

PORTFOLIO MANAGEMENT IN TIMES OF ELEVATED RISK. SAFE-HAVEN AND HEDGE ASSETS IN CAPM SETTING

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ABSTRACT

The purpose of the article. The purpose of the article is to present the safe-haven concept according to the latest academic literature and distinguish it from the hedge and diversifier terms that are sometimes used interchangeably by researchers and portfolio managers. The ultimate goal of the paper is to place the safe-haven and hedge assets in the portfolio theory setting by introducing the negative beta parameter as stated in the Capital Asset Pricing Model. According to the literature, this article proposes a few approaches to identify and characterize safe-haven assets and to discover the perspective and outline further research in the portfolio theory.

Methodology. The work uses the method of descriptive and comparative analysis of literature, i.e., Systematic Literature Review (SLR). This method is used to present scientific overview of portfolio management when uncertainty rises to identify safe-haven and hedge assets.

Results of the research. This paper aims to characterize and identify three main types of assets helping investors to reduce the portfolio risk: safe haven, hedge, and diversifier. It introduces an improved analytical framework of beta parameter and drawdown beta concept to contribute to the rapidly expanding research on portfolio theory. Lastly it depicts a trade-off effect, which is stronger in-crisis performance of safe-haven assets. The returns of safe-haven assets are more positive when the stock market returns are more negative that may safeguard the financial system.

Keywords: safe-haven assets, hedge, diversifier, CAPM, beta.

JEL Class: C10, F30, F31, G11, G15.

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INTRODUCTION

The extreme recent events of the COVID-19 pandemic crisis, the Russian invasion of Ukraine and the Israeli–Palestinian conflict highlighted the demand to manage the portfolio risk sparked by unprecedented market conditions. Unexpected market breakdowns caused global stock markets frequently fluctuated and led to a cross-market spillover of financial risks. These last events manifested that the risk could spread to other financial markets by a rapid information transfer. As a consequence, international investors and portfolio managers cannot ignore the existence of market spillovers and need to find appropriate assets or risk diversification methods in view of the returns on the investment portfolio. Therefore, traditional investment strategies could not remain effective in the face of high geopolitical risk and it is crucial to identify safe-haven and hedge assets when crisis events occur. Recently, there has been a growing body of research analyzing safe-haven and hedge attributes of different financial assets like gold, bitcoin and other reserve currencies and lastly commodities (He et al., 2018: 30–37, Feder-Sempach et al., 2024).

Altogether, gold, reserve currencies like the Japanese yen and Swiss franc, some debt instruments, as well as commodities, are considered popular safe havens for international stock markets. However, the conclusions on the safe haven and hedge abilities of above mentioned assets have not reached a consensus, making it difficult for investors to compare the performances of different assets that are labelled ‘safe’ when extreme events occur mainly because of the spillover risk (Wang et al., 2022: 1–16).

The purpose of the article is to present the safe-haven concept according to the latest academic literature and distinguish it from the hedge and diversifier terms that are sometimes used interchangeably by researchers and portfolio managers. The main objective is to place the safe-haven assets in the portfolio theory setting by introducing the negative beta parameter according to the Capital Asset Pricing Model (CAPM) by adding the drawdown beta concept and contribute to rapidly expanding research on identifying safe-haven assets thoroughly.

1. THE CONCEPT OF SAFE-HAVEN ASSETS

The safe haven literature is large and it is still growing. The rising global uncertainty amplifies the demand for safe-haven assets because the term 'safe haven' refers to investments that are expected to retain or increase in value during times of market upheaval. These assets are desired by investors who want to reduce their exposure to losses when markets are volatile. A flight to safety ensues as a way to avoid a potential portfolio drawdown. Typically, safe havens are

characterized by their liquidity, stability, and ability to hedge against market downturns. They are not risk-free financial assets but are considered to offer protection against systemic risks that can cause widespread losses in other asset classes portfolio. Theoretically, this concept is usually perceived as a hiding place, meaning that investors can protect wealth during the market crisis. However, the safe-haven effect is generally present in developed financial markets (Baur and McDermott, 2010: 1886–1898).

There is a significant relationship between the safe assets and safe-haven assets regarding the level of risk and return. The empirical safe-haven literature proposes two almost independent strands: a safe-haven strand, and a safe assets strand (Baur et al., 2021)¹. Primarily, the term safe haven was used to refer to an asset with low risk and high liquidity (Upper, 2000), making it similar to a safe asset but these two terms are different in nature. Safe assets are safe over a long period of time regardless of crisis, whereas a safe-haven attribute is a short-lived phenomenon identified only during the market collapse. Safe assets are uncorrelated with other assets' returns on average, while safe haven assets are negatively correlated with other asset returns during a market crisis (Bogolębska et al., 2024). See the Figure 1 depicting differences between safe-haven assets, safe assets and risky assets.

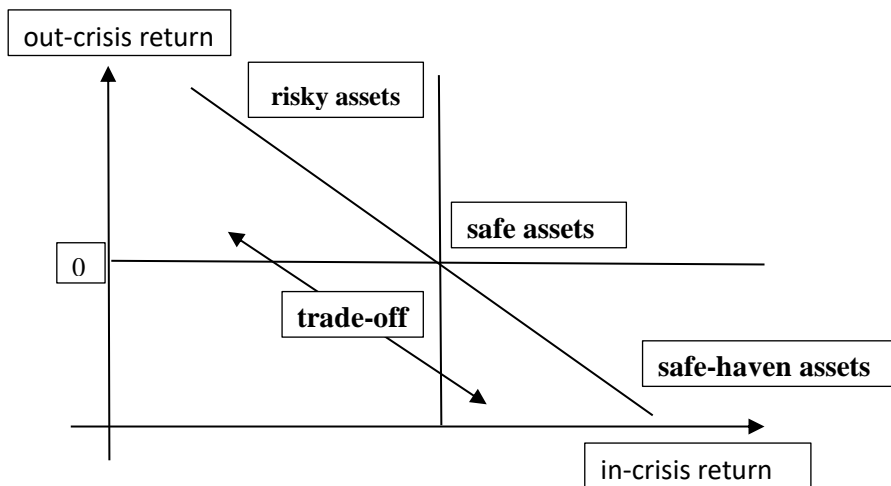


Figure 1. Trade-off across assets

Source: Baur et al. (2021).

¹ According to Baur et al. (2021) three almost independent strands have emerged in the literature: a safe-haven strand, a safe assets strand and a flight to quality strand. Flight to quality emphasizes investors' movements from stocks to bonds in response to negative market shocks.

According to Figure 1 the safe haven property comes at a cost when market rises conversely to risky asset performance that comes at a cost when market falls. The trade-off shows that the positive returns of safe-haven assets in a crisis come at the cost of lower or negative returns in non-crisis periods in compliance with economic and financial theory (Baur et al., 2021).

There is a large and growing number of research trying to indicate established or potential safe-haven assets. Most of the identification strategies are based on the average return during the adverse market conditions or crisis periods. Nonetheless, the definition of a safe-haven asset remains controversial in academic literature and the safe-haven investments are usually distinguished from hedge and diversifiers.

The ability to hedge risk is often a central consideration for international investors during rising uncertainty. Diversification and hedging are often considered as dominant investment strategies in financial markets. Ultimately, a safe haven is defined as a security that is negatively correlated with stock market returns in the case of a market crash. This feature is contrasted with a hedge property, which is defined as a security that is uncorrelated with the stock market on average (Baur and Lucey, 2009). According to Baur and McDermott (2010: 1886–1898) “a strong (weak) safe haven is defined as an asset that is negatively correlated (uncorrelated) with another asset or portfolio in certain periods only, e.g., in times of falling stock markets. A strong (weak) hedge is defined as an asset that is negatively correlated (uncorrelated) with another asset or portfolio on average”. Similarly to a safe haven “a strong (weak) hedge is defined as an asset that is negatively correlated (uncorrelated) with another asset or portfolio on average”. Above features of two types of asset properties include the length of the effect whereas hedge attribute holds on average and safe-haven attribute only during the declining stock market.

Baur and Lucey (2009), followed by Baur and McDermott (2010: 1886–1898), introduced a precise terminology showing the distinction between the safe-haven and hedge terms, previously considered to be a function of safe-haven assets, and adding one more, i.e. diversifier meaning an asset that is positively, but not perfectly correlated with another asset on average (see Table 1).

Table 1. Strong and weak safe-haven and hedge and diversifier definition

Name of the feature	Definition
Strong safe haven	An asset is a strong safe haven when it is negatively correlated with the stock market during periods of market distress
Weak safe haven	An asset is a weak safe haven when it is uncorrelated with the stock market during periods of market distress
Strong hedge	An asset is a hedge when it is negatively correlated with the stock market on average (not only during times of financial distress)
Weak hedge	An asset is a hedge when it is uncorrelated with the stock market on average (not only during times of financial distress)
Diversifier	An asset is a diversifier when it is positively but not perfectly correlated with the stock market on average (not only during times of financial distress)

Source: own elaboration based on the cited literature and Feder-Sempach et al. (2024).

There are several assets that are mostly classified as safe havens: gold (Baur and Lucey (2009), sometimes silver and other commodities (Cifarelli and Paladino, 2015: 1–15), reserve currencies (Ranaldo and Söderlind, 2009), public debt instruments (Kaul and Sapp, 2006: 760–779), defensive stocks, and recently, cryptocurrencies, such as Bitcoin (Li and Miu, 2023: 367–385). Recently, Rizvi et al. (2022: 106396) investigated the safe-haven properties of Green, Islamic, and Crypto assets against gold and treasury securities. They revealed that both Green and Islamic Bonds only act as safe-haven assets during the normal market condition which in contrast to a safe-haven definition stating that a safe-haven effect works during the market downturns. Traditional US Treasuries, cryptocurrencies, and gold emerged as safe-haven assets under bearish or extreme volatility periods legitimizing their safe-haven attribute.

1.1. Gold and precious metals

Gold has a substantial, safe haven property in every economic condition (Boubaker et al., 2020: 123093; Akhtaruzzaman et al., 2021: 105588; Triki and Ben Maatoug, 2021: 101872). Primarily, gold is considered a safe-haven asset, helping investors to reduce risk during uncertain periods but other precious metals such as silver, platinum, and palladium are still gaining importance. Gold has traditionally been considered a safe-haven asset against exchange rates, highlighting its monetary asset role (Batten et al., 2010). Nowadays, gold has retained its traditional monetary role as a store of value while it no longer plays a central role in the contemporary monetary system. It has a significant symbolic value that distinguishes it from other precious metals because it played a central role in the history of the monetary system. Gold ended its primary role in the international monetary system after the collapse of the Bretton Woods system in

1971 but still it is a part of most central banks' foreign-exchange reserves (Bie and Henneberg Pedersen, 1999).

One of the first articles analysing the safe-haven attribute of gold was proposed by Baur and Lucey (2009) and Baur and McDetmott (2010: 1886–1898), who found that gold was a strong safe haven for most developed markets during the peak of the Global Financial Crisis (GFC). Gold has always been considered as a safe-haven asset because it is negatively correlated with the economic cycle and usually provides positive returns during crises (Bouri et al., 2020). The safe-haven and hedge attribute of gold was analyzed against G7 stock markets (Shahzad et al., 2020), or US real estate stocks in the long and short run (Raza et al., 2018) and developed and emerging markets. Shahzad et al. (2019: 322–330) studied the role of Bitcoin, gold and commodities for stock indices and gold, and the commodity index can be considered as a weak safe-haven asset in some cases. Bekiros et al. (2017: 317–334) examined the hedging and diversification roles of gold for the BRICS markets proving that gold acts as a hedge and safe-haven asset for BRICS stocks in both crisis and non-crisis periods.

Contrary to gold and sometimes silver, platinum and palladium are usually classified as industrial metals (Vigne et al., 2017) but platinum may be useful as a safe haven in periods of extreme stock market declines (McCown and Shaw, 2017: 328–337). Their high economic value and ability to maintain this value even during financial downturns make precious metals, especially gold and silver, safe-haven assets (Starr and Tran, 2008: 416–436). The interactions between precious metals and stock indices are not homogenous, what is more, they differ across countries. This can be attributed to different properties of these commodities with the emphasis on significantly different demand and supply fundamentals, as well as the size and complexity of financial markets, creating different spillover mechanisms.

Azimli (2022: 102679) analyzed the dynamic connectedness of asset classes among four commodities: copper, iron, gold, and silver and ten major global stock indices. The results indicate that silver outperforms gold as a safe-haven asset in the post-COVID 19 period. Lucey and Li (2015) find evidence that during extreme stock and bond market distress in the United States, silver, platinum, and palladium act as a safe haven contrary to gold. On the other hand, Sikiru and Salisu (2021: 2199–2214) indicate that only gold acted as a safe haven during the COVID-19 among precious metals. Mujtaba et al. (2023: 2381–2414) examine the hedge and safe-haven properties of four commodity classes (precious metals, energy, agriculture, and livestock), for the United States and China at an equity index and sectoral level. Their findings indicate that precious metals are weak safe havens for all equity sectors of China and the USA. What is more, this property is limited. Additionally, in case of China, precious metals provide a weak hedge to the majority of sectors and the Shanghai Composite Index (SCI). Gençyürek and

Ekinci (2023: 297–321) investigate the role of precious metals as diversifier, hedgers and safe-haven assets in the stock markets of BRICS and Turkey. They find that all of the four metals are effective risk management instruments, except for hedging strategy. Moreover, to mitigate risk, investors should increase the weight of precious metals in their portfolio, except for gold. These studies confirm that precious metals are too distinct to be considered a single asset class. Conventionally, gold and silver are perceived as substitutes of money (Batten et al., 2010), and they are treated as a store of value and a medium of exchange (Jain and Ghosh, 2013). Their safe-haven characteristics are well documented in the academic literature stressing gold prominence in investment and monetary debates (O'Connor et al., 2015).

1.2. Currencies

The list of safe-haven currencies is consistent with the list of main reserve currencies, i.e., the US dollar, the euro, the Swiss franc, and the Japanese yen exhibiting the dominant position of the US dollar followed by the euro (Lu et al., 2024: 3–5). Accordingly, the determinants of safe-haven currency status are compatible with the determinants of international currencies (Bogołębska et al., 2019: 65–81). Nevertheless, the global structure of foreign exchange reserves does not explain the strong representation of the yen and the franc as safe-haven assets and overestimates the role of the common European currency euro.

In the literature on safe-haven currency drivers, the emphasis is on the structural characteristics of the economy. Habib and Stracca (2012: 50–64) showed that only a few country-specific characteristics, such as the net foreign asset position and the size of the stock market, and in the case of advanced countries, the interest spread compared to the US, are somewhat systematic drivers of safe-haven currency behaviour. Additionally, Masujima (2019) indicated that above mentioned drivers are not permanent and they might change strongly. The results of the panel regression suggest that the determinants of safe havens shifted from external sustainability factors, such as current account surplus to market-driven factors, such as carry trade opportunity and high liquidity during and after the financial crisis. The results also highlight the increasing effects that changes the monetary policy stance and investors' willingness to avoid risk and invest in safe-haven assets (Feder-Sempach et al., 2024).

Much empirical research confirms the different patterns of safe-haven currency behaviour. Ranaldo and Söderlind (2009) showed that the Swiss franc, along with the yen and the euro, has significant safe-haven characteristics and moves inversely with international equity markets and foreign exchange trends. Coudert et al. (2014) found that only the yen and the US dollar exhibited safe-haven properties observed in advanced and emerging financial markets.

What is worth stressing is the currency's safe haven status that may change over time, e.g., the Swiss franc appreciates against the euro in response to increases in global risk but depreciates against the dollar, the yen and the British pound, (Grisse and Nitschka, 2015: 153–164). Recently, an innovative study was conducted by Feder-Sempach et al. (2024) stating that safe-haven effects work differently for gold and the yen; hence, the Japanese yen seems to act as the strongest safe haven across all stock indices. According to the latest research of Changrong et al. (2024: 101013), no East Asian currency has a safe-haven attribute under geopolitical risk and trade policy uncertainty. However, the Japanese yen maintains its status against VIX index, (Lee et al., 2024: 119–134).

Nowadays, new potential safe-haven assets are studied, namely cryptocurrencies and Bitcoin. The fast growing cryptocurrency market has succeeded in attracting the attention of investors and financial institutions. The cryptocurrency protocol is based on the voluntary participation and it is not subject to any control and allows everyone to accumulate and transfer value in a currency that resists price manipulation (Chemkha et al., 2021: 71–85). Bitcoin is a decentralized digital currency, independent of any political centres, neither governments nor central banks. For that reason, Bitcoin and other cryptocurrencies can be considered a potential safe-haven asset but the literature suggests that Bitcoin fulfilled this role to a limited extent at most.

However, empirical studies are skeptical about the prospects for cryptocurrencies as safe haven assets. Bouri et al. (2017) examined whether bitcoin can act as a hedge and a safe haven for major world stock indices, bonds, oil, gold, the general commodity index, and the US dollar index. The empirical results indicate that bitcoin is a poor hedge and it is suitable for diversification purposes only. However, it serves as a strong safe-haven against weekly extreme down-movements in Asian stocks. They also show that bitcoin and safe-haven properties vary between horizons. Bitcoin's status as a safe haven is partly inconsistent with the literature. Choi and Shin (2022) and Będowska-Sójka and Kliber (2021: 101390) showed that, unlike gold, bitcoin prices decline in response to financial uncertainty shocks. This is in contrast to the safe-haven quality of gold. This complex economic phenomenon could be explained by bitcoin prices' fact that the responses to economic shocks are different from those of gold, instead behave like commodities such as crude oil (Gronwald, 2019: 86–92). Apparently, the main outcome of the current literature is that bitcoin should not enter the discussion as a potential safe-haven asset (Smales, 2019: 385–393). All in all, the US dollar is still considered the best safe-haven currency for short- and medium-term investments (Tronzano, 2023: 273), followed by the Japanese yen and the Swiss franc.

1.3. Public debt instruments and defensive stocks

Debt instruments issued by the public sector are considered safe havens because they provide high-quality income regardless of economic uncertainty (Baur and Lucey, 2009). Usually, international investors tend to have more confidence in debt instruments issued by governments of advanced economies, starting with the US treasuries issued by the global reserve currency issuer. High quality sovereign bonds are the best example of safe-haven assets because of their lower volatility and the high expected creditworthiness of their issuers. Debt instruments issued by the US, UK, German, and Japanese governments can act as safe-haven assets because of the high-quality returns and risk-free label (Bogołębska et al., 2024). Usually, long-term Treasury bonds act as safe-haven assets and improve the strategy performance during markets upheavals (Kaczmarek et al., 2022: 101610).

Connolly et al. (2005) showed a negative relation between the uncertainty measures and the future correlation of stock and bond returns. They stated that bond returns tend to be high (low), relative to stock returns, during the days when implied volatility increases (decreases) substantially and during the days when stock turnover is unexpectedly high (low). These findings prove that the diversification benefits increase with rising uncertainty of the stock market showing the safe-haven properties of bonds. According to Baur and McDermott (2013), who analyzed the two most prominent safe-haven assets – US Treasury bonds and gold suggests that both bonds and gold tend to act as safe-haven assets following stock market crises. However, these assets appear to differ in the timing of their responses to crisis events and gold is a stronger safe haven. Usually, assets such as 10-year Treasuries issued by advanced economies have safe-haven attributes.

Contrary to popular belief, some stocks can play the role of safe-haven assets. Investors interested in reducing their risk during economic downturns can also choose defensive stocks or namely safe stocks to provide stable earnings and consistent returns. Safe stocks are the stocks whose price is relatively stable and feature little or no response to the market decline, e.g., Apple stocks passed the crisis of 2008 quite easily. Defensive companies deliver products considered necessities – things consumers buy even during a crisis hence, they are less prone to cyclical effects and recessions. Typically, defensive stocks provide dividends regardless of economic prosperity when they are issued by well-established companies. It may be explained by their low correlation with the overall stock market, which results in a beta parameter lower than one. Last studies by Yousaf et al. (2023: 101844) analysed the FAANA (Facebook, Apple, Amazon, Netflix and Alphabet) stocks acting as hedge, diversifier, and safe haven against four alternative assets: gold, US treasury bonds, the US dollar and bitcoin. This study showed that most of the FAANA stocks acted as weak or strong safe havens

against gold, bonds, bitcoin and the US dollar. Moreover, few FAANA stocks had a strong safe-haven attribute against the US treasury bonds and the US dollar during the COVID-19 pandemic crisis. Ultimately, above mentioned studies have a different perspective because it examines the FAANA stock as safe-havens and fills the gap in safe-haven research by changing the commonly used patterns (Bogołębska et al., 2024: 24).

2. MANAGING PORTFOLIO RISK ACCORDING TO CAPM

Harry Markowitz (1952: 77–91) launched modern portfolio theory with the idea of creating the most efficient portfolio by reducing volatility and the risk of losses by choosing assets that are potentially negatively correlated. This theory introduces a systematic approach to build and manage the investment portfolio in the long run. He advocates that the way to choose a portfolio and reduce risk is to diversify. The concept of diversification means spreading investments across a range of assets to reduce risk, including stocks, bonds, and alternative assets like commodities. He proposed how investors should combine assets into a portfolio that would provide the best possible combination of risk and return, i.e. the highest potential rate of return for a given level of risk or that would minimise the risk for a given level of return (Bogołębska et al., 2024: 25–35). Portfolio diversification is widely used in international investments. The idea is to create a pool of different assets with weak or negative correlations, allowing investors to minimise their losses if unforeseen events occur. Nowadays, widespread advanced technological improvements help international investors build a portfolio with a minimum risk (Bhuiyan et al., 2023).

First, investors should consider the relationship between different investment opportunities, including all types of assets and all international markets. It is vital to consider the entire spectrum of investments because the returns of all these investments interact. Second, portfolio theory assumes that investors are risk averse, meaning that when given a choice between two assets with equal rates of return, they will choose the one with the lowest level of risk. Therefore, the relationship between return and risk is expected to be positive. For that reason, investors are willing to accept a greater risk in search of a higher return (Reilly and Brown, 1997). Markowitz proposed a basic portfolio model, showing that the variance of the rate of return was a significant measure of portfolio risk. He derived the portfolio risk formula using the portfolio variance, and this formula indicates the importance of diversification in reducing the total portfolio risk (Miziołek et al., 2020: 41–45). Markowitz defined the efficient frontier as the highest expected return for a given level of risk, or the lowest risk for a given expected return. The efficient frontier represents the trade-offs between risk and

return, and is used to identify portfolios that follow the investors' risk tolerance and investment goals.

A simpler method for portfolio selection is the single-index model proposed by Sharpe (1964: 425–442). According to this model, returns on a security can be represented by the performance of a single factor-market index. Sharpe proposed the concept of a single market index, stating that a security's performance has a correlation with the performance of the market index. In the Sharpe model, the crucial measure is beta, which shows the sensitivity of individual assets to market movements. The use of a single index market model calls for estimates of the beta parameter for individual financial assets that could potentially be included in a portfolio. The single index market model is used to estimate beta parameters, which can be used to assess risk. To estimate the risk measured by beta, investors use the regression model. This regression line is called the security characteristic line. It is defined as the best-fit regression line through a scatter plot of the rate of return for individual risky assets and for the market portfolio over a designated period (Bogołębska et al., 2024: 26–27). The relation is depicted in Figure 2.

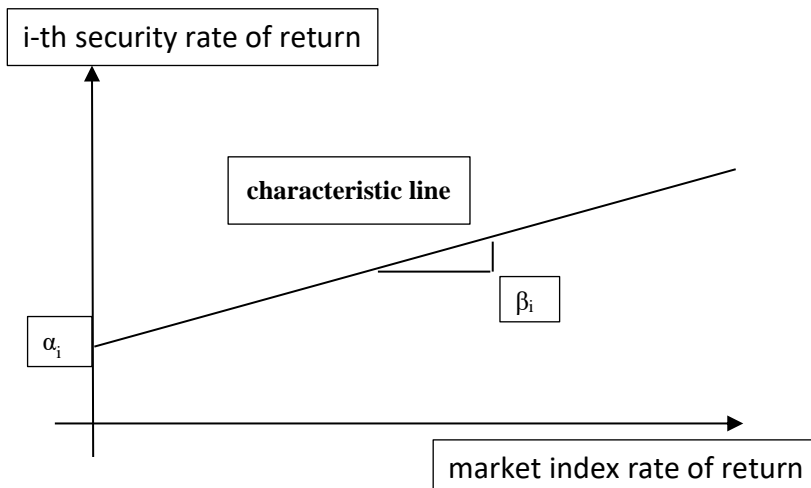


Figure 2. Security characteristic line

Source: Elton and Gruber (1995: 138).

Figure 2 shows that the intercept of the regression line is the alpha parameter, while the slope of the line is the beta parameter. Beta is a measure of volatility with reference to the general market. The beta parameter is used as an indicator of risk, and its value can be as a systematic risk measure:

$\beta < 0$ – a beta of less than zero indicates that an asset has an inverse relationship with the market. Those assets tend to increase in price when the general market prices fall, and they are potential safe-haven and hedge assets.

$0 < \beta < 1$ – a beta of less than one indicates that an asset return moves less than the market return; there is a lower systematic risk than the market. Defensive stocks have a beta of less than one. Those are potential diversifiers.

$\beta = 1$ – a beta equal to one indicates that an asset's return is fully correlated with the returns in the market itself. Adding an asset to a portfolio with a beta of 1.0 does not add any risk.

$\beta > 1$ – a beta greater than one indicates that the asset's return moves higher than the market return; there is a higher systematic risk than the market. Aggressive stocks have a beta greater than one (Bogołębska et al., 2024: 28).

The beta parameter plays a central role in modern finance as a measure of asset risk. In the context of CAPM, beta denotes the volatility, or systematic risk, of a security or an asset compared to the market. It is used in the CAPM formula as a measure of systematic risk to give an investor the expected return (Dębski et al., 2016: 75–92, Feder-Sempach and Szczepocki, 2022: 46).

According to Baur and Lucey (2009), followed by Baur and McDermott (2010), a safe-haven asset is negatively correlated with another asset during a market crisis; hence, these assets have negative beta parameters to hold their value during market turbulence, and they can reduce risk, see Table 2.

Table 2. Beta parameter and asset's properties

Asset Properties	Beta
Safe haven	Negative or 0 beta in times of financial crisis or bear market conditions
Hedge	Negative or 0 beta on average, bull and bear market conditions
Diversifier	Beta over 0 but not equal to 1 on average, bull and bear market conditions

Source: own elaboration based on the cited literature and Bogołębska et al. (2024).

Following the classification presented in Table 2, the correlation of different assets can be replaced by the beta parameter that determines whether diversification works. The beta parameter shows how one asset moves compared to another, which, in this case, is used to depict the different properties of a financial asset (Bogołębska et al., 2024: 28–29).

To show a bigger picture of safe-haven assets, Baur et al. (2021) used the quantile regression to analyze the returns of potential safe-haven assets during different market conditions including crisis. They found a trade-off effect, which is stronger in-crisis performance of safe-haven assets and weaker out-crisis

performance and vice versa for risky assets. Thus, the safe-haven effect is stronger in extreme lower and upper quantiles than in center quantiles, which is graphically depicted in Figure 3.

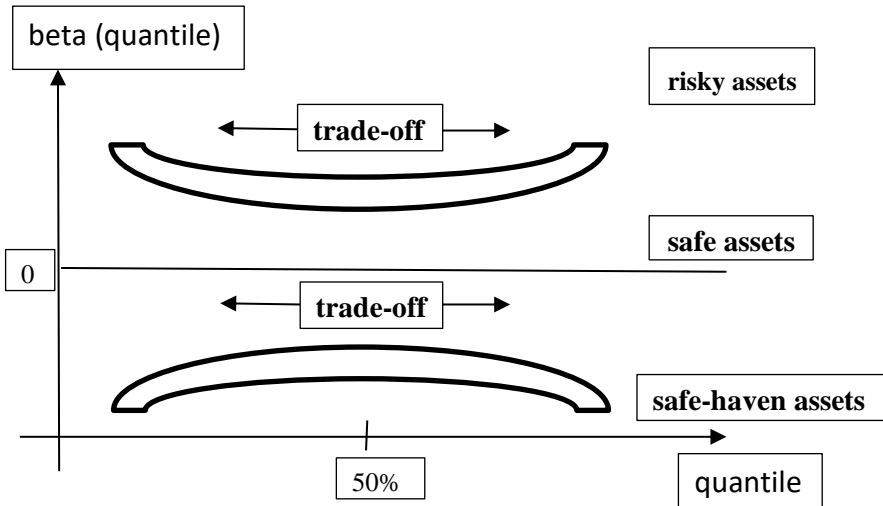


Figure 3. Beta parameter across quantiles

Source: Baur et al. (2021).

Risky assets move with the market, in particular when the market goes up or down. Therefore, their beta parameter is expected to be positive. Information insensitive safe assets have beta equals to zero. In contrast, safe-haven assets move opposite the market when the market goes down, their beta is expected to be negative for lower quantiles. This inverted u-shape curvature of conditional quantile estimates shows that safe-haven effect is stronger in extreme lower and upper quantiles than in center quantiles. Safe-haven assets do not increase in price constantly, but only when the market falls (Baur et al., 2021).

Recently, various techniques have been proposed with the latest drawdown based risk measures called Conditional Drawdown-at-Risk Beta (CdaR Beta) introduced by Zabarankin et al. (2014: 508–517) and Expected Regret of Drawdown Beta (EroD Beta) proposed by Ding and Uryasev (2022: 1265–1276). These two innovative risk measures, like the standard or traditional beta, relate the returns of an asset to the returns of the market, but are based on the concept of drawdowns: the decline in the value of an asset from a peak to a subsequent low. Drawdown betas are more sensitive to market distress during unexpected events and can work as safe-haven assets identifier by having greater informative power.

CONCLUSIONS

During the times of rising uncertainty, it becomes crucial to portfolio managers to look for assets that are negatively correlated or uncorrelated with the main components of the portfolio to limit their exposure to losses in the event of market turmoil. Thus, a safe-haven investment has the potential to protect investors and offset losses in the event of COVID-19 pandemic crisis, the Russian invasion of Ukraine and the Israeli-Palestinian conflict.

There is a list of different assets having the safe-haven attribute. Gold is regarded as an effective instrument protecting stock market investment from a decline thus a strong safe-haven asset. Precious metals are considered safe-haven assets due to their ability to hedge and offset the risk of the financial markets. Reserve currencies, the US dollar, Swiss franc, Japanese yen are common examples of safe-haven assets. They strengthen or hold their value in times of global economic uncertainty caused by economic downturns or political tensions. The US dollar stands out as the best safe-haven currency, while Swiss franc and Japanese yen are perceived as a longstanding safe-haven asset (Baltensperger and Kugler, 2016: 1–30; Zheng-Zheng et al., 2024: 119–134). The role of bitcoin as a safe-haven asset is also under discussion. Some analyses showed that bitcoin can act as potential safe-haven asset, mostly during the COVID-19 pandemic crisis – strong safe-haven asset properties (Yan et al., 2022: 415). In times of crisis, the US government debt could be viewed as a safe-haven investment because of the strong economic fundamentals of the United States and the US financial market prominence (Hager, 2016: 557–580).

There are three types of asset attributes helping investors to reduce the risk: safe haven, hedge, and diversifier. Acknowledging these different properties of financial assets can potentially help to understand complex relationships over investment holding periods and adverse market conditions to build an optimal portfolio. The definition of safe-haven, hedge and diversifying assets has been incorporated into portfolio theory by the beta parameter and the asset properties specification according to CAPM. The correlation of different assets can be replaced by the beta parameter that determines whether diversification works. The beta parameter shows how one asset moves compared to another, which, in this case, is used to depict the safe-haven, hedge and diversifying assets. The new concept of drawdown based risk measure called drawdown beta might be also helpful in reducing the overall volatility and portfolio risk. Additionally, to analyze the returns of potential safe-haven assets during different market conditions, including crisis the trade-off effect is analyzed, which is stronger in-crisis performance of safe-haven assets and weaker out-crisis performance. Returns of safe-haven assets are more positive the more negative the market returns are which may have a stabilizing effect on the overall financial system.

The ability to identify safe-haven and hedge assets is relevant to portfolio managers and all investors using an active approach to manage portfolio risk. This article comprises the most relevant research articles to manage the portfolio in times of elevated risk according to the portfolio theory and CAPM.

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BIBLIOGRAPHY

- Akhtaruzzaman, M., Boubaker, S., Lucey, B. M., and Sensoy, A. (2021). *Is gold a hedge or a safe-haven asset in the COVID-19 crisis?*. *Economic Modelling*, 102, pp. 105588. <http://dx.doi.org/10.1016/j.econmod.2021.105588>.
- Azimli, A. (2022). *Degree and structure of return dependence among commodities, energy stocks and international equity markets during the post-covid-19 period*. *Resources Policy*, 77, pp. 102679. <http://dx.doi.org/10.1016/j.resourpol.2022.102679>.
- Baltensperger, E., Kugler, P. (2016). *The historical origins of the safe haven status of the Swiss franc*. *Aussenwirtschaft*, ISSN 0004-8216, Universität St.Gallen, Schweizerisches Institut für Aussenwirtschaft und Angewandte Wirtschaftsforschung (SIAW-HSG), St.Gallen, Vol. 67, Iss. 2, pp. 1–30.
- Batten, J.A., Ciner, C. and Lucey, B.M. (2010). *The macroeconomic determinants of volatility in precious metals markets*. *Resources Policy*, 35(2), pp. 65–71. <http://dx.doi.org/10.1016/j.resourpol.2009.12.002>.
- Baur, D.G. and Lucey, B.M. (2009). *Is gold a hedge or a safe haven? an analysis of stocks, bonds and gold*. SSRN Electronic Journal [Preprint]. <http://dx.doi.org/10.2139/ssrn.952289>.
- Baur, D.G. and McDermott, T.K. (2010). *Is gold a safe haven? international evidence*. *Journal of Banking and Finance*, 34(8), pp. 1886–1898, <http://dx.doi.org/10.1016/j.jbankfin.2009.12.008>.
- Baur, D.G., Dimpfl, T. and Kuck, K. (2021). *Safe haven assets - the bigger picture*. SSRN Electronic Journal [Preprint], <http://dx.doi.org/10.2139/ssrn.3800872>.
- Baur, Dirk G. and McDermott, Thomas K. J., (2013). *Financial Turmoil and Safe Haven Assets*. <http://dx.doi.org/10.2139/ssrn.2004796>.

- Bekiros, S., Boubaker, S., Nguyen, D. K., and Uddin, G. S.. (2017). *Black Swan events and safe havens: The role of gold in globally integrated emerging markets*. Journal of International Money and Finance, 73, pp. 317–334. <http://dx.doi.org/10.1016/j.jimonfin.2017.02.010>.
- Bhuiyan, R.A., Husain, A. and Zhang, C. (2023). *Diversification evidence of bitcoin and gold from wavelet analysis*. Financial Innovation, 9(1). <http://dx.doi.org/10.1186/s40854-023-00495-1>.
- Bie, U., Henneberg Pedersen, A., (1999). *The Role of Gold in the Monetary System*, <https://www.nationalbanken.dk/en/news-and-knowledge/publications-and-speeches/archive-publications/1999/the-role-of-gold-in-the-monetary-system> [Accessed: 23.08.2024].
- Bogołębska, J., Feder-Sempach, E. and Stawasz-Grabowska, E. (2024). *Safe assets in the global economy: Supply, demand and financial stability*. Abingdon, Oxon: Routledge.
- Bogołębska, J., Feder-Sempach, E. and Stawasz-Grabowska, E. (2019). *Reserve currency status as a safe asset determinant. empirical evidence from main public issuers in the period 2005–2017*. Comparative Economic Research. Central and Eastern Europe, 22(3), pp. 65–81. <http://dx.doi.org/10.2478/cer-2019-0023>.
- Boubaker, H., Cunado, J., Gil-Alana, L. A., and Gupta, R. (2020). *Global crises and gold as a safe haven: Evidence from over seven and a half centuries of data*. Physica A: Statistical Mechanics and its Applications, 540, pp. 123093. <http://dx.doi.org/10.1016/j.physa.2019.123093>.
- Bouri, E. Molnár, P., Azzi, G., Roubaud, D., and Hagfors, L. I. (2017). *On the hedge and safe haven properties of bitcoin: Is it really more than a diversifier?*. Finance Research Letters, 20, pp. 192–198. <http://dx.doi.org/10.1016/j.frl.2016.09.025>.
- Bouri, E., Lucey, B. and Roubaud, D. (2020). *The volatility surprise of leading cryptocurrencies: Transitory and permanent linkages*. Finance Research Letters, 33, pp. 101188. <http://dx.doi.org/10.1016/j.frl.2019.05.006>.
- Będowska-Sójka, B. and Kliber, A. (2021). *Is there one safe-haven for various turbulences? The evidence from Gold, Bitcoin and ether*. The North American Journal of Economics and Finance, 56, pp. 101390. <http://dx.doi.org/10.1016/j.najef.2021.101390>.
- Changrong, L., Fandi, Y., Jiayang, L. and Shilong, L. (2024). *Research on safe-haven currencies under global uncertainty—A new perception based on the East Asian market*. Global Finance Journal, Volume 62, pp. 101013, <https://doi.org/10.1016/j.gfj.2024.101013>.
- Chemkha, R., BenSaïda, A., Ghorbel, A. and Tayachi, T., (2021). *Hedge and safe haven properties during COVID-19: Evidence from Bitcoin and gold*. The Quarterly Review of Economics and Finance, Volume 82, pp. 71–85, <https://doi.org/10.1016/j.qref.2021.07.006>.
- Choi S., Shin J., (2022). *Bitcoin: An inflation hedge but not a safe haven*, Finance Research Letters, Volume 46, Part B, <https://doi.org/10.1016/j.frl.2021.102379>
- Cifarelli, G. and Paladino, G. (2015). *A dynamic model of hedging and speculation in the Commodity Futures Markets*. Journal of Financial Markets, 25, pp. 1–15. <http://dx.doi.org/10.1016/j.finmar.2015.07.002>.
- Connolly, R., Stivers, C. and Sun, L. (2005). *Stock market uncertainty and the stock-bond return relation*. Journal of Financial and Quantitative Analysis, 40(1), pp. 161–194. <http://dx.doi.org/10.1017/s0022109000001782>.
- Coudert, V., Guillaumein, C., Raymond, H. (2014). *Looking at the Other Side of Carry Trades: Are there any Safe Haven Currencies?*. Working Papers 2014-03, CEPII research center.
- Ding, R. and Uryasev, S. (2022). *Drawdown beta and portfolio optimization*. Quantitative Finance, 22(7), pp. 1265–1276. <http://dx.doi.org/10.1080/14697688.2022.2037698>.
- Dębski, W., Feder-Sempach, E. and Świdorski, B. (2016). *Beta stability over bull and bear market on the Warsaw Stock Exchange*, Folia Oeconomica Stetinensia, 16(1), pp. 75–92. <http://dx.doi.org/10.1515/fofi-2016-0006>.
- Elton E., Gruber M. (1995). *Modern Portfolio Theory and Investment Analysis*, Fifth Edition, Wiley.

- Feder-Sempach, E., Szczepocki, P. (2022). *The Bayesian Method in Estimating Polish and German Industry Betas. A Comparative Analysis of the Risk between the Main Economic Sectors from 2001–2020*. Comparative Economic Research. Central and Eastern Europe, Volume 25, Number 2, <https://doi.org/10.18778/1508-2008.25.12>.
- Feder-Sempach, E., Szczepocki, P. and Bogolebska, J. (2024). *Global uncertainty and potential shelters: Gold, bitcoin, and currencies as weak and strong safe havens for Main World Stock Markets*. Financial Innovation. 10(1). <http://dx.doi.org/10.1186/s40854-023-00589-w>.
- Gençyürek, A.G. and Ekinci, R. (2023). *Safe-haven and hedging roles of precious metals for BRICS and Turkey*. Borsa Istanbul Review, 23(2), pp. 297–321. <http://dx.doi.org/10.1016/j.bir.2022.10.013>.
- Grisse, C. and Nitschka, T. (2015). *On financial risk and the safe haven characteristics of Swiss Franc exchange rates*. Journal of Empirical Finance, 32, pp. 153–164. <http://dx.doi.org/10.1016/j.jempfin.2015.03.006>.
- Gronwald, M. (2019). *Is Bitcoin a commodity? on price jumps, demand shocks, and certainty of supply*. Journal of International Money and Finance, 97, pp. 86–92. <http://dx.doi.org/10.1016/j.jimonfin.2019.06.006>.
- Habib, M.M. and Stracca, L. (2012). *Getting beyond carry trade: What makes a safe haven currency?*. Journal of International Economics, 87(1), pp. 50–64. <http://dx.doi.org/10.1016/j.jinteco.2011.12.005>.
- Hager, S.B. (2016). *A global bond: Explaining the safe-haven status of US Treasury securities*. European Journal of International Relations, 23(3), pp. 557–580. <http://dx.doi.org/10.1177/1354066116657400>.
- Jain, A. and Ghosh, S. (2013). *Dynamics of global oil prices, exchange rate and precious metal prices in India*. Resources Policy, 38(1), pp. 88–93. <http://dx.doi.org/10.1016/j.resourpol.2012.10.001>.
- Kaczmarek, T. Będowska-Sójka, B., Grobelny, P. and Perez, K.. (2022). *False safe haven assets: Evidence from the target volatility strategy based on recurrent neural network*. Research in International Business and Finance, 60, pp. 101610. <http://dx.doi.org/10.1016/j.ribaf.2021.101610>.
- Kaul, A. and Sapp, S. (2006). *Y2K fears and safe haven trading of the U.S. dollar*. Journal of International Money and Finance, Volume 25, Issue 5, p. 760-779, <https://doi.org/10.1016/j.jimonfin.2006.04.003>.
- Lu, C., Yu, F., Li, J. and Li, S. (2024). *Research on safe-haven currencies under global uncertainty - a new perception based on the East Asian market*. Global Finance Journal, 62, pp. 101013. <http://dx.doi.org/10.1016/j.gfj.2024.101013>.
- Lucey, B.M. and Li, S. (2015). *What precious metals act as safe havens, and when? some us evidence*. Applied Economics Letters, 22(1), pp. 35–45. <http://dx.doi.org/10.1080/13504851.2014.920471>.
- He, Z., O'Connor, F. and Thijssen, J. (2018). *Is gold a sometime safe haven or an always hedge for equity investors? A markov-switching CAPM approach for US and UK stock indices*. International Review of Financial Analysis. 60, pp. 30–37. <http://dx.doi.org/10.1016/j.irfa.2018.08.010>.
- Shahzad, S.J. H., Bouri, E., Roubaud, D. and Kristoufek, L. (2020). *Safe haven, hedge and diversification for G7 Stock Markets: Gold versus bitcoin*. Economic Modelling, 87, pp. 212–224. <https://doi.org/10.1016/j.econmod.2019.07.023>
- Lee, Z-Z., Su, C. and Tao, R. (2024). *No longer a safe haven currency? A fresh evidence of Japanese yen under uncertainty*. Panoeconomicus, 71(1), pp. 119–134. <http://dx.doi.org/10.2298/pan1903290211>.

- Li, L. and Miu, P. (2023). *Are cryptocurrencies a safe haven for stock investors? A regime-switching approach*. Journal of Empirical Finance, 70, pp. 367–385. <http://dx.doi.org/10.1016/j.jempfin.2022.12.010>.
- Markowitz, H. (1952). *Portfolio Selection*. The Journal of Finance, Vol. 7, No. 1, pp. 77-91.
- Masujima Y. (2019). *Time-variant safe-haven currency status and determinants*. RIETI Discussion Paper Series.
- McCown, J.R. and Shaw, R. (2017). *Investment potential and risk hedging characteristics of Platinum Group Metals*. The Quarterly Review of Economics and Finance, 63, pp. 328–337. <http://dx.doi.org/10.1016/j.qref.2016.06.001>.
- Miziołek, T., Feder-Sempach, E. and Zaremba, A. (2020). *International Equity Exchange-traded funds: Navigating Global ETF Market Opportunities and risks*. Cham: Palgrave Macmillan.
- Mujtaba, G. G., Siddique, A., Naifar, N. and Shahzad, S. J. H. (2023). *Hedge and safe haven role of commodities for the US and Chinese Equity Markets*. International Journal of Finance and Economics, 29(2), pp. 2381–2414. <http://dx.doi.org/10.1002/ijfe.2788>.
- O’Connor, F. A., Lucey, B. M., Batten, J. A., and Baur, D. G. (2015). *The Financial Economics of Gold — A Survey*. International Review of Financial Analysis, 41, pp. 186–205. <http://dx.doi.org/10.1016/j.irfa.2015.07.005>.
- Ranaldo, A. and Söderlind, P. (2009) . *Safe haven currencies*. SSRN Electronic Journal [Preprint]. <http://dx.doi.org/10.2139/ssrn.999382>.
- Raza, N., Ali, S., Shahzad, S. J. H., and Raza, S. A. (2018). *Do commodities effectively hedge real estate risk? A multi-scale asymmetric DCC approach*. Resources Policy, 57, pp. 10–29. <http://dx.doi.org/10.1016/j.resourpol.2018.01.001>.
- Reilly, F., Brown, K. (1997). *Investment Analysis and portfolio management*. The Dryden Press. Fifth Ed.
- Rizvi, S.K., Naqvi, B., Mirza, N., and Umar, M. (2022). *Safe haven properties of green, Islamic, and crypto assets and investor’s proclivity towards Treasury and gold*. Energy Economics, 115, p. 106396. <http://dx.doi.org/10.1016/j.eneco.2022.106396>.
- Shahzad, S.J., Bouri, E., Roubaud, D., Kristoufek, L., and Lucey, B. (2019). *Is bitcoin a better safe-haven investment than gold and commodities?*. International Review of Financial Analysis, 63, pp. 322–330. <http://dx.doi.org/10.1016/j.irfa.2019.01.002>.
- Sharpe, W. F. (1964). *Capital-Asset Prices - a Theory of Market Equilibrium under Conditions of Risk*. Journal of Finance, 19, pp. 425-442.
- Sikiru, A.A. and Salisu, A.A. (2021). *Assessing the hedging potential of gold and other precious metals against uncertainty due to epidemics and pandemics*. Quality and Quantity, 56(4), pp. 2199–2214. <http://dx.doi.org/10.1007/s11135-021-01214-7>.
- Smales, L.A. (2019). *Bitcoin as a safe haven: Is it even worth considering?*. Finance Research Letters, 30, pp. 385–393. <http://dx.doi.org/10.1016/j.frl.2018.11.002>.
- Starr, M. and Tran K. (2008). *Determinants of the physical demand for gold: Evidence from panel data*. Wiley Blackwell, vol. 31(3), pp. 416–436.
- Triki, M.B. and Ben Maatoug, A. (2021). *The gold market as a safe haven against the stock market uncertainty: Evidence from geopolitical risk*. Resources Policy, 70, pp. 101872. <http://dx.doi.org/10.1016/j.resourpol.2020.101872>.
- Tronzano, M. (2023). *Safe-haven currencies as defensive assets in Global Stocks Portfolios: A reassessment of the empirical evidence (1999–2022)*. Journal of Risk and Financial Management, 16(5), pp. 273. <http://dx.doi.org/10.3390/jrfm16050273>.
- Wang, Q., Wei, Y., Wang, Y., and Liu, Y. (2022). *On the safe-haven ability of bitcoin, gold, and commodities for international stock markets: Evidence from spillover index analysis*. Discrete Dynamics in Nature and Society, <http://dx.doi.org/10.1155/2022/9520486>.
- Upper, C. (2000). *How safe was the “safe haven”? Financial market liquidity during the 1998 Turbulences*. SSRN Electronic Journal [Preprint], <http://dx.doi.org/10.2139/ssrn.2785107>.

- Vigne, S. Lucey, B. M., O'Connor, F. A., and Yarovaya, L. (2017). *The financial economics of White Precious Metals - A Survey*. SSRN Electronic Journal [Preprint]. <http://dx.doi.org/10.2139/ssrn.2950207>.
- Yan, Y., Lei, Y. and Wang, Y. (2022). *Bitcoin as a safe-haven asset and a medium of exchange*. *Axioms*, 11(8), pp. 415. <http://dx.doi.org/10.3390/axioms11080415>.
- Yousaf, I, Plakandaras, V., Bouri, E., and Gupta, R. (2023). *Hedge and Safe-Haven Properties of FAANA against gold, US Treasury, Bitcoin, and US dollar/CHF during the pandemic period*. *The North American Journal of Economics and Finance*, 64, pp. 101844. <http://dx.doi.org/10.1016/j.najef.2022.101844>.
- Zabarankin, M., Pavlikov, K. and Uryasev, S. (2014). *Capital Asset Pricing Model (CAPM) with drawdown measure*. *European Journal of Operational Research*, 234(2), pp. 508–517. <http://dx.doi.org/10.1016/j.ejor.2013.03.024>.
- Zheng-Zheng Li, Chi Wei Su and Ran Tao (2024). *No Longer a Safe Haven Currency? A Fresh Evidence of Japanese Yen under Uncertainty*. *Panoeconomicus, Savez ekonomista Vojvodine, Novi Sad, Serbia*, vol. 71(1), pp. 119–134.

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