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Constructing a Unified European Growth Market Index: Methodology and Performance Evidence

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Summary

1. Introduction

European growth equity markets occupy a strategically important yet structurally fragile position within the continent's financial system. While small and medium-sized enterprises represent the backbone of the European economy in terms of employment and value creation, their access to public equity financing remains limited compared to more developed market-based systems such as the United States. The gap between economic relevance and capital market representation reflects deep-rooted structural characteristics of European finance, including the historical predominance of bank-based funding, heterogeneous regulatory frameworks, and uneven investor participation across countries.

In the last thirty years, several European exchanges have set up special growth segments to make it easier for smaller and faster-growing companies to get capital. The goal of these platforms was to make it easier for companies to get into public markets by lowering the requirements for listing and governance. In contrast to the United States, where small-cap stocks are grouped together under a single set of benchmarks, European growth markets mostly grew along national lines. Because of this, they are still broken up, with different listing rules, liquidity conditions, and investor bases in each country.

This fragmentation represents one of the central structural challenges of the European growth segment, first, liquidity remains limited and unevenly distributed across national platforms, leading to higher trading costs and greater price volatility, second, regulatory heterogeneity generates complexity for both issuers and investors, potentially discouraging cross-border participation. Third, capital supply differs substantially across countries, reflecting disparities in financial literacy, household portfolio allocation, pension fund participation, and institutional investor depth. These differences contribute to persistent cross-country asymmetries in market size, resilience, and growth capacity.

Recent developments have further intensified these challenges, European IPO activity has experienced significant volatility, while delisting activity has increased in several jurisdictions. In many cases, valuation discounts relative to larger international markets

reduce the attractiveness of remaining publicly listed. At the same time, private equity and venture capital have expanded their role in financing growth firms, often providing alternative funding routes outside public markets. This evolving landscape raises important questions regarding the sustainability, integration, and competitiveness of European growth exchanges.

Within this context, the absence of a truly unified European growth benchmark becomes particularly relevant, while national indices provide localized representations of growth segments, they do not capture the aggregate dynamics of the European ecosystem. A consolidated benchmark may enhance comparability, improve transparency, and provide a clearer representation of systematic risk exposure across countries. Moreover, benchmark construction itself can influence investor behavior, capital allocation, and market development, as index-based investment strategies increasingly shape modern financial markets.

Against this backdrop, this thesis investigates whether European growth equities behave as a coherent asset class when aggregated within a unified framework, or whether national fragmentation continues to dominate aggregate outcomes. To address this question, the study constructs a market-capitalization-weighted European growth index based on the current investable universe of firms classified within growth segments. Rather than replicating historical index membership year by year, the analysis evaluates how today's cross-country growth ecosystem would have behaved across recent macro-financial regimes.

The empirical strategy develops across multiple dimensions. First, cumulative return analysis and risk-adjusted performance measures are used to look at how the unified benchmark compares to national growth indices and larger asset classes. Second, rolling volatility analysis are used to look at how cyclical risk changes and how sensitive growth stocks are to macroeconomic shocks. Third, correlation structures are looked at to see how well European growth markets are integrated with each other and how they interact with other types of assets. Finally, a robustness test that leaves out the UK is done to see how sensitive the overall results are to the geographic makeup.

Through this analytical framework, the thesis seeks to clarify three interrelated dimensions of European growth markets. First, it evaluates the degree of integration of the segment by examining the extent to which growth equities across countries share common exposure to macro-financial risk factors. Second, it assesses the relevance of structural fragmentation by analysing whether geographic composition materially influences aggregate risk–return outcomes. Third, it explores the implications for market development, investigating whether cross-country aggregation can offer a more representative, balanced, and systemically coherent exposure to the European growth ecosystem.

The general motivation for this research stems from the persistent debate concerning the future of equity-based financing in Europe. If common systemic factors are what drive growth in Europe, the case for more integration and common benchmarks becomes stronger. On the other hand, if national peculiarities prevail, fragmentation might signify a more permanent limitation necessitating specific institutional reforms. This thesis constructs and analyzes a unified European growth index, providing empirical evidence that contributes to the debate and offers a structured evaluation of the segment's opportunities and structural constraints.

The study aims to reconcile structural institutional analysis with quantitative market evidence. It gives a full picture of the dynamics, weaknesses, and possible integration paths of European growth equity markets by combining index construction with performance, volatility, and correlation analysis.

2. EMPIRICAL ANALYSIS OF EUROPEAN GROWTH MARKETS

2.1 The European Growth Stock Market Landscape: Historical Development and Current State

The landscape of European equity markets has undergone significant transformations over the past three decades, particularly in relation to markets dedicated to small and medium-sized enterprises. The emergence of specialized growth markets across Europe represents a crucial development in the continent's financial architecture, providing smaller companies with access to public capital while offering investors exposure to high-growth potential firms. Understanding the historical evolution and current characteristics of these markets is essential to comprehend the challenges and opportunities facing European SMEs in accessing equity financing.

The idea of a dedicated growth markets for smaller businesses in Europe started in UK with the creation of the Alternative Investment Market (AIM) in June 1995. The London Stock Exchange created "AIM" in response to the need for a more flexible regulatory environment that could meet the needs of growth's companies. This initiative was very successful, attracting hundreds of companies over the following years and establishing London as the primary destination for European SMEs seeking public listing, the "AIM" market was designed with lighter regulatory requirements compared to the main equity market with lower listing costs and more flexible rules regarding corporate governance and disclosure. These features made it particularly attractive for young firms and family-owned businesses looking to raise capital without the problem of excessive compliance costs[1].

Following the success of the AIM model, continental European exchanges began developing their own growth market segments during the late 1990s and early 2000s. France established the Marché Libre in 1996, which later evolved into Alternext in 2005, Germany introduced the Neuer Markt in 1997, which experienced rapid growth during the dot-com bubble but subsequently collapsed following the technology sector crash in 2000-2001. This failure led to a period of skepticism regarding growth markets in Germany, and it was not until 2005 that the Entry Standard was established as a successor

[1] (https://www.aimlisting.co.uk/the-aim-market/, s.d.)

platform. Italy launched the Mercato Expandi in 2003, subsequently renamed AIM Italia in 2009 to capitalize on the brand recognition of the London market[2]. Spain developed the Mercado Alternativo Bursátil in 2006, while Sweden's growth market evolved gradually through various segments on the Stockholm Stock Exchange.

The fragmentation of European growth markets has been a defining characteristic of the continent's financial landscape. n the US, the Russell 2000 Index tracks about 2,000 small-cap companies across the country with a combined market capitalization of over one trillion dollars. In Europe, however, small and medium-sized businesses (SMEs) have to deal with a patchwork of national markets, each with its own rules, listing requirements, and investor base. The American small-cap ecosystem benefits from centralized trading venues, mainly NASDAQ and NYSE, which bring together liquidity and help smaller growth companies find the right price quickly. The S&P SmallCap 600 and MSCI USA Small Cap Index are two other US small-cap indices that cover the segment in depth. The MSCI USA Small Cap Index, for example, represents about 14% of the US market capitalization that is free float-adjusted[3]. This fragmentation has created both challenges and opportunities, on one hand, companies can choose the market that best suits their specific needs and characteristics, on the other hand, the limited size of individual national markets may result in lower liquidity, higher transaction costs, and reduced visibility for listed companies compared to their American counterparts.

The Markets in Financial Instruments Directive (MiFID) came into effect in 2007 and was a big step forward for the growth of European markets. It introduced the idea of Multilateral Trading Facilities, which gave alternative trading venues a formal set of rules to follow. This regulation distinguished between regulated markets, which are subject to strict requirements from national financial authorities, and MTFs, which operate under the rules established by their market operators. Most European growth markets function as MTFs, allowing for greater flexibility in listing requirements while maintaining certain standards of transparency and investor protection, however, this dual regulatory structure

[2] (https://www.economymagazine.it/aim-ha-cambiato-nome-si-chiama-euronext-growth-milan/, s.d.)
[3] (https://www.royceinvest.com/insights/chartbook/us-small-cap-mrkt-overview/index.html, s.d.)

has also contributed to complexity and inconsistency across different jurisdictions, potentially deterring companies from pursuing public listings.

The European Commission's Capital Markets Union initiative, launched in 2015, explicitly recognized the importance of strengthen equity financing for SMEs across the continent. The CMU action plan identified the fragmentation of European capital markets as a major obstacle to economic growth and proposed various solutions to create a more integrated financial ecosystem. Among the specific initiatives for growth markets, the introduction of the SME Growth Market label in 2018 under the revised MiFID II framework aimed to create a common European standard for markets catering to smaller companies. Exchanges meeting specific criteria regarding liquidity, governance, and disclosure could apply for this designation, theoretically making it easier for investors to identify quality growth markets across different countries[4].

In recent years, the consolidation of European exchange infrastructure has led to significant changes in the growth market system. Following Euronext's acquisition of Borsa Italiana from the London Stock Exchange Group, several growth markets were rebranded under a unified Euronext umbrella on October 25, 2021. The former AIM Italia was renamed Euronext Growth Milan, aligning the nomenclature with analogous segments on exchanges in Brussels, Dublin, Lisbon, Oslo, and Paris. This rebranding extended beyond mere nomenclature changes, as market regulations were amended to replace all references to AIM Italia, and the Nominated Adviser role was similarly renamed to Euronext Growth Adviser, this consolidation strategy represents Euronext's attempt to create greater coherence and visibility for European growth markets, building upon its stated ambition to establish "a European single trading platform and single liquidity pool gathering 25% of European equity trading activity"[5].

However, the extent to which this corporate consolidation translates into genuine market integration remains questionable. Recent analysis by the Federation of European

[4] (https://www.spglobal.com/en/research-insights/special-reports/the-eu-capital-markets-union-turning-the-tide, s.d.)
[5] (https://www.euronext.com/sites/default/files/notices/monte-titoli/1357377v-EN-lf-Market%20Notice_Rebranding.pdf)

Securities Exchanges and Oliver Wyman highlights that "unifying exchanges under a common corporate structure does not automatically translate into the integration of trading activity",[6] as unresolved structural issues such as heterogeneity in membership rules, post-trade arrangements, technology platforms, and supervisory frameworks continue to fragment the market. Despite sharing the Euronext Growth brand, these markets continue to operate under different national regulatory authorities and maintain distinct listing requirements that primarily serve domestic companies and local investor bases[7].

Current data shows substantial disparities in the development and performance of European growth markets across different countries. Sweden rise as a particularly interesting case, hosting one of the most vibrant growth market ecosystems among the analyzed countries through two main segments: the OMX Stockholm Small Cap for companies, and Nasdaq First North Growth Market, a multilateral trading facility designed specifically for growth companies. As of December 2024, Nasdaq First North hosted 473 listed companies, with the broader Nordic platform accommodating 490 companies by year-end. The OMXSSCPI index tracks the performance of all Small Cap companies on NASDAQ OMX Stockholm and serves as the primary benchmark for Swedish small-cap equity[8].

This represents a remarkable achievement for a country with approximately 10 million inhabitants and a GDP substantially smaller than larger European economies, the success of the Swedish market stems from several factors, including lenient listing requirements without minimum float or market capitalization mandates, a strong culture of equity investment where Swedish households allocate approximately 40% of their financial wealth to equities and pension funds, and robust institutional investor participation.

France and Spain have very different growth markets, the French market has a lot of companies, making it the second-largest market in terms of this metric but however, its overall market capitalization is still moderate. On the other hand, Spain's growth market

[6] (https://www.oliverwyman.com/our-expertise/insights/2025/jul/european-capital-markets-fragmentation-liquidity-gap.html, s.d.)

[7] (https://www.securitiesfinancetimes.com/securitieslendingnews/industryarticle.php?article_id=227726)

[8] (https://indexes.nasdaqomx.com/Index/Overview/OMXSSCPI, s.d.)

has a relatively high market capitalization even though there are fewer listed companies. This suggests that it tends to attract larger companies or companies that grow quickly after being listed. These differences show how different European countries define and regulate growth markets, as well as how entrepreneurs and investors do things differently in each country.

Germany and Italy represent cases where growth markets have struggled to achieve the scale and liquidity seen in Sweden or the United Kingdom. As of late 2025, the German growth market had only 70 companies and a market cap of about 80 billion euros. Italy has even more problems because its growth market, the ITAIM Index, only has about 175 companies and a much smaller market capitalization of only 8 billion euros. This small change seems especially surprising for Germany, which is Europe's biggest economy and has a lot of successful medium-sized businesses. The fact that Italian SMEs don't like public markets very much might be because of structural factors like the country's strong tradition of bank financing, the fact that many family-owned businesses want to stay private, and the fact that listed growth companies might have lower average valuations.

The United Kingdom's position as the dominant European growth market remains unchallenged despite Brexit. The AIM market, tracked primarily through the FTSE AIM 100 Index which comprises the largest 100 companies by market capitalization on the Alternative Investment Market, demonstrates remarkable scale and resilience. As of late 2025, the FTSE AIM 100 Index encompasses 101 constituent companies with a combined market capitalization of approximately 48 billion euros. However, recent times have introduced uncertainties regarding the future relationship between UK and EU capital markets, and it remains unclear whether London will maintain its dominance as European companies increasingly seek listings closer to their home markets[9].

Recent trends in European growth markets have been concerning from multiple perspectives, the number of initial public offerings has declined significantly since the financial crisis of 2008-2009, with only brief recoveries during favorable market conditions. Data from S&P Global Market Intelligence shows that European markets

[9] (Lehmann, A. (2020) 'Emerging Europe and the capital markets union', Policy Contribution 2020/17, Bruegel)

accounted for merely 11% of global IPO activity in 2022, a stark contrast to the 38% captured by the United States and 18% by China. This weak IPO activity reflects both cyclical factors, such as rising interest rates and economic uncertainty, and structural challenges related to the attractiveness of public markets for European SMEs, nonetheless the COVID-19 pandemic initially disrupted markets significantly, though a brief recovery occurred in 2021 as economies reopened and liquidity conditions remained favorable. This delisting trend has not gone unnoticed by market observers, Financial Times columnist Robert Armstrong noted in September 2023 that during the prolonged period of very low interest rates, private equity companies purchased several good quality small listed companies to take them private, contributing to the shrinking public market for small-cap stocks. This phenomenon, which Armstrong termed "the small-cap blues," reflects a broader challenge facing public markets for smaller companies, where the costs and constraints of remaining listed increasingly outweigh the perceived benefits for many firms[10].

Perhaps more troubling than the decline in IPOs is the increasing trend of delistings from European growth markets, companies are voluntarily withdrawing from public markets at accelerating rates, with the number of delistings more than doubling since 2012 according to the EU Commission Staff Working Document published in 2022[11]. This phenomenon indicates inherent issues within the European growth market model. Companies provide various justifications for delisting, such as the substantial expenses associated with maintaining a listing, onerous regulatory demands, restricted trading liquidity, and unsatisfactory valuations. Small businesses with limited administrative capacity find it very hard to meet disclosure requirements under rules like the Market Abuse Regulation because they need a lot of time and money to do so. Also, companies that have lost value in the market may find that the annual fees they pay to advisors, brokers, and exchanges are too high[12].

[10] (Armstrong, Robert. “The small-cap blues,” Financial Times, September 28 2023.)
[11] (EU Commission Staff Working Document SWD(2022) 762 final, Brussels, 7.12.2022)
[12] (https://www.astrid-online.it/static/upload/2212/221207-impact-assessment-listing_en.pdf, s.d.)

The fragmentation of European growth markets is clear in the fact that there are different national platforms and regulatory frameworks in different countries. For example, the differences in rules about multiple voting rights show very well this problem. Some countries let companies issue shares with extra voting rights, which lets founders and families keep control while getting money from the public markets. Other countries don't allow these kinds of structures, so companies must choose between keeping control and getting public equity. This regulatory arbitrage makes things less efficient and could cause companies to choose where to list based on how flexible the rules are for governance instead of how good the market is or how many investors it has. Recent EU surveys show that 76% of stakeholders think that multiple voting rights shares could help small and medium-sized businesses (SMEs) get listed, especially family-owned and fast-growing companies[13].

Looking forward, the future development of European growth markets faces significant pitfalls but also potential solutions for improvement, the Capital Markets Union initiative continues to advance, though progress has been slower than initially anticipated. Recent proposals aim to harmonize certain aspects of listing requirements and disclosure rules across EU member states, potentially reducing the complexity and costs faced by companies seeking public listings, the role of institutional investors, particularly pension funds and sovereign wealth funds, represents a potential source of increased demand for growth market securities if appropriate regulatory and structural conditions can be established. Additionally, the growing emphasis on sustainable finance and ESG considerations may create opportunities for smaller companies with strong environmental and social credentials to attract capital from specialized investors, since smaller companies can adapt better to this new paradigm[14].

The challenges facing European growth markets reflect deeper structural issues in the continent's financial system, the traditional dominance of bank financing in most

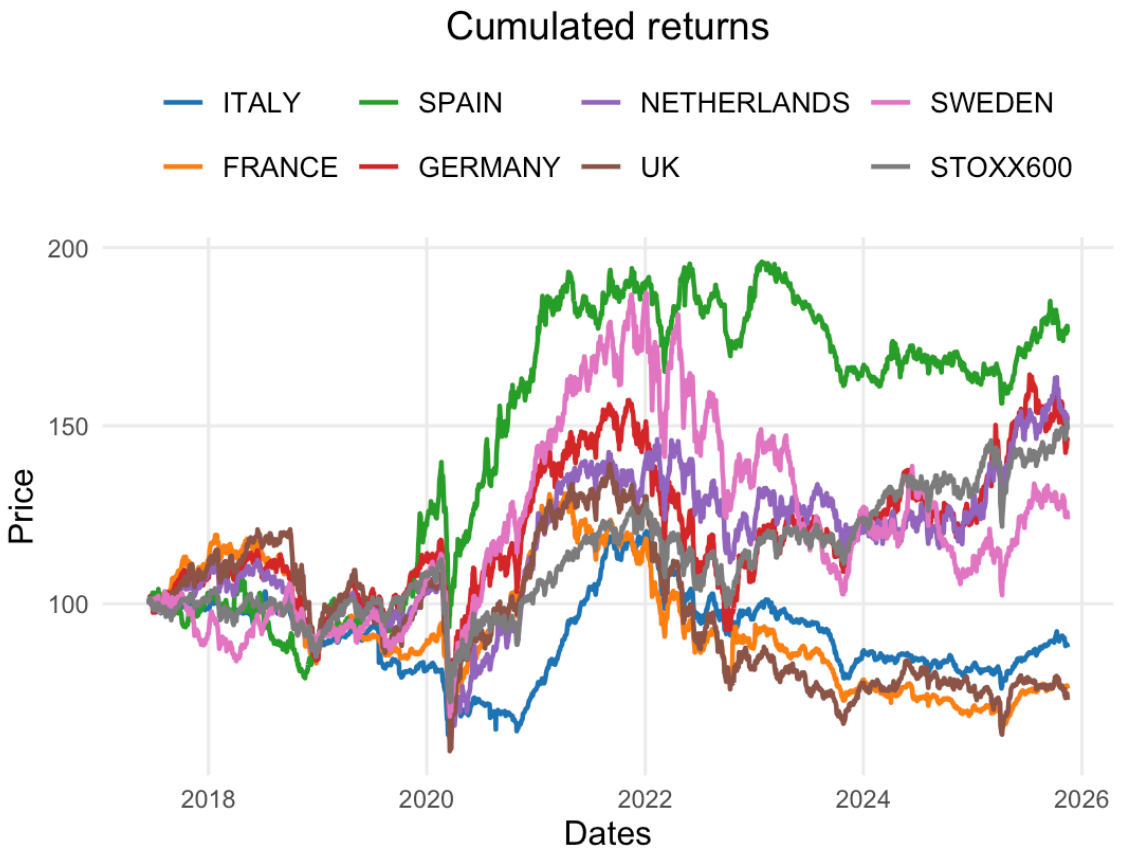
[13] (https://www.pinsentmasons.com/out-law/news/new-law-multiple-vote-share-structure-part-of-eu, s.d.)
[14] (https://www.gide.com/en/news-insights/eu-listing-act-comes-into-force/, s.d.)

European countries, as documented by ECB and OECD data analyzed by Panetta in 2023, has created common path dependencies that make it harder for equity markets to compete effectively from a lot point of views. Cultural factors, including attitudes toward risk, transparency, and shareholder governance, vary notably across every European country and influence both the willingness of companies to go public and the "appetite" of investors for growth stocks. Educational initiatives to improve financial literacy and awareness of equity investment opportunities, also for institutional investors like pension funds, may gradually shift these attitudes, though such changes occur slowly. In the meantime, European SMEs continue to rely primarily on retained earnings and bank loans for financing their investments, potentially constraining their growth and limiting their ability to compete with better-capitalized American and Asian rivals[15].

2.2 Performance Analysis of European Growth Market Indices

The empirical analysis of European growth market performance over the period from June 2017 to November 2025 provides valuable insights into the risk-return characteristics of small-cap equity investments across different European jurisdictions. This section examines seven distinct national growth market indices representing Italy (ITAIM Index), France (ALASI Index), Spain (IBMAB Index), Germany (SDYP Index), the Netherlands (ASCX Index), the United Kingdom (AIM 100 Index), and Sweden (OMXSSCPI Index), alongside the Euro Stoxx 600 as a broader European equity market benchmark. The analysis period encompasses several significant macroeconomic events, including the late stages of post-financial crisis recovery, the COVID-19 pandemic and its aftermath, the Russian invasion of Ukraine and subsequent energy crisis, and the aggressive monetary policy tightening cycle implemented by the European Central Bank beginning in July 2022.

[15] (https://www.ecb.europa.eu/press/blog/date/2023/html/ecb.blog230830~cfe3be0960.en.html, s.d.)



Source: Author's calculations

2.2.1 Return and Volatility Characteristics

Index	Annualized_Return	Annualized_Volatility	Sharpe_Ratio	Max_Drawdown	VaR_5_Percent
ITAIM Index (Italy)	-1.47%	10.91%	-0.140	-39.19%	-14.24%
ALASI Index (France)	-3.09%	12.46%	-0.241	-50.91%	-18.97%
IBMAB Index (Spain)	6.68%	13.24%	0.507	-33.11%	-16.14%
SDYP Index (Germany)	4.30%	19.25%	0.282	-41.07%	-31.85%
ASCX Index (Netherlands)	4.76%	17.38%	0.318	-44.79%	-27.86%
AIM 100 Index (UK)	-3.61%	17.58%	-0.157	-54.54%	-26.56%
OMXSSCPI Index (Sweden)	2.30%	18.54%	0.182	-45.31%	-28.15%
Euro Stoxx 600	4.64%	15.40%	0.330	-35.55%	-22.99%

Source: Author's calculations

The performance data shows that the risk-return characteristics of European growth markets are very different from each other. For example, the annualized returns ranged from -3.09% for the French ALASI Index to +6.68% for the Spanish IBMAB Index over the analysis period (June 2017 to November 2025). The Spanish growth market stands out as the best among European growth indices, with annualized returns of 6.68% and annualized volatility of 13.24%. This gives it a Sharpe ratio of 0.507, using the one-year German government bond yield as the risk-free rate. This better risk-adjusted performance is very different from what happened in the Italian and French growth markets, which both had negative annualized returns of -1.47% and -3.09%, even though they had lower volatility profiles of 10.91% and 12.46%, which were lower than those of some markets that did better.

The UK's AIM 100 Index similarly underperformed with an annualized return of -3.61% and elevated volatility of 17.58%, yielding a negative Sharpe ratio of -0.157. This disappointing performance must be contextualized within the structural challenges confronting British capital markets following the Brexit referendum in 2016 and the subsequent implementation of new regulatory and trading framework that created operational complexities and potential deterrents for both issuers and investors.

The superior performance of Spanish growth equities over this period can be attributed to several structural and cyclical factors that distinguished Spain's economic trajectory from other major European economies. Spain's economy showed amazing resilience and growth after the COVID-19 pandemic. GDP grew by 5.1% in 2021, and the recovery picked up speed in the second half of the year thanks to a strong job market and the return of many tourism activities[16]. This tourism-led recovery provided particularly strong support for Spanish small and medium-sized enterprises, many of which operate in sectors directly or indirectly linked to the hospitality and services industries, furthermore, Spain benefited from relatively rapid implementation of investments under the EU's Recovery and Resilience Plan, which provided additional fiscal stimulus supporting domestic demand and business investment. The country's GDP growth remained solid even in more recent periods, expanding 2.8% year-on-year in Q3 2025, demonstrating

[16] (https://www.imf.org/en/publications/fandd/issues/2025/06/spains-shift-to-success-carlos-cuerpo, s.d.)

sustained economic momentum that translated into favorable conditions for listed growth companies[17].

The Italian and French growth markets, on the other hand, had to deal with more difficult operating conditions, such as structural economic weaknesses, a higher risk of energy price shocks, and a slower recovery after the pandemic. Italy's economy has had a hard time with low productivity growth in the past. For example, productivity growth has been negative for the past twenty years, and the country's public debt is expected to be more than 1.3 times its GDP by 2025. Additionally, there is ongoing political instability, which makes it very hard for small businesses to grow and invest. The IMF noted in September 2025 that while Italy's economy had been relatively resilient, the country must offset a declining working-age population and a shortage of highly skilled professionals to improve its growth trajectory[18]. The ITAIM Index had a 10.91% annualized volatility, which is lower than that of other markets. This suggests that Italian growth companies may be focused in more mature, slower-growing sectors that don't have as much upside potential but also a little less downside risk.[19] The ALASI Index in France was more volatile at 12.46% and had negative returns of -3.09%. This means that French growth companies had to deal with more business uncertainty and poor fundamental performance. The European Commission's 2024 SME Country Fact Sheet for France said that French SMEs saw their real value-added drop by 1.9% in 2023 and 1.0% in 2024. Also, job growth slowed down a lot, going from 3.1% in 2023 to just 0.3% in 2024. French small and medium-sized businesses (SMEs) faced these tough conditions because of bigger problems, such as slow productivity growth and competition from both inside and outside the European Union[20].

The German SDYP Index presents an interesting case, delivering a positive annualized return of 4.30% but experiencing the highest volatility among all examined indices at 19.25%, this combination of high returns and high volatility resulted in a Sharpe ratio of

[17] (https://tradingeconomics.com/spain/gdp-growth-annual, s.d.)
[18] (https://www.imf.org/en/news/articles/2025/09/15/cf-italy-needs-higher-productivity-and-more-people-working)
[19] (https://www.scoperatings.com/ratings-and-research/research/EN/177844)
[20] (https://webgate.ec.europa.eu/circabc-ewpp/d/d/workspace/SpacesStore/bf732451-2d19-42b6-a9b6-488f6cb5c40f/download)

0.282, indicating less favorable risk-adjusted performance compared to Spain despite the positive absolute returns. Germany's growth market volatility likely reflects the significant exposure of German SMEs to global manufacturing and industrial cycles, sectors that experienced dramatic swings during the analysis period as supply chains were disrupted by the pandemic, demand patterns shifted, and energy costs fluctuated wildly. The German economy, as Europe's largest manufacturing powerhouse, was particularly vulnerable to the energy crisis of 2022[21], with natural gas and electricity prices reaching extraordinary levels that threatened the viability of energy-intensive industries[22]. The Netherlands' ASCX Index exhibited similar characteristics to Germany, with a positive annualized return of 4.76% accompanied by elevated volatility of 17.38%, yielding a Sharpe ratio of 0.318. The Dutch economy's exceptional openness to international trade makes it more exposed to trade shocks than the average European Union country, with the OECD documenting that a negative trade shock would lead to a fall in Dutch exports by almost 4% and a GDP decrease of approximately 1.7% in the medium term[23]. Research on Dutch SMEs demonstrates that companies in the export sector face higher risk exposure but also higher potential returns, with trading enterprises representing approximately 30% of Dutch businesses and exhibiting greater vulnerability to exchange rate fluctuations and supply chain disruptions. This structural trait of Dutch growth companies accounts for the volatility seen in the ASCX Index performance during the analysis period marked by pandemic-induced supply chain disruptions, turmoil in the energy market, and increasing trade protectionism[24].

Sweden's OMXSSCPI Index delivered a positive annualized return of 2.30% with substantial volatility of 18.54%, producing a Sharpe ratio of 0.182. This relatively modest performance of risk-adjusted performance may reflect sector composition effects, as Swedish growth markets include significant representation from technology and innovation-oriented companies that experienced valuation compression during the 2022-

[21] (https://cepr.org/voxeu/columns/energy-crisis-and-german-manufacturing-sector-structural-change-no-broad, s.d.)
[22] (https://gbfinancemag.com/the-recent-weakness-in-the-german-manufacturing-sector/, s.d.)
[23] (https://www.oecd.org/en/publications/oecd-economic-surveys-netherlands-2025_2dd1f4aa-en/full-report/preserving-trade-competitiveness-amidst-increasing-global-fragmentation_d7457f46.html, s.d.)
[24] (https://thesis.eur.nl/pub/5648/Thesis_Markus_Sartori_Thijs_Scholte.pdf)

2023 period when the European Central Bank embarked on its most aggressive monetary policy tightening cycle since the introduction of the euro.

The performance of European growth market indices over the June 2017 to November 2025 period was profoundly shaped by three major macroeconomic shocks: the COVID-19 pandemic and its asymmetric recovery patterns, the European Central Bank's aggressive monetary policy tightening cycle between mid-2022 and late 2023, and the energy crisis triggered by Russia's invasion of Ukraine in February 2022. These forces affected all European growth markets but with dramatically different intensity depending on country-specific economic structures and sectoral compositions[25] [26].

The pandemic caused a lot of synchronized disruption, but the recovery phase was very different based on type of sectors. Economies that relied on tourism bounced back quickly as international travel resumed, while economies that relied on manufacturing faced long-lasting supply chain problems. The tightening of monetary policy made valuations drop the most for smaller companies that are focused on growth and are very sensitive to changes in interest rates. The energy crisis created asymmetric impacts depending on industrial energy intensity and reliance on Russian gas imports, with manufacturing-intensive economies facing severe margin compression as gas and electricity prices surged. Additional country-specific factors including structural economic challenges, Brexit-related uncertainty[27], and varying trade openness further differentiated performance trajectories. The correlation patterns underscore that despite economic integration; national growth markets retain substantial idiosyncratic characteristics requiring careful country-specific analysis.

[25] (https://www.statista.com/statistics/621489/fluctuation-of-fixed-rate-interest-rates-ecb/, s.d.)
[26] (https://www.bancaditalia.it/pubblicazioni/rapporto-bce/2024-bce/index.html?com.dotmarketing.htmlpage.language=1)
[27] (https://www.theguardian.com/business/2024/oct/28/london-aim-delistings-budget-inheritance-tax-relief)

2.2.2 Risk-Adjusted Performance Metrics

The Sharpe ratio analysis, which uses the one-year German government bond yield as the risk-free rate to adjust returns for volatility, gives important information about how different growth markets compare in terms of risk-adjusted appeal. Spain's IBMAB Index clearly stands out with a Sharpe ratio of 0.507. This means that investors got about 0.51 units of extra return for every unit of volatility they took on. This is better than not only other growth markets but also the Euro Stoxx 600 benchmark, which had a Sharpe ratio of 0.330 even though it had better diversification and included bigger, more stable companies. The Netherlands and Germany occupy the second and third positions among growth markets with Sharpe ratios of 0.318 and 0.282 respectively, while Sweden's 0.182 Sharpe ratio places it fifth among the seven growth markets examined.

The negative Sharpe ratios recorded by Italy (-0.140), France (-0.241), and the United Kingdom (-0.157) indicate that these markets failed to compensate investors adequately for the risks undertaken, with returns falling below the risk-free rate over the analysis period.

2.2.3 Downside Risk Analysis

The maximum drawdown statistics shows the extent of peak-to-trough declines experienced by each index during the analysis period, providing useful information about tail risk and the potential losses for an investor during market stress episodes. France's ALASI Index experienced the most severe maximum drawdown at -50.91%, indicating that investors who purchased at the peak would have experienced losses exceeding 50% before any subsequent recovery, this extreme drawdown occurred during the acute phase of the COVID-19 market disruption in March 2020, when European equity markets experienced their most severe declines since the 2008 financial crisis. The UK's AIM 100 Index recorded the second-worst maximum drawdown at -54.54%, while the Netherlands' ASCX Index experienced a drawdown of -44.79%. These severe drawdowns underscore the elevated tail risk associated with small-cap growth equity investments, which typically exhibit greater sensitivity to market stress and liquidity constraints than large-cap, more stable equities, during crisis periods.

Spain's maximum drawdown of -33.11% was relatively good, this result helped its risk-adjusted performance profile, the index had less severe downside than most other growth markets while still making money. Germany's maximum drawdown of -41.07% and Sweden's -45.31% were big but not unusual compared to other markets. Italy's maximum drawdown of -39.19% was moderate compared to other markets, which is consistent with its lower overall volatility profile. The Euro Stoxx 600 benchmark, on the other hand, had a maximum drawdown of -35.55%, considering bigger and more stable companies this is an usual value. This shows that spreading investments across different countries and including larger companies offered some protection against big losses, but this protection was not complete during the pandemic, which caused unprecedented market disruption.

The 5% Value at Risk statistics add to the maximum drawdown analysis by showing the threshold loss that would only happen in 5% of observations, assuming normally distributed returns. In other words, VaR at 5% shows the smallest loss an investor could expect in the worst 5% of all trading periods. The VaR numbers for European growth indices ranged from -14.24% to -31.85%, which is much higher than the Euro Stoxx 600's VaR of -22.99%. This shows that small-cap growth stocks have a lot more downside risk, which means that investors could lose a lot more money when the market is going bad. The considerable variation in both maximum drawdown and VaR across different national growth markets reflects not only the differing volatility profiles of these indices but also the varying severity and timing of country-specific economic shocks experienced during the analysis period.

2.2.4 Comparison with Euro Stoxx 600

The inclusion of the Euro Stoxx 600 in the analysis provides valuable perspective on how European growth markets performed relative to the broader European equity market, which encompasses 600 large, mid, and small-cap companies across 17 European countries and represents approximately 90% of the free-float market capitalization of the European stock market. The Euro Stoxx 600 got an annualized return of 4.64% with a volatility of 15.40%, resulting in a Sharpe ratio of 0.330, this performance was superior to most growth indices on a risk-adjusted basis, exceeded only by Spain's exceptional Sharpe ratio of 0.507, the divergence between growth market and large-cap performance

reflects important dynamics that characterized European equity markets during the analysis period.

First, the monetary policy environment changed a lot from being easy to being strict during the last part of the analysis period. The ECB started its most aggressive tightening cycle in decades in July 2022. Between then and September 2023, the ECB raised its key policy rates by 450 basis points, bringing the deposit facility rate from -0.50% to 4.00% in response to inflation that had reached multi-decade highs. The ECB kept rates high through the first half of 2024, but in June 2024 they started to slowly lower them. By the end of 2024, the deposit rate had dropped to 3.15%, and by early 2025 it had dropped to 2.9%. This tightening cycle had asymmetric effects across the market capitalization spectrum, with smaller companies generally experiencing bigger valuation compression due to their higher sensitivity to funding costs, greater reliance on external financing for growth, and higher default risk perceptions during periods of monetary restriction[28].

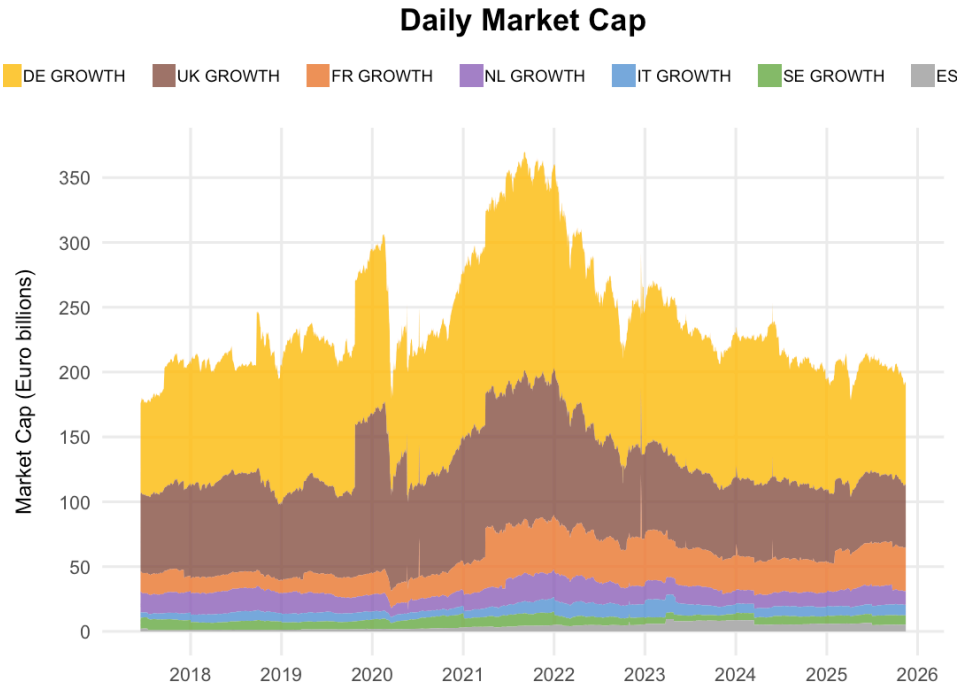
Second, the European energy crisis that erupted in 2022 following Russia's invasion of Ukraine had differential impacts across companies of different sizes and sectors, the extraordinary surge in natural gas and electricity prices created severe margin pressure for energy-intensive businesses while also triggering broader economic slowdown concerns that weighed particularly heavily on smaller, domestically-focused companies with less pricing power and fewer hedging capabilities than large multinationals. Big companies usually have advanced treasury operations and credit facilities that help them deal with this kind of volatility. Smaller growth companies, on the other hand, often don't have these tools and had a harder time dealing with this type of crisis[29].

Third, the differences in the make-up of growth indices and the Euro Stoxx 600 caused systematic performance differences. The Euro Stoxx 600 includes many large multinational companies with revenue streams that are spread out across different countries, so they can benefit from economic growth outside of Europe even when the economy in Europe is not doing well. Growth indices, conversely, are dominated by

[28] *ht* (tps://www.statista.com/statistics/621489/fluctuation-of-fixed-rate-interest-rates-ecb/, s.d.)
[29] (https://essd.copernicus.org/articles/17/3431/2025/, s.d.)

smaller companies with predominantly domestic or regional operations, creating greater sensitivity to European economic conditions, additionally, sector composition varies significantly, with growth indices typically having less representation from defensive sectors like utilities and consumer staples that provided relative stability during volatile periods.

2.2.5 Market Capitalization Dynamics



Source: Author's calculations

The stacked area chart showing market cap in billions of euros from June 2017 to November 2025 shows that daily market capitalization changes across European growth markets are very different, with some markets being much larger and growing faster than others. Germany's growth market (shown in yellow) had the highest market capitalization most of the time, peaking at about 350 billion euros between 2021 and 2022 and then falling to around 200 billion euros by the end of 2025. The UK growth market (shown in brown) constituted the second-largest component, with market capitalization fluctuating between approximately 100-200 billion euros across the period. France (orange) and the

remaining markets (represented by various other colors including purple for Netherlands, blue for Italy, and green for Sweden) comprised relatively smaller portions of the aggregate European growth market capitalization.

The temporal dynamics visible in the market capitalization chart tell a compelling story of boom, crisis, and partial recovery, the period from 2018 through early 2020 showed relatively stable aggregate market capitalization with modest growth, reflecting the mature phase of the post-financial crisis economic expansion. The huge drop in market capitalizations that happened in March 2020 was due to the COVID-19 market disruption. At that time, there was unprecedented uncertainty about how the pandemic would affect the economy, which led to one of the fastest equity market declines in history. The recovery that followed was very V-shaped, with market capitalizations reaching new highs by late 2021 as vaccines became available, economies reopened, fiscal and monetary stimulus remained very supportive, and investors priced in strong earnings recovery for growth companies that were ready to take advantage of the post-pandemic economic reopening and structural trends like digitalization.

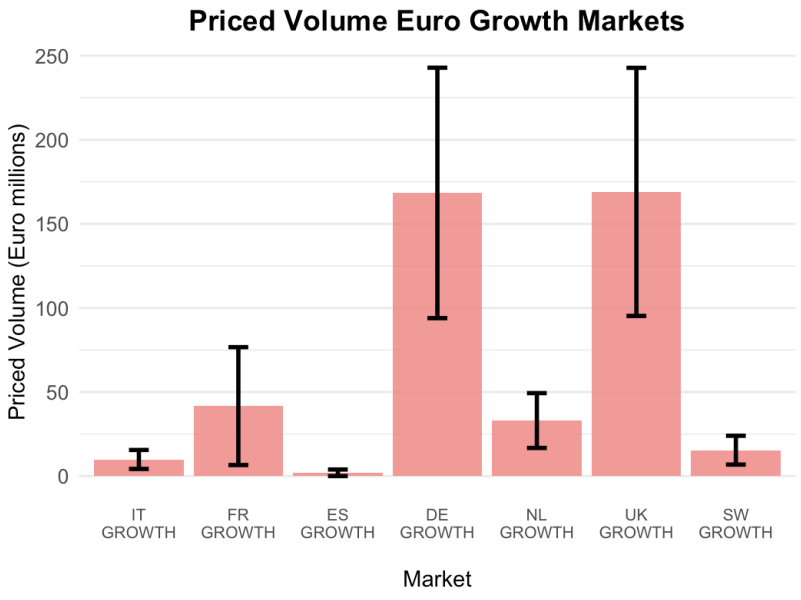
But the market capitalizations reached their highest points in late 2021 and then started to drop throughout 2022. This was because the overall economy got a lot worse, with inflation reaching levels not seen in decades due to supply chain problems, labor shortages, rising commodity prices, and loose fiscal policies all putting pressure on prices. Central banks switched from easing to tightening, raising interest rates sharply, which lowered the value of stocks, especially for growth-oriented companies whose values are most affected by discount rates. The European energy crisis and more economic uncertainty were caused by Russia's invasion of Ukraine in February 2022. This made growth equity valuations even lower. By the end of 2022 and into 2023, the total market capitalization of the European growth market had dropped a lot from its 2021 highs, but it hadn't gone back down to the low point of the March 2020 pandemic.

From 2023 to 2025, market capitalizations slowly stabilized and started to recover as inflation slowed down, the ECB signaled and then put into action interest rate cuts, and the economy got better after the difficult conditions of 2022. However, the total market

capitalization in late 2025 is still well below the peaks of 2021. This shows that growth equity valuations have not fully returned to their pre-tightening levels, even though monetary policy is starting to normalize. This gap that keeps happening is because interest rates are higher now than they were in the 2010s and early 2020s, and investors may be more cautious about the growth prospects for small and medium-sized businesses in Europe because of the structural problems that European economies are facing.

The relative contributions of different national markets to the overall growth market capitalization in Europe show important trends about how these markets are growing in different ways. Germany's dominant position during this time is since there are more listed companies on German growth markets and German growth companies have higher average market capitalizations than most other markets. The UK's significant and relatively stable contribution shows that London's AIM market is still importa. The small and stable contributions from markets like Italy (blue) and Sweden (green) at the bottom of the stacked chart show that these markets mostly have smaller companies with lower market capitalizations, even though they have a lot of listed companies.

2.2.6 Priced Volume Dynamics



Source: Author's calculations

Turnover (or Priced Volume) represents the total monetary value of securities exchanged in a market over a specific period, calculated as the product of trading volume and price. Unlike simple volume metrics that count the number of shares traded, priced volume captures the actual economic activity and serves as a key indicator of market liquidity, the ease with which assets can be bought or sold without significantly impacting prices. The analysis illustrates the average daily priced volume across seven European growth indices from June 2017 to November 2025, revealing striking disparities in market liquidity that reflect both structural factors and the impact of recent macroeconomic shocks.

With about €170 million in daily turnover, the German and UK growth markets are the most active in trading. This is because their alternative market segments are more mature and have more institutional depth. This institutional infrastructure and large investor base have proven to be strong even during times of market stress. However, the large standard deviations seen show that there were spikes in volatility during the COVID-19 crisis and the following cycles of monetary tightening.

In stark contrast, peripheral European growth markets exhibit significantly lower liquidity levels, French growth markets average approximately €40 million daily, while Italian, Spanish, Swedish, and Dutch markets range between €3-32 million. The Spanish market's particularly low turnover of around €3 million per day underscores the liquidity fragmentation that characterizes smaller European growth segments. These disparities intensified during the 2022-2024 period, when European small-cap funds experienced massive outflows(€8.2 billion in Q2 2022 alone) as investors fled to large-cap equities amid rising interest rates and geopolitical uncertainty. By 2025, capital flight had decelerated but cumulative outflows still totaled €4.3 billion in the first half, indicating persistent investor reluctance toward smaller growth names[30].

The COVID-19 pandemic first messed up trading patterns in all markets, but the recovery paths were very different. Between March and June 2020, junior exchanges raised €2.7 billion through secondary offerings. This was only a small part of overall SME funding

[30] (https://en.oninvest.com/article/why-european-small-caps-are-back-on-investors-radar-in-2025, s.d.)

compared to bank lending. More importantly, the time after the pandemic showed that smaller markets had structural liquidity problems. For example, Italian mid-cap liquidity improved by 31.2% year-over-year by 2025, but small-cap segments stayed much weaker. This was because of concentrated ownership structures and low trading activity.[31].

The liquidity gap between core markets (Germany, UK) and peripheral growth segments shows that regulatory reforms have had a hard time fixing structural problems. MiFID II made it even harder for small-cap stocks to get cash in 2018. Empirical evidence shows that bid-ask spreads got wider and analyst coverage got lower.[32]. A 2019 survey of UK fund managers found that 89% thought MiFID II hurt the liquidity of small- and mid-cap stocks. They also thought that research quality decreased as specialists became generalists covering too many stocks[33]. The European Commission's 2021 report acknowledged that "insufficient market liquidity" remains a fundamental barrier, noting that MiFID II inadvertently "undermined local brokerage houses" critical for SME research coverage[34].

The EU Market Infrastructure Package (2025)[35] proposes to put €10 trillion in retail savings toward productive investments and implementing structural reforms including tick size optimization and enhanced research incentives. However, SMEs continue facing "increasing friction" in accessing capital despite improved conditions for large firms, with demand for SME funding expected to rise 5-10% driven by nearshoring trends[36]. Addressing these liquidity constraints requires not only regulatory reform but fundamental changes in investor composition and market infrastructure to create the "diversity of risk appetites" necessary for vibrant capital markets.

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[31] (https://www.afme.eu/media/emtkq0dw/afmeimpactofcovid19oneuropeancapitalmarketsupdatefinaldraft1111.pdf, s.d.)

[32] (https://www.efmaefm.org/0EFMAMEETINGS/EFMA%20ANNUAL%20MEETINGS/2020-Dublin/papers/EFMA%202020_stage-1301_question-Full%20Paper_id-428.pdf)

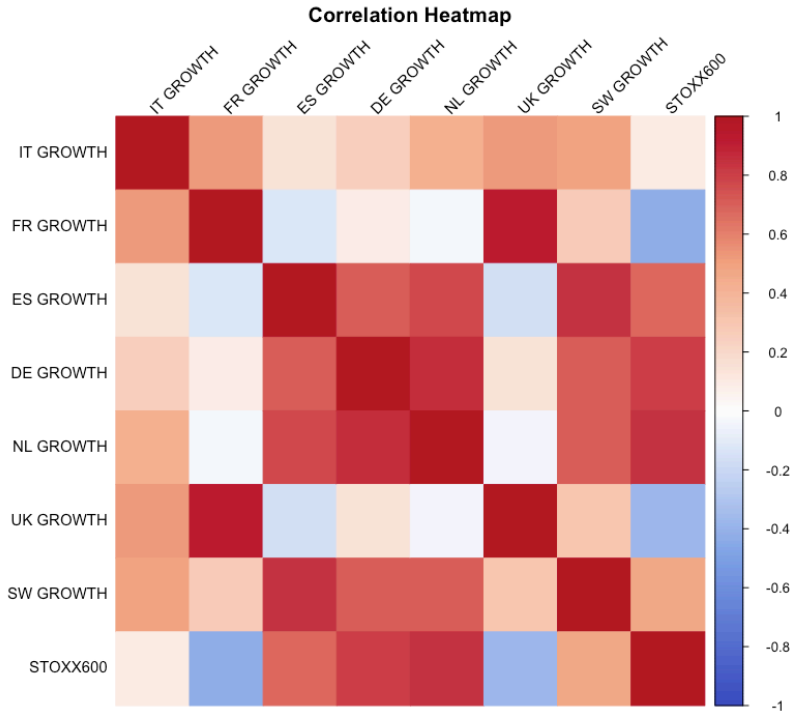
[33] (https://www.tradersmagazine.com/departments/buyside/peel-hunt-survey-reports-mifid-ii-hurt-small-and-mid-cap-liquidity/, s.d.)

[34] (https://finance.ec.europa.eu/system/files/2021-05/210525-report-tesg-cmu-smes_en.pdf, s.d.)

[35] (https://globalmarkets.cib.bnpparibas/eu-market-infrastructure-package-2025/, s.d.)

[36] (Posi (tion Paper on the EU SME Growth Markets Consultation)

2.2.7 Correlation Structure of European Growth Indexes



Source: Author's calculations

The correlation heatmap provides crucial insights into the co-movement patterns among European growth markets and their relationships with the broader European equity market represented by the Euro Stoxx 600. Several important patterns emerge from this correlation analysis that challenge conventional assumptions about European market integration, First, correlation coefficients vary greatly between different pairs of growth markets, with some being strongly positive and others being moderately negative. This shows that being close to each other geographically and economically does not always mean that growth equity returns will move together. Second, the relationships between individual growth markets and the Euro Stoxx 600 benchmark are very different. Some markets have strong positive correlations, while others, like the UK and Sweden, have negative correlations that are shown as blue cells in the matrix.

The negative correlation between UK growth equities and the Euro Stoxx 600 is particularly striking and likely reflects the unique circumstances of Brexit, which created divergent economic and market dynamics between the UK and continental Europe. When European markets benefited from factors like eurozone economic recovery or ECB policy

accommodation, UK markets often faced headwinds from Brexit-related uncertainty, regulatory divergence, and potential economic costs of reduced integration with the EU, creating the observed negative correlation pattern. Similarly, Sweden's negative correlation with the Euro Stoxx 600 benchmark may reflect its unique economic structure, with its growth market heavily weighted toward innovative technology and healthcare companies that respond differently to macroeconomic conditions than the large industrials, financials, and consumer companies that dominate broad European indices.

Spain's unusually strong positive relationship with the Euro Stoxx 600 benchmark sets it apart from other growth markets. This may be because Spanish growth companies are mostly in sectors that are well-represented in the large-cap benchmark and respond similarly to macroeconomic factors. The Euro Stoxx 600 and most other growth markets are usually positively correlated, but not always. This means that growth stocks are affected by things that affect all stocks in Europe, like the ECB's monetary policy, changes in the euro's exchange rate, and the growth of the European economy. But they also have big idiosyncratic return parts that are caused by things like the country, the sector mix, and the unique traits of smaller companies.

From a portfolio construction standpoint, these correlation patterns significantly affect investors aiming for diversification in European equity markets. The notable variability in correlations among growth markets indicates that geographic diversification within European growth equities can yield substantial risk mitigation advantages, as losses in one market may be partially counterbalanced by gains or diminished losses in markets exhibiting low or negative correlations. But the different and sometimes weak correlations show that European growth markets can't be thought of as a single asset class. To be successful in this area, you need to choose the right countries and know about the factors that affect each one. The negative correlations between the UK and some continental markets, as well as between Sweden and the broad European benchmark, show that smart investors can build portfolios with better risk-adjusted returns by carefully combining growth market exposures.

3. Construction of a Unified European Growth Market Index

3.1 Dataset Construction

The goal of this chapter is to build a unified European growth market index that combines all the previously analyzed growth indices into a single market capitalization-weighted benchmark, to achieve this, we started by extracting price and market capitalization data for all companies that are constituents of the indices examined in Chapter 2.

The dataset includes companies from seven European growth markets, with the following distribution:

- ◊ ITAIM Index (Italy) with 184 companies
- ◊ ALASI Index (France) with 557 companies
- ◊ IBMAB Index (Spain) with 50 companies
- ◊ SDYP Index (Germany) with 70 companies
- ◊ ASCX Index (Netherlands) with 20 companies
- ◊ AIM 100 Index (UK) with 101 companies
- ◊ OMXSSCPI Index (Sweden) with 107 companies

For each stock, we collected quarterly prices and market capitalization values from June 2017 to November 2025, resulting in a total of 34 quarterly observations for stock, all data were extracted in euros to ensure consistency across different markets.

A critical aspect of the index construction methodology is that the company list is based on the constituents present in each index as of November 2025, this approach has important implications: many of these companies were not publicly traded or were not part of their respective growth indices in the earlier periods of our sample. Consequently, the dataset contains a substantial number of N/A (missing) values, particularly for the earlier years, this is an expected feature of the data and reflects the dynamic nature of growth markets, where companies enter through IPOs and index inclusions over time.
This methodological choice introduces a survival bias in the index, as it inherently includes only companies that successfully remained listed through November 2025, excluding those that may have been delisted, acquired, or failed during the observation

period. By constructing the index using only currently listed companies, we are effectively building a benchmark that reflects the investable universe as it exists today, providing insight into the structure and composition of European growth markets from a contemporary perspective.

3.2 Index Construction Methodology

The Unified European Growth Market Index is constructed as a market capitalization-weighted index with quarterly rebalancing, designed to track the performance of the combined universe of European small-cap equity markets. The construction process follows a systematic methodology that ensures consistency and replicability across all 34 quarters from June 2017 to November 2025.

The construction process begins with loading quarterly price and market capitalization data for all constituent companies across the seven European growth indices, each stock's ticker is mapped to its respective reference index (ALASI Index for France, ITAIM Index for Italy, IBMAB Index for Spain, SDYP Index for Germany, ASCX Index for Netherlands, AIM 100 Index for UK, and OMXSSCPI Index for Sweden) to maintain traceability of geographic and market origin throughout the analysis.

3.2.1 Filtering Criteria

To ensure data quality and construct a reliable index, a systematic filtering process is applied at each quarter to exclude missing data, anomalous prices, and extreme returns that may signal data errors or exceptional corporate events.

The filtering criteria operate sequentially:

Data availability: Both price and market capitalization must be available (non-missing) for the current quarter, additionally, for all quarters after the initial observation, these values must also be available for the previous quarter to enable return calculation. This requirement ensures that only stocks with complete data can contribute to index performance in each period.

Outlier removal: to prevent data errors and exceptional events from distorting index performance, stocks with anomalous observations are systematically excluded from the calculation. Two types of outliers are identified and removed: first, price observations that fall outside reasonable bounds are filtered out, as extreme price levels (either too high or too low) typically indicate data recording errors or currency mismatches rather than actual market values. This approach prioritizes the construction of a stable, representative benchmark over the inclusion of all possible data points, accepting a trade-off between comprehensiveness and reliability.

These filtering criteria are applied dynamically at each rebalancing date, meaning that the set of eligible constituents can change from quarter to quarter based on data availability and quality.

3.2.2 Index Calculation

The index is initialized at a base value of 100 in the first quarter (June 2017), for this initial period, all stocks that meet the basic data availability and quality requirements are included, with their weights determined by their respective market capitalizations. No return calculation is performed in the first quarter, as there is no prior period for comparison.

For each subsequent quarter t (where t > 1), the index value is calculated through a multi-step process that ensures market capitalization weighting and eliminates look-ahead bias:

1. *Weight determination*: The weight of each constituent *i* at quarter *t* is calculated based on its market capitalization at the previous quarter (*t-1*):

$$w_{i,t} = \frac{MktCap_{i,t-1}}{\sum_{j=1}^{N} MktCap_{j,t-1}}$$

where N is the number of valid constituents at quarter t-1. This lagged weighting approach reflects real-world index construction practices, where portfolio weights must be determined before the start of the holding period using publicly available information.

2. *Return calculation*: The quarterly return for each stock i is computed as the simple price change:

$$R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}$$

where P represents the stock price at the end of each quarter.

3. *Index return*: The overall index return for quarter t is the weighted average of individual stock returns, using the weights determined in step 1:

$$R_{Index,t} = \sum_{i=1}^{N} w_{i,t} * r_{i,t}$$

This formulation ensures that larger companies (by market capitalization) have a proportionally greater impact on index performance, consistent with standard market capitalization-weighted index methodology.

4. *Index value update*: The index level at quarter t is calculated by applying the quarterly return to the previous period's index value:

$$Index_t = Index_{t-1} * (1 + R_{Index,t})$$

This chain-linking approach maintains consistency across the entire time series and allows the index to accurately reflect cumulative performance over the full observation period.

This methodology ensures that the index is self-financing and replicable, reflecting the actual performance an investor would achieve by holding a market capitalization-weighted portfolio of constituent stocks with quarterly rebalancing. The approach does not account for transaction costs, dividends, or other practical considerations, focusing instead on pure price performance.

3.2.3 Index Composition and Rebalancing

At each quarterly rebalancing date, the index composition is dynamically updated to reflect changes in market capitalization, data availability, and the entry of new companies into the dataset. The number of constituents varies significantly across the observation period, starting from a limited number in the early quarters , 450 companies (due to the survival bias discussed in Section 3.1) and increasing progressively as more companies appear in the dataset with valid price and market capitalization data, 867 in the last quarter in 2025.

This evolution in constituent count reflects two distinct phenomena: the natural growth and expansion of European growth markets as they attracted more listings over time, and the mechanical effect of our methodology, which includes only companies present in November 2025, many of which were not yet listed in the earlier periods. As a result, the index's market coverage and diversification improve substantially from 2017 to 2025.

The complete index composition is recorded for each quarterly rebalancing. This includes the ticker symbol, market cap, percentage weight in the index, and the reference index of origin for each part. With this level of detail, is possible to see how concentrated the index is, how it is spread out across different countries, and how much each country's market contributes to the index's overall performance. It also shows which companies are responsible for index returns in each period and how the balance between markets changes over time[37].

3.2.4 Handling of Missing Data and Special Cases

The methodology handles the progressive entry of companies into the dataset as they become available (either through IPOs or through the start of their data history in our sample). When a company first appears with valid data, it is automatically included in the index at the next rebalancing date, with its weight determined by its market capitalization relative to all other eligible constituents. Similarly, companies that temporarily lack data (due to trading suspensions, missing observations, or other reasons) are automatically

[37] ("Index rebalancing and stock market composition: Do indexes time the market?")

excluded from that quarter's index calculation and can re-enter in subsequent periods if their data becomes available again.

This flexible approach to composition changes ensures that the index adapts to the dynamic nature of growth markets, where companies frequently enter, exit, and experience temporary data interruptions, while maintaining methodological consistency and preventing manual intervention in the construction process[38].

[38] ("A Primer of Data Cleaning in Quantitative Research: Handling Missing Values and Outliers")

4. Results

4.1 Index composition and evolution over time

The composition of the Unified European Growth Market Index evolves significantly over its 34 quarter lifespan, transitioning from a relatively concentrated set of 450 constituents in June 2017 to a more diversified universe of 867 companies by September 2025 (last quarter available for 2025). This expansion of 417 firms not only mirrors the maturation of European small-cap markets but also reveals the interplay between organic market growth and methodological design choices, ultimately enhancing the index's market coverage and diversification profile.

Two primary forces underpin this increase, first the market dynamics played a key role, as European growth exchanges saw rising IPO activity, particularly in established hubs like Germany and the UK, adding fresh listings over time and reflecting broader economic recovery post-2017[39]. Second, methodologically, the index incorporates only firms present in the November 2025 dataset, creating a survivorship filter[40]: early periods underrepresent later entrants until their historical data becomes available, progressively broadening coverage. While this introduces a look-forward bias, it aligns with investable universes used by practitioners and ensures focus on resilient, currently listed firms.

Quarter	Date	Total Market Cap (€M)	Number of Companies	Growth of Mkt Cap from Q1 (%)	Average Firm Size (€M)
Q1	Jun 2017	142,545	450	+0.0%	317
Q9	Jun 2019	145,536	526	+2.1%	277
Q17	Jun 2021	234,239	622	+64.3%	377
Q26	Sep 2023	169,487	783	+18.9%	216
Q34	Sep 2025	193,535	867	+35.8%	223

Source: Author's calculations

The index's aggregate market capitalization expanded from €142.5 billion in June 2017 to €193.5 billion by September 2025, representing a 36% increase over the observation period. This growth trajectory proved non-linear, peaking at €234 billion in mid-2021 amid the post-pandemic growth stock rally before moderating through 2022-2023 as

[39] ("Market Growth Insights")
[40] (https://en.wikipedia.org/wiki/Survivorship_bias, s.d.)

monetary tightening pressured valuations[41], by late 2023, the index stabilized around €170-190 billion as constituent additions offset per-firm valuation compression.

German SDYP constituents have a strong presence throughout the sample, making up 45.5% to 55.1% of the total market capitalization weighting, even though new entrants are slowly diluting their influence. Germany's structural advantages, such as larger average firm sizes (€300-500M vs. €100-200M in Southern markets), better liquidity, and mature industrial clusters that make scalable growth companies that are less likely to be delisted, explain this dominance[42].

The UK AIM 100's influence has grown from 18.1% in Q1 2017 to 26.0% in Q34 2025. This is because London is still a popular place for growth listings and because people are moving to London's ecosystem after Brexit.
Nordic markets do better than their population size would suggest. The Dutch ASCX stays steady at 5–9%, while the Swedish/Norwegian OMXSSCPI adds 7–9%. This is because of efficient exchanges with strict quality filters that favor liquid, innovative small-caps over sheer volume. Their stability comes from having fewer but more certain members than Southern listings, which are more scattered.
Peripheral markets lag but converge gradually. French ALASI fluctuates around 7-8%, while Italian ITAIM advances from 0.9% to 4.7% and Spanish IBMAB from 0.3% to 2.5%. Structural constraints—smaller firm sizes, subdued IPO pipelines, fragmented liquidity—limit early impact, though accelerating growth rates signal maturation of Southern European growth ecosystems.

Index concentration declined markedly over time, indicating improved diversification, the top 10 stocks commanded 27.4% of total weight in June 2017 but only 17.1% by September 2025, driven by the entry of hundreds of mid-sized firms diluting individual stock influence. Early dominance featured mega-caps like PSM GY (5.99% weight in Q1 2017), SHA0 GY (4.40%), and SZU GY (2.61%), primarily German industrials and

[41] (https://www.spglobal.com/spdji/en/spiva/article/spiva-europe, s.d.)
[42] (https://stoxx.com/exploring-sdax-the-benchmark-for-german-small-companies/, s.d.)

specialty manufacturers whose billion-euro capitalizations reflected mature business models within small-cap classifications.

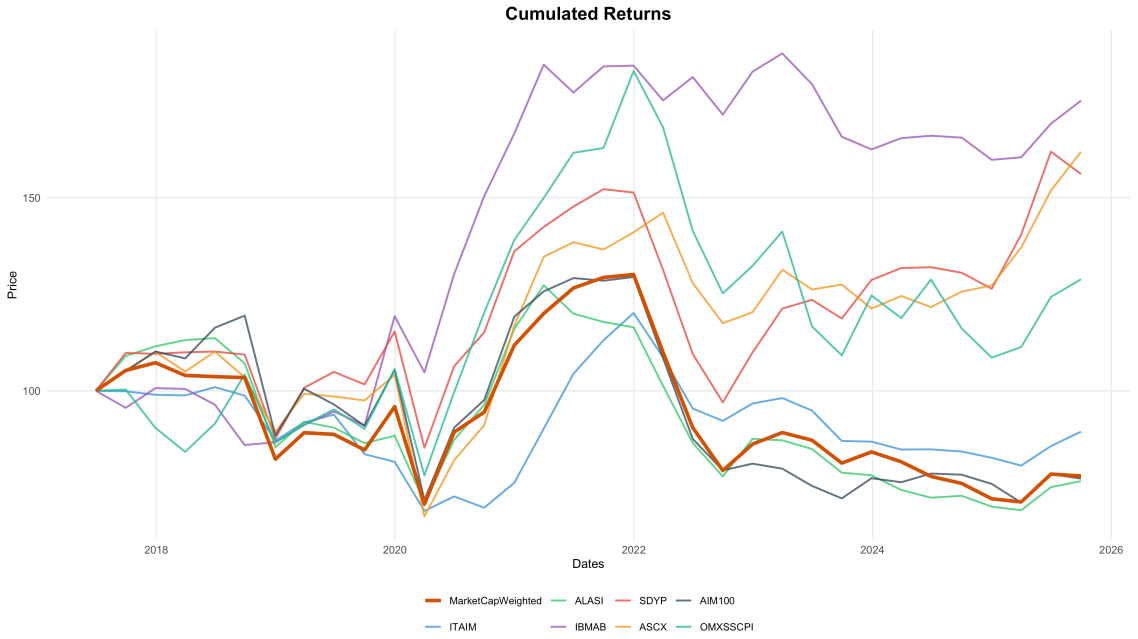
By the last quarter, leadership changed to a more balanced representation, with JET2 LN (UK travel, 2.34%), 1SXP GY (German tech, 2.22%), and SPG GY (German industrials, 1.93%) leading a more spread-out top tier. The fact that German stocks have consistently been at the top of the rankings, with the 10 highest average weights throughout the observation period, shows that the market is deep and the firms are of high quality. On the other hand, the increasing prominence of UK firms in later quarters shows that Brexit has had an effect on redomiciling and that AIM is a competitive listing environment.

This change from high concentration (top 10 = 27%) to moderate concentration (top 10 = 17%) shows that the index is becoming more representative of pan-European growth equity performance. This is because the index is becoming more representative of the growth of individual firms in small-cap universes that are about to graduate to mid-cap benchmarks.

4.2 Index's Performance and Characteristics analysis

Indice	Annualized Return (%)	Annualized Std Dev (%)	Sharpe Ratio	Max Drawdown (%)	VaR 5% Annual (%)
MarketCapWeighted	-2,98	21,181	-0,164	-45,256	-37,639
ITAIM	-1,35	15,028	-0,198	-32,874	-23,950
ALASI	-3,18	19,365	-0,212	-45,736	-33,201
IBMAB	7,03	17,855	0,311	-14,709	-17,748
SDYP	5,55	22,007	0,233	-36,262	-35,810
ASCX	6,01	21,872	0,258	-38,724	-25,855
AIM100	-3,08	23,912	-0,120	-45,112	-43,956
OMXSSCPI	3,12	24,579	0,136	-40,606	-34,176

Source: Author's calculations



Source: Author's calculations

This section presents and interprets the empirical performance of the Unified European Growth Market Index (UEGMI), constructed as a quarterly rebalanced market-capitalization-weighted benchmark aggregating seven European growth-market segments, over the June 2017 – September 2025 period.

The index delivers an annualized return of –2.98%, with an annualized volatility of 21.18%, resulting in a negative Sharpe ratio of –0.164, downside risk is substantial, with a maximum drawdown of –45.26% and a 5% annual Value-at-Risk of –37.64%. These metrics indicate that over the full sample the unified growth-market segment failed to compensate investors for the level of volatility undertaken and was exposed to pronounced tail risk.

The time-series dynamics of cumulative returns show a clear regime-dependent structure. The drop in the first quarter of 2020 was caused by the COVID-19 pandemic, which caused a systemic liquidity shock. After this event, the economy made a strong recovery through 2021, thanks to unprecedented monetary easing, fiscal stimulus, and a strong re-rating of growth-oriented stocks. The index, on the other hand, reached its highest point in late 2021 and then fell for a long time in 2022 and 2023, which was the same time as

the European energy crisis and the European Central Bank's most aggressive tightening cycle since the euro was introduced.

This behaviour is consistent with asset pricing theory on growth and small-cap stocks. Firms with longer-duration cash flows are more sensitive to discount-rate increases, as emphasized in the literature on equity duration and factor exposures[43]. The repricing phase following the surge in inflation and policy rates therefore exerted disproportionate pressure on the unified growth segment relative to large-cap benchmarks.

4.2.1 Structural Drivers of Performance

Return attribution analysis provides deeper insight into the mechanisms behind the aggregate outcome because the index is market-cap weighted, performance is heavily influenced by high-weight constituents and by countries whose growth segments contain larger firms.

The UK is the biggest positive contributor at the country level, with a total positive effect of more than nine percentage points. France, Sweden, and Germany, on the other hand, have a lot of negative cumulative effects. The Netherlands and Southern European segments, on the other hand, have smaller net effects. The unified index's negative annualized return doesn't mean that all of Europe is doing poorly; it just means that large continental sleeves are doing better during the post-2021 tightening regime.

At the single-stock level, attribution confirms strong concentration in downside drivers, a small number of large-weight German constituents generated substantial negative cumulative impacts, reflecting both sustained weight persistence and extended drawdowns during 2022–2023. Conversely, a limited set of UK and German winners contributed positively, most notably JET2 LN Equity, whose cumulative impact exceeds three percentage points. The coexistence of strong winners and dominant losers highlights a defining feature of growth markets: high cross-sectional dispersion combined with structural weight concentration in market-cap-weighted benchmarks.

[43] (Fama and French, Lettau and Ludvigson, & Asness)

Quarterly impact analysis further reinforces the macro-regime interpretation, the most negative quarter occurs during the COVID shock in Q1 2020, followed immediately by a powerful rebound. However, the prolonged negative sequence in 2022–2023, rather than a single crisis event, explains most of the deterioration in long-term performance. This suggests that the index's weak risk-adjusted profile is driven primarily by sustained valuation compression under restrictive financial conditions rather than by isolated tail events.

4.2.2 Constituent Migration and Structural Measurement Bias

A crucial interpretative limitation arises from the index construction methodology; the unified index is based on the set of firms that remain constituents of their respective national growth markets as of the final quarter of 2025. While this approach ensures consistency and reflects the current investable growth ecosystem, it introduces two structural distortions.

First, the index is subject to survivorship bias, as firms that failed, were acquired (high potential returns), or delisted before 2025 are excluded. However, unlike many empirical contexts in which survivorship artificially inflates historical returns, the unified index still exhibits negative long-run performance, suggesting that survivorship alone does not explain the observed outcomes.

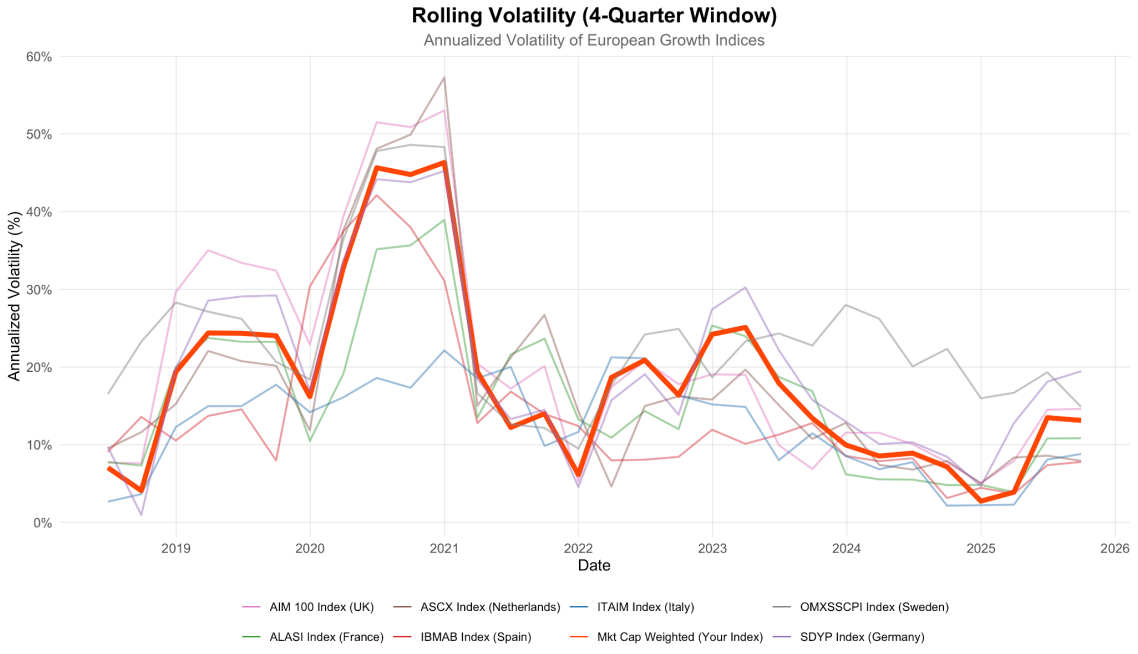
More importantly, the index is affected by what may be described as a "success attrition" or migration bias. growth markets function as transitional environments in which firms raise capital during early expansion phases. When firms perform particularly well and reach sufficient scale, they frequently migrate to main regulated markets, mid-cap segments, or broader indices. As documented in the literature on listing decisions and market migration[44], successful firms tend to upgrade their listing venue once liquidity and visibility improve.

[44] (Pagano & Chemmanur and Fulghieri)

Consequently, some of the strongest performers of the 2017–2025 period are no longer present in the 2025 growth-market universe and are therefore mechanically excluded from the unified index. This mechanism differs from classical survivorship bias because it removes not only failed firms but also firms that "outgrew" the segment. The net effect may be a downward distortion of long-term returns, as the index captures firms that survived yet remained within the growth classification rather than those that graduated upward.

This structural feature has important implications, the unified index should be interpreted as representing the performance of the persistent growth-market core rather than the total wealth created within European growth ecosystems. It effectively tracks firms that remained structurally embedded within fragmented national growth markets across macro regimes, as such, the index provides insight into the resilience and vulnerability of companies that continue to depend on growth-market infrastructure, rather than offering a complete historical accounting of all firms that passed through these segments.

4.2.3 Volatility analysis



Source: Author's calculations

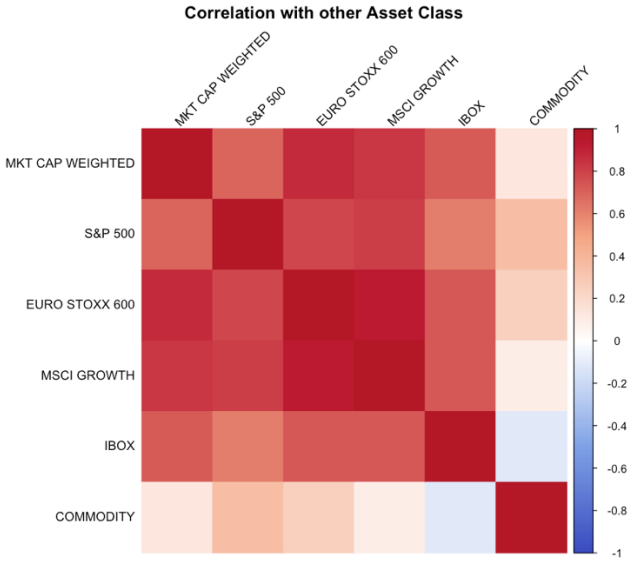
The rolling four-quarter annualized volatility chart confirms the strongly cyclical nature of European growth markets. Volatility increases sharply during 2020–2021, reflecting the uncertainty generated by the COVID-19 shock and the subsequent reopening phase. This pattern is consistent with empirical evidence showing that pandemic-related uncertainty triggered unprecedented spikes in financial market volatility[45]. The synchronization of volatility surges across national segments suggests the presence of common global risk factors, in line with the international co-movement[46].

The Unified Market Cap Weighted Index closely follows the volatility patterns of the biggest markets, especially Germany (SDYP) and the UK (AIM 100). This behavior is consistent with the index construction methodology outlined in Chapter 3: since the benchmark is weighted by market capitalization, the largest and most liquid segments primarily influence overall risk fluctuations. At the height of volatility in 2021, the unified index reached levels similar to those of its most important parts, showing that the structurally heavier markets are the main drivers of aggregate risk.
The renewed increase in volatility during 2022 coincides with the ECB tightening cycle and the European energy crisis. Growth-oriented equities are particularly sensitive to discount-rate shocks and policy uncertainty, as documented by Pastor and Veronesi (2012)[47] and Adrian, Duarte and Shin (2019)[48]. Smaller markets such as Italy and Spain display more contained volatility swings, reflecting their lower capitalization weight and more domestically oriented sector exposure.

The rolling volatility analysis supports the idea that the unified index acts like a capitalization-driven aggregate that takes into account systemic shocks that affect European growth equities, while still showing that there are differences between national markets.

[45] (Baker)
[46] (Bekaert, G., Hodrick, R.J. & Zhang, X. (2009). International Stock Return Comovements. Journal of Finance)
[47] (Pastor, L. & Veronesi, P. (2012). Uncertainty about Government Policy and Stock Prices.)
[48] (Adrian, T., Duarte, F. & Shin, H.S. (2019). Financial Vulnerabilities and Risk Premia)

4.2.4 Correlation analysis



Source: Author's calculations

The correlation matrix with other asset classes highlights important differences in the degree of integration between the Unified European Growth Market Index and other major asset classes. The index exhibits a very strong positive correlation with the Euro Stoxx 600 and MSCI Growth, indicating that European growth equities move closely with broader European and global growth-oriented equity markets. This result is consistent with international asset pricing evidence showing that equity markets share common global risk factors, particularly during periods of financial stress and monetary tightening[49]. The strong relationship suggests that the unified index remains structurally embedded within the broader European equity cycle despite its small-cap focus.

The correlation with the S&P 500 is positive but somewhat lower than with European benchmarks, this reflects global market integration, as documented by Forbes and Rigobon (2002), but also highlights partial segmentation. European growth stocks are influenced by global risk sentiment and capital flows, yet they remain more sensitive to

[49] (International Stock Return Comovements, Bekaert, Hodrick and Zhang, 2009)

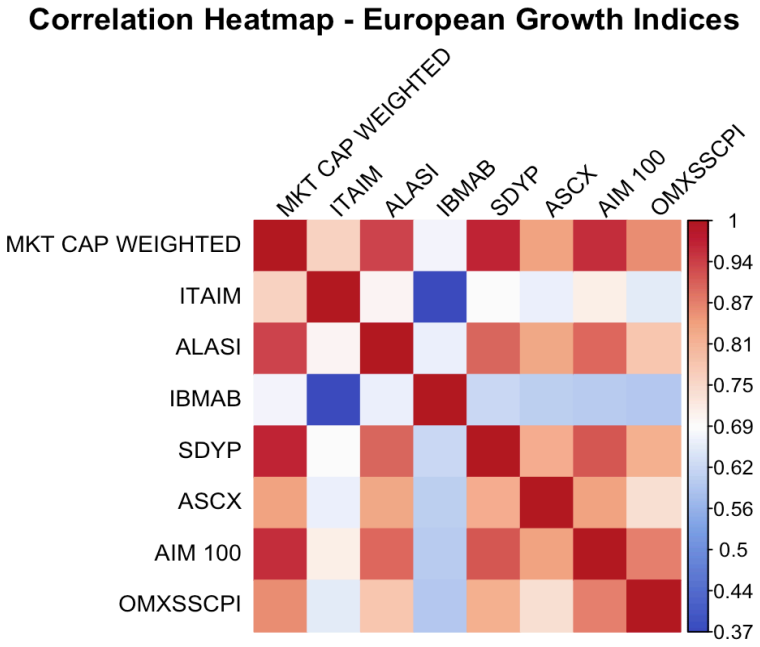
regional economic conditions and ECB policy dynamics than to U.S.-specific macroeconomic developments.

The correlation with corporate bonds (iBoxx Index) is more important because it is moderate, not high. A correlation of about 0.4 means that both asset classes respond to common macro-financial shocks, like changes in interest rates or credit spreads, but they are driven by different fundamental mechanisms. Credit risk and yield dynamics have a bigger effect on corporate bond returns than growth equities, which are more affected by earnings expectations and changes in the discount rate. This moderate correlation means that the two things move together to some extent, but it also means that there is a lot of room for diversification.

The weakest connection is with commodities. This is because commodity markets are affected more by supply shocks, geopolitical tensions, and inflationary pressures than by corporate profitability. This finding aligns with empirical literature indicating that commodities may provide diversification advantages compared to equities[50].

Overall, the correlation structure confirms that the Unified European Growth Market Index behaves primarily as a cyclical equity asset class, strongly integrated with global equity markets but only moderately linked to fixed income and weakly connected to real assets such as commodities. This pattern suggests limited diversification benefits within the equity space but more meaningful diversification potential in a broader multi-asset allocation framework.

[50] *F* (acts and Fantasies about Commodity Futures, Gorton and Rouwenhorst, 2006)



Source: Author's calculations

The correlation matrix across European growth indices provides further insight into the structural characteristics of the Unified European Growth Market Index, as expected, the unified index exhibits very strong positive correlations with most of its constituent national segments, particularly with SDYP (Germany) and AIM 100 (United Kingdom). This result is fully consistent with the market-cap-weighted construction discussed in Chapter 3, where German and UK constituents represent the dominant share of total capitalization and therefore exert a disproportionate influence on aggregate performance.

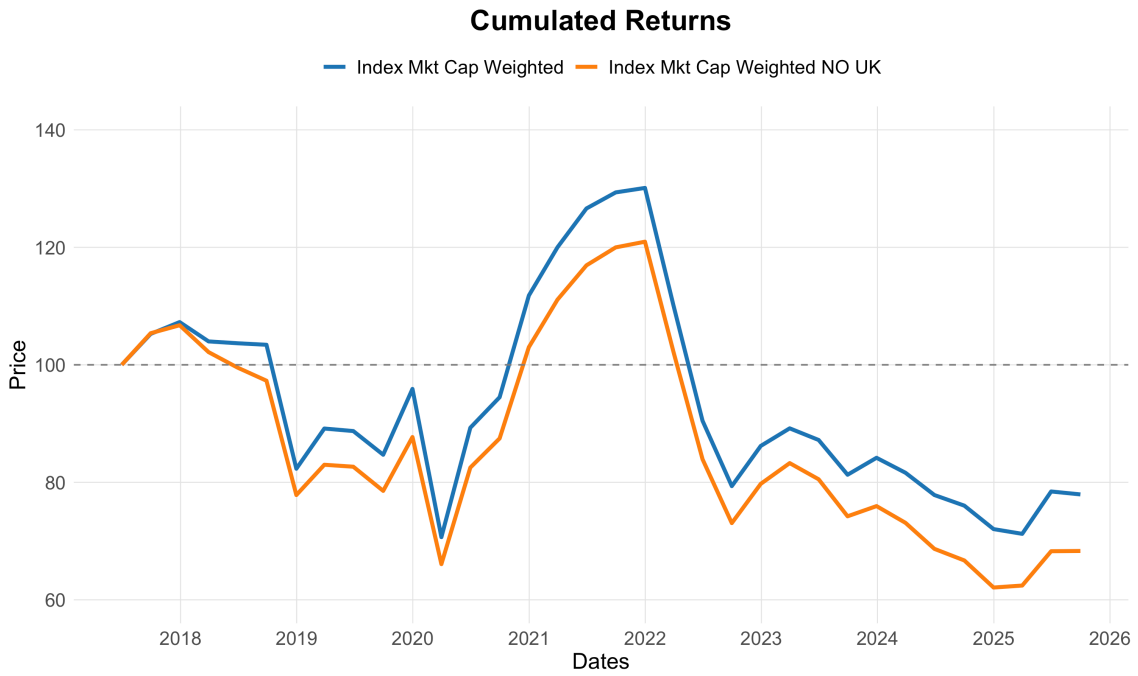
The high correlation with SDYP confirms the structural weight of German growth companies within the unified benchmark, as previously shown in the index composition analysis, German firms consistently account for the largest capitalization share, meaning that quarterly fluctuations in the German segment translate directly into movements of the unified index. Similarly, the strong association with AIM 100 reflects the economic relevance of the UK growth market within the European ecosystem, despite institutional separation following Brexit.

On the other hand, correlations with smaller markets like ITAIM and IBMAB are much lower, and in some cases, only moderate. This is because these markets have a smaller

weight in the unified index and the growth segments in Southern Europe are more unique. As discussed in Chapter 2, these markets have different sectoral compositions, less liquidity, and are more affected by changes in the economy at home. The lower correlation coefficients support the larger point that European growth markets are still partly fragmented and heterogeneous, rather than fully integrated into a single homogeneous asset class.

Importantly, the overall correlation structure reinforces the interpretation that the unified index behaves as a weighted aggregation dominated by the largest and most liquid national segments. The index does not simply average national dynamics; it amplifies those markets with higher capitalization and deeper trading activity. Overall, the correlation analysis confirms that while European growth markets share common cyclical drivers, structural differences across countries remain economically meaningful and shape the behaviour of the unified benchmark.

4.2.5 Construction of a UK-Excluded Unified Growth Index



Source: Author's calculations

To assess the structural contribution of the United Kingdom within the Unified European Growth Market Index, a second benchmark was constructed using the same market-cap-weighted methodology but excluding all UK-listed constituents. Over the full sample period, the UK-excluded index delivers an annualized return of approximately –4.5%, compared to –2.98% for the baseline unified index, and exhibits a Sharpe ratio of around –0.22, slightly weaker than the original benchmark (–0.164). These figures indicate that removing the UK component leads to lower cumulative performance and a deterioration in risk-adjusted returns.

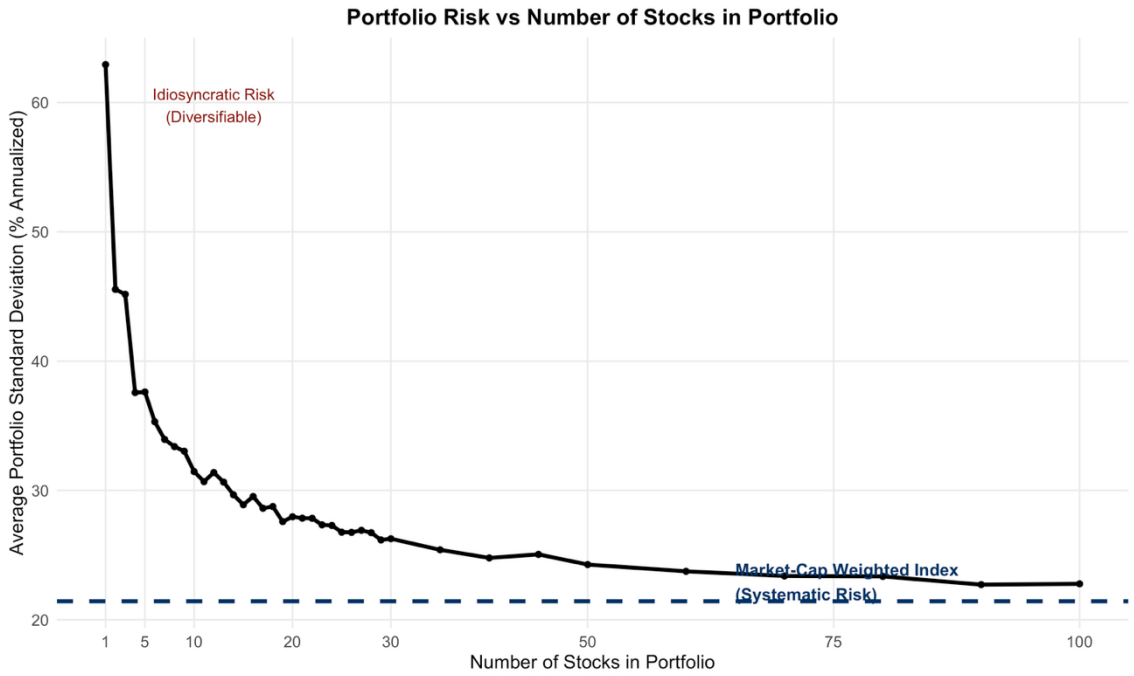
The comparison of cumulative returns confirms this divergence. Both indices show almost the same cyclical turning points, which are caused by common macro-financial factors like the COVID-19 shock, the 2021 recovery phase, and the following tightening cycle. However, the UK-excluded version always stays below the baseline index. After 2022, the gap gets bigger, which suggests that UK constituents helped to stabilize things in the later stages of the sample.

However, this result must be interpreted carefully, both indices are constructed using the set of firms that remain constituents as of 2025. They therefore do not replicate the exact historical evolution of national growth indices, in particular, several UK firms that underperformed during the post-Brexit period may have exited the growth segment or delisted prior to 2025 and are consequently excluded from the dataset. As discussed in the section on survivorship and migration bias, the constructed benchmark reflects the performance of the persistent 2025 universe rather than the full historical trajectory of UK growth markets.

This distinction is crucial, although certain UK growth indices may have experienced periods of relative weakness following Brexit, the unified benchmark captures only the surviving firms within the 2025 classification. The relative underperformance of the UK-excluded version therefore reflects the structural role of UK constituents within the persistent sample rather than a contradiction of broader post-Brexit market trends.

In general, the robustness exercise shows that geographic composition has a big effect on overall outcomes in a market-cap-weighted framework. At the same time, it makes the methodological point that results should be seen as a structural sensitivity test, not as a counterfactual reconstruction of historical performance after Brexit.

5. Discussion of Results: Diversification and Systematic Risk



Source: Author's calculation

The diversification analysis replicates the classical framework presented in Bodie, Kane and Marcus (Investments) and is rooted in the principles of modern portfolio theory (Markowitz, 1952). Individual stock returns are first computed, after which randomly selected equally weighted portfolios of increasing size are constructed through repeated Monte Carlo simulations and then for each portfolio size, the average annualized volatility across 1,000 simulations is reported.

The results strongly confirm the theoretical prediction, the average annualized volatility of a single stock is approximately 60–65%, reflecting the high idiosyncratic risk typical of small and growth-oriented firms. As additional securities are included, portfolio

volatility declines sharply, with around 10 stocks, average volatility falls to roughly 30–32%, representing a reduction of nearly half relative to holding a single stock. When the portfolio reaches 30 stocks, volatility stabilizes around 25–26%, and beyond approximately 50 stocks, the curve flattens further, converging near 23–24%.

This lower bound closely matches the annualized volatility of the Unified Market-Cap Weighted Index (approximately 21–22%, represented by the dashed line in the figure). The convergence indicates that once a sufficiently large number of securities is included, idiosyncratic risk is largely diversified away, leaving systematic risk as the dominant component of portfolio volatility.

The shape of the curve shows two structural features of the European growth segment. First, individual growth stocks have very high volatility on their own, which is consistent with their smaller market capitalization, lower liquidity, and greater exposure to firm-specific shocks. Second, diversification greatly lowers total risk, but it can't get rid of exposure to common macro-financial drivers like monetary tightening, pandemic uncertainty, or energy-related shocks, which were already found in the rolling volatility and performance analysis.

Overall, the evidence confirms that the Unified European Growth Market Index behaves as a broadly diversified portfolio in which unsystematic risk is largely eliminated, and aggregate volatility is driven primarily by systematic market forces.

6. Conclusions

This thesis analyzes the structural and performance characteristics of European growth equity markets by constructing a unified market-cap-weighted index based on the current investable universe of growth-listed companies as of 2025. The benchmark is constructed using the current investable universe of growth-listed firms as of 2025, including companies that entered the market during the sample period. As a result, the index reflects the performance history of today's growth constituents rather than a point-in-time replication of historical index membership. This approach allows for the evaluation of how a consolidated European growth benchmark would behave when built from today's surviving and investable firms.

The primary objective was to assess whether this cross-country aggregation of growth companies exhibits the features of a coherent asset class and to determine the extent to which national concentration effects continue to influence aggregate performance. The empirical strategy combines cumulative return analysis, volatility dynamics, correlation structures across asset classes and national indices, and a robustness exercise excluding UK constituents. Together, these components provide a structured assessment of how geographic composition, macro-financial exposure, and market structure shape the behaviour of European growth equities within a unified framework.

The unified index including all constituent countries exhibits the typical characteristics of European growth markets, with pronounced cyclical fluctuations and a risk–return profile largely shaped by common macro-financial conditions. When the United Kingdom is excluded, the cumulative performance of the benchmark is slightly weaker, indicating that the UK segment contributes positively to overall return levels within the unified framework.

At the same time, the comparison between the two versions reveals a high degree of similarity in cyclical patterns and volatility phases, this suggests that aggregate dynamics are predominantly driven by shared systemic factors rather than by any single national component. While geographic composition affects the magnitude of cumulative outcomes, it does not alter the underlying structure of return movements. In other words,

the presence of the UK influences performance intensity but not the fundamental macro-financial exposure of the European growth segment.

Overall, the evidence indicates that cross-country aggregation enhances the representativeness of the benchmark, while common risk factors remain the primary drivers of performance across European growth markets.

The broader interpretation of these findings is consistent with the institutional evidence discussed by Borri and Di Giorgio (2024), who highlight how the development of European equity markets is shaped by both demand-side and supply-side determinants. Differences in financial literacy, household asset allocation patterns, pension fund participation, regulatory harmonization, and overall market depth contribute to persistent structural heterogeneity across countries. Growth segments are particularly sensitive to these factors, as they rely more heavily on equity financing, investor confidence, and liquid secondary markets. In several European economies, the predominance of bank-based financing models, limited institutional investor participation, and uneven geographic development constrain the expansion of publicly listed growth firms. At the same time, valuation pressures, delisting dynamics, and competition from private capital alternatives affect the attractiveness and stability of public growth markets, these structural characteristics influence not only firm-level financing conditions but also the aggregate performance and resilience of national growth indices.

Within this broader framework, the construction of a unified European growth index acquires both analytical and practical relevance. From an academic standpoint, it provides a consolidated benchmark that allows for a coherent assessment of systematic risk and aggregate performance across fragmented national markets. From an investment perspective, it enhances transparency and comparability, potentially facilitating cross-border capital allocation. The literature shows that benchmark construction and index inclusion influence liquidity, visibility, and valuation dynamics (“The Price Response to S&P 500 Index Additions and Deletions: Evidence of Asymmetry and a New Explanation” Chen, Noronha & Singal, 2004), suggesting that the existence of a pan-European growth benchmark could contribute to greater market depth and investor

participation. From a policy perspective, such a benchmark aligns with the objectives of the Capital Markets Union, which seeks to reduce fragmentation and strengthen equity-based financing channels for European firms.

The analysis provides a structured and consistent assessment of European growth markets, while also opening up possibilities for further improvement and growth. The index is based on a stable group of growth companies from different countries, which makes sure that the methods are consistent and that the sample is comparable. However, future research could improve on this by adding rolling constituent adjustments that show how membership changes over time, giving a different view of how national growth segments change over time.

While the empirical framework primarily concentrates on aggregate performance and volatility dynamics, future research could enrich the analysis by incorporating multi-factor asset pricing models, sector-level decomposition, and explicit macroeconomic variables such as interest rate changes and inflation expectations, thereby allowing for a more granular identification of the drivers of systematic risk within European growth equities. Additional investigation into liquidity conditions, trading activity, and microstructural characteristics would further enhance the understanding of cross-country differences in market efficiency and capital allocation. By extending the analytical toolkit while preserving the unified benchmark approach developed in this thesis, subsequent studies could provide a more comprehensive assessment of the integration and structural resilience of European growth capital markets.

In conclusion, this thesis shows that European growth equity markets move closely together in response to common macro-financial cycles yet continue to reflect underlying national structural differences. The unified market-cap-weighted index developed in this study provides a coherent representation of the aggregate risk profile of the European growth segment and illustrates how geographic composition influences overall performance dynamics.

More generally, building a pan-European growth benchmark helps us better understand how to look at fragmented national markets in a more unified way. Common shocks cause synchronized volatility, but things like the way institutions work, how investors behave, and how deep the market are still important for country-level outcomes. In this regard, the establishment of unified benchmarks may represent a pragmatic advancement towards enhanced transparency and international comparability.

At the same time, the creation of a single European growth index also generates tangible opportunities, a consolidated benchmark can improve visibility for growth-oriented firms, facilitate cross-border capital allocation, and provide institutional investors with a standardized reference for portfolio construction. By reducing informational segmentation and enhancing comparability, such an index may encourage broader participation from both active and passive investment vehicles. In turn, this could contribute to improved liquidity conditions and a more efficient allocation of equity capital across European markets.

Ultimately, however, the long-term strengthening of European growth capital markets will depend not only on improved benchmarking and integration tools, but also on structural progress in financial harmonization, investor participation, and the expansion of equity-based financing channels across the continent.

Bibliography

(s.d.).

acts and Fantasies about Commodity Futures, Gorton and Rouwenhorst, 2006. (s.d.).

Adrian, T., Duarte, F. & Shin, H.S. (2019). Financial Vulnerabilities and Risk Premia. (s.d.).

Armstrong, Robert. “The small-cap blues,” Financial Times, September 28 2023. . (s.d.).

Baker, S. B.-I. (s.d.).

Bekaert, G., Hodrick, R.J. & Zhang, X. (2009). International Stock Return Comovements. Journal of Finance. (s.d.).

EU Commission Staff Working Document SWD(2022) 762 final, Brussels, 7.12.2022. (s.d.).

Fama and French, 1., Lettau and Ludvigson, 2., & Asness, F. a. (s.d.).

https://cepr.org/voxeu/columns/energy-crisis-and-german-manufacturing-sector-structural-change-no-broad. (s.d.).

https://en.oninvest.com/article/why-european-small-caps-are-back-on-investors-radar-in-2025. (s.d.).

https://en.wikipedia.org/wiki/Survivorship_bias. (s.d.).

https://essd.copernicus.org/articles/17/3431/2025/. (s.d.).

https://finance.ec.europa.eu/system/files/2021-05/210525-report-tesg-cmu-smes_en.pdf. (s.d.).

https://gbfinancemag.com/the-recent-weakness-in-the-german-manufacturing-sector/. (s.d.).

https://globalmarkets.cib.bnpparibas/eu-market-infrastructure-package-2025/. (s.d.).

https://indexes.nasdaqomx.com/Index/Overview/OMXSSCPI. (s.d.).

https://stoxx.com/exploring-sdax-the-benchmark-for-german-small-companies/. (s.d.).

https://thesis.eur.nl/pub/5648/Thesis_Markus_Sartori_Thijs_Scholte.pdf. (s.d.).

https://tradingeconomics.com/spain/gdp-growth-annual. (s.d.).

https://webgate.ec.europa.eu/circabc-ewpp/d/d/workspace/SpacesStore/bf732451-2d19-42b6-a9b6-488f6cb5c40f/download. (s.d.).

https://www.afme.eu/media/emtkq0dw/afmeimpactofcovid19oneuropeancapitalmarketsupdatefinaldraft1111.pdf. (s.d.).

https://www.aimlisting.co.uk/the-aim-market/. (s.d.).

https://www.astrid-online.it/static/upload/2212/221207-impact-assessment-listing_en.pdf. (s.d.).

https://www.bancaditalia.it/pubblicazioni/rapporto-bce/2024-bce/index.html?com.dotmarketing.htmlpage.language=1. (s.d.).

https://www.ecb.europa.eu/press/blog/date/2023/html/ecb.blog230830~cfe3be0960.en.html. (s.d.).

https://www.economymagazine.it/aim-ha-cambiato-nome-si-chiama-euronext-growth-milan/. (s.d.).

https://www.efmaefm.org/0EFMAMEETINGS/EFMA%20ANNUAL%20MEETINGS/2020-Dublin/papers/EFMA%202020_stage-1301_question-Full%20Paper_id-428.pdf. (s.d.).
https://www.euronext.com/sites/default/files/notices/monte-titoli/1357377v-EN-lf-Market%20Notice_Rebranding.pdf. (s.d.).
https://www.gide.com/en/news-insights/eu-listing-act-comes-into-force/. (s.d.).
https://www.imf.org/en/news/articles/2025/09/15/cf-italy-needs-higher-productivity-and-more-people-working. (s.d.).
https://www.imf.org/en/publications/fandd/issues/2025/06/spains-shift-to-success-carlos-cuerpo. (s.d.).
https://www.oecd.org/en/publications/oecd-economic-surveys-netherlands-2025_2dd1f4aa-en/full-report/preserving-trade-competitiveness-amidst-increasing-global-fragmentation_d7457f46.html. (s.d.).
https://www.oliverwyman.com/our-expertise/insights/2025/jul/european-capital-markets-fragmentation-liquidity-gap.html. (s.d.).
https://www.pinsentmasons.com/out-law/news/new-law-multiple-vote-share-structure-part-of-eu. (s.d.).
https://www.royceinvest.com/insights/chartbook/us-small-cap-mrkt-overview/index.html. (s.d.).
https://www.scoperatings.com/ratings-and-research/research/EN/177844. (s.d.).
https://www.securitiesfinancetimes.com/securitieslendingnews/industryarticle.php?article_id=227726. (s.d.).
https://www.spglobal.com/en/research-insights/special-reports/the-eu-capital-markets-union-turning-the-tide. (s.d.).
https://www.spglobal.com/spdji/en/spiva/article/spiva-europe. (s.d.).
https://www.statista.com/statistics/621489/fluctuation-of-fixed-rate-interest-rates-ecb/. (s.d.).
https://www.theguardian.com/business/2024/oct/28/london-aim-delistings-budget-inheritance-tax-relief. (s.d.).
https://www.tradersmagazine.com/departments/buyside/peel-hunt-survey-reports-mifid-ii-hurt-small-and-mid-cap-liquidity/. (s.d.).
"A Primer of Data Cleaning in Quantitative Research: Handling Missing Values and Outliers", A. M. (s.d.).
"Index rebalancing and stock market composition: Do indexes time the market?", M. S. (s.d.).
"Index rebalancing and stock market composition: Do indexes time the market?", M. S. (s.d.).
"Market Growth Insights", P. 2. (s.d.).
International Stock Return Comovements, Bekaert, Hodrick and Zhang, 2009. (s.d.).
Lehmann, A. (2020) 'Emerging Europe and the capital markets union', Policy Contribution 2020/17, Bruegel. (s.d.).
Pagano, P. a., & Chemmanur and Fulghieri, 1. (s.d.).
Pastor, L. & Veronesi, P. (2012). Uncertainty about Government Policy and Stock Prices. (s.d.).

Posi (tion Paper on the EU SME Growth Markets Consultation, E. 2. (s.d.).
tion Paper on the EU SME Growth Markets Consultation, Euronext, 2018. (s.d.).
tps://www.statista.com/statistics/621489/fluctuation-of-fixed-rate-interest-rates-ecb/. (s.d.).
Which Financial Frictions? Parsing the Evidence from the Financial Crisis of 2007–2009, Adrian, Colla and Shin, 2013. (s.d.).