

To What Extent Does Portfolio Diversification Reduce Systemic Risk During Global Financial Crises?

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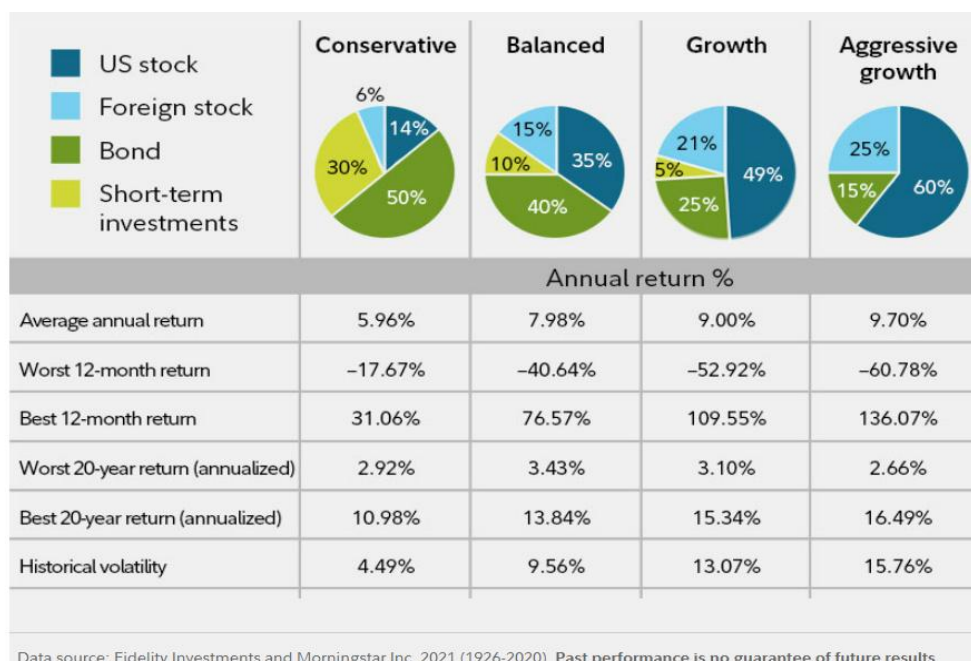
I. Introduction

The 2008 Financial Crisis (GFC) around the world presented an ugly paradox to modern finance. Generally uncorrelated assets started to move in concert, and asset correlations across regions and equity classes experienced extreme spikes in asymmetrical fashion. Instruments that once promised diversification, like mortgage-backed securities, demonstrated interconnectivity that was not generally considered. Portfolios that passed through 'normal' or calm periods crumbled under high volatility, highlighting how the foundational principle, diversification, weakens under systemic shocks.

Diversification is widely regarded as one of the best tools for managing risk. The principle is founded on Harry Markowitz's Modern Portfolio Theory (1952), and asserts that combining assets with low correlations will reduce portfolio volatility, thereby reducing the size of losses from individual exposures. Under normal and stable conditions, the principle holds remarkably well, and investors in both developed and emerging markets benefit from boundaries of risk driven by expanding the potential correlation of exposure in an industry, geography, or asset class. However, crises have repeatedly proven that diversification has limits - when markets roar from contagion, a high degree of asset correlation emerges, and liquidity evaporates when systemic risk overwhelms even the best-constructed portfolios.

This tension raises an important question: how much can diversification reduce systemic risk in an international financial crisis? Certainly, diversification will protect individual portfolios from idiosyncratic shocks; however, systemic shocks, such as the 2008 GFC and the COVID-19 market shock, indicate that correlations collapse, and diversification fails during global systemic events.

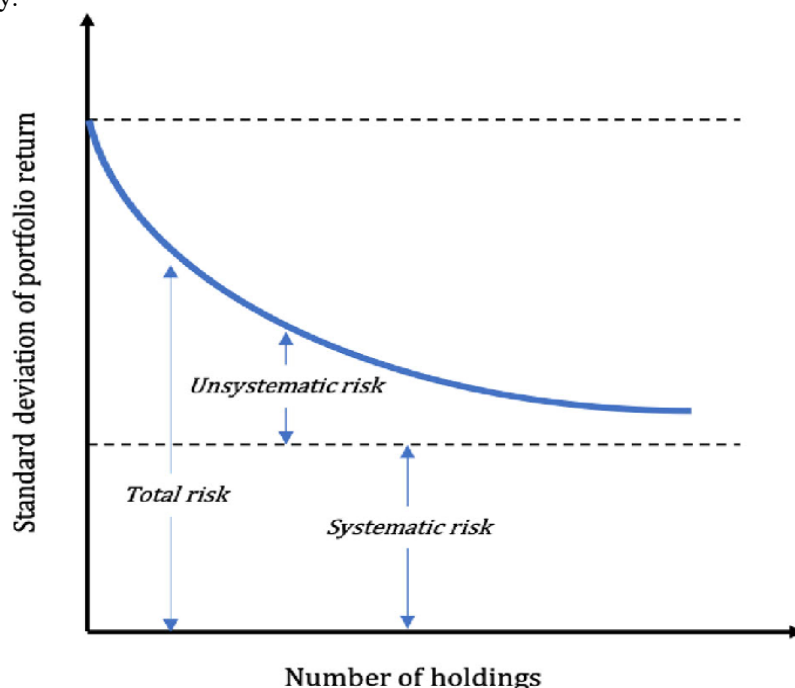
The paper aims to contribute to the conversation surrounding this fundamental tension in global finance by connecting financial theory to empirical observations made during the recent crises. The paper examines the "theory of portfolio diversification" from Markowitz's background, and then compares outcomes across different contexts (especially, between developed and emerging economies which differ markedly in terms of risk, volatility, market depth, and institutional quality). The paper uses case study evidence, including observations from the 2008 GFC, and the market shock associated with COVID-19, along with cross-country evidence from systemic banking crises and sovereign crises, to consider whether the plausibility of portfolio diversification exists to reduce systemic risk versus delaying loss during periods of crisis in an international financial system.



Source: [Cfitrade](#)

II. Theoretical Background

The idea of diversification is best known through the lens of Modern Portfolio Theory (MPT) developed by Harry Markowitz in 1952. As described in MPT, investors can create an "efficient frontier" of portfolios by combining assets whose returns are not perfectly correlated. This means that an investor can reduce the total volatility of the portfolio while maintaining the expected return of the individual assets. Simply put, diversification is effective in lowering risk known as idiosyncratic risk or unsystematic risk—the risk that is associated with a specific firm, industry, or investment. Diversification is unable to alter or reduce systematic risk,—market risk, or risk that is associated with other assets in the market—because risk that is systematic is market-wide and derived from factors such as recessions, interest rate shocks, global or national crisis, which would affect a market of assets concurrently.



This figure is based on Markowitz (1952) and shows that with an increasing number of portfolio holdings the standard deviation of portfolio returns can be reduced. This is due to a reduction of idiosyncratic risk which vanishes as a result of diversification

This distinction of idiosyncratic risk from systemic risk or systematic risk is at the root of portfolio theory; idiosyncratic risk belongs to the factors unique or special to the specific securities based on management decisions, the environment of industry competition, etc., and this risk can be diversified away. Systemic risk applies to market-wide or economy-wide shocks, and diversification does nothing to eliminate this, as systemic factors will push all assets' correlations upward, resulting in losses among assets across the portfolio.

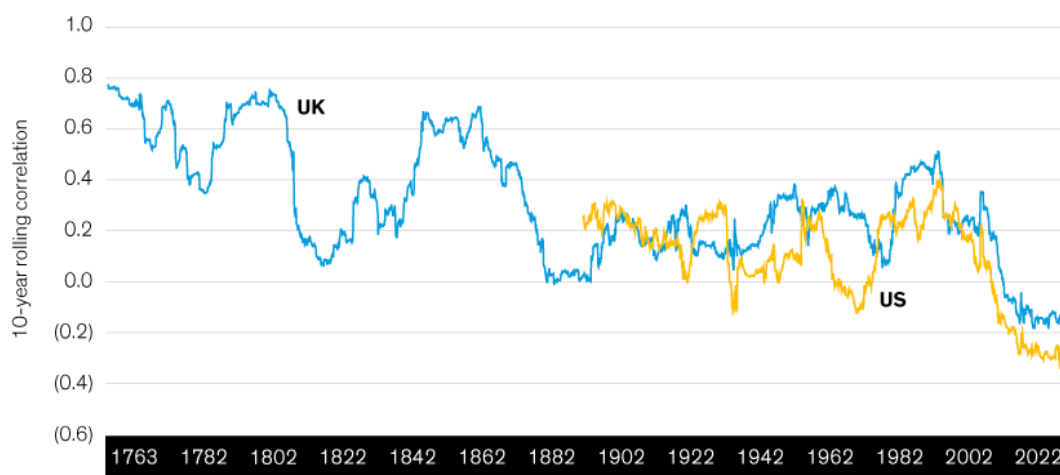
An additional relevant point provided by MPT is that diversification benefits ultimately experience diminishing returns. The "flattening curve" effect states that the most significant risk reduction from diversification occurs when uncorrelated assets are added at the beginning. For instance, an investor who owns one stock could see portfolio volatility dramatically reduced when owning 10 stocks. However, further assets beyond a certain amount will continue to produce less and less benefit for the portfolio. Empirical studies have suggested that, on average, in developed markets approximately 30 to 50 assets are required to sufficiently diversify a portfolio (Zaimović et al., 2021).

Emerging markets present a different challenge. Because of higher volatility, weaker financial institutions, less liquidity, and a higher risk of the influence of political and currency risk, a portfolio of far more assets will be required to achieve the same level of diversification as the above assets would in a developed market. Some studies indicate that 50 to 100 or more securities may be required to reach similar diversification benefits. Even at that level of assets in emerging markets, however, the inherent fragility of the market limits the ability of diversification to provide risk-reduction benefits.

Things are further intensified in times of crisis. The behavior of asset classes during a crisis generally diminishes the protective benefits of diversification because the degree of correlation between asset classes rises. When we rely on our diversified portfolios, normally uncorrelated assets begin rising and falling together when faced with a global shock. For example, in the 2008 financial crisis, both equities and "safer" asset classes - including government bonds - showed increased correlations while their respective prices dropped. In these situations, regardless of how diversified we think we are, we are once again exposed to systemic losses as asset prices converge in their behavior.

So, while diversification is a powerful and effective tool for mitigating idiosyncratic risk in normal market conditions, this effectiveness is inherently limited by systemic risk, where - under a global financial crisis - it is exactly when we most need the benefits of diversification.

Display 1: Long Run 10-Year Rolling Stock-Bond Correlation for US and UK



Historical analysis and current estimates do not guarantee future results.

August 31, 1763, through April 30, 2022

Rolling 10-year correlation between stock and bond returns.

Source: Global Financial Data, Robert Shiller database, Thomson Reuters Datastream and AllianceBernstein (AB)

Source: [Alliancebernstein](https://alliancebernstein.com)

III. Literature Review

3.1 Optimal Number of Assets

The issue of the number of stocks necessary for effective diversification has been examined in numerous empirical works. A systematic literature review of studies from 1968 to 2021 is presented by Zaimović, Omanović, and Arnaut-Berilo (2021) and they find that among developed markets, portfolios of about 30-50 stocks substantially reduce unsystematic (idiosyncratic) risk, while in emerging markets, 50 or 100 stocks or more may be needed to achieve the same reduction in risk levels. They also identify that the number is highly sensitive to

many factors, including what risk measure is employed, whether the portfolios are equally weighted or based on some formulations, frequency of the data, market condition (normal conditions vs turbulent), among several other factors.

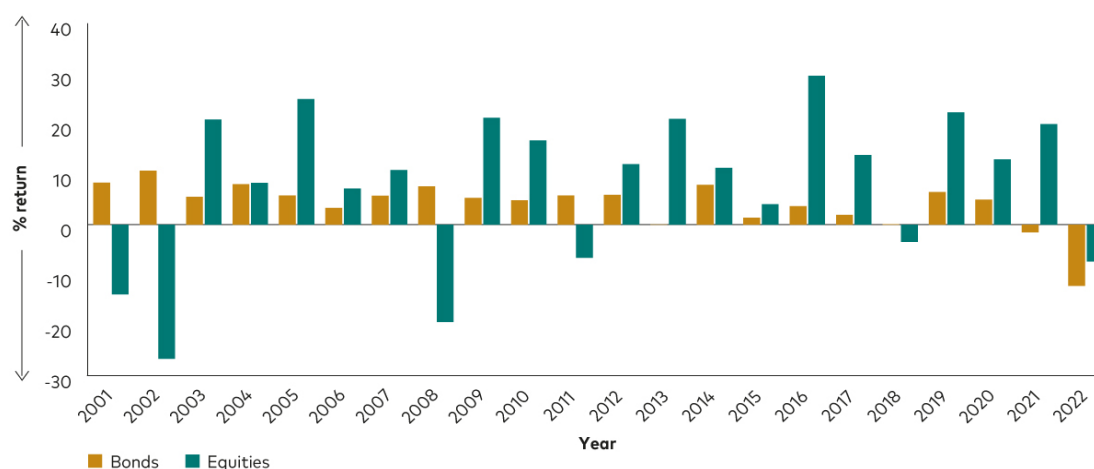
The authors observe that during crisis periods, correlations among stocks tend to increase quite substantially and the "flattening curve" of risk reduction slows down: in that, more assets are needed to achieve the same marginal reduction in risk, and in many cases, large portfolios actually suffer large losses when systemic shocks dominate the period. Zaimović et al. (2021) indicated that during the Global Financial Crisis (2008) and the COVID-19 pandemic, fewer marginal benefits from diversification were achieved, largely due to increasing correlations of asset returns.

3.2 Diversification & Banking Sector

Empirical evidence in the banking sector depicts a more nuanced perspective: diversification can reduce risk and improve stability, but this improvement has non-linear benefits, and systemic effects can flip the result either up or down.

- A study of banks in China (2008–2019) using semiparametric techniques identifies that asset and income diversification add only modest benefits to risk reduction and profitability, especially for certain bank types (e.g., national shareholding banks and city commercial banks). For stability purposes and income diversification, state-owned banks have improved outcomes compared to others, but more generally, income diversification does not always add value to banks and may, in fact, expose banks to excess risk, particularly when the diversification is non-interest income or tied to high volatility activities.
- In emerging markets, the evidence shows mixed effects from revenue diversification: for example, in East Asia and Latin America, some studies have concluded that non-interest income (trading, fees) improved the performance of some banks, but the increase in volatility that is associated with non-interest income has erased stability gains. Relationships are inconsistent across banks and types of non-interest income.
- There's also the idea of a 'diversification discount': as noted in some studies about global banking, diversified banks may trade at a lower valuation than banks with a more specialized business model, possibly due to issues of complexity, inefficiencies, or overextension into unknown businesses. Other research into the diversification of banks shows that the costs (monitoring, governance, regulatory) and exposure to volatile non-core income risks can diminish (if not more than offset) the benefits of diversification. (This corroborates the mixed findings in studies of Chinese banks and emerging markets as it relates to bank diversification).

Performance of global equities and global bonds over more than 20 years



Source: [Vanguard](#)

3.3 Crisis Patterns

Research on financial crises reveals strong evidence that normal diversification assumptions fail during crisis or stress periods.

- According to the IMF's timeframe (1970 until now), there have been hundreds of banking crises: approximately 217 currency crises, 147+ banking crises, and 67 sovereign debt crises. Furthermore, crises for countries tend to occur in tandem or triplets ("twin" or "triple" crises), such as banking +

currency, which lead to compounded contagion of shocks across markets. These overlaps, while pronounced in highly connected and crisis-stressed environments, are amplifying systemic risk and preventing diversification.

- Banking crises, in particular, are known to have longer durations and generate deeper losses for GDP, investment, consumption, etc. In an extreme disturbance's depth or breadth, correlations become pronounced across asset classes and markets.
- Empirical work on sector connectedness (for example in China) shows that extreme risk seemingly stimulate a connectedness (risk transmission), even at multiple iterations, like in moments of stress during the 2008 crisis, or in intermittent Chinese interbank liquidity crises of the last decade, or stock market plunges (the last 20 years), or trade wars - whatever its cause- measures of spillover or connectedness elevate which indicates increased risk of transmission across sectors. In stress or crisis environments, even seemingly diversified exposure can generate severe losses..

3.4 Resilience Frameworks and Beyond Diversification

Although diversification is a helpful tool, most recent literature has emphasized that resilience entails the application of more strategies that are complementary to diversification:

- (McKinsey's Risk & Resilience Agenda Report, 2021) suggests that, in addition to portfolio diversification, institutions must also conduct stress-testing, scenario planning, build reserves and liquidity, and even adopt macro-prudential policies, in order to counter systemic risks and vulnerabilities.
- Some more recent studies from banks (Asia, etc), as well as a couple of banking studies recently published, report that the effects and benefits of diversification strategies (asset diversification, income diversification, funding diversification etc.) are quite heterogeneous by factors such as size of the bank, capitalization, liquidity, etc. Some of these studies suggest that regulations and policies are unique to each institution, and cannot be designed with a "one size fits all" approach. For example, asset diversification helps some banks but will also reduce stability in other cases, as the strategy is applied to diversify funding.
- The literature also discusses the risk that when a large number of institutions employ the same diversification strategies (e.g. investing in assets that have become popular globally, and /or using similar models), their portfolios will thus be similar, which mitigates the benefits of diversification, from a systemic perspective, and may even contribute to systemic vulnerability in these circumstances in the event of shocks. (For example, network theory studies, studies of common exposures)

IV. Methodology

This study uses a comparative framework by using evidence of cases, bank-level data, and multi-country crisis data to evaluate the potential of diversification to reduce systemic risk. Two major case studies are used to demonstrate the diminishing value of diversification: the 2008 Global Financial Crisis and the COVID-19 shock. At the institutional level, a study of African banks (2000-2020, 705 observations, GMM) shows a non-linear relationship between diversification and stability; a study of Chinese banks found that while diversification was shown to reduce firm-level risk, it may merely shift risks from the individual bank to the broader system when institutional strategies converge (33 banks, 2007-2019). At the broadest level, the International Monetary Fund's dataset on currency crises (217), banking crises (147), and sovereign debt crises (67) which references crises from 1970-2017 is used to evaluate clustering of crises stemming from contagion. The analysis focuses on correlations, portfolio concentration, and spillovers with emphasis on the distinction between the stability of an individual portfolio and the possibilities of systemic risk.

V. Case Studies & Evidence

The limits of portfolio diversification are most evident during times of global financial shock, as rising correlations and shared exposures diminish the protective value of risk diversification.

2008 Global Financial Crisis (GFC)

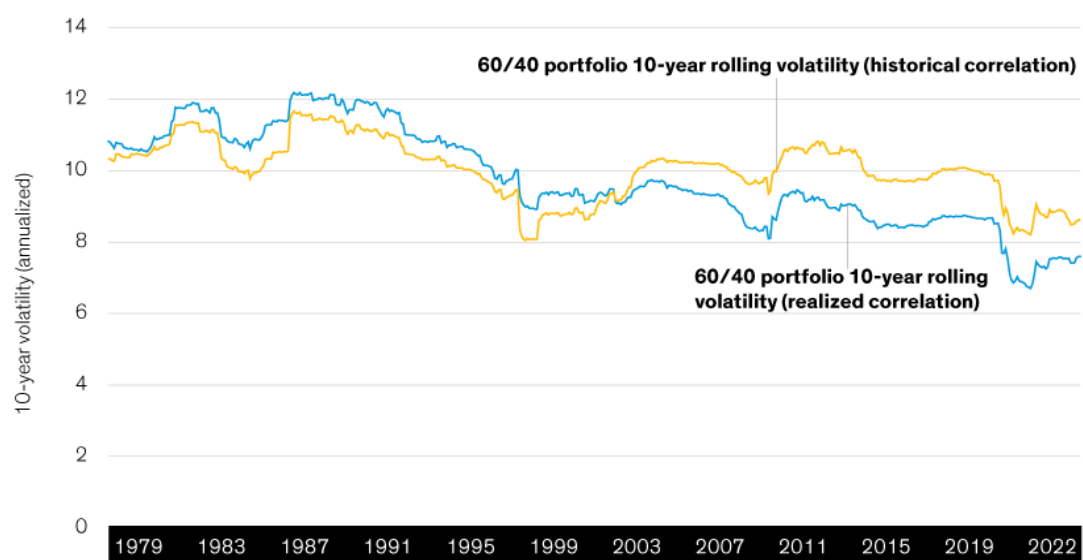
A key takeaway from the 2008 crisis is that diversification can hide systemic weaknesses. Mortgage-backed securities (MBS) were widely accepted as safe and diversified instruments because they pooled thousands of loans, in different locations and with different types of borrowers. However, MBS were ultimately correlated through exposure to the U.S. housing market - when housing prices dropped, correlations across portfolios soared,

and what was believed to be a diversified MBS holding lost value simultaneously (Cowrywise, 2020). Even larger institutional investors with broadly diversified portfolios could not escape contagion, demonstrating how systemic risk overwhelms risk management at the firm level.

COVID-19 Market Crash

The COVID-19 pandemic was another shock that demonstrated how non-correlated asset classes can correlate in unforeseen ways. Early in the market panic of 2020, and at different times, equities and bonds moved together, decreasing the reliability of the classic 60/40 stock-bond allocation (AllianceBernstein, 2020). Even safe-haven assets, such as gold and U.S. Treasuries typically viewed as providers of stability, showed performance spreads during liquidity-induced sell-offs, which highlighted that during shocks, system-wide factors- such as flight-to-cash and policy uncertainty- reduce the reliability of typical hedges.

Display 2: The Volatility of 60/40 Portfolios Has Been Abnormally Suppressed



Historical analysis and current estimates do not guarantee future results.

November 30, 1979, through March 31, 2022

The chart shows the realized volatility of a passive 60/40 portfolio invested in 60% US equities and 40% US government bonds. It also shows the volatility of the same portfolio assuming a stock-bond correlation of 0.13.

Source: Global Financial Data, Thomson Reuters Datastream and AB

Source: [Alliancebernstein](#)

Lessons from the Banking Sector.

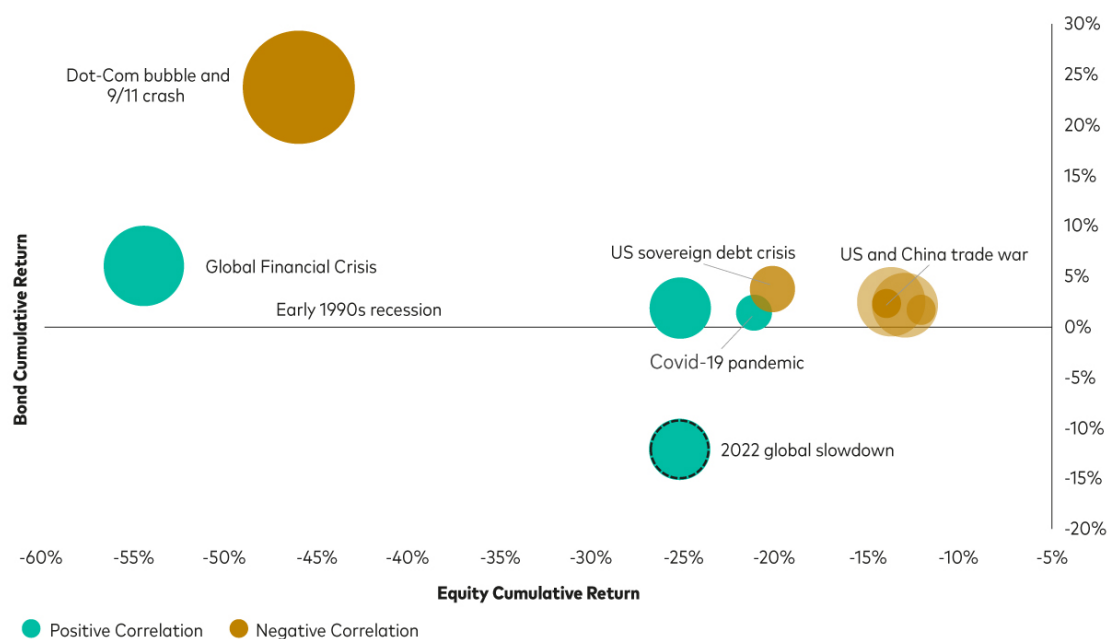
Evidence from the banking sector highlights the limitations of diversification. A study of 45 African countries covering the years 2000–2020, found that diversification provides some improvements in bank stability but only to a certain point; excessive diversification, however, increases complexity and systemic vulnerability, demonstrating a non-linear relationship (Wiley, 2022). Similarly, in China, loan portfolio diversification from one sector to another reduced individual bank risk but did not reduce systemic risk, as banks diversifying into similar sectors increased joint exposure to system shocks (Tang et al., 2023). Overall, while the evidence suggests that diversification at the institutional level can increase firm resilience, but this may increase risk transmission system-wide if strategies converge.

Historical Crisis Data

The broader crisis datasets further reinforce the limits of diversification. For example, the International Monetary Fund (IMF) documents 217 currency crises, 147 banking crises, and 67 sovereign debt crises as of 1970 (Laeven & Valencia, 2013); some of which occur in "twin" and in some instances "triple" crises. Being co-occurring crises, these tendencies raise levels of contagion, as shocks in one market signal more effective transmission across other markets, undermining any free price benefits of cross-asset diversification or cross-venue diversification, as incidents prompted across state lines do. Banking crises produce effects that last a long time, generating not only deeper recessions but also longer recessions beyond crisis types. Together, the examples make evident that even if diversification reduces idiosyncratic risk in normal times, its protective power will be

limited in systemic crisis times - when correlations (individually, institutionally, and across institutions) increase and vulnerabilities converge.

Global equities and aggregate bonds performance during equity market downturns



Source: [Vanguard](#)

VI. Discussion & Analysis

The success of diversification is contingent on the circumstances; it tends to be effective in stable environments, whereas it tends to fail in crises that are systemic in nature.

When Diversification Works.

In typical or normal market environments – when asset correlations are relatively stable and shocks to assets are primarily idiosyncratic, diversification provides the classic benefits. In developed market environments, a portfolio of roughly 30–40 stocks that have been well-selected can significantly reduce volatility and mitigate residual exposure to any one asset (Zaimović et al., 2021). Greater diversification can occur by spreading exposures across asset classes (e.g., equity, bonds, commodities, etc.) to assure even more smoothing returns under low correlations of cross-asset classes.

When Diversification Fails.

However, during crises, the benefits mentioned above are disrupted when correlations across markets and asset classes rise dramatically. The financial crisis of 2008 and the market tumble associated with COVID-19 in 2020 are relevant examples that illustrated how common exposures, liquidity constraints, and panic selling can render diversification meaningless or ineffective. In addition, systemic risk can be amplified by herd mentality: when institutions rationally adopt common strategies (like a liquid and safe allocation to diversify, or follow a passive index benchmark), shocks to that asset are broadcasted across many layers of the market, resulting in fragility (Tang et al., 2023).

Comparing Developed and Emerging Markets.

When analyzing the challenge of diversification, there are distinct issues in developed and emerging markets. In developed markets, it only requires relatively few assets to lower risk significantly, but systemic relationships across banks and asset classes tend to undermine resiliency. In emerging markets, to stabilize return on portfolios, portfolios must hold more assets than in developed markets to offset higher volatility and institutional weakness (Zaimović et al., 2021). However, allocating more to emerging markets in anticipation of good diversification may create illiquidity in the event of a crisis, which ends up negating the advantages of diversification, as investors become highly reactive to the uncertainty present during as well as prior to uncertainty crises.

Other than Diversification.

Given these limitations, resiliency requires something more than spreading investments across a diverse portfolio. Stress testing can help identify portfolio weaknesses under possible extreme outcomes. Other instruments to provide some insurance against systemic shocks include options and tail-risk protection, as well as other hedging strategies to help achieve systemic or distribution targets. At the regulatory level, macroprudential approaches to mitigate vulnerabilities to the system may include Basel III, countercyclical capital buffers, liquidity coverage ratios, and so forth. Consulting frameworks such as McKenzie's resilience framework argue that all organizations must build adaptive capacity, whatever the context, for example, from capital management at the local level, to public, private partnerships to help manage systemic risk.

VII. Policy & Practical Implications

The results of this study have specific implications for investors, regulators, and policymakers managing risk in interconnected financial markets.

Among Investors.

Diversification remains a fundamental, risk-managing tool. However, it may not be sufficient in and of itself for managing risk during a systemic crisis. In addition to traditional diversification, investors should seek investments in alternative assets with low correlations to conventional markets, such as real estate, commodities, or hedge strategies. Knowing the correlations and evolving market conditions, dynamic allocation of assets could reduce systemic risk exposure. Finally, it is very important to understand portfolio vulnerabilities to extreme events through scenario analysis and stress testing regardless of the underlying position, which was evidenced by the 2008 Global Financial Crisis and the significant daily market volatility of COVID-19.

Among Regulators.

Regulators need to move away from individual institutions and toward system-wide resiliency. It is important to observe portfolios' concentration and overlapping exposures, and the same diversification strategy by different financial institutions can further heighten system fragility. Macroprudential tools like countercyclical capital buffers, leverage limits, and liquidity regulation can then enhance the ability of the financial system to withstand an economic shock. Conducting stress testing across the entire system can expose vulnerabilities while firm-specific stress testing methods might not discover vulnerabilities; this would help senior regulators develop policy interventions before a crisis would occur.

For Policymakers.

On a larger scale, policymakers can help achieve resilient financial systems. Resilience can be enhanced by improving supply chain and credit markets, and through robust digital infrastructure, which will enable economies to absorb shocks. In emerging markets in particular, encouraging architectures that promote depth and liquidity of financial markets can promote effective diversification, increasing the range of instruments available for investors to manage risk. As highlighted in many resilience frameworks, collaborations between public and private actors will help determine structural vulnerabilities before there is a crisis.

In summary, effective risk management is obtained through integration, addressing any dimension of risk at the individual, institutional, or systemic level, while incorporating techniques and the oversight of rules and regulations, it also promotes long-term structural resilience strategies along with diversification management techniques.

VIII. Conclusion

This research shows that while diversification is still an essential and effective approach to managing individual portfolio risk, it will not eliminate systemic risk in global financial crises. Diversification is highly contextual, depending on the type of market, the market crisis, and the movement of asset correlations. In developed countries, individuals may still be able to reduce risk with moderately sized portfolios, but in emerging countries, individuals are encouraged to diversify more due to the historical high volatility and lack of solid market infrastructure which increases the risks associated with a portfolio size invested in the market.

The evidence from history shows that during the 2008 Global Financial Crisis and the COVID-19 market shocks and studies of the banking sector in Africa and China, diversification will not protect investors from systemic risk under stress. During systemic crisis shocks, correlations among assets can rise, investors with common exposure can transmit shocks among properties and assets, and even traditional safe havens may not protect investors. It can be inferred that diversification will not, by itself, prevent a significant market meltdown or contagion that leads to systemic risk in all markets.

Effective management of risk requires complementary strategies: macroprudential regulation, dynamic stress testing, hedging, and coordinated responses at the institutional and policy level. Diversification should be

viewed as critical but insufficient in itself, as one element of a larger framework to improve systemic resilience. To answer the research question, diversification can lower risk at the individual level but does not reduce systemic risk experienced during global crises. Policymakers, regulators, and investors will need to adopt integrated strategies that consider portfolio management and structural, regulatory, and institutional safeguards to withstand future shocks to the financial system.

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