)	(0.011)	(0.000)	(0.001)	(0.029)	(0.023)	(0.001)	(0.006)
(7) Control for education	-0.01139	0.00560	-0.00033	0.00039	-0.00573	0.02127	0.00065	0.00048
	(0.025)	(0.021)	(0.001)	(0.005)	(0.040)	(0.034)	(0.877)	(0.389)
(8) Time fixed effects	0.00039	0.00554	-0.00001	-	0.00907	0.01775	0.00070	-0.00056
	(0.013)	(0.009)	(0.000)	-	(0.024)	(0.020)	(0.002)	(0.007)

Table 36 - Robustness checks of sports and political interactions as mood indicators (Stock Market Performance)

	Sports and political interactions as mood indicators – Stock Market Performance			
	Foot-ball*RightLeft Ratio	Football*Politi-calMajority	Olym-pics*RightLeft Ratio	Olympics*Politi-calMajority
Model (3)	-0.12754***	0.18244***	0.00191*	0.00215
	(0.045)	(0.066)	(0.001)	(0.003)
(1) Endogeneity Corrected	-0.11453	0.17631**	0.00178	0.00232
	(0.094)	(0.079)	(0.002)	(0.004)
(2) Remove 2 Large Econ-omies	-0.12171***	0.14293*	0.00189	0.00435
	(0.040)	(0.077)	(0.001)	(0.007)
(3) Pre-financial crisis	-0.16712***	0.08777	0.00413***	0.00370*
	(0.020)	(0.106)	(0.001)	(0.002)
(4) Post-financial crisis	-0.08620	0.08947	-0.00007	0.00331
	(0.085)	(0.080)	(0.001)	(0.002)
(5) Control for taxes	-0.02486	0.11979	0.00271	0.00069
	(0.148)	(0.081)	(0.007)	(0.002)
(6) Control for migration	0.00604	-0.00978	0.00036	0.00402
	(0.084)	(0.079)	(0.001)	(0.003)
(7) Control for education	0.00604	-0.00978	0.00036	0.00402
	(0.084)	(0.079)	(0.001)	(0.003)
(8) Time fixed effects	-0.01765	0.04422	0.00083	0.00281**
	(0.030)	(0.036)	(0.001)	(0.001)

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