h e g

Haute école de gestion
Genève

The Swiss Franc's safe haven journey: an in-depth analysis of its growing trend and behaviour

Bachelor Project submitted for the degree of
Bachelor of Science HES in International Business Management

by

Queenie Pearl LAUBER

Bachelor Project Mentor:
Sylvain GODINET, lawyer

Geneva, 31 May 2024
Haute école de gestion de Genève (HEG-GE)
International Business Management

Hes·so GENÈVE
Haute Ecole Spécialisée de Suisse occidentale

Disclaimer

This report is submitted as part of the final examination requirements of the Haute école de gestion de Genève, for the Bachelor of Science HES-SO in International Business Management. The use of any conclusions or recommendations made in or based upon this report, with no prejudice to their value, engages the responsibility neither of the author, nor the author's mentor, nor the jury members nor the HEG or any of its employees.

Acknowledgements

I would like to extend my deepest gratitude to those who have contributed to the completion of this thesis.

First and foremost, I am grateful to all the individuals who participated in the interviews, offering their valuable insights and expertise, as well as taking the time to provide extensive responses to my questions. Their contributions have therefore been pivotal in shaping the trajectory of my research.

I am also truly grateful to Mr Sylvain Godinet, Mr Nicolas Montandon, Mr Yann Schorderet, Mr Alexandre Caboussat, Mr Frédéric Ruiz, Mr Nicolas Depetris-Chauvin and Mr Jan Erik Meidell for their invaluable guidance throughout the research process as well as their advice on gathering input and structuring my research effectively. Their support and encouragement were instrumental in refining the focus of my thesis while navigating the complexities of my research.

Lastly, I extend my appreciation to all those who provided support, including my colleagues as well as my network from other banks. Their continuous feedback and guidance played a significant role in shaping the direction of my thesis.

The collective support and guidance of all participants have been instrumental, and I am sincerely grateful for their contributions to my thesis, and especially for their patience throughout the process.

Executive Summary

The Swiss Franc or CHF, Switzerland's local currency, is known globally as a defensive and safe haven currency in times of economic turmoil. This means that investors tend to seek refuge in the currency to preserve their wealth, which may lead to its potential appreciation against other currencies and assets. However, the various economic and geopolitical events that occurred in recent years may have fuelled uncertainty about the Swiss Franc as a safe haven currency and have led to interventions from the Swiss National Bank (SNB) to maintain price stability and protect the Swiss economy.

We begin our analysis by introducing the concept of safe haven assets and currencies. We also outline the main factors that influence the movements of currencies which will lay the foundation for understanding economic theories behind the movements of safe haven currencies. We then deep dive into the Swiss Franc and its implications on the Swiss economy before introducing the SNB's mandate and monetary policy tools. As the SNB is one of the only central banks that actively intervenes in the foreign exchange (FX) market to control its domestic currency, we also detail the drivers that have led the SNB to significantly increase its level of foreign currency reserves as well as the potential implications this has had on the performance of Switzerland's central bank. This report will not extensively focus on monetary policies from the SNB however, it will provide high-level transparency on the latest macroeconomic developments and the implications for the currency. Finally, we will conclude the literature review by bridging the gap between the theoretical foundations of the Swiss Franc against its actual dynamics over the last decades which will then serve as the basis for our analysis.

The continuous appreciating trend of the CHF over the last decades has sparked interest from many researchers who attempted to explain the behaviour of the currency. Thus, the purpose of this study is to achieve an in-depth understanding of the currency by identifying the potential drivers of the currency's movements based on contemporary data to assess how its safe haven characteristic may influence its behaviour using inferential statistics. Furthermore, this study also aims to identify potential circumstances when the currency appreciated in times of uncertainty, which will also support in clarifying whether the CHF remains a safe haven currency today, through a detailed event study as well as descriptive statistics. The results of our empirical analysis will then be summarized in the conclusion of this research.

Contents

List of Abbreviations

Abbreviations	Description
AUD	Australian Dollar
B/S	Balassa-Samuelson
CH	Switzerland
CHF	Swiss Franc
CPI	Consumer Price Index
ECB	European Central Bank
ESTR	Euro Short-Term Rate, the Eurozone's reference rate
EU	European Union
EUR	Euro
FRED	Federal Reserve Economic Data
FX	Foreign Exchange
GBP	British Pound
GDP	Gross Domestic Product
IMF	International Monetary Fund
JPY	Japanese Yen
NFA	Net Foreign Assets
NIIP	Net International Investment Positions
OECD	The Organization for Economic Cooperation and Development
PPI	Purchase Price Index
PPP	Purchasing Power Parity
RER	Real Exchange Rate
SARON	Swiss Average Rate Overnight, Switzerland's reference rate
SNB	Swiss National Bank
US	United States
USD	U.S. Dollar
UIP	Uncovered Interest Rate Parity
VIX	CBOE Volatility Index
WB	World Bank

List of Tables[1]

[1] Data and detailed calculations available on demand.

List of Figures[2]

[2] Data and detailed calculations available on demand.

1. Introduction

In the 1850s, it was following the first federal monetary law enacted by the Federal Assembly that the CHF was born as Switzerland's local currency. During that time, the currency was pegged to the value of silver, under the Latin Monetary Union, which lasted until the 1920s (CFI TEAM 2023a). It was after the First World War that Switzerland earned its title as safe haven currency as most currencies had decreased in value while the CHF, at that time, was able to stabilize due to the amount of gold held by the SNB (EUGSTER 2023a). After the Second World War, the Bretton Woods agreement became the framework for exchange rates, which pegged the currency of 44 nations against the value of gold, and was created by the International Monetary Fund and the World Bank (CHEN 2024a). The system collapsed in the early 1970s with Switzerland being one of the first countries to allow its currency to float which soon led to its appreciation and to the SNB applying monetary policies for the first time to control the fluctuation of its currency. This has then transitioned to the flexible exchange rate system we know today (EUGSTER 2023b). The unique characteristics of the CHF have led to its continuous appreciation over the years against major currencies (CANETG 2023), becoming therefore a subject of interest in many studies. In the 1970s, shortly after the end of the Bretton Woods agreement, 1 unit of USD would cost around CHF 4,30, approximately 5x the price of USD 1 today[3]. A similar picture, albeit less dramatic can be drawn for the EUR/CHF exchange rate, as the euro came only into existence in 1999 (REYNARD 2008, p. 20). While existing studies suggest that changes in Europe's structure may have contributed to stabilizing movements of the CHF (REYNARD 2008, p. 28), other factors such as its role as a refuge in times of heightened volatility may continue to drive the currency's appreciation, potentially impacting the Swiss economy as doing business with the country becomes more and more costly. Indeed, a strong currency negatively impacts exports which, in turn, may impact economic growth particularly if a country is heavily reliant on export activities (KRAMER 2023), and this has led to the SNB frequently intervening to ensure the stability of the Swiss economy (SCHLEGEL 2024). However, in this ever-changing economic environment, the question arises: is the CHF still perceived as a safe haven currency today, and what are the drivers that potentially influence the movements of the currency, especially in recent years?

[3] According to data from Factset.

2. Literature review

2.1 Understanding safe haven assets

To assess whether the CHF remains a safe haven currency today, we must begin by setting the scene on existing theoretical foundations such as what defines a safe haven asset in the context of currencies. Are there defined criteria to consider an asset as “safe haven”? Is it enough to look at currency movements or are there other factors that deem an asset as “safe haven”?

A safe haven asset is defined by its ability to retain or rise in value in times of market turmoil leading to investors seeking refuge within these assets to mitigate their potential loss exposure. As such, these assets, as a trade-off of their safe haven characteristics, are therefore expected to offer lower yields during normal economic times (CHEN 2023). For an asset to be deemed “safe haven” or defensive, it is expected to showcase specific characteristics such as high liquidity to be easily convertible to cash, limited supply compared to demand, continuous demand such that the asset remains irreplaceable to some extent, and continuous usage and quality in the long run. For this reason, gold is a typical example of a safe haven asset as investors tend to seek refuge in this commodity during times of uncertainty (CFI TEAM 2023b).

Beyond these characteristics, investor behaviour is key in defining whether an asset showcases safe haven characteristics (CHEN 2023). Indeed, while the asset is expected to perform during times of uncertainty, this can only happen if there is demand for such asset which would then lead to its rise in value in times of high volatility (CFI TEAM 2023b). The desirability of such assets can be influenced by economic and political factors, meaning a robust economy with low inflation and a stable currency as well as a stable political system (INVESTOPEDIA 2023a). This means that an asset within an industry that outperforms while the rest of the industry is declining could be considered a safe haven asset, depending on the desirability and safety of the asset for investors. Some examples of safe haven assets include (CHEN 2023):

- **Equities:** Defensive stocks, which are publicly listed companies operating in the consumer staples and healthcare industries (non-cyclical industries which means that these sectors experience constant demand for their products) (MONTEVIRGEN 2023). However, the value of these investments can be eroded by the level of inflation within the country in which the investor places its money (SMITH 2022).

- **Bonds:** Treasury Bills, which are short-term debt issued by the U.S. government at a discount of its par value, the difference being the equivalent of the coupon which is perceived at maturity upon redemption of the bond (HAYES 2024). Treasury Bills, being fixed-income assets (LIOUDIS 2024), are susceptible to erosion in value due to inflation (WISE 2023).
- **Commodities:** Gold is often considered a safe haven asset that provides a hedge against inflation, as its real value tends to rise alongside increasing price levels. Furthermore, gold has an intrinsic value as it is backed by a physical asset (IACCINO 2024).
- **Currencies:** CHF, USD, JPY, owing to the stability of the underlying countries issuing these currencies, as we will see later on. These are, however, fiat money with no intrinsic value as their value is defined by supply and demand (CHEN 2024b), which can also be eroded by the level of inflation within the country in which investors place their money (SMITH 2022).

Safe haven assets remain closely linked to safe haven currency given that a flight-to-safety occurring for example into Treasury Bills, an asset denominated in USD, leads to an appreciation of the USD compared to other currencies as investors need to purchase USD to invest in Treasury Bills (MCCAULEY, MCGUIRE 2009, p. 87). The same therefore applies for other safe haven assets such as the healthcare industry, for which, companies within that industry are therefore considered defensive stocks in times of economic turmoil (CHEN 2024c). The pharmaceutical sector, an area of healthcare, accounts for 50% of Switzerland's total exports (Confédération suisse 2023a) making it one of the most important industries given Switzerland is an export-oriented country (Confédération suisse 2024a). As investors seek refuge in defensive stocks, we assume that the CHF may therefore also appreciate because of this industry however, as opposed to Treasury Bills for which the flows can be to a certain extent affected by changes in bond yields (KABERNA 2023) and the yield curve (CHEN 2020a), there appears to be limited knowledge on where investors explicitly put their money when they invest in CHF during times of uncertainty, for example, whether it is deposited in banks or invested in companies within the pharmaceutical industry. While there are many existing safe haven assets, the scope of this research will focus mainly on the CHF in comparison to other existing safe haven currencies, and we will therefore not seek to

explain the type of assets that contribute to an appreciation of the CHF but rather the currency movements itself.

2.2 Understanding safe haven currencies

2.2.1 Currency movements

Several factors contribute to how a currency fluctuates, which will be crucial to understand prior to deep diving into monetary policy measures implemented by the SNB. Currencies are denoted in relative terms which means the value of one currency compared to another, and several factors may influence exchange rate valuations as suggested by economic theory which we further outline below (TWIN 2024):

Inflation differentials suggests that, all else being equal, a country with a high level of inflation may lead to a weaker currency against a country with a low level of inflation according to the theory of Purchasing Power Parity. This is due to less investments flowing into the country with a high level of inflation (lower demand for the currency) as the real return is eroded by inflation therefore hindering purchase power. To control inflation, central banks may implement monetary policy actions such as hiking interest rates to slow down economic activity.

Interest rates differentials suggests that, all else being equal, a country with low interest rates encourages consumption which will potentially lead to accelerated growth and inflation however, a low interest rates environment does not attract foreign investments (lower demand for the currency) compared to a country with higher interest rates. As financing is cheap, there will be more demand than supply in the liquidity market which may lead to a rise in market interest rates. Inversely, a country with high interest rates will attract foreign investments which may lead to an appreciation of the currency compared to a country with low interest rates. The covered interest rate parity is a no-arbitrage opportunity condition on interest rate differentials between two countries using forward contracts while the uncovered interest rate parity (UIP) uses expected spot rates and is most used in developing macroeconomic models. To simplify, this means that two countries with interest rate differentials will see this differential reflected in the value of the exchange rate to avoid arbitrage opportunities (HARGRAVE 2024). Any deviations from the UIP may lead to profit opportunities through carry trades, by borrowing in a low-interest-rate country and investing in a high-interest-rate country (HAYES 2023a).

Economic growth suggests that, all else being equal, a country with strong economic growth perspective will attract foreign investments leading to the potential appreciation of the currency.

Current account level suggests that, all else being equal, a country with a deficit will lead to a potential depreciation of the local currency against foreign currencies. As a deficit means that the country imports more than it exports, it buys more foreign currencies (against its local currency) than it receives. **Terms of Trade (TOT)** is a similar measure to current account deficits but compares the price of a country's exports to the price of its imports. A ratio exceeding 1 means the price of its exports increased more than the price of its imports. A favourable increase in the terms of trade suggests more revenues thus an increasing demand for the currency. Similarly, an unfavourable decrease in the terms of trade suggests less revenues thus dampening demand for the currency (KOPP 2024).

A country's debt level suggests that, all else being equal, a country with a large debt does not attract foreign investments due to the inflationary risks which should therefore weaken the domestic currency. To pay for its debt, a country can print more money which will devaluate its currency. The increase in money supply will lower interest rates (supply exceeds demand for liquidity) which will stimulate economic activity leading to a potential rise in inflation and eroding purchase power.

These factors tend to fluctuate as a result of the underlying effects of macroeconomic events, and a sudden shock may lead to these factors worsening or improving. In the case of safe haven currencies, a sudden shock could lead to its appreciation relative to other currencies which therefore further shapes the characteristics that induce investors to park their assets during times of economic uncertainty within those safe haven currencies. We noted previously that a robust economy and a stable political system are crucial for investors to decide on which safe haven asset to invest in. For currencies, these characteristics mean that the issuing country of the currency should:

- **Maintain low inflation and interest rates** (HAYES 2023b)**:** High interest rates are often associated with high inflation, eroding real returns and purchasing power (FOLGER 2024). Maintaining a low inflation rate stimulates demand which stimulates growth and is healthy for an economy (ROSS 2024).
- **Exhibit positive economic growth** (LOBEL 2022)**:** Inflation and growth are positively correlated (HALL 2023). This means that a country

exhibiting negative growth will potentially face declining inflation, discouraging consumption and investments, and further deteriorating the economy.

- **Be independent from other countries with a stable political system** (HAYES 2023b)**:** e.g. Switzerland is shielded from political issues arising in the EU (NYE 2023).

Three possible definitions of safe haven currency characteristics are also brought forward by the ECB which are outlined below (HABIB, STRACCA 2011, p. 5):

- The currency is issued by a country with less risk,
- The currency is backed by a strong and highly liquid financial market,
- The issuing country is shielded from potential global crisis.

Such factors have therefore potentially led to the strong appreciation of the CHF against major currencies over the last decades as we will see later on. It is also worthwhile noting that currencies are not a hedge against inflation however, it can offer protection against riskier investments in times of high volatility (HAYES 2023b) (SMITH 2022). This means that they are not immune to the effects of inflation given it erodes the value of the currency, but some safe haven currencies exhibit more resilience or stable performance during inflationary pressure. This therefore also depends on the ability of the country holding the currency to control the level of inflation within its economy, and we will therefore see that the CHF potentially offers better safe haven benefits than the USD given the ability of the Swiss economy to sustain a relatively low level of inflation compared to its peers.

2.2.2 Characteristics

The CHF, having emerged as a safe haven currency after WWI, is one of the most sought-after currencies today in times of uncertainty. Historically, the CHF has proven to be resilient during times of economic distress and has continuously appreciated over the years against major currencies, further fuelling its safe haven status in the eyes of investors (TODOROVA 2020). Its desirability can be attributed to Switzerland's stable economic and political system, being to some extent immune from potential issues arising in the EU, as well as through its continuous positive balance of trade (FENECH, CUSCHIERI 2019). The country has also been able to maintain significantly better price stability (inflation reaching 3,5%) compared to the US, UK and Europe in 2022, despite being above SNB target inflation rate of 2% (GILCHRIST 2023). Furthermore, the

currency benefits from low inflation albeit low interest rates (see section 2.3), strong exports leading to current account surpluses, as well as the low debt-to-GDP ratio which is well below international standards (Confédération suisse 2021; 2024b).

In comparison, the JPY also showcases similar attributes to the CHF, benefitting from a stable political system (HAYES 2023b) as well as strong liquidity being the third most traded currency as well as the world's funding currency for carry trade transactions (CHANANA 2023). While Japan has been facing deflation for over 30 years, it was successfully able to return to a positive and low inflation territory (SPOSATO 2024) as it maintained its dovish[4] approach to monetary policy to ensure that inflation does not drop below 0. It was therefore the last major central bank to hike rates from -0,1% to a range of 0 to 0,1% following the global rise in inflation mid-2020s (HE 2024).

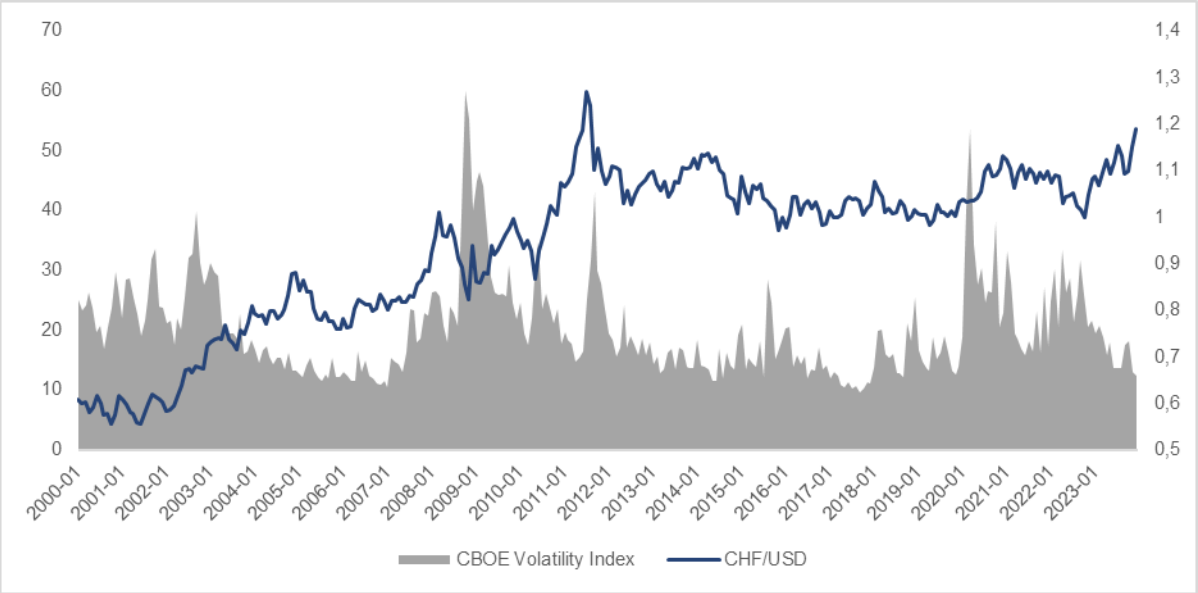
The USD is also considered a safe haven currency, and aside from its robust economy, the currency showcases safe haven characteristics primarily due its strong liquidity, being the world's reserve currency and the most used currency for international trade. As we have mentioned previously, in times of uncertainty, investors globally may seek refuge in Treasury Bills, another safe haven asset, which may lead to an appreciation of the USD (HAYES 2023b). An interesting finding from the IMF outlines that the CHF and JPY tend to appreciate against the USD during global risk aversion (DE BOCK, FILHO 2013). **Figure 1** and **figure 2** illustrates the movement of the CBOE Volatility Index[5], which we compute as the measure of global risk aversion, against the evolution of the CHF/USD respectively JPY/USD. While it may be true that JPY tended to appreciate against the USD, the CHF exhibited more random movements against the USD during heightened volatility. The CHF also showcases a continuous rising trend against the USD while the JPY, on the other hand, exhibits little to no trend against the USD. It is worthwhile noting that while the figures below may follow the findings of the IMF, relying on bilateral currency movements may not be sufficient to conclude which currency benefits most during periods of shock. Indeed, a sudden appreciation of the CHF against the USD may be due to a stronger appreciation of the CHF against the EUR than the USD against the EUR. Similarly, a sudden depreciation of the CHF against the USD may be due to a stronger depreciation of the CHF against the EUR than the USD against the EUR, and so on. One can therefore identify a number of possible outcomes by taking a

[4] Policy favouring interest rate cuts to stimulate economic activity. The opposite can be referred to as a hawkish approach to monetary policies. (INVESTOPEDIA 2023b)

[5] An index that measures the risk sentiment according to market expectations using the implied volatility of option prices. (KUEPPER 2023)

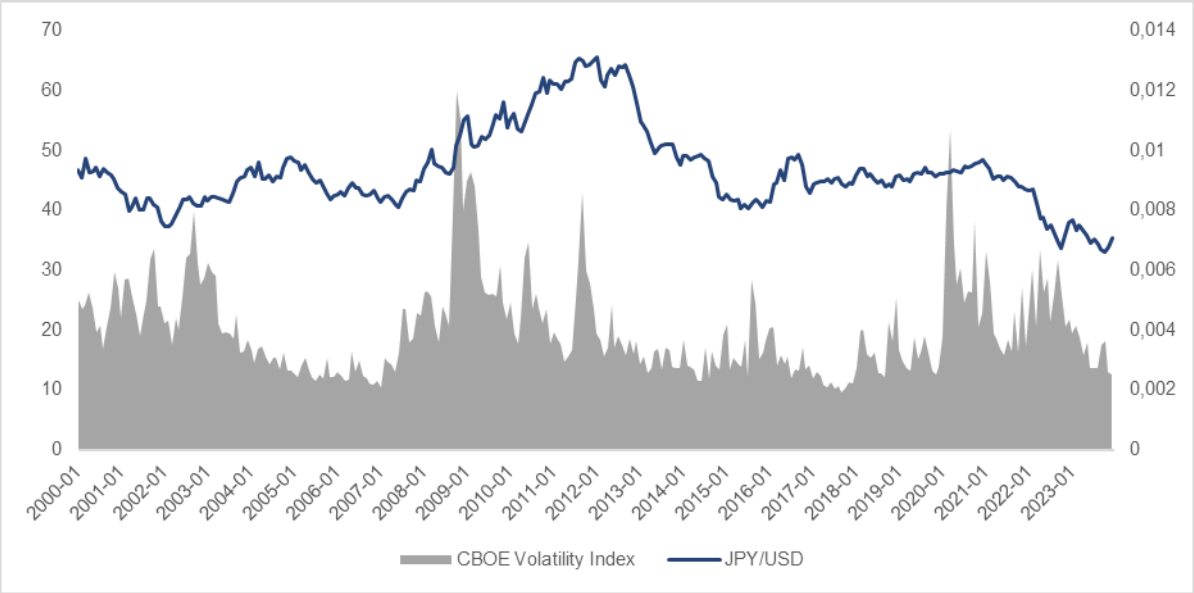
common base for comparison of currency movements. In any case, to gather input on which currency benefits the most in times of uncertainty and is most attractive to investors, it is important to understand what has driven the sudden appreciation or depreciation of the currency by potentially comparing it against a common base using, for example, the EUR, and looking at cross-currency movements as we will explain further in section 4 of this report.

Fig. 1: The evolution of the CBOE Volatility Index (VIX) as a measure of global risk aversion and the CHF/USD exchange rate



Source: Monthly price of VIX and nominal exchange rates of CHF/USD from Factset, see appendix 3.1

Fig. 2: The evolution of the CBOE Volatility Index (VIX) as a measure of global risk aversion and the JPY/USD exchange rate



Source: Monthly price of VIX and nominal exchange rates of JPY/USD from Factset, see appendix 3.1

Moreover, one of our experts (see appendix 2, respondent A) also highlighted that a key driver in the choice of the safe haven currency could be the characteristics of those currencies. Indeed, while both the USD and JPY hold strong liquidity thereby being able to respond to the demand of safe haven currency needs, the CHF, on the other hand, cannot offer the same level of liquidity. According to our expert, as the CHF appreciated due to increasing demand for the currency, the SNB had to introduce measures such as negative interest rates not only to stimulate the economy after the global financial crisis but to also discourage the demand for CHF, before it then decided to intervene in the FX market to control the strong appreciation of the currency as we will see later on in this report. This implies that assessing the volume of flows is irrelevant in the analysis, and instead, movements should be evaluated based on exchange rate levels. Consequently, this additional consideration will also be factored into our study.

2.3 The Swiss Franc

2.3.1 A benefit and drawback for Switzerland

Switzerland has historically been able to sustain significantly low levels of inflation within its economy. Even as inflation rose globally in the mid-2020s due to a surge in demand, supply disruptions, and an increase in energy prices (HA et al. 2023), inflation in Switzerland rose by only 3,5%, a much lower level compared to other economies, and its peak in close to 30 years (EURONEWS 2024). Several reasons may explain the success of the country over the last years. One of the most prevailing factors is the strong CHF which, for the most part, owes its success to its safe haven characteristics. Over the years, the CHF has continuously appreciated against other major currencies as investors perceived the country as a refuge in times of economic turmoil. Because of this, the strength of the CHF protects the economy from a rise in inflation as imported goods remain cheaper. In addition, because of the mandate of the SNB which we will further discuss in the next section, Switzerland has been able to successfully control inflation through its effective monetary policies taking into account the safe haven behaviour of its currency (FUSTER 2024). Excluding other economic factors that may also contribute to the success of the Swiss economy, the strength of the CHF combined with the measures implemented by the SNB resulted in inflation declining at 2,1% in 2023, with inflation primarily generated by domestic products (+2,3% as of December, YoY) against lower inflation from imported goods (-0,2% as of December, YoY) (Confédération suisse 2024c). In other instances, which are not necessarily due to supply shock and high inflation as shown in the previous example, a slowdown in economic activity due to less consumption and investments may lead to potential recessions[6] which then puts downward pressure on prices (OZAROWSKI 2022). As outlined previously, having a safe haven currency means that it would appreciate despite economic slowdown which could further fuel downward pressure on prices for the country holding that safe haven currency, thereby increasing the risk of negative inflation. Deflation occurs when inflation drops below zero (NICKOLAS 2023) and is the most dire economic scenario for countries as it would then trigger a potential chain reaction resulting in diminished consumption, investment, and growth (INVESTOPEDIA 2024b). This is especially the case for export-oriented countries such as Switzerland (Confédération suisse 2024a), as a strong currency make exports more expensive thus

[6] Reported as two consecutive quarters of negative GDP growth (INVESTOPEDIA 2024a), where GDP is a measure of economic activity within a country. (CALLEN 2023)

potentially dampening net exports[7] and negatively impacting GDP. This means that depending on the nature of the shock, the strength of the CHF could either present a benefit or a drawback for the country. In an environment in which inflation is rising rapidly, the strength of the CHF is therefore an important driver for the Swiss economy to sustain low inflation, while the intervention of the SNB on the FX markets is beneficial to counter deflationary pressure and stimulate economic growth by protecting its export activities.

Given the importance of the currency's strength for the Swiss economy, this raises the question about the potential implications for Switzerland if the currency were no longer perceived as a refuge currency for investors, especially as the dynamics may have changed since past crises. According to high-level preliminary findings, the consensus from the experts we have interviewed (see appendix 2) outlined that a loss in the attractiveness of the CHF as a safe haven currency could occur mainly due to structural changes in the political and economic landscape, particularly if such changes lead to potential deficits, higher debt level, loss in labour productivity from immigration, loss in its independence through integration in the EU, or a deeper recession for Switzerland compared to other countries. According to another expert (see appendix 2 respondent F), the perception of Switzerland as a safe haven could be at risk if other nations question its neutrality, as it was the case during the invasion of Ukraine by Russia when Switzerland implemented sanctions against Russia (WASHINGTON POST 2023). The respondent suggests that Switzerland's neutrality may come under scrutiny amid the potential escalating trade tensions between the US and China, as it would likely align more closely with its Western allies which could therefore hinder its safe haven status. These findings are also complemented by the statement from a strategist at Barclays who suggests that such an event would occur if there were significant changes in the SNB's balance sheet that would lead to significant outflows on the liabilities from Swiss-issued assets, meaning the SNB applying changes that would discourage investors from going into CHF-denominated assets which would reduce the supply of CHF thereby driving Swiss interest rates higher (INDYK 2023).

However, the implications are, at this stage, unclear. On the one hand, the currency would follow the movements as per economic theory (see section 2.2.1) and according to our experts (see appendix 2), a loss in the attractiveness of the currency could also potentially drive capital outflows as companies likely relocate into a more stable economy

[7] Depending on price elasticity of goods that are being exported, i.e. some industries may exhibit inelastic demand for its goods which would mean that a strong CHF would have potentially limited impact on exports as demand would remain stable regardless of the currency's movements.

given the primary characteristic of a safe haven currency being attached to a country's overall political and economic stability (HAYES 2023b). This could therefore lead to a depreciation of the currency which should potentially result in higher exports respectively driving further economic growth and inflation (STOJANOV, ENGEL, VARELA 2024). On the other hand, capital outflows in the country could also lead to a slowdown in economic activity as it would potentially discourage foreign and domestic investments which, conversely, would put downward pressure on growth respectively prices and income (CHEN 2021a). This could therefore also reduce labour migration which would potentially affect productivity and innovation within the country, which is critical according to our experts (see appendix 2). Finally, due to dampening demand, the currency would no longer appreciate in times of uncertainty as investors would no longer perceive it as a safe haven currency, and the Swiss economy would therefore no longer be potentially immune to economic shocks. This means that the SNB would likely need to come up with a different strategy to anticipate the impact of potential economic turbulences given it would no longer benefit from the upsides of a strong currency. From the above, it is therefore evident that many aspects would need to be considered and further analysis would be required, potentially quantifying the effects on GDP, in order to understand the implications for the Swiss economy. This will not be discussed in more detail in this report given the primary focus being on the currency's movements today, however, this could be a subject for further research.

2.3.2 Monetary policy tools

The Swiss National Bank (SNB) is responsible for maintaining price stability in Switzerland. Through various monetary policy tools, it aims at ensuring that the Swiss Consumer Price Index (CPI) does not rise by more than 2% year-on-year (SWISS NATIONAL BANK 2023a). During its quarterly bulletin publication, it sets out the inflationary pressure within the country, outlines its current monetary policy, and shares its views on the outlook for the next quarter for Switzerland as well as in major economies worldwide (SWISS NATIONAL BANK 2023b).

There are several measures the SNB can implement in order to fulfil its mandate to maintain price stability in Switzerland. We outline below the different tools that are used and how it is implemented (SWISS NATIONAL BANK 2023c).

Interest on sight deposits

The SNB can influence policy rates by raising respectively decreasing interest rate paid on sight deposits, which influences the cash deposited by financial institutions on accounts held at the SNB such that, a higher policy rate encourages more deposits thereby reducing money supply and vice-versa. This has an impact on the money market and therefore influences short-term interest rates, while long-term interest rates are then influenced by market supply and demand. It is worth noting that the SNB also applies a methodology in which, as of a certain threshold, it applies a cut on the interest rate remunerated in order to ensure that financial institutions manage their deposits to the benefit of the broader economy.

Open market operations

The SNB can influence money supply by purchasing or selling instruments from/to a financial institution which is then credited into the respective sight deposit account, to inject respectively absorb liquidity. These are referred to as Repo (for repurchase transaction) whereby the SNB commits to sell respectively purchase back the asset at a later stage. It can also control the level of money supply through SNB bills which are debt issued by the SNB. To inject liquidity back into the market, the SNB can repurchase on the secondary market its debt certificate after it has been issued. One of the most used methods, particularly in recent years to control the strength of the CHF, is through FX transactions (FISCHER et al. 2024). The SNB holds reserves of foreign currencies and can influence the money supply available on the market by either purchasing foreign currencies against CHF which, all else being equal, lead to a depreciation of the CHF against the foreign currency being purchased, or by selling foreign currencies against CHF which, all else being equal, lead to an appreciation of the CHF against the foreign currency being sold. This can be done either immediately (spot) or via a swap transaction which is a simultaneous agreement to purchase (respectively sell) the foreign currency now and sell (respectively purchase) back the foreign currency later on. The purchase and sale of securities in CHF is also an instrument that can control the level of liquidity in the economy however, it is no longer used by the SNB.

Standing facilities

The SNB may support the economy in times of economic turmoil by creating facilities in which counterparties can withdraw liquidity under conditions that were predefined by the SNB. Intraday refers to same-day transactions, with no interest, which is usually facilitated via repo transaction, a commitment to repurchase at a later date. Liquidity-

shortage financing facility is a limit granted against a collateral that should be covered by 110% of the amount borrowed, and repaid until the next banking day. A special-rate repo agreement is applied which is based on the policy rate and a potential surcharge of minimum 0%. Recently, the SNB also established the COVID-19 refinancing facility (CRF) following the COVID-19 ordinance for which, liquidity is made available against collateral with no maturity date. Financial institutions can thereby increase respectively decrease liquidity available on a daily basis.

It is also common that several instruments are used simultaneously to sterilize the potential drawback effects of using a single instrument. For example, if the SNB hikes its policy rate after many years of dovish monetary policy, it may also implement open-market transactions by issuing SNB bills to absorb excess liquidity from the market which would reduce supply for the current level of demand thereby raising short-term interest rates as close as possible to the policy rate (FISCHER et al. 2024).

2.3.3 The era of FX interventions

Over the last decade, the SNB has more often than so made use of FX transactions as an effective instrument to control the appreciation and depreciation of the CHF. It is as a result of the European debt crisis that the SNB revised its expansionary policy[8] in September 2011 by committing to purchase unlimited amounts of foreign currencies to peg the EUR/CHF exchange rate at 1,20 (MOMBELLI 2018). This prevented a further appreciation of the CHF and alleviated potential deflationary pressure resulting from declining exports, with interest rates remaining positive albeit close to zero, to further encourage economic activity. Thereafter, the peg was lifted in January 2015 causing a surge of 20% on the value of the CHF against EUR (MOSKOWITZ 2019), which led to the SNB introducing negative interest rates in an attempt to control deflationary pressure which was forecasted at -1,1% at that time (SWISSINFO.CH 2022). Switzerland being an export-oriented economy (Confédération suisse 2024a), GDP growth occurs primarily by ensuring a positive balance of trade which cannot be achieved if the CHF significantly appreciates against other currencies. The SNB has therefore continuously purchased foreign currencies to foster economic growth within the Swiss economy, amounting to CHF 353bn from January 2015 to the second quarter of 2022, to counter the appreciation of the CHF for which, a third of its appreciation can be attributed to investors fearing the impact of the pandemic (REVILL 2022).

[8] Quarterly Bulletin 3/2011

In June 2022, it began hiking interest rates (policy rate)[9] and the SNB officially ended the era of negative interest rates in September 2022[10]. At the same time, the SNB began selling foreign currencies to strengthen the CHF (FISCHER et al. 2024) as inflation rose sharply to 3,5% in August due to geopolitical tensions in Europe and underlying surging energy prices. In times of inflationary pressure, in order to prevent the Swiss economy from importing inflation, the SNB could potentially decide to let the CHF appreciate naturally or by selling its FX reserve. Similarly, in order to protect its exports, the SNB may decide to intervene in the FX market by increasing its reserve of foreign currencies in order to decrease the value of the CHF (REUTERS 2024).

According to a recent report from UBS AG (FISCHER et al. 2024), the rate hikes combined with a reduction in FX reserve therefore contributed to an overall appreciation of the CHF, albeit the slight depreciation reported in February 2024, and allowed Switzerland to successfully control rising inflation to a much lower level compared to Europe and the US. The SNB sold foreign currencies amounting to approximately CHF 160bn between June 2022 and November 2023, which contributed to the strength of the CHF, and prevented the effects of inflation from imported goods. In addition, to counter the effects of fostering dovish monetary policies for many years, the SNB also applied a tiered remuneration approach to incentivize financial institutions to lend more liquidity instead of leaving it on sight deposits while also absorbing liquidity through open-market transactions to ensure that the SARON rate is as close as possible to the new policy rate. This means that without these measures, the excess liquidity from the money market could have potentially offset the effect of hiking its policy rate. The report also indicates no dramatic increase in FX reserves observed in its balance sheet between mid-December 2023 and mid-January 2024 despite the appreciation of the CHF, and given the currency then depreciated in February 2024, there are no expectations from the SNB to foster again an aggressive approach to balance sheet expansion. Furthermore, the SNB's balance sheet has also shown stable volumes indicating that the SNB likely no longer aims to absorb excess liquidity beyond rolling over existing maturities of open market transactions, unless further FX interventions and policy rate changes occur in the future so as to counter the potential liquidity effects in the market.

The ability to implement successful measures that navigate around a currency that challenges traditional economic theory has therefore allowed the SNB to be the first

[9] Quarterly Bulletin 2/2022

[10] Quarterly Bulletin 3/2022

major central bank to cut interest rates by 25 basis points (0,25%) in March 2024 after over a year of hawkish[11] monetary policy, bringing its policy rate down to 1,5%. Indeed, the decline in inflationary pressure, weak foreign demand, as well as the surge in the value of the CHF, have led to the central bank reducing its policy rate to stimulate once again economic activity. While the SNB forecasts a decline in inflation globally, it does not rule out the possibility of inflation remaining elevated for longer in other economies due to the current geopolitical tensions in the Middle East[12]. This recent policy rate cut has therefore led to the CHF depreciating by 1-2% against major currencies which is likely due to the interest rate differential as many other central banks have left their policy rate unchanged (LE NEWS 2024).

[11] Policy favouring interest rate hike to slow down economic activity. The opposite can be referred to as a dovish approach to monetary policies. (INVESTOPEDIA 2023b)

[12] Quarterly Bulletin 1/2024

3. Understanding the dynamics of the Swiss Franc

Over the years, many researchers have therefore tried to extrapolate the cause and effects of currency movements which has been proven difficult given the complexity and the many factors influencing exchange rate valuations, as explained by economic theory which we have outlined in section 2.2.

Figure 3 illustrates the movements of the CHF which has exhibited continuous appreciation against major currencies since the beginning of the century. This increasing trend can be explained by a number of factors that were identified in previous studies. According to an existing study from the SNB (REYNARD 2008), this could be explained, among other less significant factors, by an increase in productivity in Switzerland. Indeed, one the most prominent factors that contributed to the appreciation of the CHF at the beginning of the century can be explained by the Balassa-Samuelson effect (REYNARD 2008, p. 27), an economic theory suggesting that productivity differences between high-income countries against low-income countries will lead to divergence in prices and income from tradable goods and non-tradable goods sectors[13]. High-income countries benefit from productivity on tradable goods given that workers in that sector then earn higher incomes which, in turn, raises prices of non-tradable goods as these workers then increase their consumption in the domestic market. This also explains why low-income countries have lower domestic prices compared to high-income countries (INVESTOPEDIA 2023c). For Switzerland, compared to the Euro area as outlined and tested in that research, this difference in productivity will support the appreciation of the currency against the euro through the effect of rapid growth within its export sectors which will then accelerate the growth of its domestic sectors.

[13] Tradable goods are goods that are produced domestically and exported internationally, while non-tradable goods are goods produced and consumed domestically.

Fig. 3: The appreciation of the Swiss Franc against major currencies, measured as the value of foreign currency for 1 unit of CHF

Source: Monthly nominal exchange rates from Factset, see appendix 3.1

Inspired by the SNB's research (REYNARD 2008, p. 3), we began our analysis by computing the daily real exchange rate RER of EUR for 1 unit of CHF in order to compare its evolution against the nominal exchange rate CHF/EUR. We however use the formula from the IMF (CATAO 2019):

$$RER = e\frac{P^*}{P}$$

where e is the nominal exchange rate, P is the CPI in Switzerland and P^* is the CPI in the Euro area, adjusted to base year 1999 to make both indices comparable.

Figure 4 therefore illustrates the behaviour of the calculated real exchange rate and nominal exchange rate. According to our calculated RER, the CHF appears to be overvalued compared to the euro, when adjusted for price levels. This means that based on CPI levels, all other factors remaining equal, the CHF should be higher in nominal terms than it currently is. The law of one price suggests that prices of goods should be identical around the world, and is the foundation of the PPP theory which suggests that the exchange rate should be equal to the price of identical goods in one country over the price of the same goods in another country to ensure no arbitrage opportunities. The theory suggests that the exchange rate should evolve around a constant, which is not the case in figure 4 (INVESTOPEDIA 2020). While its long-term positive trend can be potentially explained by the B/S effect to a certain extent as outlined in the SNB's

research (REYNARD 2008, p. 27), other contributing factors have led to a strong CHF, one of which being typically its characteristics as a safe haven currency. From the global financial crisis leading to the European debt crisis, the currency significantly appreciated against the EUR which led to the intervention of the SNB on the foreign exchange in 2011 to stabilize the currency and protect its exports. This peg, which was lifted in 2015, resulted once again in a significant appreciation of the currency. The SNB continued to intervene in the foreign exchange markets afterwards, depending on economic cycles, to either strengthen or weaken the currency (see section 2.3.3). We therefore believe that this widening gap between the RER and e could suggest that the nominal exchange rate is not adjusting sufficiently to compensate for the differences in price levels between Switzerland and the Euro area, thus allowing for potential arbitrage opportunities, and could be partially explained by the continuous intervention of the SNB on the FX market to control the movements of the CHF.

Fig. 4: CHF/EUR Real Exchange Rate vs Nominal Exchange Rate evolution

Source: Monthly nominal exchange rates of CHF/EUR from Factset and monthly real exchange rates of CHF/EUR calculated based formula RER with CPI data from Factset, see appendix 3.1

However, many events unfolded in recent years which further contributed to the appreciation of the currency. While the B/S effect coupled with economic theory, such as those outlined in section 2.2.1, remain key to explaining currency movements, the CHF tended to also appreciate when economic theory would have suggested otherwise. In conjunction with the literature review detailed previously in this report as well as the view of our experts (see appendix 2), we believe that this is due to the following factors

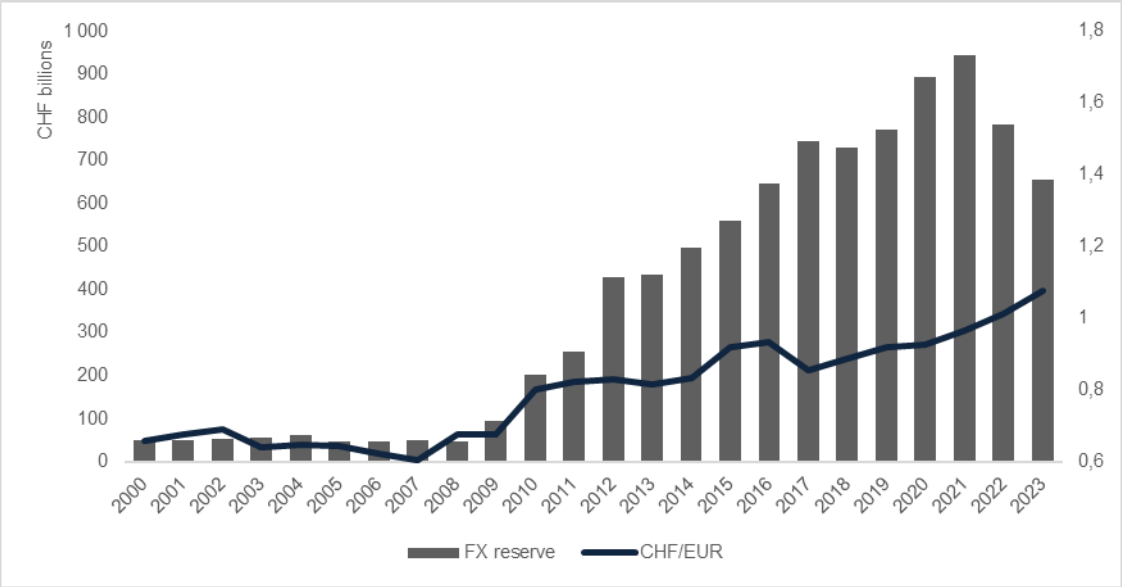
that became more prominent after the global financial crisis in 2008: i) the increased perception of investors that the CHF is a refuge during times of heightened volatility, and ii) the intervention of the SNB on the FX market to prevent a strong currency from negatively impacting exports which, in turn, supports economic growth of the country and therefore an appreciation of the currency in the long-run. Indeed, because of its perception as a safe haven currency, the CHF does not follow the fundamentals of currency movements during risk-off events which therefore requires the SNB to intervene by purchasing foreign currencies when there is heightened demand for CHF, a measure that started with the peg of EUR/CHF at 1,20 in 2011 as outlined in section 2.3.3. Since then, the SNB accumulated significant levels of foreign currencies reaching its peak in 2021, and then gradually started to decrease the level of reserves by selling its foreign currencies to strengthen the CHF as inflation rose globally. These factors are interlinked given that risk-off markets lead to a rise in the value of CHF for which, its value could then be controlled by the intervention of the SNB, depending on the type of economic crisis.

In **figure 5**, we therefore illustrate the level of foreign currency reserves held at the SNB as well as the evolution of the nominal exchange rate CHF/EUR. It outlines that the CHF has shown a positive trajectory and has still significantly appreciated in the last 20 years, despite the large increase in the level of foreign currency reserves held at the SNB which attempted to control an overly appreciating CHF during the global financial crisis and onwards. Without the intervention of the SNB on the FX market, the CHF would have likely appreciated even more which would have negatively impacted the economic activity in Switzerland thereby putting downward pressure on prices. The SNB would have needed to further intervene using other monetary policy tools to stimulate economic activity, such as cutting its policy rate which would have also led to a devaluation of the currency. However, given that such measure would influence short-term interest rates, one could imagine that changes in its policy rate to stimulate economic activity would likely take more time to achieve the desired outcome, as it also depends on the level of liquidity in the market for it to be effective. For example, the SNB may need to apply additional measures to absorb excess liquidity from the markets to ensure that the supply of money is scarce, which would then lead to higher interest rates in the liquidity market potentially closer to the target policy rate thus ensuring the effectiveness of its policy rate hike. While such measure may have an immediate impact on currency movements due to changes in market sentiment which influences supply and demand (CHEN 2020b), the expected effects from changes in its policy rate may take more time to materialize and could therefore still influence the currency's movements afterwards (PETERS 2024).

On the other hand, an intervention in the FX market has almost an immediate impact on the currency's movements as it addresses directly the supply and demand of affected currencies (CHEN 2021b). Although these measures may support in maintaining the stability of the Swiss economy thereby contributing to the increasing investor's perception of the currency as a safe haven, one could however question whether there are any potential implications in artificially influencing the trajectory of the CHF for the Swiss economy.

Indeed, the SNB, while being the central bank of Switzerland and operating independently of the Swiss government (SWISS NATIONAL BANK 2023d), is also a publicly listed company with half of its share capital being held by the cantons, cantonal banks and other government institutions in Switzerland while the remainder is held by private investors (SWISS NATIONAL BANK 2023e). As such, it is expected to create value for its shareholders by delivering positive results in order for shareholders to benefit from the distribution of annual profits. In 2022, the SNB reported substantial losses of CHF 132,5bn mainly driven by poor market performance as well as a strong appreciation of the CHF with gold only slightly positively contributing to the results following the rise in inflation. In the years that preceded, the SNB accumulated foreign currencies and investments to carry out its monetary policy which led to a significant increase in its balance sheet and therefore amplified the losses driven by poor market conditions. This will consequently impact public institutions in Switzerland which rely on the distribution of dividends for public finances. As outlined in the communication of its 2022 results (SWISS NATIONAL BANK 2023f), the SNB was nevertheless able to successfully implement its monetary policy strategy to maintain price stability despite uncertainty from rising inflation, which takes precedence over poor financial results (SWISSINFO.CH 2024). Given the losses incurred, the SNB will withhold future profits until an adequate and desirable equity level is reached. The other side of the coin, however, is that through these measures, the SNB maintains its credibility as a sizeable and solid central bank, which is crucial to ensuring price stability within an economy. Furthermore, having gone out of the negative interest-rate environment, the SNB is now also better equipped to implement monetary policies without having to solely rely on FX interventions and/or open-market transactions. As we have seen previously, being the front-runner in controlling inflation, it was also the first major central bank to cut rates in March 2024, ever since the rise of inflation mid-2020s and the hawkish approach to monetary policies applied across all major central banks.

Fig. 5: The annual level of foreign currency reserves held at the Swiss National Bank and the evolution of the CHF/EUR exchange rate



Source: Swiss National Bank, annual nominal exchange rate of CHF/EUR from Factset, see appendix 3.1

3.1 Methods

To analyse the factors driving the Swiss Franc's movements, we conducted an empirical analysis through an OLS regression[14] with our assessment period spanning from 2000 to 2022. We started by identifying variables that may have a positive or negative relationship with the CHF, assuming linear relationship in the long-run between our dependent variable Y and independent variables X.

First, we needed to select the appropriate measure of the dependent variable Y,which we aim to explain. Given the many factors influencing currency movements (see section 2.2), we opted for the **CHF/EUR real exchange rate (RER) as variable Y** which is adjusted for inflation (CPI), as calculated in figure 4, in the interest of not overfitting the model with many variables. The choice of variable can be justified by the fact that Europe is, by far, the largest trading partner of Switzerland, and therefore a highly liquid currency pair traded (Confédération suisse 2023b). It is also important to note that while the EUR may exhibit the characteristics of a safe haven currency, it is exposed to broader political issues in the Euro area which therefore questions its status as a safe haven currency (HAYES 2023b). Due to this, we will assume that the EUR is not a safe haven currency

[14] Ordinary Least Squares regression, also known as linear regression. A method suggested and taught by Professor Alexandre Caboussat.

and should therefore not disrupt the potential relationship of the CHF with our selected risk aversion variable within the model.

The choice of independent variables X comprises the input drawn from existing empirical studies, interviews conducted with our experts (see appendix 2), and our own evaluation. We also considered the economic factors outlined in section 2.2.1, however, to avoid overfitting the model, we only included variables that are most relevant as suggested by our experts as well as existing studies. This included:

- The level of **immediate short-term interest rate (Rate Diff. EU-CH, X_1)** differential between Switzerland and the Euro area, as suggested by our experts (appendix 2) and supported by economic theory (section 2.2.1).
- the price of **CBOE Volatility Index (VIX, X_2)** as a measure of global risk aversion to account for movements that could be explained by the Swiss Franc's safe haven characteristics, as suggested by our experts (appendix 2) and supported by literature review (section 2.2.2).
- the price of **Brent Crude Oil (Oil, X_3)** adjusted by the Purchase Price Index (PPI) of the United States given its denomination in USD, inspired by the SNB's research (REYNARD 2008, p. 19).
- The balance of **Net International Investment Position (NIIP, X_4)** in Switzerland, inspired by existing studies from the SNB (REYNARD 2008, p. 20) and ECB (HABIB, STRACCA 2011) which suggest including a measure of Net Foreign Assets. We opted for NIIP as a substitute which accounts for the difference in a nation's external assets and liabilities, as well as defines whether it is a debtor or creditor nation similarly to the NFA (GANTI 2024).
- the balance of **foreign currency reserves (FX reserve, X_5)** held at the SNB, as per our own assessment in figure 5

After several trial-and-error[15], we decided to run our OLS regression without differencing[16] our data to capture broader changes in the movements of the CHF. Using stationary data instead of our time-series non-stationary data[17] would have led to

[15] Data and detailed calculations available on demand.

[16] Process of transforming non-stationary data into stationary data by taking the difference between two observations to remove any predictable pattern.

[17] Variables that exhibit trends, cycles, random walks, or any form of combination.

insignificant results from our OLS regression, i.e. the adjusted R square would have been close to null. Moreover, given part of the data was not available in daily frequencies, we had to also perform a linear interpolation to obtain the potential daily values for some of the variables used in the model under the assumption of a linear increase. While inflation (CPI) has not been included directly as a variable, it is incorporated in the model through the CHF/EUR real exchange rate ($\boldsymbol{RER}$). The immediate short-term interest rate (Rate Diff. EU-CH, $\boldsymbol{X_1}$) differential between Switzerland and the Euro area has been accounted for in the model as per below formula:

$$\Delta = r^* - r$$

Where $\boldsymbol{r}$ is the interest rate level in Switzerland and $\boldsymbol{r}^*$ is the interest rate level in the Euro area. We have purposely not used the daily rates of SARON or ESTR as a measure of short-term interest rates given that we do not have enough data for the desired period. As we have seen previously, the VIX measures the implied volatility of the market based on option prices (KUEPPER 2023). This measure should therefore adequately capture the movements which are potentially due to an increase in market volatility thereby explaining the safe haven characteristic of the currency. Furthermore, we opted to follow the approach of the SNB and include oil prices as well as NIIP for Switzerland (REYNARD 2008, pp. 19–20) to capture the terms of trade as outlined in the economic theory (section 2.2.1). Oil prices should serve as a proxy for the level of export prices while the NFA position respectively NIIP in Switzerland should reflect the nation's strength in responding to its liabilities therefore indirectly influencing its capacity to import which influences import prices. We have also seen that the B/S effect appears to be significant in explaining the movements of the CHF in the long run. We will however not test this variable again and rather focus on variables that emerged after the SNB's research (REYNARD 2008), which is the evolution of foreign currency reserves held in Switzerland's central bank. The overview of variables as well as the source of each dataset used in the OLS regression is available in appendix 3.2.

3.2 Results

Table 1 Correlation among variables

	Y	X_1	X_2	X_3	X_4	X_5
Y	1,00					
X_1	-0,69	1,00				
X_2	-0,11	0,26	1,00			
X_3	0,05	-0,36	-0,19	1,00		
X_4	0,29	-0,39	0,18	0,30	1,00	
X_5	0,96	-0,68	-0,14	-0,04	0,38	1,00

Source: Correlation function under data analysis in Microsoft Excel (function from the add-in Analysis Toolpak) using the data from appendix 3.2

Table 2 OLS regression output A

Regression Statistics	
Multiple R	0,971918516
R Square	0,944625601
Adjusted R Square	0,94457941
Standard Error	0,051359737
Observations	6000

Source: Regression function under data analysis in Microsoft Excel (function from the add-in Analysis Toolpak) using the data from appendix 3.2 with full output result available under appendix 3.3.

Table 3 OLS regression output B

Regression Statistics	
Multiple R	0,97150468
R Square	0,943821344
Adjusted R Square	0,94378386
Standard Error	0,051727052
Observations	6000

Source: Regression function under data analysis in Microsoft Excel (function from the add-in Analysis Toolpak) using the data from appendix 3.2 with full output result available under appendix 3.4.

Table 4 OLS regression output C

Regression Statistics	
Multiple R	0,72204573
R Square	0,52135004
Adjusted R Square	0,52103067
Standard Error	0,15098753
Observations	6000

Source: Regression function under data analysis in Microsoft Excel (function from the add-in Analysis Toolpak) using the data from appendix 3.2 with full output result available under appendix 3.5.

3.3 Discussion

Table 1 shows the correlation between our dependent variable (Y), and our independent variables (X). We observe a significant negative relationship between FX reserves (X_5) and Rate Diff. EU-CH (X_1) which are two independent variables. This could lead to potential multicollinearity[18] issues in the regression which, in practice, should be addressed by removing one of the independent variables that has a high positive or negative correlation with the other independent variable. Some statisticians may argue that a high correlation, as of +/- 0,7, among independent variables may lead to multicollinearity issues (DUDA 2022). The correlation of our FX reserves and Rate Diff. EU-CH being close to that threshold, we decided to address the multicollinearity issue by removing one of these variables.

Table 2 shows the result of the OLS regression considering all variables from table 1 without having resolved the multicollinearity issue, and **table 3** shows the result of the OLS regression after resolving the multicollinearity issue by removing Rate Diff. EU-CH (X_1). According to the F-statistic, the model is globally significant and all the independent variables we have selected are relevant to explaining the movements of the CHF which we interpret from their low P-value being below 5% (see appendix 3.3 and 3.4). However, the adjusted R Square, which outlines the percentage of movements that can be explained by our selected independent variables proportionally to their effects, is significantly high. This could be interpreted as good news given a result closer to 1 respectively 100% combined with the result of our F-statistic and P-values would mean that our model successfully explains the behaviour of the CHF. Unfortunately, this is not

[18] Occurs when two or more independent variables are highly positively or negatively correlated among themselves. This could generate misleading results in the regression given that a high correlation between independent variables assumes that these variables are not entirely independent.

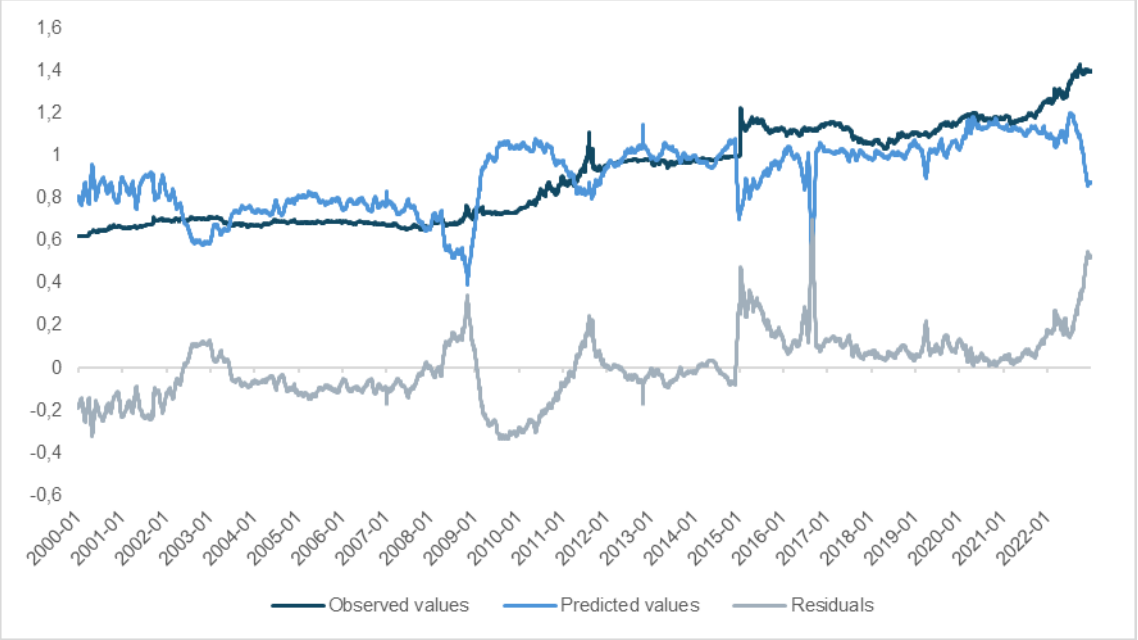
the case as the result may be too good to be true. To date, no one has yet been able to explain the movements of currencies and if that were possible, that would likely mean that one could predict the direction of currency movements and therefore capitalize on profits. A better reflection of reality would be if our adjusted R Square were significantly lower than the one reported in tables 2 and 3.

Table 4 shows the result of the OLS regression after resolving the multicollinearity issue by removing FX reserves (X_5). According to the F-statistic, the model is globally significant and all the independent variables we have selected are relevant to explaining the movements of the CHF which we interpret from their low P-value being below 5% (see appendix 3.5). This time, the adjusted R Square appears to be more reasonable and realistic compared to the results generated from tables 2 and 3. We could therefore calculate the predicted values of the CHF according to the following equation:

$$CHF/EUR\ RER\ predicted\ values = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

using the coefficients, denoted β, from appendix 3.5 as well as the values of our independent variables X within our dataset according to appendix 3.2. We can then compare these results with the actual value of our dependent variable Y, the difference being the residuals or error term for which, the lower the residuals, the better the model is at predicting the movements of our dependent variable Y. We therefore illustrate these results under **figure 6**, where it appears that between 2008 and 2009, our model predicted a lower CHF/EUR exchange rate compared to the observed value suggesting that the CHF may have been overvalued. Similarly, between 2010 and 2012, our model predicted a significantly higher CHF/EUR exchange rate compared to the observed value suggesting that the CHF may have been undervalued, if we consider only the variables from our model.

Fig. 6: Real Exchange Rate CHF/EUR observed values vs predicted values

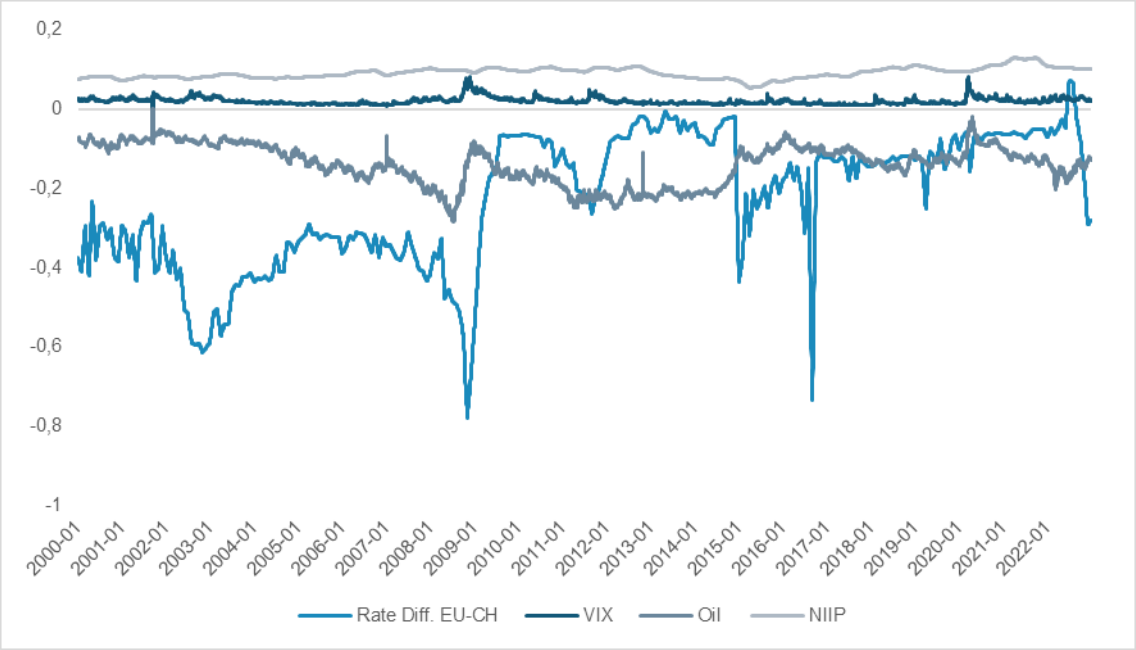


Source: observed values are daily real exchange rates of CHF/EUR calculated based formula RER with CPI, predicted values are calculated based on previous equation using coefficients from appendix 3.5 and the data for the OLS regression from appendix 3.2, while residuals are the difference between both values

We therefore looked at the effects of our individual variables, such as $\beta_1 X_1$ for Rate Diff. EU-CH (X_1), and plotted them together to illustrate the effects of each variable on our CHF/EUR RER. In **figure 7**, we observe that the Rate Diff. EU-CH (X_1) appears to have the largest effect on the movements of the CHF/EUR RER. Between 2008 and 2009, the predicted value of our CHF/EUR RER was significantly impacted by the large interest rate differential between the Euro area and Switzerland, whereas this differential was significantly lower between 2010 and 2012. This therefore outlines the negative relationship between Rate Diff. EU-CH (X_1) and CHF/EUR RER which suggests that a wider differential should lead to a depreciation of the CHF against the EUR while a narrower differential should lead to an appreciation of the CHF against the EUR, according to predicted values. This means that this relationship follows the economic theory on currency movements as outlined previously in section 2.2.1, suggesting that this variable does not move according to the Swiss Franc's safe haven characteristic. Nevertheless, the observed values show us a different picture as the CHF/EUR exhibited a continuous and steady appreciation despite our model suggesting differently. According to some of our experts, interest rates may have little impact on the behaviour of the CHF (see appendix 2, respondent F) which we believe is not entirely true. While our model did show residuals compared to observed values suggesting deviations in the

trajectory of our predicted values, we would not rule out interest rates as an explanatory variable in the behaviour of the currency pair as we believe that this deviation is likely due to missing variables in the model that may potentially counter or offset the relationship of Rate Diff. EU-CH (X_1).

Fig. 7: The weighted effect of each independent variable in our predicted values of CHF/EUR RER



Source: coefficients from appendix 3.5 multiplied by the value of each independent variable of the OLS regression from appendix 3.2 to get individual effect across all observations

As we have outlined previously, we know that the continuous intervention of the SNB played a key role in influencing the movements of the currency during economic shocks, thereby ensuring price stability in Switzerland, and should somehow be taken into consideration within the model. The gap between our observed values and predicted values could be therefore potentially explained to a certain extent by this missing variable which we could also interpret as a measure of the safe haven characteristic of the CHF given it potentially captures the stability of the Swiss economy. Moreover, according to one of our experts (see appendix 2, respondent F), another measure to assess the safe haven characteristic of the CHF could be by looking at (market) interest rate changes. Indeed, if interest rates start rising significantly, this could mean that investors no longer have confidence in the currency as they demand a higher interest rate for assets denominated in CHF. In the liquidity market, this would mean that there is less supply (lenders/investors) compared to demand (borrowers) leading to a higher equilibrium for

market interest rates (ROSS 2021). It is also important to note that including potential lags or smoothing using moving averages, for example, to incorporate long-term trends rather than short-term fluctuations on some of our variables could potentially improve the output of our model. For example, as seen previously, while the effects of policy rate changes may immediately impact the currency due to changes in market sentiment, it may however take longer for the desired effects to reach the economy, which could potentially justify the inclusion of a variable such as interest rate level in Switzerland with a pre-determined lag. The current model could therefore still yield better results if we could somehow include the level of FX reserve without creating a model that appears to be too good to be true, the interest rate level in Switzerland potentially with and without lags, and maybe even some variables that were smoothed to capture long-term trends. This could be a subject for future research.

Finally, we also investigated the cause that led our model to report overly optimistic results within tables 2 and 3. We plotted each independent variable against our dependent variable to visually assess their relationship and discovered that most of our variables did not exhibit any obvious form of linear relationship, despite our attempts to transform the data using natural logarithms, except for FX reserve $X5$ (see appendix 3.6). Existing studies have also shown that linear regressions in time-series data may incorrectly reflect the relationship among variables as correlation may be spurred and coincidental which therefore potentially challenges the accuracy of our results especially as we have not differenced our data and opted to include non-stationary variables within our model. This could also explain the cause of the significantly high correlation between our CHF/EUR RER and the level of foreign currency reserves held at the SNB, leading to a significant adjusted R Square. Granger and Engle have challenged the use of linear regression for time series, suggesting the use of cointegrating vectors, by which, non-stationary variables are integrated such that they cannot move away from a long-term equilibrium (CFI TEAM 2023c). In economics, variables may therefore often be cointegrated. For example, GDP, price levels, and money supply may move together in the long run given an increase in money supply leads to more consumption, leading to higher prices which then follows a change in consumption behaviours, potentially impacting GDP growth. In our case, we could imagine that cointegration exists between the CHF/EUR nominal exchange rate, interest rates, and the level of foreign currency reserves. For example, an increase in foreign currency reserves may depreciate the CHF/EUR nominal exchange rate, further stimulating economic activity and thereby fuelling upward pressure on prices (inflation) which, in turn, may lead to an increase in interest rate and a potential appreciation of the CHF/EUR nominal exchange rate due to

interest rate differential. This assumption suggests that cointegration may exist among our variables, and could be identified by performing, for example, the Johansen test on all variables to get the number of cointegration relationships which then needs to be applied in conjunction with other statistical models to identify where the cointegration relationship lies, by estimating cointegrating vectors (CFI TEAM 2023c). This is explored in the SNB's research (REYNARD 2008, p. 23), whereby the author uses the Vector Error Correction Model (VECM), a model applied for time series data that identifies long-term equilibrium in the relationship among variables while also accounting for any potential short-term deviations through the error correction term (ECT), the rate at which the variable's temporary deviation returns to its long-run equilibrium (REHAL 2022). Moreover, another constraint we have identified within our model is that using an OLS regression suggests that the variability of our data evolves homogeneously around the linear relationship of variables. For variables such as the VIX, this is likely not ideal as it may exhibit sudden large variations driven by unplanned economic shocks which increases the implied volatility in the market (see section 2.2.2), suggesting that its variability is therefore not homogeneous. Given we rely on its variations to identify the safe haven characteristic of the CHF, under the assumption that an increase in volatility suggests an appreciation of the CHF, the output from our OLS regression may therefore inadequately explain the influence of the VIX over the movements of the CHF. This suggests that a better estimate could be potentially achieved through other statistical methods such as ARCH[19]/GARCH[20] models which attempt to predict the variability of the data (ENGLE 2001) and therefore potentially capture heterogeneous deviations from variables such as the VIX.

These findings therefore question whether the use of an OLS regression is ideal at all for this type of analysis, however, given these models go beyond the scope of our curriculum, we will not explore any further these potential solutions. Nevertheless, we will still attempt to outline the drivers of the currency's behaviour over the years using the output from our OLS regression in conjunction with existing studies and literature. Indeed, while the model may not be adequate to finish this study, we believe that the deviation between our predicted values and the trajectory of the observed values may be due to missing variables within our model that could potentially offset the effect of Rate Diff. EU-CH ($X1$) which is the main cause of the deviation between predicted and observed values. Thus, the inclusion of these missing variables within the appropriate

[19] Autoregressive Conditional Heteroskedasticity.

[20] Generalized Autoregressive Conditional Heteroskedasticity.

statistical model could potentially yield better results to capture and identify the potential cause that led to the CHF exhibiting a steady appreciation over the last decades.

According to our assessment, which is based on existing literature as well as the input we gathered from our experts (see appendix 2), this appreciating trend may be due to a series of potential chain reactions that began when CHF started to be perceived as a safe haven currency after WWI. We believe that this attracted flows that accelerated growth in Switzerland and led to the currency strongly appreciating against major currencies until the introduction of the EUR which seemingly slowed down the appreciation course of the currency, albeit still on a growth path (REYNARD 2008, p. 28). The B/S effect, as demonstrated in existing studies outlining that Switzerland is more productive than the Euro area, contributed to the steady appreciation of the CHF against the EUR over the years and led to the rapid economic growth of Switzerland (REYNARD 2008, p. 27), causing a flow of high-skilled workers to relocate within the country to benefit from high wages (see appendix 2, respondent F). Labour migration is therefore a significant source of growth, according to our experts, as it enabled the country to be one of the leaders in innovation while also further increasing its productivity compared to other countries (see appendix 2, respondent A and F). Exchange rates being a relative game, a rapid increase in productivity positively impacts an export-oriented country such as Switzerland compared to other countries and leads to the currency strongly appreciating in normal times based on the economic theory of exchange rates (see section 2.2.1). Furthermore, in times of uncertainty, the safe haven characteristic of the currency then kicks in leading to further appreciation of the currency. Thus, the strength of the CHF began due to its perception as safe haven currency which then benefitted the Swiss economy in its growth trajectory over the years and led to its continuous appreciating trend, which appears to be regardless of any economic cycle, be it in normal times or stressful times. One might therefore say that as long as the CHF is perceived a safe haven currency, there might be no circumstances that could lead to a change in the overall trajectory of this trend. However, with the number of events that unfolded over recent years, and relying on the results of our model in figure 6, we observe circumstances in which the residuals appear to be lower despite shocks that potentially took place which suggests that factors such as Rate Diff. EU-CH ($X1$), a driver that follows normal economic theory, potentially prevailed over missing safe haven characteristics variables (excluding large deviations from shocks in 2008-2009 and 2010-2012). This therefore led us to question under which circumstances the CHF appreciated due to its safe haven characteristic, and whether it remains a safe haven currency today especially as the economic and political landscape evolves continuously.

4. Identifying potential flight-to-safety

4.1 Methods

We therefore looked into instances in which the main safe haven currencies have appreciated as well as the extent to which they have appreciated, in order to identify whether there are potential patterns in the choice of the safe haven currency. We identified several shocks of different characteristics that occurred since the beginning of the century and looked at the movement of different currency pairs, including its cross-currency movements, in order to better understand the cause of the potential appreciation or depreciation of each currency pair. Given we need to consider the level of liquidity within the respective currency pair traded, we assessed the potential flight-to-safety characteristics within the following two occurrences: i) comparing the USD and CHF against the EUR as a basis, and ii) comparing the USD and JPY against the AUD which was selected as it is commonly used in carry trades together with the JPY (CHEN 2020c). This allowed us to identify the number of occurrences under which the CHF appreciated more in comparison to the USD and under which the JPY appreciated more in comparison to the USD. We then interpreted the findings based on existing literature as well as interview outcomes and looked for patterns that would allow us to conclude in which case the CHF, USD, or JPY was the preferred currency in times of uncertainty.

We first started by identifying several shocks that took place since the beginning of the century, defined the start date of each crisis, and clustered per event type and region as illustrated in **figures 8 and 9**. In total, 25 events were selected to measure the appreciation of the CHF, USD, and JPY (see appendix 3.7). Given the complexity of collecting frequent, heterogeneous, and impactful events equally spread since the beginning of the century, it is important to note that the sample size may be limited and the choice of shocks may be therefore concentrated within a certain period and biased on the regions and type of crisis included within the dataset.

Fig. 8: Proportion per type of crisis

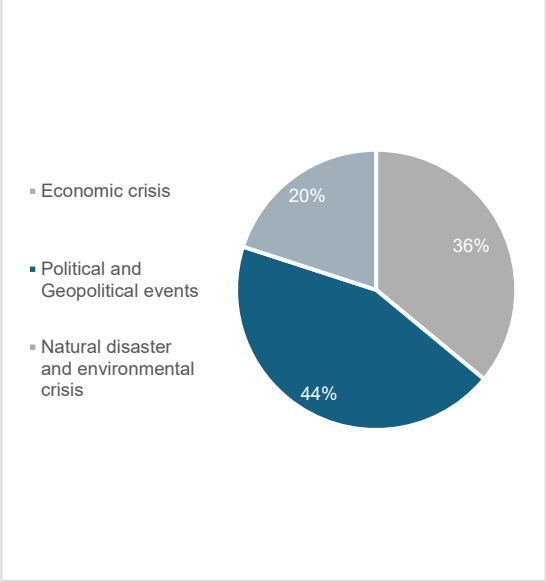
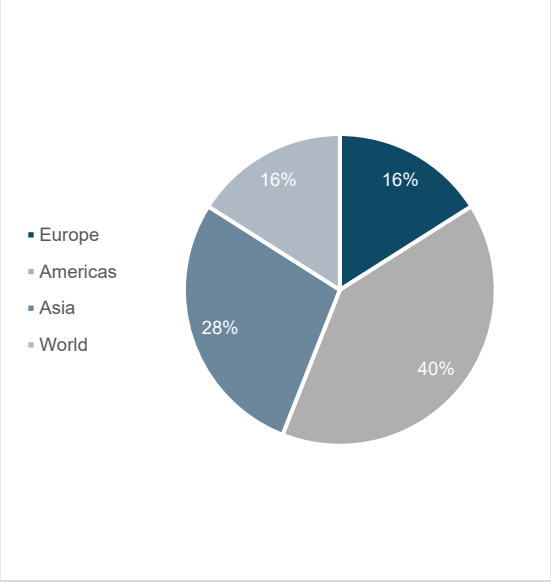


Fig. 9: Proportion per region



Source: See appendix 3.7

In most cases, the start date, when $t = 0$, has been defined based on when the shock suddenly took place or the following business day if the shock occurred over the weekend. However, for shocks that had a delayed effect, which is mainly applicable to economic crises, we looked at the evolution of the stock market using the country's main stock market index (e.g. S&P500 for the US, MERVAL for Argentina, BOVESPA for Brazil) and selected the start date of the shock based on when the index started dropping before reaching its lowest level, within the period of when the event took place. For the European debt crisis, we applied a slightly different approach given the long-lasting effect of the crisis. Furthermore, its origination being to a certain extent driven by the global financial crisis (KENTON 2021), we tried to segregate both events by reviewing the period in the European debt crisis during which the EUR/CHF exhibited rather stable movements and selected the moment the CHF started to appreciate against the EUR as a start date for the crisis which occurred well before the SNB started pegging the currency pair. We then performed an event study[21] by gathering the daily price of the following currency pairs:

Occurrence CHF vs USD:

- **CHF/EUR, measured in 1 unit of CHF:** Measure to assess the extent of the movements of the CHF, using the EUR as a common base for comparison.

[21] A method suggested by Professor Nicolas Depetris-Chauvin.

- **USD/EUR, measured in 1 unit of USD:** Measure to assess the extent of the movements of the USD, using the EUR as a common base for comparison
- **CHF/USD, measured in 1 unit of CHF:** Cross-currency valuation to measure which currency appreciated during the crisis.

Occurrence JPY vs USD

- **JPY/AUD, measured in 1 unit of JPY:** Measure to assess the extent of the movements of the JPY, using the AUD as a common base for comparison.
- **USD/AUD, measured in 1 unit of USD:** Measure to assess the extent of the movements of the USD, using the AUD as a common base for comparison.
- **JPY/USD, measured in 1 unit of JPY:** Cross-currency valuation to measure which currency appreciated during the crisis.

If the CHF and USD depreciated against the EUR respectively the JPY and USD depreciated against the AUD, the event did not lead to a flight-to-safety into safe haven currencies. We then calculated the daily abnormal variation that occurred due to the crisis. Let e denote the daily nominal exchange rate for each currency pair and μ is the arithmetic average that will be calculated based on the exchange rate from 90 trading days prior to the start of the crisis (denoted as $t = -90$ while $t = 0$ is the start of the crisis). We assume this period provides a sufficiently stable benchmark against which we can compare exchange rate variations and identify abnormal movements.

$$Daily\ abnormal\ variation = \frac{e}{\mu(e_{t=-90}, \dots, e_{t=0})} - 1$$

The daily abnormal variation is calculated from $t = 0$ until 30 trading days after the crisis. We opted for 30 trading days as markets usually price in immediately shocks (ERSAN et al. 2021). For contagion crises that spill over or for which fluctuations occur over longer periods, we estimate the daily abnormal variation beyond 30 trading days by applying as end date, the moment when the stock market is recovering according to the movements of the stock market index of the affected country going through the crisis. For the global financial crisis and the European debt crisis, we opted for 180 trading days, while for the Argentina Financial Crisis, we opted for 60 trading days. For the intervention of Iran in the Israel-Palestine conflict (event #25), we calculate the daily abnormal variation 15 trading days after the event given its recent occurrence. All other shocks apply a 30-trading day period for the calculation of the abnormal variation.

Once we have calculated the daily abnormal variation, we can calculate the cumulated abnormal return (CAR) for each currency pair from $t = 0$ to the ending period of 30 trading days (more or less, depending on the crisis).

$$CAR = \sum_{t=30} Daily\ abnormal\ variation$$

The CAR of each currency pair allows us to identify instances in which the respective safe haven currency has truly appreciated against the basis used for comparison (EUR respectively AUD). If we look at only the CAR of the currency pairs CHF/USD or JPY/USD, this will not give us any indication on whether a flight-to-safety occurred given a potential rise in the value of CHF/USD could be explained by a USD that is maybe weakening more than the CHF against the EUR, and vice-versa. We therefore exclude events in cases where both the CHF and USD respectively the JPY and USD depreciated against the basis used for comparison as it potentially indicates no flight to safety into those currencies.

4.2 Results

The outcome of the event analysis methodology as described in section 4.1. is outlined under **table 5** for the appreciation of CHF and USD against the EUR respectively **table 6** for the appreciation of the JPY and USD against the AUD. **Table 7** shows the number of times each currency pair has displayed an appreciation during the 25 economic shocks selected based on a CAR above 0,15. Given the CAR calculates the accumulated variation during a 30-trading day period (respectively 15-, 60- and 180-trading day period), any positive value below 0,15 would be meaningless in our opinion, and the currency should therefore not be considered as having appreciated as a consequence of the shock (no flight-to-safety). This methodology has been applied across all tables and figures in section 4.

Table 5: Flight-to-safety CHF vs USD

#	CAR CHF/EUR	CAR USD/EUR	Cross-currency CAR CHF/USD	Flight to safety	Currency
1	0,331350729	1,417684777	-1,053959734	yes	USD
2	0,802536706	-1,337892772	2,218164169	yes	CHF
3	0,498347512	1,204618204	-0,69618678	yes	USD
4	-0,512357712	-0,901244268	0,369765389	no	
5	-0,243134586	-1,208815857	0,966815135	no	
6	-0,032598253	0,330321308	-0,375597892	yes	USD
7	12,11199583	28,20521753	-13,92228068	yes	USD
8	12,09939118	19,85958561	-6,833182974	yes	USD
9	0,057539561	-1,65192474	1,801901102	no	
10	-0,035962416	-0,64424914	0,606917374	no	
11	-0,03466045	-0,676875308	0,642968598	no	
12	0,13098958	-0,506528558	0,641894222	no	
13	-0,319774543	0,211455139	-0,53554816	yes	USD
14	-0,132625788	0,924533191	-1,025101314	yes	USD
15	0,295841449	0,427477661	-0,133126046	yes	USD
16	0,380203013	1,394840689	-0,968513596	yes	USD
17	0,144225691	0,182385692	-0,042069529	yes	USD
18	0,610875994	0,045006392	0,568100305	yes	CHF
19	0,730682541	0,194659228	0,576937089	yes	CHF
20	-0,103079183	-0,610420239	0,504562947	no	
21	0,355096179	0,750063168	-0,367866126	yes	USD
22	0,582695995	0,948401439	-0,271270905	yes	USD
23	0,030362828	-0,71546971	0,76679556	no	
24	0,170776655	0,566809684	-0,33837776	yes	USD
25	-0,353891677	0,263934903	-0,643712357	yes	USD

Source: Daily nominal exchange rates from Factset followed by manual calculations as detailed in section 4.1 using Microsoft Excel

Table 6: Flight-to-safety JPY vs USD

#	CAR JPY/AUD	CAR USD/AUD	Cross-currency CAR JPY/USD	Flight to safety	Currency
1	1,7014833	1,731859075	-0,037942376	yes	USD
2	1,728430087	0,989076386	0,709053014	yes	JPY
3	-4,786531465	-0,215700661	-4,579085047	no	
4	-1,32357765	-1,323783543	-0,011206856	no	
5	-0,126062996	-1,237190241	1,125810103	no	
6	-0,549732097	0,036805686	-0,590507804	no	
7	88,79195781	60,45772337	20,76975829	yes	JPY
8	0,039582384	-0,947986881	0,822849242	no	
9	-0,865278148	-1,008116171	0,134774581	no	
10	-1,098091964	-0,190847355	-0,914966823	no	
11	-1,357965607	-0,231517939	-1,137255668	no	
12	-0,558178514	0,432989905	-0,971372867	yes	USD
13	1,485557211	0,556938247	0,912020517	yes	JPY
14	-0,228415629	-0,058952842	-0,163602769	no	
15	1,546524477	-0,328752046	1,89352859	yes	JPY
16	-2,081868218	0,625291748	-2,645482632	yes	USD
17	1,227357072	0,299284962	0,920022652	yes	JPY
18	-0,133348641	0,137271243	-0,299592643	no	
19	3,01140944	2,751051515	0,261688964	yes	JPY
20	-0,408036341	-0,884677781	0,468996086	no	
21	-0,327811855	0,450276173	-0,681980121	yes	USD
22	-1,837130921	-0,657151135	-1,18321172	no	
23	0,874409883	0,506968455	0,481771864	yes	JPY
24	-0,34581306	0,857680347	-1,219839363	yes	USD
25	-0,485375513	0,258225225	-0,790674209	yes	USD

Source: Daily nominal exchange rates from Factset followed by manual calculations as detailed in section 4.1 using Microsoft Excel

Table 7: Frequency of currency appreciation

Currency pair (excl. cross-currency CHF/USD and JPY/USD)	**Count of positive values per currency based on 25 events ($CAR > 0,15$)**
CHF/EUR	12, thereof 7 economic crisis, 5 political and geopolitical events respectively 3 Europe, 4 Americas, 2 Asia, 3 World
USD/EUR	15, thereof 8 economic crisis, 6 political and geopolitical events, 1 natural disaster and environmental crisis respectively 4 Europe, 5 Americas, 3 Asia, 3 World
JPY/AUD	8, thereof 6 economic crisis, 2 political and geopolitical events respectively 1 Europe, 4 Americas, 3 World
USD/AUD	12, thereof 6 economic crisis, 5 political and geopolitical events, 1 natural disaster and environmental crisis respectively 5 Americas, 4 Asia, 3 World

Source: Data from tables 5 and 6.

4.3 Discussion

In **figure 10**, we present the occurrences per type of crisis where the relative appreciation of the CHF over the EUR exceeded that of the USD over the EUR, denoted as “CHF”, alongside instances where the relative appreciation of the USD over the EUR surpassed that of the CHF over the EUR, denoted as “USD”. Our analysis reveals a higher frequency of occurrences where the USD appreciated more against the EUR than the CHF did, suggesting a preference for the USD as safe haven currency in all types of crises. Based on discussions with our interviewees (see appendix 2, respondent A), one reason that could prevent the CHF from appreciating as much as the USD is the volume. Switzerland does not have the capacity to respond to safe haven currency demand needs as the USD does. Additionally, while entering the CHF during turbulent times could result in improved performance, exiting the currency becomes more difficult when

markets return to a risk-on environment. By the time investors are able to do so, the currency has likely already depreciated, posing a potential liquidity risk when choosing the CHF as a safe haven currency compared to the USD, due to the lack of demand.

In **figure 11**, we present the occurrences per region where the relative appreciation of the CHF over the EUR exceeded that of the USD over the EUR, denoted as “CHF”, alongside instances where the relative appreciation of the USD over the EUR surpassed that of the CHF over the EUR, denoted as “USD”. Our analysis reveals that a higher frequency of occurrences where the USD appreciated more against the EUR than the CHF did, suggesting the continued preference for the USD as safe haven currency for crisis taking place in Europe, Americas and Asia. On the other hand, the CHF seems to be equally the preferred currency for global crises, denoted as “World”, impacting more than one region. However, it is also important to note that while a crisis triggered in Europe could potentially result in more flows into the CHF from European investors, given that Europe is Switzerland's main trading partner (Confédération suisse 2023b), the currency may not appreciate as much as the USD. This is because a crisis in Europe slows down its economic activity, negatively impacting Switzerland's exports as it exports less to Europe due to reduced consumption (Confédération suisse 2023c), which is one of the drivers of the currency's performance according to economic theory (see section 2.2.1). Therefore, assessing whether a safe haven currency appreciates more depending on where the crisis begins would require considering additional factors such as potentially quantifying the effect on exports from the country holding the safe haven currency, compared to the flows that took place into the safe haven currency in question.

Fig. 10: Flight-to-safety per type of crisis CHF vs USD

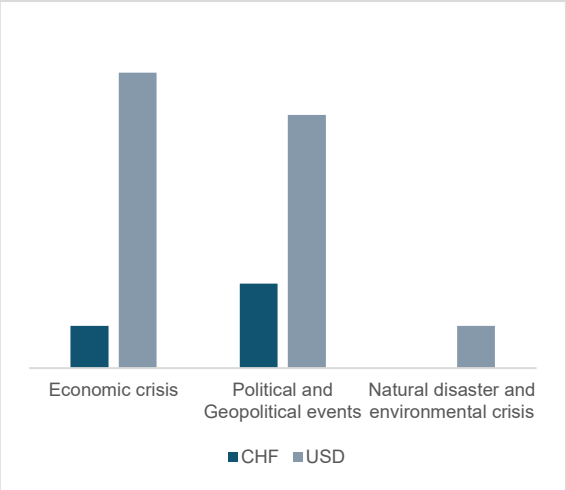
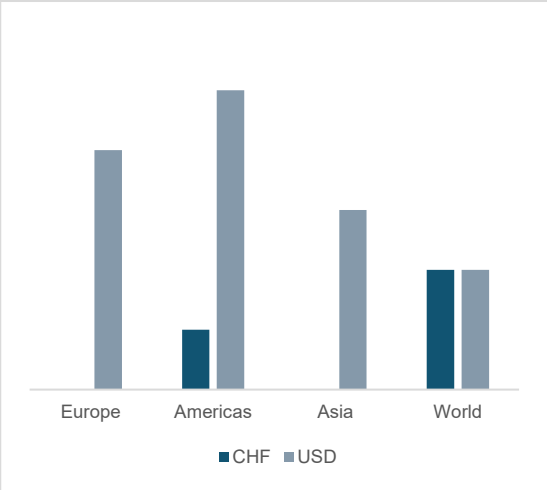


Fig. 11: Flight-to-safety per region CHF vs USD



Source: Data from table 5 under section 4.2 subject to at least one currency pair (excl. cross-currency) appreciating with CAR > 0,15. CHF illustrates the count of occurrences when the relative appreciation CHF/EUR exceeded the relative appreciation USD/EUR. USD illustrates the count of occurrences when the relative appreciation USD/EUR exceeded the relative appreciation CHF/EUR.

In **figure 12**, we present the occurrences per type of crisis where the relative appreciation of the JPY over the AUD exceeded that of the USD over the AUD, denoted as “JPY”, alongside instances where the relative appreciation of the USD over the AUD surpassed that of the JPY over the AUD, denoted as “USD”. Our analysis reveals a higher frequency of occurrences where the JPY appreciated more against the AUD than the USD did, suggesting a preference for the JPY as safe haven currency for economic crisis. On the other hand, the USD seems to be the preferred currency for crisis triggered by political and geopolitical events as well as natural disasters. These findings also align with the outcome from one of our interviews during which, the interviewee outlined the importance of the type of crisis which will also influence the choice of safe haven currency (see appendix 2, respondent A). Other factors such as carry trade effects may also contribute to the appreciation of the JPY. For example, during the global financial crisis, the JPY has appreciated more than the USD which may be due to the significant volume of discontinued carry trades that were mainly in currency pairs AUD/JPY and NZD/JPY (CHEN 2020c). The JPY being the funding currency for carry trades, unwinding the trade means selling off the high-yielding asset, in this case, AUD, to refund the low-yielding loan, in this case, JPY, which resulted in an increase in demand for JPY and a stronger appreciation of the currency against the AUD (FASTERCAPITAL 2024).

In **figure 13**, we present the occurrences per region where the relative appreciation of the JPY over the AUD exceeded that of the USD over the AUD, denoted as “JPY”, alongside instances where the relative appreciation of the USD over the AUD surpassed that of the JPY over the AUD, denoted as “USD”. Our analysis reveals that a higher frequency of occurrences where the JPY appreciated more against the AUD than the USD did, suggesting the continued preference for the JPY as safe haven currency for crisis taking place in Europe, Americas and global crises, denoted as « World ». On the other hand, the USD seems to be the preferred currency for crises triggered in Asia. However, for the same reason as the CHF mentioned previously, a crisis triggered in Asia may lead to more flows into the JPY from Asian investors however, given that Japan’s main trading partners are in Asia (WITS 2020), the currency may not appreciate as much as the USD due to the reduced economic activity. Therefore, assessing whether a safe haven currency appreciates more depending on where the crisis begins would require considering additional factors, such as potentially quantifying the effect on exports from the country holding the safe haven currency, compared to the flows that took place into the safe haven currency in question.

Fig. 12: Flight-to-safety per type of crisis JPY vs USD

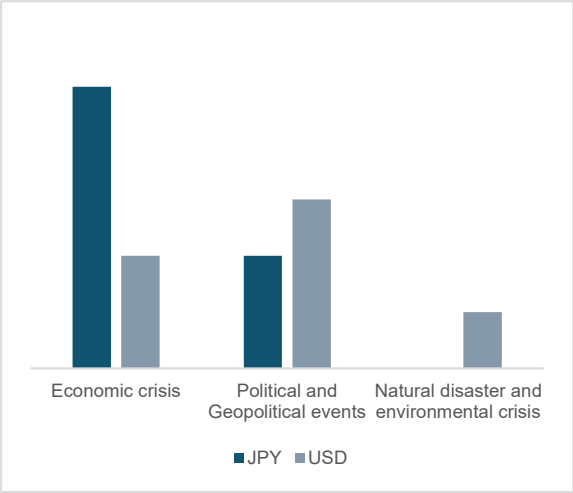
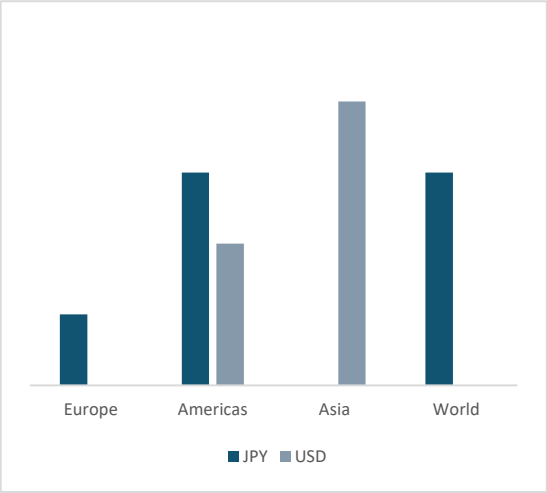


Fig. 13: Flight-to-safety per region JPY vs USD



Source: Data from table 6 under section 4.2 subject to at least one currency pair (excl. cross-currency) appreciating with CAR > 0,15. JPY illustrates the count of occurrences when the relative appreciation JPY/AUD exceeded the relative appreciation USD/AUD. USD illustrates the count of occurrences when the relative appreciation USD/AUD exceeded the relative appreciation JPY/AUD.

While the data suggests that there have been more occurrences in which the relative appreciation of the USD exceeded that of the CHF as well as the JPY, there is not enough evidence to conclude that the USD is indeed the preferred currency in times of

shock, given the limited number of observations within this analysis. Moreover, according to our expert (see appendix 2, respondent A), the differences in the characteristics of these safe haven currencies may also influence their relative appreciation, thereby making comparisons challenging. For instance, Switzerland may lack the liquidity capacity to meet the demand for CHF, leading to the SNB intervening in the FX market to control the strong appreciation of the currency caused by scarce supply. Similarly, as previously mentioned, the JPY is often utilized in carry trades, benefiting from an assumed inverse relationship between carry trades and economic growth, resulting in increased demand for the JPY during economic shocks. It is therefore crucial to interpret these findings in conjunction with existing studies on the topic.

In **figures 14 and 15**, we illustrate the data from table 7, showing the occurrences of appreciation in the CHF/EUR and USD/EUR pairs during the 25 selected shocks per type of crisis. Similarly, **figures 16 and 17** depict the same view for the JPY/AUD and USD/AUD. We observe a tendency where the USD appreciates more frequently than the CHF and JPY. The JPY, on the other hand, does not appear to appreciate as frequently as the CHF, although this discrepancy may stem from biases in the sample as well as differences in the bases used for comparison. We chose different bases to ensure that the currency pairs included are sufficiently traded to realistically capture currency movements during shocks. However, because of this difference, we cannot directly compare the impact of each shock between the CHF and the JPY, which explains why the results from tables 5 and 6 are discussed separately. The USD has seen more instances in which it has appreciated during economic shocks when the EUR was used as a base, compared to the AUD. This may be, once again, due to biases in the sample selection, which led to the AUD not exhibiting significant movements against the USD respectively the JPY, as some events were potentially not relevant for the AUD. Australia being far away from where most of the shocks occurred, the volume of outflows from AUD into safe haven currencies is likely less significant than the outflows in EUR. An interesting observation is that the data suggests crises stemming from natural disasters and environmental issues are less likely to trigger a flight to safety into safe haven currencies, whereas the opposite trend is observed for economic crises. Political and geopolitical events present more mixed views, however, we assume that a majority of these differences could be driven by the inclusion of shocks that were not impactful enough to prompt a flight to safety into USD.

Fig. 14: Appreciation per crisis CHF/EUR

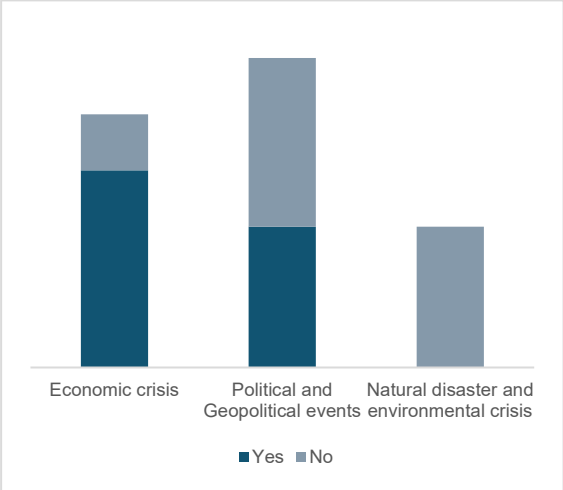
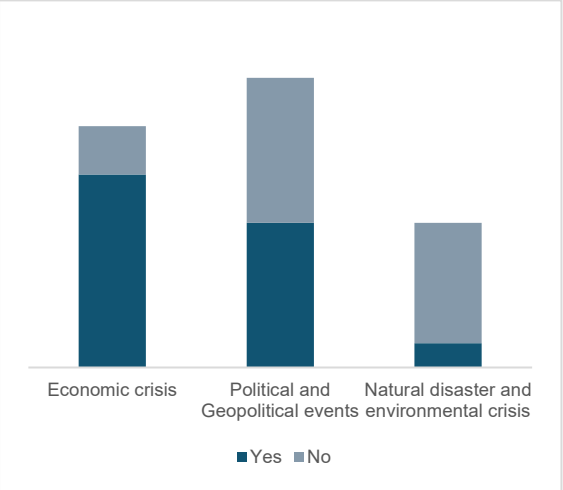


Fig. 15: Appreciation per crisis USD/EUR



Source: Data from tables 5 and 7 under section 4.2 subject to the currency pair appreciating with a CAR > 0,15 per crisis

Fig. 16: Appreciation per crisis JPY/AUD

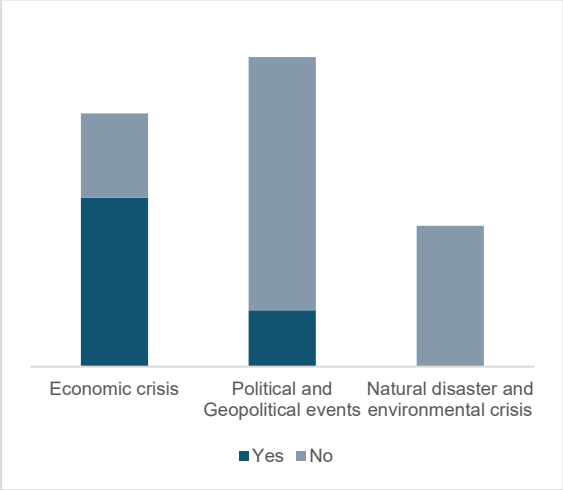
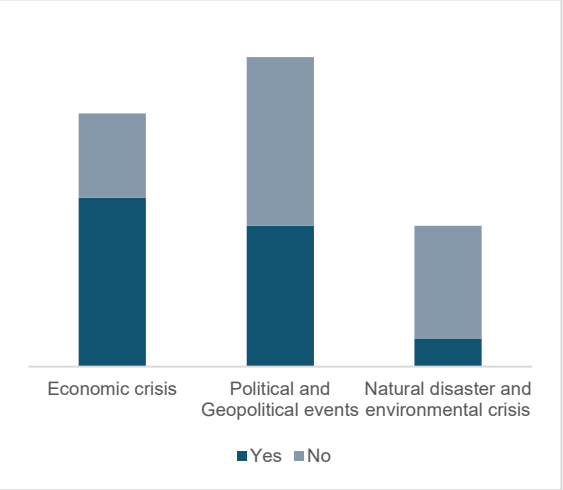


Fig. 17: Appreciation per crisis USD/AUD



Source: Data from tables 6 and 7 under section 4.2 subject to the currency pair appreciating with a CAR > 0,15 per crisis

For the sake of completeness, in **figures 18 and 19**, we also illustrate the data from table 7, showing the occurrences of appreciation in the CHF/EUR and USD/EUR pairs during the 25 selected shocks per region. Similarly, **figures 20 and 21** depict the same view for the JPY/AUD and USD/AUD. We observe a tendency where the USD appreciates more frequently than the JPY for crises in Asia, however, in all other instances, the appreciation appears to be similar across the board for the CHF and USD respectively

the JPY and USD. As highlighted previously, while the JPY appears to appreciate less frequently compared to the CHF, both currencies are not comparable given we used different bases for comparison, and the AUD may have been potentially more immune to the negative effects of these crises due to its distance from the shocks we selected within our sample.

Fig. 18: Appreciation per region CHF/EUR

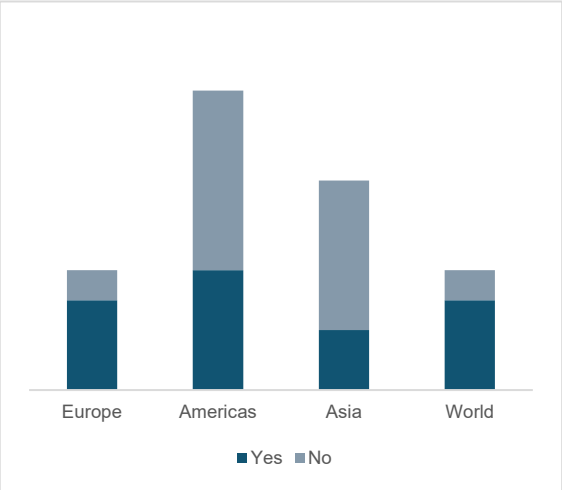
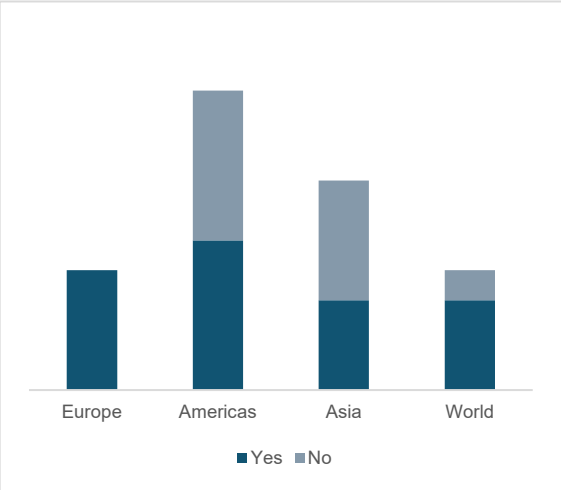


Fig. 19: Appreciation per region USD/EUR



Source: Data from tables 5 and 7 under section 4.2 subject to the currency pair appreciating with a CAR > 0,15 per crisis

Fig. 20: Appreciation per region JPY/AUD

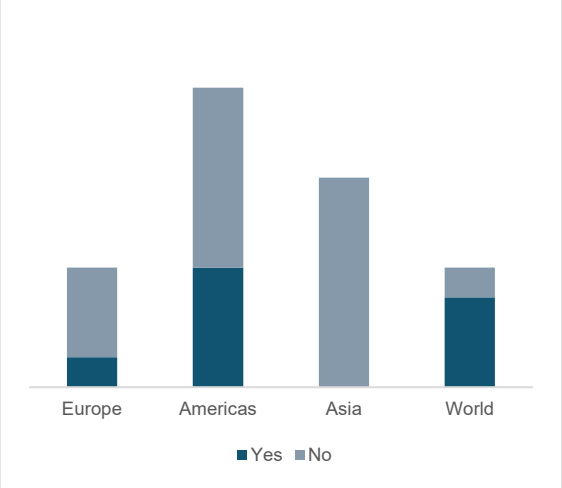
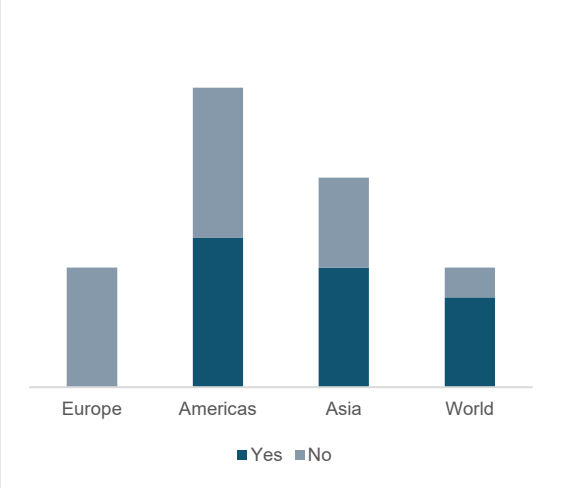


Fig. 21: Appreciation per region USD/AUD



Source: Data from tables 6 and 7 under section 4.2 subject to the currency pair appreciating with a CAR > 0,15 per crisis

Finally, based on the findings in table 7, the USD/EUR experienced appreciation in 60% of the 25 selected crises, while the USD/AUD appreciated in 48% of these events. Given the characteristic of the USD as a safe haven currency, we believe it would be reasonable to use this ratio as the base for comparing the frequency at which the CHF respectively JPY appreciated instead of comparing it against the entire sample size. This means that the CHF/EUR appreciated 80% of the time the USD/EUR appreciated while the JPY/AUD appreciated 67% of the time the USD/AUD appreciated. In our view, this gives us clear evidence that the CHF continues to live up to its expectations as safe haven currency potentially even more so than its peer, the JPY. However, given the difference in characteristics of each safe haven currency and basis used for comparison, the limited sample size, as well as the disparity in the number of event types and regions selected being not proportional, the number of occurrences in which each currency has appreciated may therefore not accurately reflect reality. Moreover, another challenge lay in the complexity of finding enough events for the sample, as well as events that are sufficiently impactful for the currency to experience a surge in value during the shock. It is therefore important to interpret the outcome of this research in conjunction with existing studies as well as economic theory.

5. Conclusion

Among other factors, we know that one of the main drivers influencing the movements of the CHF is the B/S effect as outlined in the SNB's research (REYNARD 2008) to which, we tried to demonstrate that the intervention on the FX market, along with other factors collected in interviews and through existing literature, has been a key driver to explaining the movements of the currency in recent years. As we attempted to test the extent of this relationship through several OLS regressions, we came across extremely high adjusted R Square results within our output which appeared to be too good to be true. Excluding FX reserve from our model, we obtained more reasonable results which led us to calculate predicted values and compare them against observed values. Our findings then suggested that Rate Diff. EU-CH had the greatest effect on the movements of our CHF/EUR RER, which contradicted the statement from one of our experts. Indeed, we believe that this variable, despite the gap between predicted and observed values, is significant and the potential deviation, illustrated in the residuals, arises from the fact that our model may lack additional variables that could improve the accuracy of our model which, in some cases, may even offset the effect of Rate Diff. EU-CH. Incorporating somehow the level of FX reserve, interest rate levels in Switzerland with and without lags, and maybe even smoothing some variables could therefore support in improving the trajectory of our predicted values, and could be a subject for future research. We also further investigated the cause that led our results to report extremely high adjusted R Square, especially with the inclusion of FX reserve, which led us to the theory advocated by Granger and Engle by which, identifying cointegration among variables measured by a long-run equilibrium is better suited for time series in order to avoid spurious correlation. A combination of the Johansen test with a more sophisticated model such as the VECM could therefore yield potentially better results in identifying the drivers influencing the CHF today. Additionally, we discovered that an OLS regression assumes homogeneous variability of the data around its linear relationship which is clearly not the case for the VIX, the variable we used to identify the safe haven characteristic of the CHF. Indeed, in times of high uncertainty, the VIX could exhibit large variations which are inadequately captured within our model, and other statistical methods such as ARCH/GARCH models which predicts the variability of the data could therefore be more adequate to capture the heterogeneous variations of the VIX. These models will unfortunately not be further explored in this research as it goes beyond the scope of our curriculum however, this could be also subject for future research. While our model may not be ideal for this type of analysis, we still attempted to explain the rising trend of the

CHF by combining the outcome of our model with existing literature as well as the input we gathered from our experts. Indeed, we came to the conclusion that the appreciating trend of the CHF stemmed from its historical perception as a safe haven currency post-WWI which drove economic growth causing a flow of high-skilled workers to relocated in Switzerland leading to an increase in productivity thereby further reinforcing its value. This trajectory appears to be regardless of the economic cycle, be it in normal times when Switzerland benefits from growth driven by differences in productivity, or in stressful times when Switzerland benefits from a strong currency as investors seek for safety in the CHF. This therefore suggests that as long as the CHF is perceived as a safe haven currency, there might be no circumstances in which the evolution of the currency would see a change in trajectory. However, according to our model, there appears to have been instances in which the Rate Diff. EU-CH, a variable that moves according to economic theory, has potentially prevailed over the safe haven characteristic variables inadequately captured within our model, during specific shocks which therefore led us to question whether the CHF remains a safe haven currency today, and under which circumstances the currency appreciated during past crises.

Assessing whether the CHF remains a safe haven currency today is a threefold answer. Firstly, according to most of our experts (see appendix 2), investors' perception of the CHF as a refuge in times of high market volatility has increased, further recognizing its status as a safe haven currency. Secondly, alongside this statement, we can also add that the SNB’s continued focus on maintaining price stability through various monetary policy measures, coupled with its ability to manage a currency whose behaviour diverges from traditional economic theory, has ensured stability in the Swiss economy over many years, even during distressed times. This stability has potentially boosted investor trust in the currency, with part of the Swiss Franc's continuous appreciation against major currencies being attributed to the diligent monetary policies applied by the SNB. Lastly, according to figure 1, the CHF/USD exhibited random movements against our selected measure of global risk aversion (CBOE Volatility Index), implying that the CHF does not always appreciate against the USD during global risk aversion, as opposed to what was advocated in an existing study from the IMF. However, simply comparing the CHF's movements against a single currency (e.g. USD) does not provide a comprehensive understanding of its behaviour. Thus, we needed to compare both currencies against a common base, such as the EUR, to fully evaluate the CHF's movements.

Consequently, we decided to further analyse the currency's movements during specific shocks to clarify whether the CHF truly qualifies as a safe haven currency today, which

was explored in the last section of this study, alongside the USD and JPY. The CHF was compared to the USD using the EUR as a basis while the JPY was compared to the USD using the AUD as a basis. The data suggests that the USD is the preferred currency when compared with the CHF while it is not always the case when it is compared with the JPY. If we look at the number of occurrences according to the type of crisis, the USD seems to always prevail against the CHF regardless of the type of shock while the JPY prevails over the USD if the shock is driven by an economic crisis. The relative appreciation of these currencies during specific shocks, however, also depends on the characteristics of these safe haven currencies. For instance, the level of liquidity differs per currency and the supply scarcity of the CHF may lead to the SNB intervening to prevent the currency from becoming too strong. The JPY, on the other hand, benefits from an increasing demand due to unwinding carry trade transactions which leads to investors buying JPY and selling AUD to reimburse their loans labelled in JPY. There is therefore not enough evidence to conclude that the USD is indeed the preferred currency given the limited number of observations within this analysis as well as with the differences in their characteristics.

If we cluster crises according to their regions, the frequency at which the CHF surpassed the relative appreciation of the USD against the EUR is equal for both CHF and USD for global crises, denoted as « World », while the USD prevailed for all other regions (Europe, Americas, and Asia). This means that for crises that have a global impact, the CHF and the USD are equally valued as safe haven currencies. On the other hand, the JPY exhibited more often a stronger relative appreciation than the USD for crises around the world except in Asia, a region where the USD prevailed. However, given Europe's significant role as a trading partner for Switzerland relative to the US, a crisis originating in Europe may lead to reduced exports from Switzerland, which implies that any potential appreciation of the CHF may be partly offset by the decreased economic activity, resulting in a relatively weaker appreciation of the CHF against the EUR compared to the appreciation of the USD against the EUR. The same applies to the JPY given that the US does not trade as much with Asian countries compared to Japan. This means that while a potential flight-to-safety may have occurred in these currencies, this may be partly offset by the reduction in trading activities. For the results to be meaningful, it would be therefore worth exploring the same analysis while incorporating factors that would quantify the effect of trading activities on currency movements. An extension to this study could be subject for future research.

Finally, while observing the occurrences of appreciation in the various currency pairs assessed during selected shocks, our data suggests that crises stemming from natural disasters and environmental issues are less likely to prompt a flight-to-safety into safe haven currencies, as opposed to economic crises. Furthermore, our evidence suggests that the CHF appreciated 80% of the time the USD appreciated, the benchmark we use for comparison given it exhibited the highest frequency of appreciation out of the 25 shocks. Aligning with the opinion of our experts, we can therefore conclude that the CHF still showcases safe haven characteristics today according to our study.

References

CALLEN, Tim, 2023. Gross Domestic Product: An Economy's All. *IMF* [online]. 6 February 2023. Retrieved from : https://www.imf.org/en/Publications/fandd/issues/Series/Back-to-Basics/gross-domestic-product-GDP [accessed 24 March 2024].

CANETG, Fabio, 2023. Why is the Swiss franc appreciating so much? *SWI swissinfo.ch* [online]. 28 November 2023. Retrieved from : https://www.swissinfo.ch/eng/business/why-is-the-swiss-franc-appreciating-so-much/49011112 [accessed 18 March 2024].

CATAO, Luis, 2019. Real Exchange Rates: What Money Can Buy. *IMF* [online]. 19 March 2019. Retrieved from : https://www.imf.org/en/Publications/fandd/issues/Series/Back-to-Basics/Real-Exchange-Rates [accessed 5 April 2024].

CFI TEAM, 2023a. Swiss Franc (CHF). *Corporate Finance Institute* [online]. 6 November 2023. Retrieved from : https://corporatefinanceinstitute.com/resources/foreign-exchange/swiss-franc-chf/ [accessed 18 March 2024].

CFI TEAM, 2023b. Safe Haven. *Corporate Finance Institute* [online]. 18 October 2023. Retrieved from : https://corporatefinanceinstitute.com/resources/career-map/sell-side/capital-markets/safe-haven/ [accessed 19 March 2024].

CFI TEAM, 2023c. Cointegration. *Corporate Finance Institute* [online]. 21 November 2023. Retrieved from : https://corporatefinanceinstitute.com/resources/data-science/cointegration/ [accessed 14 April 2024].

CHANANA, Charu, 2023. What moves the Japanese yen (JPY)? *SAXO* [online]. 21 June 2023. Retrieved from : https://www.home.saxo/en-ch/content/articles/forex/what-moves-the-japanese-yen-jpy-21062023 [accessed 23 March 2024].

CHEN, James, 2020a. Yield Curve Risk: Overview, Types of Risk. *Investopedia* [online]. 25 March 2020. Retrieved from : https://www.investopedia.com/terms/y/yieldcurverisk.asp [accessed 2 May 2024].

CHEN, James, 2020b. Announcement Effect Definition. *Investopedia* [online]. 15 September 2020. Retrieved from : https://www.investopedia.com/terms/a/announcment-effect.asp [accessed 6 April 2024].

CHEN, James, 2020c. Currency Carry Trade: Definition as Trading Strategy and Example. *Investopedia* [online]. 21 December 2020. Retrieved from : https://www.investopedia.com/terms/c/currencycarrytrade.asp [accessed 20 April 2024].

CHEN, James, 2021a. Capital Outflow: Definition and Examples. *Investopedia* [online]. 10 February 2021. Retrieved from : https://www.investopedia.com/terms/c/capital-outflow.asp [accessed 24 March 2024].

CHEN, James, 2021b. Foreign Exchange Intervention Definition, Strategies, Goals. *Investopedia* [online]. 24 March 2021. Retrieved from : https://www.investopedia.com/terms/f/foreign-exchange-intervention.asp [accessed 6 April 2024].

CHEN, James, 2023. Safe Haven: Definition and Examples in Investing. *Investopedia* [online]. 18 March 2023. Retrieved from : https://www.investopedia.com/terms/s/safe-haven.asp [accessed 19 March 2024].

CHEN, James, 2024a. Bretton Woods Agreement and the Institutions It Created Explained. *Investopedia* [online]. 25 February 2024. Retrieved from : https://www.investopedia.com/terms/b/brettonwoodsagreement.asp [accessed 18 March 2024].

CHEN, James, 2024b. Fiat Money: What It Is, How It Works, Example, Pros & Cons. *Investopedia* [online]. 28 February 2024. Retrieved from : https://www.investopedia.com/terms/f/fiatmoney.asp [accessed 13 April 2024].

CHEN, James, 2024c. Understanding Defensive Stocks, Pros & Cons, and Examples. *Investopedia* [online]. 2 May 2024. Retrieved from : https://www.investopedia.com/terms/d/defensivestock.asp [accessed 2 May 2024].

CONFÉDÉRATION SUISSE, 2021. Export. *Confédération suisse* [online]. 29 December 2021. Retrieved from : https://www.eda.admin.ch/aboutswitzerland/en/home/wirtschaft/uebersicht/export.html [accessed 22 March 2024].

CONFÉDÉRATION SUISSE, 2023a. Chemical and pharmaceutical industry. *Confédération suisse* [online]. 28 December 2023. Retrieved from : https://www.eda.admin.ch/aboutswitzerland/en/home/wirtschaft/taetigkeitsgebiete/chemie-und-pharma.html [accessed 2 May 2024].

CONFÉDÉRATION SUISSE, 2023b. Switzerland-EU in figures. *Confédération suisse* [online]. 7 November 2023. Retrieved from : https://www.eda.admin.ch/europa/en/home/dienstleistungen-publikationen/schweiz-eu-in-zahlen.html [accessed 10 April 2024].

CONFÉDÉRATION SUISSE, 2023c. Economy and trade – an essential partnership. *Confédération suisse* [online]. 21 August 2023. Retrieved from : https://www.eda.admin.ch/missions/mission-eu-brussels/en/home/key-issues/economy-finance.html [accessed 20 April 2024].

CONFÉDÉRATION SUISSE, 2024a. Swiss economy – Facts and figures. *Confédération suisse* [online]. 1 January 2024. Retrieved from : https://www.eda.admin.ch/aboutswitzerland/en/home/wirtschaft/uebersicht/wirtschaft---fakten-und-zahlen.html [accessed 2 May 2024].

CONFÉDÉRATION SUISSE, 2024b. Federal debt. *Confédération suisse* [online]. 25 April 2024. Retrieved from : https://www.efd.admin.ch/efd/en/home/finanzpolitik/bundesschulden.html [accessed 25 April 2024].

CONFÉDÉRATION SUISSE, 2024c. Average annual inflation of +2.1% in 2023 - Swiss Consumer Price Index in December and annual inflation 2023 | Press release.

Confédération suisse [online]. 8 January 2024. Retrieved from : https://www.bfs.admin.ch/asset/en/30225915 [accessed 24 March 2024].

DE BOCK, Reinout and FILHO, Irineu de Carvalho, 2013. *The Behavior of Currencies during Risk-off Episodes* [online]. Washington : International Monetary Fund. Retrieved from : https://www.imf.org/external/pubs/ft/wp/2013/wp1308.pdf [accessed 24 March 2024].

DUDA, Scott, 2022. Identifying and Addressing Multicollinearity in Regression Analysis. *Medium* [online]. 14 October 2022. Retrieved from : https://scottmduda.medium.com/identifying-and-addressing-multicollinearity-in-regression-analysis-ca86a21a347e [accessed 10 April 2023].

ENGLE, Robert, 2001. GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics. *Journal of Economic Perspectives*. Vol. 15, no. 4, pp. 157–168. DOI 10.1257/jep.15.4.157.

ERSAN, Oguz et al., 2021. The speed of stock price adjustment to corporate announcements: Insights from Turkey. *Emerging Markets Review*. Vol. 47, p. 100778. DOI 10.1016/j.ememar.2020.100778.

EUGSTER, David, 2023a. A blessing and a curse: the strength of the Swiss franc. *SWI swissinfo.ch* [online]. 23 May 2023. Retrieved from : https://www.swissinfo.ch/eng/culture/a-blessing-and-a-curse-the-strength-of-the-swiss-franc/48532020 [accessed 18 March 2024].

EUGSTER, David, 2023b. When the Swiss franc had to learn to float. *SWI swissinfo.ch* [online]. 26 February 2023. Retrieved from : https://www.swissinfo.ch/eng/politics/when-the-franc-had-to-learn-to-float/48301476 [accessed 18 March 2024].

EURONEWS, 2024. Swiss inflation continues to slow down in February. *euronews* [online]. 4 March 2024. Retrieved from : https://www.euronews.com/business/2024/03/04/swiss-inflation-continues-to-slow-down-in-february [accessed 24 March 2024].

FASTERCAPITAL, 2024. Carry trade unwind: Preparing for the Carry Trade Unwind. *FasterCapital* [online]. 4 April 2024. Retrieved from : https://fastercapital.com/content/Carry-trade-unwind--Preparing-for-the-Carry-Trade-Unwind.html [accessed 20 April 2024].

FENECH, Maria and CUSCHIERI, Calamatta, 2019. Safe haven Switzerland. *Times of Malta* [online]. 29 August 2019. Retrieved from : https://timesofmalta.com/article/safe-haven-switzerland.731614 [accessed 22 March 2024].

FISCHER, Franziska et al., 2024. *European Economic Perspectives SNB: FX interventions and the balance sheet*. . Zurich : UBS AG. [internal document]

FOLGER, Jean, 2024. What Is the Relationship Between Inflation and Interest Rates? *Investopedia* [online]. 26 February 2024. Retrieved from : https://www.investopedia.com/ask/answers/12/inflation-interest-rate-relationship.asp [accessed 21 March 2024].

FUSTER, Thomas, 2024. What are Switzerland's secrets for a low inflation rate? *Neue Zürcher Zeitung* [online]. 26 February 2024. Retrieved from : https://www.nzz.ch/english/what-are-switzerlands-secrets-for-a-low-inflation-rate-ld.1819196 [accessed 22 March 2024].

GANTI, Akhilesh, 2024. Net International Investment Position (NIIP): Definition, Example. *Investopedia* [online]. 28 April 2024. Retrieved from : https://www.investopedia.com/terms/n/net-international-investment-position-niip.asp [accessed 30 April 2024].

GILCHRIST, Karen, 2023. The small European nation of Switzerland beat sky-high inflation. Here's how. *CNBC* [online]. 27 February 2023. Retrieved from : https://www.cnbc.com/2023/02/27/how-switzerland-beat-high-inflation-why-the-swiss-economy-is-strong.html [accessed 22 March 2024].

HA, Jongrim et al., 2023. *What Explains Global Inflation* [online]. Washington : World Bank Group. Retrieved from : https://documents1.worldbank.org/curated/en/099417212182324899/pdf/IDU04d2b00a8052e30403409fc1033a96b1c81ac.pdf [accessed 24 March 2024].

HABIB, Maurizio Michael and STRACCA, Livio, 2011. *Getting beyond carry trade: what makes a safe haven currency?* [online]. Frankfurt am Main : European Central Bank. Retrieved from : https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1288.pdf [accessed 21 March 2024].

HALL, Mary, 2023. Why Does Inflation Increase With GDP Growth? *Investopedia* [online]. 10 October 2023. Retrieved from : https://www.investopedia.com/ask/answers/112814/why-does-inflation-increase-gdp-growth.asp [accessed 21 March 2024].

HARGRAVE, Marshall, 2024. Covered Interest Rate Parity: Definition, Calculation, and Example. *Investopedia* [online]. 11 April 2024. Retrieved from : https://www.investopedia.com/terms/c/covered-interest-rate-parity.asp [accessed 13 April 2024].

HAYES, Adam, 2023a. Uncovered Interest Rate Parity (UIP): Definition and Calculation. *Investopedia* [online]. 11 October 2023. Retrieved from : https://www.investopedia.com/terms/u/uncoveredinterestrateparity.asp [accessed 13 April 2024].

HAYES, Adam, 2023b. Safe Haven Currency: Definition, How It Works, How to Trade. *Investopedia* [online]. 23 June 2023. Retrieved from : https://www.investopedia.com/safe-haven-currency-7503736 [accessed 21 March 2024].

HAYES, Adam, 2024. How to Buy Treasury Bills. *Investopedia* [online]. 10 April 2024. Retrieved from : https://www.investopedia.com/terms/t/treasurybill.asp [accessed 13 April 2024].

HE, Laura, 2024. Bank of Japan brings era of negative interest rates to an end with first hike in 17 years | CNN Business. *CNN* [online]. 19 March 2024. Retrieved from : https://edition.cnn.com/2024/03/18/business/japan-boj-negative-interest-rate-ended-intl-hnk/index.html [accessed 23 March 2024].

IACCINO, Bob, 2024. The role of gold in turbulent times. *Reuters* [online]. 18 March 2024. Retrieved from : https://www.reuters.com/plus/cme/the-role-of-gold-in-turbulent-times?utm_medium=paid&utm_source=linkedin&utm_campaign=cme&utm_id=299344843 [accessed 13 April 2024].

INDYK, Samuel, 2023. Swiss franc grapples with safe-haven identity crisis after Credit Suisse | Reuters. *Reuters* [online]. 24 March 2023. Retrieved from : https://www.reuters.com/business/finance/swiss-franc-grapples-with-safe-haven-identity-crisis-after-credit-suisse-2023-03-24/ [accessed 24 March 2024].

INVESTOPEDIA, 2020. Law of One Price: Definition, Example, Assumptions. *Investopedia* [online]. 29 September 2020. Retrieved from : https://www.investopedia.com/terms/l/law-one-price.asp [accessed 5 April 2024].

INVESTOPEDIA, 2023a. How Does Inflation Affect the Exchange Rate Between Two Nations? *Investopedia* [online]. 9 June 2023. Retrieved from : https://www.investopedia.com/ask/answers/022415/how-does-inflation-affect-exchange-rate-between-two-nations.asp [accessed 19 March 2024].

INVESTOPEDIA, 2023b. Inflation Hawk: Dovish and Hawkish Monetary Policy Explained. *Investopedia* [online]. 24 June 2023. Retrieved from : https://www.investopedia.com/terms/h/hawk.asp [accessed 23 March 2024].

INVESTOPEDIA, 2023c. Balassa-Samuelson Effect: Overview of the Economic Theory. *Investopedia* [online]. 18 September 2023. Retrieved from : https://www.investopedia.com/terms/b/balassasamuelson-effect.asp [accessed 4 April 2024].

INVESTOPEDIA, 2024a. Recession: What Is It and What Causes It. *Investopedia* [online]. 16 April 2024. Retrieved from : https://www.investopedia.com/terms/r/recession.asp [accessed 16 April 2024].

INVESTOPEDIA, 2024b. Why Is Deflation Bad for the Economy? *Investopedia* [online]. 17 January 2024. Retrieved from : https://www.investopedia.com/articles/personal-finance/030915/why-deflation-bad-economy.asp [accessed 24 March 2024].

KABERNA, Frank, 2023. Bond yields hit new highs: what it means for the dollar. *IG* [online]. 19 October 2023. Retrieved from : https://www.ig.com/us/news-and-trade-ideas/bond-yields-hit-new-highs--what-it-means-for-the-dollar-231018 [accessed 2 May 2024].

KENTON, Will, 2021. European Sovereign Debt Crisis: Eurozone Crisis Causes, Impacts. *Investopedia* [online]. 28 October 2021. Retrieved from : https://www.investopedia.com/terms/e/european-sovereign-debt-crisis.asp [accessed 20 April 2024].

KOPP, Carol M., 2024. Terms of Trade (TOT): Definition, Use as Indicator, and Factors. *Investopedia* [online]. 1 April 2024. Retrieved from : https://www.investopedia.com/terms/t/terms-of-trade.asp [accessed 13 April 2024].

KRAMER, Leslie, 2023. How Importing and Exporting Impacts the Economy. *Investopedia* [online]. 27 September 2023. Retrieved from :

https://www.investopedia.com/articles/investing/100813/interesting-facts-about-imports-and-exports.asp [accessed 18 March 2023].

KUEPPER, Justin, 2023. CBOE Volatility Index (VIX): What Does It Measure in Investing? *Investopedia* [online]. 12 December 2023. Retrieved from : https://www.investopedia.com/terms/v/vix.asp [accessed 24 March 2024].

LE NEWS, 2024. Swiss National Bank surprises with interest rate cut. *Le News* [online]. 21 March 2024. Retrieved from : https://lenews.ch/2024/03/21/swiss-national-bank-surprises-with-interest-rate-cut/ [accessed 2 April 2024].

LIOUDIS, Nick, 2024. Treasury Bonds vs. Treasury Notes vs. Treasury Bills. *Investopedia* [online]. 12 April 2024. Retrieved from : https://www.investopedia.com/ask/answers/033115/what-are-differences-between-treasury-bond-and-treasury-note-and-treasury-bill-tbill.asp [accessed 13 April 2024].

LOBEL, Ben, 2022. A Guide to Safe-Haven Currencies and How To Trade Them. *DailyFX* [online]. 15 November 2022. Retrieved from : https://www.dailyfx.com/education/macro-fundamentals/safe-haven-currencies.html [accessed 21 March 2024].

MCCAULEY, Robert N. and MCGUIRE, Patrick, 2009. Dollar appreciation in 2008: safe haven, carry trades, dollar shortage and overhedging. [online]. Retrieved from : https://www.bis.org/publ/qtrpdf/r_qt0912i.htm [accessed 13 April 2024].

MOMBELLI, Armando, 2018. The financial crisis of 2008 and the Swiss 'miracle'. *SWI swissinfo.ch* [online]. 14 September 2018. Retrieved from : https://www.swissinfo.ch/eng/business/10-years-after-the-collapse-of-lehman-brothers_the-financial-crisis-of-2008-and-the-swiss-miracle/44397608 [accessed 29 March 2024].

MONTEVIRGEN, Karl, 2023. Defensive and cyclical stocks: What investors should know. *Britannica Money* [online]. 21 April 2023. Retrieved from : https://www.britannica.com/money/cyclical-stocks-defensive-investing [accessed 13 April 2024].

MOSKOWITZ, Dan, 2019. Why Switzerland Scrapped the Euro. *Investopedia* [online]. 25 June 2019. Retrieved from : https://www.investopedia.com/articles/forex/013015/why-switzerland-scrapped-euro.asp [accessed 29 March 2024].

NICKOLAS, Steven, 2023. Understanding Deflation vs. Disinflation. *Investopedia* [online]. 17 September 2023. Retrieved from : https://www.investopedia.com/ask/answers/032415/what-difference-between-deflation-and-disinflation.asp [accessed 24 March 2024].

NYE, Christopher, 2023. What is a safe haven currency? *Smart Currency Business* [online]. 27 February 2023. Retrieved from : https://www.smartcurrencybusiness.com/news/articles/what-is-a-safe-haven-currency/ [accessed 21 March 2024].

OZAROWSKI, Chris, 2022. Do Prices Go Down In a Recession? Here's What Usually Gets Cheaper | Nasdaq. *Nasdaq* [online]. 19 September 2022. Retrieved from :

https://www.nasdaq.com/articles/do-prices-go-down-in-a-recession-heres-what-usually-gets-cheaper [accessed 24 March 2024].

PETERS, Katelyn, 2024. Response Lag: What It Is and How It Works. *Investopedia* [online]. 24 February 2024. Retrieved from : https://www.investopedia.com/terms/r/response_lag.asp [accessed 6 April 2024].

REHAL, Viren, 2022. VECM Estimation and Interpretation - SPUR ECONOMICS. *SPUR ECONOMICS* [online]. 9 May 2022. Retrieved from : https://spureconomics.com/vecm-estimation-and-interpretation/ [accessed 14 April 2024].

REUTERS, 2024. SNB study tallies cost of intervention to curb franc gains | Reuters. *Reuters* [online]. 1 April 2024. Retrieved from : https://www.reuters.com/markets/europe/snb-study-tallies-cost-intervention-curb-franc-gains-2024-04-01/ [accessed 2 April 2024].

REVILL, John, 2022. Swiss National Bank ends era of foreign currency purchases | Reuters. *Reuters* [online]. 30 September 2022. Retrieved from : https://www.reuters.com/markets/europe/swiss-national-bank-intervened-support-franc-q2-2022-09-30/ [accessed 29 March 2024].

REYNARD, Samuel, 2008. What Drives the Swiss Franc? [online]. Retrieved from : https://www.snb.ch/en/publications/research/working-papers/2008/working_paper_2008_14 [accessed 4 April 2024].

ROSS, Sean, 2021. How Does Money Supply Affect Interest Rates? *Investopedia* [online]. 28 June 2021. Retrieved from : https://www.investopedia.com/ask/answers/040715/how-does-money-supply-affect-interest-rates.asp [accessed 10 April 2024].

ROSS, Sean, 2024. When Is Inflation Good for the Economy? *Investopedia* [online]. 1 April 2024. Retrieved from : https://www.investopedia.com/ask/answers/111414/how-can-inflation-be-good-economy.asp [accessed 2 April 2024].

SCHLEGEL, Martin, 2024. Interest rates and foreign exchange interventions: Achieving price stability in challenging times. *SWISS NATIONAL BANK* [online]. 9 April 2024. Retrieved from : https://www.snb.ch/en/publications/communication/speeches/2024/ref_20240409_msl [accessed 11 April 2024].

SMITH, Lisa, 2022. Inflation and Deflation: Keep Your Portfolio Safe. *Investopedia* [online]. 30 January 2022. Retrieved from : https://www.investopedia.com/articles/basics/11/guarding-against-inflation-deflation.asp [accessed 13 April 2024].

SPOSATO, William, 2024. Japan's Public Hates the New Inflation. *FP* [online]. 15 January 2024. Retrieved from : https://foreignpolicy.com/2024/01/15/japan-economy-inflation-deflation/ [accessed 23 March 2024].

STOJANOV, Aleksandar, ENGEL, Jakob and VARELA, Gonzalo, 2024. How exports react to exchange rate fluctuations, and what it means for low- and middle-income countries. *World Bank Blogs* [online]. 24 April 2024. Retrieved from :

https://blogs.worldbank.org/en/trade/how-exports-react-to-exchange-rate-fluctuations--and-what-it-mea [accessed 6 May 2024].

SWISS NATIONAL BANK, 2023a. The SNB's monetary policy strategy | Swiss National Bank. *SWISS NATIONAL BANK* [online]. 27 September 2023. Retrieved from : https://www.snb.ch/en/the-snb/mandates-goals/monetary-policy/strategy [accessed 26 March 2024].

SWISS NATIONAL BANK, 2023b. Quarterly Bulletin. *SWISS NATIONAL BANK* [online]. 27 September 2023. Retrieved from : https://www.snb.ch/en/news-publications/economy/quarterly-bulletin/quarterly-bulletin [accessed 26 March 2024].

SWISS NATIONAL BANK, 2023c. The implementation of monetary policy | Swiss National Bank. *SWISS NATIONAL BANK* [online]. 27 September 2023. Retrieved from : https://www.snb.ch/en/the-snb/mandates-goals/monetary-policy/implementation [accessed 26 March 2024].

SWISS NATIONAL BANK, 2023d. Questions and answers on the SNB's independence and its relationship with the Confederation. *SWISS NATIONAL BANK* [online]. 27 September 2023. Retrieved from : https://www.snb.ch/en/services-events/digital-services/faq-overview/qas_unabhaengigkeit [accessed 7 April 2024].

SWISS NATIONAL BANK, 2023e. Questions and answers on the SNB as a company. *SWISS NATIONAL BANK* [online]. 27 September 2023. Retrieved from : https://www.snb.ch/en/services-events/digital-services/faq-overview/qas_unternehmen [accessed 7 April 2024].

SWISS NATIONAL BANK, 2023f. Annual loss for the SNB in 2022 - reasons, significance and consequences. *SWISS NATIONAL BANK* [online]. 27 September 2023. Retrieved from : https://www.snb.ch/en/publications/communication/speeches/2023/ref_20230428_jsb [accessed 7 April 2024].

SWISSINFO.CH, 2022. Switzerland exits negative interest rate era. *SWI swissinfo.ch* [online]. 22 September 2022. Retrieved from : https://www.swissinfo.ch/eng/business/switzerland-exits-negative-interest-rate-era/47920304 [accessed 29 March 2024].

SWISSINFO.CH, S. W. I., 2024. Swiss National Bank: interventions necessary for price stability. *SWI swissinfo.ch* [online]. 10 April 2024. Retrieved from : https://www.swissinfo.ch/eng/banking-fintech/swiss-national-bank-foreign-exchange-market-interventions-necessary-for-price-stability/75458505 [accessed 7 April 2024].

TODOROVA, Vessela, 2020. Safe Haven Currencies. *Economic Alternatives*. Vol. 26, no. 4, pp. 579–591. DOI 10.37075/EA.2020.4.05.

TWIN, Alexandra, 2024. 6 Factors That Influence Exchange Rates. *Investopedia* [online]. 15 February 2024. Retrieved from : https://www.investopedia.com/trading/factors-influence-exchange-rates/ [accessed 20 March 2024].

WASHINGTON POST, 2023. Opinion | The Ukraine war led to a head-spinning shift in European neutrality. *Washington Post* [online]. 6 April 2023. Retrieved from :

https://www.washingtonpost.com/opinions/2023/04/06/switzerland-neutrality-europe-ukraine-war/ [accessed 24 March 2024].

WISE, Hannah, 2023. How inflation affects your investments. *Julius Baer* [online]. 17 August 2023. Retrieved from : https://www.juliusbaer.com/en/insights/wealth-insights/how-to-invest/how-inflation-affects-your-investments/ [accessed 13 April 2024].

WITS, 2020. Japan Trade | WITS Data. *World Integrated Trade Solution* [online]. 3 January 2020. Retrieved from : https://wits.worldbank.org/CountrySnapshot/en/JPN [accessed 21 April 2024].

Use of Artificial Intelligence-assisted tools

In the context of this work, the author declares having used Artificial Intelligence-assisted tools for the following purposes:

- Improvements of form (spelling, syntax, reformulation, report structure)

  Mention of AI tools used: No reformulation or report structure is issued from any AI tools (this is solely my work). On rare occasions, ChatGPT was used as additional support in spelling and syntax as well as to clean up spelling in interview transcriptions and shorten the length of some extremely hefty interview answers by summarizing key points of those answers (see appendix 2).

- Substantive reflections (production of analysis, recommendations)

  Mention of AI tools used: ChatGPT was solely used to help enhance my understanding of some concepts or confirm whether the ideas I proposed for my analysis made sense. The analysis and recommendations are solely my work, and ChatGPT was merely used as an « advisor » for my work.

- Data collection and interpretation

  All calculations and various analyses were performed using Microsoft Excel version 2403 (data available on demand).

  Mention of AIs used: ChatGPT was used as a starting point for reflections which then allowed me to find the right angle to approach my thesis and generate my own ideas. It was also used as a « sparring partner » for me to challenge its ideas and also advise on whether my ideas made sense. Ultimately, the data collection is the result of my own extensive manual efforts, and the interpretation of the results is based on the knowledge I acquired at HEG Geneva (Forecasting & Decision-making, Macroeconomics course). ChatGPT was also used to shorten the length of some extremely hefty interview answers by summarizing the key points of those answers (see appendix 2).

Appendix 1 - Chatbot conversations used in this research

I have not used any Chatbot as a source for my research. Instead, my work has always been supported by existing literature, input from experts I have interviewed, or based on the assumptions and/or knowledge I acquired at HEG Geneva. There is therefore no appendix showing exchanges with any Chatbots, as the sole purpose for which I had to use it has been detailed in the disclaimer on the previous page.

Appendix 2 – Interviews of Chief Investment Officers (CIO) and Foreign Exchange (FX) specialists in various financial institutions

The 5 respondents are English speakers, and interviews were conducted in English.

Interview Protocol

Code	Question
QP01	*What are the main characteristics of safe haven currencies, particularly the Swiss franc?*
QP02	*Have you observed a change in investor confidence on the Swiss franc currency over the last years? And in your opinion, is the Swiss franc still a safe haven currency today?*
QP03	*What needs to happen in the Swiss economy for the Swiss franc to no longer be seen as a safe haven currency? And what would be the potential implications for Switzerland?*
QP04	*Have you observed instances or events in which a flight to safety occurred more on the Swiss franc rather than other safe haven currencies? And in your opinion, what is the cause for investors opting for one safe haven over another?*
QP05	*What could be a good benchmark to measure the movements of the Swiss franc and extrapolate factors that were potentially driven by traditional currency movement versus safe haven in characteristic movements?*
QP06	*What are the most prominent fundamental variables that influence the movements of the Swiss franc today?*
QP07	*What could be a good measure of risk aversion?*
QP08	*What could be a good indicator to identify if there is some kind of regional bias in terms of the movements of the Swiss Francs?*

Interview transcription - Respondent A

Code	Response
QP01A	Safe haven currencies are currencies that underperform when the markets are running smoothly and fine. Meaning, if you have well running equity markets, if the global economy is shining and everything is pointing towards investments and investment opportunities, then these currencies typically underperform. And whenever troubles are on the horizon, the same currencies are appreciating, and so it's a kind of a cycle between risk-on versus risk-off in markets, and safe haven currencies are the one that appreciate in the troubled times.
QP02A	The investor's confidence has even increased over the cycle of the last three or four years. This inflation cycle, which we had globally, because the Swiss National Bank managed to sail through a global inflation wave with Switzerland having almost no elevated inflation, so nothing compared to the eurozone with 10% or the US with almost 10% inflation for some time, which increased the interest in holding CHF. We see that very clearly from our clients out of Asia, out of the US, out of the eurozone. There is more and more discussion on whether we add some CHF just as they sometimes ask whether gold should be added in the portfolios.
QP03A	One thing that could happen is an excessive inflation. That always can happen to a country for one reason another which would then lead to discussions around: is the Swiss inflation protection still intact? Secondly, during the pandemic, there was a huge discussion about how well-capitalized Switzerland is. The central bank had money to cover close to 1.5 GDP for 1.5 years of Swiss growth so there was enough money around to finance anything. Thirdly, if the relationship with the eurozone starts to get a different twist and we suddenly would be considered almost part of the eurozone with little independence in times of trouble then that would also lead to a considerable re-evaluation of the CHF as a safe haven. If that were to happen, I believe the Swiss economy would still do fine. From a labour migration point of view, we then would have to see how that would impact one of the big sources of growth of Switzerland which is the labour migration from abroad coming to Switzerland. Switzerland has a very good and solid labour market and can fill it easily with well-educated people from France, Germany, and other countries if that is still intact. If not, then we could have a problem and that is one of the consequences. The other one is big companies which will enjoy this stability of our country and the question is if they then would look for other opportunities to work or relocate.
QP04A	I would reformulate that if I were you and just look for situations where the appreciation of the CHF was much stronger than for the dollar. Whenever we talk about geopolitical concerns such as a war outbreak, where the US is the big macho to help the world getting back to peace, then the USD is very strong because investors are seeking shelter from the economic power of the US. Here, Switzerland has nothing to offer, and the fact that we are neutral does not help a lot. So, that is a basic case where the USD is very strong, but then we have other cases where the JPY, USD and CHF appreciate at the same time. In years when you have environmental chaotic situations, like Fukushima, for example, even though it happened in Japan, the JPY appreciated and so did the USD and CHF. Anything other that slows growth, for example, at the outbreak of the pandemic which affected all of us, all three currencies appreciated. So, there are clear cases where all of them appreciate and there are cases when you have high troubles in the US, for example, a credit crisis, then the CHF tends to outperform. On the other hand, during the Eurozone debt crisis, it was clear first the USD appreciated, and due to CHF's closeness to the EU, the currency did not appreciate as much as the USD did. CHF is always good in situations where you also have to consider whether the US credit market is also affected one way or the other.
QP05A	I would really concentrate in the first part on the exchange rate moves and maybe even on bid-ask spreads that are the typical risk indicators. Secondly, you could go on things like exchange rate volatility: does the exchange rate volatility rise together with the CHF appreciation or not? Thirdly, you can concentrate on equity markets, for

	instances, typical situations where equity go belly up and CHF is appreciating, which is the awful part for us. As Swiss investors, we then have a double effect as the international stocks are falling and our currency is rising against other currencies. The correlation between the swings of international stocks and the reaction of the CHF would be insightful for the risk-on vs risk-off part. And then depending on how severe the situation is, you can also look at monthly sight deposits by the Swiss National Bank. If they are doing regular interventions, you can see how fast they act or how much they deduct. In a large part of the last 10-15 years, you can use these as an indicator such as the changes of the balance sheet. It is very clearly seen in situations like French elections, the intervention activity has risen dramatically.
QP06A	You need a measure of risk-on vs risk-off. There was once a good article at the turn of the century, to use one-month implied currency volatility. You take a geometric average of EUR/USD, USD/CHF, and USD/JPY. You measure how the geometric average of these three is moving. Maybe you can also take something like higher risk, like more risk-on like the GBP or the AUD. But using a geometric average of the implied volatility of these currencies, so the option implied volatility could also help you to identify periods of higher stress relative to others on currency markets. Then, what you need is yield differentials across countries like the three months or one-month deposit rates. And then I would use something like equity market performance. S&P 500, a year over a year or a quarter over a quarter relative to SMI quarter over a quarter. You can see already how the CHF appreciation and the underperformance of the SMI are clear indication that people still buy the CHF even if on the SMI there is not a lot happening.
QP07A	VIX, or you take something different like CDS, that should probably be fine. If you have CDS spreads from Italian bonds because Italy is always very sensitively reacting to troubles in the Eurozone, that would work. You could also take maybe even CDS spreads of some companies like UBS, which also indicate that there are some troubles. It is a bit trial and error by looking for the right company to represent the country's situation using CDS.
QP08A	It is not about the region or regional bias. Sometimes, it is curious that things can blow up in the US and the USD appreciates. So, it is not really a regional bias that investors are scared of the region where the origin of the troubles arises. It's something completely different, which I think many people ignore when they talk about safe haven currencies. And that is the different characteristics of the three major safe havens currencies. And that was my last point: that's the volume. The US bond market covers roughly 40% of the global bond market. The Swiss bond markets is 0.4% and the Japanese bond market is 18%. And we do not have the volumes to soak up the safe haven needs. That is why I started off with: *try to identify safe havens with changes in exchange rate or prices rather than anything else". Switzerland will never be able to swallow large-scale needs to relocate. So, if the eurozone as a whole is in trouble, it is not possible that everyone is getting CHF instead of euros because we do not have the volumes. It is possible to have a certain appreciation, and here the Swiss National Bank had to give clear limits but also introduce measures like negative interest rates in order to get rid of it. I think we should look at regional issues, the different characteristics of the markets, of the countries that are hosting the safe havens. In the US, USD is steadily depreciating over many years relative to the CHF, relative to the euro. So, in that sense, it is a lousy safe haven compared to the CHF. It is still appreciating versus most emerging markets and from an emerging market perspective, if you are an investor or if you are living in an emerging market, it is the most obvious choice to buy USD or gold. From their perspective, it is still kind of okay and in fact it offers also the liquidity that you would lack in the CHF. Then there is another one safe haven which is the Norwegian Krone (NOK). Norway is extremely rich, there are a lot of reserves built up due to the oil. It is a peaceful country separated from the European Union so it could be a second Switzerland. The only difference is they have rather high inflation but the most cruel thing is when you have NOK and then try to sell it again usually in this risk-on period where people try to get out of the risk of the safe have, the door is suddenly very small and it's very difficult to get out. By the time you are able to sell your NOK, the prices have already deteriorated quite

	strongly. We also found in our experience as investing in CIO that it only gives the appearance that you have a good safe haven asset in your portfolio, because once you try to sell it the prices are falling again. Here I would say the CHF runs a similar risk because the market is much smaller than the US. Once the safe haven period is finished, the CHF may depreciate rather quickly and then it is hard to get out. Investing or buying CHF very often means just holding cash which is very low with a very low yield term.

Interview transcription - Respondent B

Code	Response
QP01B	Market-wise, safe currencies appreciate whenever, let's say, there's a risk-off sentiment in the market. But that's just looking at the market. I would say safe haven currencies have different characteristics. Let's say, if you compare to US and Switzerland, the USD is a safe haven currency, because of its strong financial market, the banking system cannot work without the USD. In Switzerland, it's other reasons. It's the stable situation of the economy, the stable fiscal situation, the surplus in the foreign account, all these factors are characteristics of the CHF as a safe haven.
QP02B	Usually, the safe haven status of the CHF also depends on how much confidence there is for the EUR. Usually, the CHF is measured against EUR. If you go back in time, for example, 2005 and 2006, a lot of investors thought that the EUR could be the new CHF, that it could have safe haven characteristics, which then led to a short depreciation of the CHF up to EUR/CHF 1.70. But this then changed during the global financial crisis and the European debt crisis, when the EUR was at risk. This really then defined the CHF as a safe haven currency. Now, in recent years, I would say the status of the CHF as a safe haven currency has slightly depreciated, but it's still seen as a safe haven, maybe not as much as 10 years ago when there were fears that the Eurozone could break apart.
QP03B	There could be several reasons for the CHF losing its safe haven appeal. For example, a huge fiscal deficit, skyrocketing debt level, a collapse of the financial system, or political changes that would change the perception of Switzerland as a strong stable economy.
QP04B	I believe that during the European debt crisis, the CHF was more of a safe haven currency than, for example, the JPY or the USD. I believe the reason is that let's say German investors or Italian investors, were more likely to deposit their holdings in Switzerland rather in Japan because it's far away even from a cultural perspective so they are more likely to bring their money to Switzerland rather than investing in Japan or the US. So, I would say whenever the Eurozone is at risk, then the CHF is likely to appreciate more than the JPY or the USD. An Asian investor will likely not go for the CHF. But if you look at the European debt crisis, it was a crisis that also had a global reach albeit was much more focused in Europe than on all the parts of the world. So, investors more impacted by this crisis were German investors, for example, and not Japanese investors. And that is why I believe the flows are much stronger. It's not only about the crisis but also the area where the people are affected that plays a role in the flows that would go more into the CHF.
QP05B	Maybe looking at the movement of the CHF against different currencies. You could look at the CHF against USD, but that's also a safe haven currency and against the AUD and EUR which are not safe haven currencies. And there you could see, what are general movements, maybe not linked to safe haven flows, but maybe to inflation or higher interest rates but what are the genuine safe haven flows. So maybe that could be a benchmark. A couple of bilateral trade or bilateral exchange rates. Looking at what is a common movement. And then, extracting the safe haven flow or movement by subtracting the common movement. An idea could be a comparison between the movement of the CHF against the euro, for example, and against the broad basket. And when you can see a huge discrepancy, you know that this could be a safe haven flow.
QP06B	The inflation differential between Switzerland and let's say the respective other country or the currency. Secondly, the interest rate differential, the interest rate on the short end of the curve, and thirdly, a measure of risk aversion. These are the main elements that have to go into an equation.
QP07B	Volatility Index (VIX) or CDS would be a good measure and what could also work is the interest rate differentials between German bonds and Italian bonds, especially for European crisis, these are measures that are very sensitive to changes in the underlying fundamentals.
QP08B	Let's say the extent to which the respective safe haven currency appreciates, if JPY appreciates much more the CHF, then it's likely a shock coming from Asia. The other

	indicators could be, for example, stock markets or bond markets, if you have a shock in one area, everyone's hit, but this area is hit much, much more, and so you should see many more repercussions in the stock markets or the bond markets. If you have a shock, you could look at different stock market indices, and the one with the strongest drop, that's likely the one where the shock occurred. Then, if you take your three elements, risk aversion is the element tied to the safe haven characteristic of the currency. It would be nice if it would have the right sign, whether there is a positive correlation between where the shock took place and the risk aversion (safe haven characteristic). You check if it is a safe haven currency by netting out the effects from inflation and interest rates then you hope for a positive correlation with the movement of risk aversion measure, which should tell you that this is a safe haven currency.

Interview transcription - Respondent C

Code	Response
QP01C	Simply put, the fact is that basically the CHF tends to appreciate during troubled periods in the market. When you have stress actually in the financial markets, you have an appreciation of a safe haven currency.
QP02C	Yes, it is still a safe haven currency. The perception of the CHF as a safe haven currency has increased over the recent years driven by the fact that basically Switzerland actually remained a pretty stable country over the recent years. If you look at what we have seen over the last 15 years, Switzerland remained pretty stable on a relative basis compared to other countries. Probably one of the most important examples is the crisis that we have seen in the Eurozone, which is basically still apparent in foreign exchange rates, as the euro has never recovered from what happened 10 years ago, and the perception of the CHF being actually a safe haven currency I think is definitely still very important and maybe even more important than before. In foreign exchange rates, this is always a relative game in the sense that you compare the currency to another one.
QP03C	For that to happen, we would need something dramatic for the country so we can think about different hypothesis such as a deep and profound recession that would be deeper in Switzerland than in other countries. Because, once again, foreign exchange rates are always a relative game. So, we need basically a recession that would be actually more profound in Switzerland than in Germany, the US or in the UK for example. We might have also, I would say apart from a recession, we could think about something very specific, you know, happening to the country for instance if we have a structural change, with regards to how the country is governed in terms of fiscal policy for example. These are some examples which I believe are, however, unlikely. The implications are tricky with regards to the fact that, if we think that there could be a depreciation of the CHF, obviously it could favor exports of the country. And on the other hand, this could have negative impact on investment flows as foreign investors would no longer regard the CHF as something that is very secure and safe leading to a depreciation of the CHF because you do not have people investing in CHF anymore. This would also lead to a further depreciation of the CHF but favoring exports. It could also have a negative impact on the banking industry if basically you have some investors that look at the CHF as a safe haven and actually have the assets that are deposited in the CHF. So, a potential positive impact for exports, but a potential negative impact for the banking industry. For the Swiss National Bank, its mandate is about inflation, and growth to some extent with regard to the fact that you have this trade-off between growth and inflation. This means that the CHF as a safe haven currency is an advantage if you have higher inflation or inflation is above the target. If inflation is too low, the CHF being a safe haven currency might be a problem for the Swiss National Bank, as the appreciation of the CHF might make inflation go even lower.
QP04C	Typically, in periods when you have a lot of turmoil and troubled periods like back in 2008 or when we had the European debt crisis, we have to look at actually what happened to the CHF, what happened to the USD, what happened to the Japanese yen and look at these figures. I unfortunately do not have the data in mind so it would be best to examine the data in order to answer this question. It is about the flows in the sense that the USD might even be the big winner of trouble times if you have big outflows of all those countries that get back to the US because basically US investors take their money back from abroad. So, this is really a question of the strength of these flows that could go actually from one direction to another. If you think of the importance of the US, we might think that basically the USD might even actually appreciate more than the CHF given you have more people / US investors bringing back their money to the US.
QP05C	Taking a basket is simpler as you consider the different turns all at the same time. So,

	this is simpler with regard to the fact that it gives you already some kind of a comprehensive appreciation of the currency, because looking at one currency pair, you would need to reconcile with the movements that drive also that currency. To answer the aim of your study, you need to compare to quantify the appreciation and identify the deviation from fundamental variables coming from safe haven characteristics while comparing it to the effects of economic shocks. Working the basket is simpler because you have comprehensive way looking at major currency pairs at the same time.
QP06C	Interest rates, inflation, economic growth are the usual suspects. One that could be added is a variable about the fiscal status of the country in terms of budget, public finances.
QP07C	The Volatility Index (VIX) or a substitute like a measure of CDS Index, but it is highly likely that both are correlated. There is another one that was very popular during the supreme crisis, which is the TED spread, but it is probably very specific to what happened back in 2008. Those are, I would say, the usual suspects which we have seen over the last years. The risk factor is definitely very important and is probably key in the relationship of safe haven characteristics. But the problem is how you measure that. I guess these variables would be highly correlated together.
QP08C	You should do that with dummy variables. The problem that you have in this topic is that each crisis will be different triggered by something specific, and so the way to model that will be through a specific dummy variable to do the job. In other words, to identify the specific periods and what I guess you will need to do is to quantify the size of the coefficient from these specific dummy variables that are associated to the different crisis, and to come up with some kind of synthesis or summary that is about saying that overall on average, this currency is the one that reacted the most during troubled times, according to the model.

Interview transcription - Respondent D

Code	Response
QP01D	There is not a single safe-haven currency. The term "safe haven" differs from what defines a strong currency, which depends on various economic factors. The CHF exemplifies three key characteristics. Currency value is always relative, unlike stocks which are quoted against specific currencies. Understanding currency evolution requires considering inflation differentials, interest rates, trade balance, current account, and budget deficit/surplus. The balance of the current account is crucial for long-term currency strength. A country's deficit drives its currency down as it needs external financing. This explains why the USD is often weak due to its trade and current account deficits. In the long term, currency evolution is straightforward, but short-term fluctuations are common.
QP02D	During turbulent times, investors often turn to the CHF as a safe haven. The currency's stability, low inflation, and other factors make it attractive. However, its long-term value is not solely determined by these factors. Short-term fluctuations are influenced by geopolitical situations. Historically, the CHF's value followed a regression line, appreciating by about 2-2.5% annually against a basket of currencies. The 2008-2009 crisis led to a surge in its value, prompting SNB intervention to set a floor against the Euro. Despite occasional interventions, the Franc remains strong due to Switzerland's robust fundamentals, including a growing trade balance and controlled inflation. The currency's strength has helped maintain low inflation, giving room for interest rate adjustments. While the CHF may appear undervalued, SNB interventions cannot override market forces in the long run. The currency's strength has shielded Switzerland from imported inflation, giving its export-oriented sector a competitive edge. Investment in innovation and productivity has been crucial for maintaining competitiveness in the face of a strong currency.
QP03D	In my view, there are various factors to consider. Firstly, if Switzerland becomes less industrious, meaning we work fewer hours compared to other European countries like France - though exact figures are not available - we currently work around 25 or 30% more hours per year than in France. So, if we lose this competitive edge, and if social contributions paid by companies to the state increase significantly, it could affect the competitiveness of our products and industry. Switzerland's strong work ethic has been a key factor in our prosperity. This could prompt industrial companies to relocate their operations, emphasizing the importance of productivity.
QP04D	During the 2008 financial crisis, people in South America and Latin America preferred strong currencies like the dollar. In times of crisis, they bought dollars to protect their assets. While the CHF is strong, it's less known globally compared to the dollar. Therefore, people often choose the dollar due to its familiarity. However, from a Swiss perspective, the USD is considered weak. The choice of currency depends on one's viewpoint. For example, in Turkey, people prefer dollars due to the weakness of the Turkish lira. Historically, investors chose Switzerland for its stability rather than the strength of the CHF. In the 1970s, high inflation in Europe led investors to Switzerland to avoid currency devaluation and lack of confidence in their own governments. Therefore, regional preferences vary depending on individuals' backgrounds.
QP05D	I would focus on analyzing the CHF/EUR and CHF/USD pairs as they are our primary partners. It's essential to understand our trade balance with Japan before drawing any conclusions, but the globalized nature of trade complicates this. Additionally, Japan's tightly controlled bond market makes drawing conclusions challenging. Concentrating on the Eurozone and US makes sense, given they are our main trading partners. China's currency, the Yuan, adds complexity due to its limited convertibility with the CHF.
QP06D	Again, your approach highlights a crucial aspect of finance: the market tends to adequately price financial assets over the long term. However, short to mid-term, there can be divergence and unforeseen circumstances. It is essential to maintain a scientific approach. Considering the analysis of total debt between Switzerland and the Eurozone could be insightful, as Switzerland's debt is currently well-contained compared to the Eurozone's escalating debt over the last two decades. This aspect

	could have significant implications, particularly regarding budget deficits and the long-term weakness of the USD.
QP07D	Yes, exploring the Credit Default Swaps (CDS) of countries could offer valuable insights, particularly during periods of crisis like the Euro crisis. The surge in CDS can indicate heightened market sentiment and potential risks. While the VIX primarily relates to the stock market, during significant events like the 2008 or 2011 global financial crises, increased CHF volatility coincided with spikes in the VIX. Analyzing extreme VIX levels, especially when it surpasses 30, could provide clues about its impact on the foreign exchange market.
QP08D	No answer

Interview transcription - Respondent E

Code	Response
QP01E	Not all currencies serve the same function; they can act as safe havens to shelter investments from risk. Assets like US Treasuries, gold, the Japanese yen, and the CHF play unique roles in this regard. Liquidity is key, especially in the US Treasury market, where ample liquidity ensures fair pricing. However, trust is equally important; investors must have faith in a government's commitment to honoring its debts. The USD, despite recent political challenges, remains a dominant safe haven due to its widespread use in pricing commodities. China and Russia's diversification away from the dollar into gold underscores concerns about its stability. Meanwhile, the CHF benefits from Switzerland's political stability and strong banking system, making it an attractive safe haven. However, its strength can hinder inflation and competitiveness. Trust in financial institutions, as seen in Credit Suisse's difficulties, is vital for maintaining stability. Overall, the dynamics of safe haven assets are complex and influenced by various factors, including political events and market sentiment.
QP02E	Switzerland's position as a safe haven is widely regarded as one of the best, despite challenges. While liquidity issues in markets like US Treasuries hinder the CHF's appeal, other factors contribute to its strength. Political tensions and sanctions have led some investors to withdraw, impacting Geneva's role in oil trading. However, Switzerland's negative interest rates haven't prompted significant foreign investor exodus from the CHF. Instead, investors have shifted towards riskier assets like stocks and private equity. To maintain its safe haven status, Switzerland must prioritize innovation, particularly in blockchain, cryptocurrency, and quantum computing. While political stability remains robust, emerging political factions pose challenges. Switzerland's ability to balance traditional neutrality with evolving geopolitics will be key to its continued relevance in global finance.
QP03E	Switzerland's position as a safe haven is widely regarded as one of the best, despite challenges. While liquidity issues in markets like US Treasuries hinder the Swiss Franc's appeal, other factors contribute to its strength. Political tensions and sanctions have led some investors to withdraw, impacting Geneva's role in oil trading. However, Switzerland's negative interest rates haven't prompted significant foreign investor exodus from the Swiss Franc. Instead, investors have shifted towards riskier assets like stocks and private equity. To maintain its safe haven status, Switzerland must prioritize innovation, particularly in blockchain, cryptocurrency, and quantum computing. While political stability remains robust, emerging political factions pose challenges. Switzerland's ability to balance traditional neutrality with evolving geopolitics will be key to its continued relevance in global finance. The significant increase in currency reserves, now standing at around CHF 650-660b due to Swiss National Bank interventions, would pose a challenge. The priority would be to reduce these reserves gradually to mitigate potential imported inflation resulting from a weaker currency. This could take three to four years. A weaker currency could boost exports and job creation, but challenges remain due to natural economic flows. Policy errors, in this context, would involve addressing these natural flows, such as the possibility of major pharmaceutical companies leaving the Swiss Stock Exchange for the S&P500. This shift would alter dividend payments, reducing the inflow of billions of CHF.
QP04E	When comparing private investors to institutional investors, the key difference lies in their approach to currency selection. Institutional investors often prioritize replicating indices like the World Bond Index for diversification and liquidity. In contrast, private investors focus more on utility, considering factors like where they plan to settle or invest in the long term. Switzerland's appeal as a destination influences this decision, reflecting a 'home bias.' For private investors, asset allocation drives currency selection. For example, those favoring private equity may lean towards the dollar due to long-term investment horizons, while preferences for stocks or bonds further shape currency choices. Unlike institutional investors driven by statistical analysis, private investors prioritize personal utility and family considerations. Consequently, currency decisions are influenced more by individual needs and preferences than market

	trends or statistical data.
QP05E	No answer
QP06E	Interest rate differentials hold significant weight in analyzing currency movements, particularly when comparing currencies like the CHF to the dollar and euro. Visually and statistically, there's a clear correlation between 10-year bond yield differentials and currency spot rates, indicating a preference for one currency over the other. Despite occasional fluctuations, interest rate differentials remain a crucial factor. Other indicators, such as volatility skew and economic surprise indices, have been explored but prove less reliable. The VIX, once a reliable measure of risk aversion, has evolved due to market sophistication, with hedge funds now actively selling volatility. This shift diminishes the VIX's effectiveness as an indicator. While still influential, traditional economic indicators have limited applicability to the CHF due to Switzerland's unique economic context and fewer available data points. Ultimately, the CHF's performance is influenced by its safe-haven status, export-driven economy, and correlation with European economic conditions.
QP07E	In analyzing currency movements, diverse indicators are explored, including CDS spreads, options markets, investor sentiment, and financial condition indices. While interest rate differentials remain pivotal, newer indicators like CDS spreads provide valuable insights, despite some investor reluctance. Options markets, specifically the put-call ratio, are scrutinized for potential signals, although their effectiveness varies. Investor sentiment indices, such as the AAII, offer additional perspectives on market sentiment. Financial condition indices, like those from Bloomberg and Goldman Sachs, are closely monitored for their correlation with currency movements, particularly in the USD market. However, the applicability of traditional economic indicators to the CHF is limited due to Switzerland's unique economic context and fewer available data points. Moreover, the VIX's role as an indicator of risk aversion has evolved, with hedge funds now actively selling volatility, diminishing its effectiveness. Alternative indicators like gold reserves and political stability indices offer additional perspectives but may have limited explanatory power for the CHF. Innovative approaches include assessing Google searches for currency-related terms, retail investor influence on the currency market, and position indicators from online platforms like FXstreet.com and dailyfx.com. However, the efficacy of these approaches requires further investigation. Ultimately, constructing models that adapt to changing market dynamics and incorporating diverse indicators across different time periods is recommended for a comprehensive understanding of currency movements
QP08E	No answer

Interview transcription - Respondent E

Code	Response
QP01E	Not all currencies serve the same function; they can act as safe havens to shelter investments from risk. Assets like US Treasuries, gold, the Japanese yen, and the CHF play unique roles in this regard. Liquidity is key, especially in the US Treasury market, where ample liquidity ensures fair pricing. However, trust is equally important; investors must have faith in a government's commitment to honoring its debts. The USD, despite recent political challenges, remains a dominant safe haven due to its widespread use in pricing commodities. China and Russia's diversification away from the dollar into gold underscores concerns about its stability. Meanwhile, the CHF benefits from Switzerland's political stability and strong banking system, making it an attractive safe haven. However, its strength can hinder inflation and competitiveness. Trust in financial institutions, as seen in Credit Suisse's difficulties, is vital for maintaining stability. Overall, the dynamics of safe haven assets are complex and influenced by various factors, including political events and market sentiment.
QP02E	Switzerland's position as a safe haven is widely regarded as one of the best, despite challenges. While liquidity issues in markets like US Treasuries hinder the CHF's appeal, other factors contribute to its strength. Political tensions and sanctions have led some investors to withdraw, impacting Geneva's role in oil trading. However, Switzerland's negative interest rates haven't prompted significant foreign investor exodus from the CHF. Instead, investors have shifted towards riskier assets like stocks and private equity. To maintain its safe haven status, Switzerland must prioritize innovation, particularly in blockchain, cryptocurrency, and quantum computing. While political stability remains robust, emerging political factions pose challenges. Switzerland's ability to balance traditional neutrality with evolving geopolitics will be key to its continued relevance in global finance.
QP03E	Switzerland's position as a safe haven is widely regarded as one of the best, despite challenges. While liquidity issues in markets like US Treasuries hinder the Swiss Franc's appeal, other factors contribute to its strength. Political tensions and sanctions have led some investors to withdraw, impacting Geneva's role in oil trading. However, Switzerland's negative interest rates haven't prompted significant foreign investor exodus from the Swiss Franc. Instead, investors have shifted towards riskier assets like stocks and private equity. To maintain its safe haven status, Switzerland must prioritize innovation, particularly in blockchain, cryptocurrency, and quantum computing. While political stability remains robust, emerging political factions pose challenges. Switzerland's ability to balance traditional neutrality with evolving geopolitics will be key to its continued relevance in global finance. The significant increase in currency reserves, now standing at around CHF 650-660b due to Swiss National Bank interventions, would pose a challenge. The priority would be to reduce these reserves gradually to mitigate potential imported inflation resulting from a weaker currency. This could take three to four years. A weaker currency could boost exports and job creation, but challenges remain due to natural economic flows. Policy errors, in this context, would involve addressing these natural flows, such as the possibility of major pharmaceutical companies leaving the Swiss Stock Exchange for the S&P500. This shift would alter dividend payments, reducing the inflow of billions of CHF.
QP04E	When comparing private investors to institutional investors, the key difference lies in their approach to currency selection. Institutional investors often prioritize replicating indices like the World Bond Index for diversification and liquidity. In contrast, private investors focus more on utility, considering factors like where they plan to settle or invest in the long term. Switzerland's appeal as a destination influences this decision, reflecting a 'home bias.' For private investors, asset allocation drives currency selection. For example, those favoring private equity may lean towards the dollar due to long-term investment horizons, while preferences for stocks or bonds further shape currency choices. Unlike institutional investors driven by statistical analysis, private investors prioritize personal utility and family considerations. Consequently, currency decisions are influenced more by individual needs and preferences than market

	trends or statistical data.
QP05E	No answer
QP06E	Interest rate differentials hold significant weight in analyzing currency movements, particularly when comparing currencies like the CHF to the dollar and euro. Visually and statistically, there's a clear correlation between 10-year bond yield differentials and currency spot rates, indicating a preference for one currency over the other. Despite occasional fluctuations, interest rate differentials remain a crucial factor. Other indicators, such as volatility skew and economic surprise indices, have been explored but prove less reliable. The VIX, once a reliable measure of risk aversion, has evolved due to market sophistication, with hedge funds now actively selling volatility. This shift diminishes the VIX's effectiveness as an indicator. While still influential, traditional economic indicators have limited applicability to the CHF due to Switzerland's unique economic context and fewer available data points. Ultimately, the CHF's performance is influenced by its safe-haven status, export-driven economy, and correlation with European economic conditions.
QP07E	In analyzing currency movements, diverse indicators are explored, including CDS spreads, options markets, investor sentiment, and financial condition indices. While interest rate differentials remain pivotal, newer indicators like CDS spreads provide valuable insights, despite some investor reluctance. Options markets, specifically the put-call ratio, are scrutinized for potential signals, although their effectiveness varies. Investor sentiment indices, such as the AAII, offer additional perspectives on market sentiment. Financial condition indices, like those from Bloomberg and Goldman Sachs, are closely monitored for their correlation with currency movements, particularly in the USD market. However, the applicability of traditional economic indicators to the CHF is limited due to Switzerland's unique economic context and fewer available data points. Moreover, the VIX's role as an indicator of risk aversion has evolved, with hedge funds now actively selling volatility, diminishing its effectiveness. Alternative indicators like gold reserves and political stability indices offer additional perspectives but may have limited explanatory power for the CHF. Innovative approaches include assessing Google searches for currency-related terms, retail investor influence on the currency market, and position indicators from online platforms like FXstreet.com and dailyfx.com. However, the efficacy of these approaches requires further investigation. Ultimately, constructing models that adapt to changing market dynamics and incorporating diverse indicators across different time periods is recommended for a comprehensive understanding of currency movements.
QP08E	No answer

Interview transcription - Respondent F

Code	Response
QP01F	As you know, currency is always linked to a country. So you have different aspects. First one is the political stability which brings confidence to the economy from investors and obviously, also for the currency. Second one and it's linked, is the economic aspect. When you have laws that are enforced by the government and followed by the people and businesses alike, it brings much more confidence from investors into the currency. Another one would be geopolitical matters, and basically, this is linked to the neighborhood of Switzerland for instance. So Switzerland has a lot of agreements with the European Union and they are the main partners basically, also with the US, but much more with the European Union, and they are allies. So with all these aspects, it brings confidence to international investors in regard to the currency. There is also another aspect which is historical as Switzerland has been historically very stable if not for more than 100 or even 200 years. That's the political situation was really stable and Switzerland was not really at war with any countries also because of the neutral status. I believe it is also because people are automating their behaviour. What is the first thing you think when you want to protect your assets? Basically, Switzerland and God. All these aspects are therefore the reasons that make of this currency a safe haven for all investors.
QP02F	I believe that in January 2015, when the SNB stopped the peg they put in place at 1,20 between EUR/CHF, this has had a major impact on investors and also on companies in Switzerland which failed because of this surprising move. At that time, if I remember correctly, the President of the SNB had communicated a few days prior that they would never remove the peg at 1,20. A few days later, the peg was stopped and obviously, this did not resonate well with investors. In the last years, I believe this would be the only main events that could have impacted investor confidence however given that the fundamentals are so strong, and this decision was rather an extraordinary move (with no expectation to repeat itself), I currently do not see why this should change the perception of investors on the CHF being a safe haven currency. As you have noticed, there are currently a lot of important events going on in the world, such as the war in Europe, the Middle East as well as the economic situation in China whereby, I believe this is even the main point. China’s rising economy might challenge the leadership of the US which may even reinforce the confidence in all safe haven currencies and assets. I would even include also cryptocurrencies as one of them, the Bitcoin, I classify today as a safe haven currency, even though some of its characteristics may not follow those of safe haven assets. Nevertheless, I understand that this is not the scope of your research.
QP03F	Let's switch to a bit more technical aspect. If you see the historical data on the interest rate of the CHF, you will notice that the usual interest rate in CHF is very low. If you wanna challenge the status of the CHF, you need to check first the interest rates. When you see interest rates rising, it means that investors have no longer confidence in the currency . Swiss interest rates are historically even lower than the US which is also considered a safe haven currency given the USD is not only the currency of the US, but also the currency of 90-95% of the countries in the world. There are a lot of reasons why the CHF could be no longer a safe haven. One that is maybe not that obvious which I could mention is the political geostrategic war between China and the US. Here is why: the CHF and Switzerland is, as I said earlier, a neutral country. But actually, it is not really because Switzerland is an ally of the West. So, the perception of the world is that Switzerland is not really neutral. If something happens, and the US decide to push Switzerland to react, then other countries, other than occidental countries, will see Switzerland as not exactly neutral. For example: Lately, when the war started between Russia and Ukraine, Switzerland did not really know how to behave. They first wanted to remain neutral. Then because of pressure from the allies, they decided to put sanctions in place against Russia, which then reacted by saying that now they no longer see Switzerland as a “friend. In previous wars, they never said that to Switzerland which means that all other countries might see Switzerland as less neutral compared to before. When we will have this polarisation between US

	and China, you will have a lot of countries going to one side or the other, and Switzerland will have to pick a side eventually. Obviously, we all know which side it will choose, which means that other countries will consider it as not neutral anymore which could affect its status a safe haven, as the potential database of economic partners between Switzerland and other countries is reduced. Being a safe heaven is not always a good thing for the for the country. It may give good opportunities for the country, but also can have bad implications. When you have a lot of uncertainty in the world, the value of the CHF tends to rise. This is exactly what happened the for the last 10 years, Switzerland, if you compare to you to the EUR, when I started to work in in Switzerland basically, the rate was 160. So EUR 1 was equal to CHF 1.60. Now we are below 1 which is a huge move. Basically, the EUR lost 50% of the value compared to CHF, and this has a lot of impact on the economy it reduces Swiss exports. Most of the time the economy can suffer, and this was the main reason of the peg at 1:20 EUR/CHF which was to give time to the companies to adapt. But you also have companies that might not choose Switzerland to put their headquarters such as to build cars for instance so most of the time Switzerland imports cars because it is too expensive to make cars. So these kind of activities are not done in Switzerland because of the expensive CHF. Other implications include having less assets, less flows coming into Switzerland which will affect economic activity, research, innovation, and many other things. For instance, the salaries in CHF are high, and due to that, a lot of people with really high skills are coming to Switzerland to work. Switzerland is one of the most innovative countries in the world and it is mainly because Switzerland is seen as a safe haven for CHF. This therefore helped the currency rise and become a leader in terms of economy, research and innovation in the world. Losing this safe haven status may imply no longer attracting a high-skilled workforce. That is more linked to the fact, like the US being a currency used around the world for trades, it is also somehow the case for Switzerland. Because most of the time, big economic actors keep in mind that Switzerland can be used for their medium to long-term activity. If you lose this status, they will no longer think about having Switzerland in their assets, and they will switch to some other assets. And by doing this, it will ease the policy of the SNB in the sense that when you have fewer actors investing in your economy and in your currency, your policy might have less impact on other partners and so the SNB might adapt its monetary policy by potentially taking less into account the interest of all investors using CHF as a tool for their daily business.
QP04F	I have not seen instances in which more investors choose CHF over USD. The point is that the USD is used as a tool or a weapon for the US economy. Switzerland, on the other hand, would never use its currency as weapon to influence other economies. This is important because if you remain neutral, you are seen as more stable, and this would be a potential cause for investors choosing CHF over USD.
QP05F	I would suggest to analyze according to the weighted commercial exchange between all commercial partners, so mainly USD and EUR. I would say that is the best way to evaluate, taking for the example the USD Index but a similar measure for CHF.
QP06F	Fundamental variables except interest rates potentially. I mentioned earlier the interest rates for CHF. Unfortunately, interest rates are not a good tool to evaluate strengths. Let us compare the interest rates of the USD and the interest rates of much more exotic countries such as Turkey. The impact of interest rates in the US is really strong. Interest rates are actually driving the USD against all other countries which also makes sense because the US is considered the world's currency. If you go on the other side of the spectrum, you have a Turkey where interest rates have absolutely no impact on the currency. The current interest rate in Turkey is approximately 40 to 50% a year. So when you buy one Turkish lira (TRY), you get richer by 50% at the end of the year. But the value of the TRY is decreasing more and more every day. When I started my career, with USD 1, you could buy TRY 1.5. Now, for USD 1, you buy TRY 35 and interest rates are 40% which shows that this has no impact on the value of the currency. This is due to the lack of confidence in the country's currency as opposed to the USD where there is confidence but also because it is used as a weapon being the world's currency. For the CHF, in my opinion, interest rates do not have a significant impact because even if you decrease to negative territory which was the case until recently, the CHF continues

	to rise.
QP07F	The VIX is a really good tool to evaluate the strength of the CHF, and as you know, we had a really big move of uncertainty in the world over the last years, and the currency kept on rising. You could potentially also see a correlation between the strength of the currency and this uncertainty growing in the world, and I am pretty sure that the correlation would be close to 1 due to the safe haven status of the CHF. However, I believe that due to the neutral situation of Switzerland which will depend actually on the evolution of the geopolitical situation between the US and and China, the CHF will be used less and less as a safe haven because of the potential polarisation of the world.
QP08F	No answer

Appendix 3 – Ancillary information[22]

Appendix 3.1: Data collected for figures

Data	Frequency	Figure (by order of usage)	Source
CHF/USD Nominal Exchange Rate	Monthly	Figures 1 and 3	Factset
JPY/USD Nominal Exchange Rate	Monthly	Figure 2	Factset
CBOE Volatility Index	Monthly	Figures 1 and 2	Factset
CHF/GBP Nominal Exchange Rate	Monthly	Figure 3	Factset
CHF/EUR Nominal Exchange Rate	Monthly	Figures 3 and 4	Factset
CHF/JPY Nominal Exchange Rate	Monthly	Figure 3	Factset
CHF/EUR Real Exchange Rate	Monthly	Figure 4	Calculated with formula from section 3
Consumer Price Index (CPI) Switzerland	Monthly	Figure 4	Factset
Consumer Price Index (CPI) Euro area	Monthly	Figure 4	Factset
CHF/EUR Nominal Exchange Rate	Annual	Figure 5	Factset
Foreign currency reserves (FX reserve)	Annual	Figure 5	SNB
CHF/EUR Real Exchange Rate	Daily	Figures 6, 7 Appendix 3.6	Data from OLS regression in appendix 3.2
CHF/EUR Real Exchange Rate predicted values	Daily	Figure 6	Calculated with formula from section 3.3
CHF/EUR Real Exchange Rate residuals	Daily	Figure 6	Calculated by subtracting CHF/EUR RER and CHF/EUR RER predicted values
Weighted effect of immediate short-term interest rate	Daily	Figure 7	Calculated by multiplying the coefficient from

[22] Data and detailed calculations available on demand. Factset links require a login credential.

differential between Switzerland and the Euro area (Rate Diff. EU-CH) on predicted values of OLS regression			appendix 3.5 and data in OLS regression from appendix 3.2
Weighted effect of CBOE Volatility Index on predicted values of OLS regression	Daily	Figure 7	Calculated by multiplying the coefficient from appendix 3.5 and data in OLS regression from appendix 3.2
Weighted effect of Brent Crude Oil (Oil) on predicted values of OLS regression	Daily	Figure 7	Calculated by multiplying the coefficient from appendix 3.5 and data in OLS regression from appendix 3.2
Weighted effect of Net International Investment Position (NIIP) on predicted values of OLS regression	Daily	Figure 7	Calculated by multiplying the coefficient from appendix 3.5 and data in OLS regression from appendix 3.2
Number of crises per type of event (in percent of total)	n.a.	Figure 8	Data from list of crises in appendix 3.7
Number of crises per region (in percent of total)	n.a.	Figure 9	Data from list of crises in appendix 3.7
Nominal Exchange Rate CHF/EUR	Daily	Figures 10, 11, 14, 18	Factset
Nominal Exchange Rate USD/EUR	Daily	Figures 10, 11, 15, 19	Factset
Nominal Exchange Rate JPY/AUD	Daily	Figures 12, 13, 16, 20	Factset
Nominal Exchange Rate USD/AUD	Daily	Figures 12, 13, 17, 21	Factset
Immediate short-term interest rate differential between Switzerland and the Euro area	Daily	Appendix 3.6.1	Data from OLS regression in appendix 3.2
Price of CBOE Volatility Index	Daily	Appendix 3.6.2	Data from OLS regression in appendix 3.2
Price of Brent Crude Oil adjusted to US PPI	Daily	Appendix 3.6.3	Data from OLS regression in appendix 3.2
Net International Investment Position (NIIP) Switzerland	Daily	Appendix 3.6.4	Data from OLS regression in appendix 3.2
Foreign currency reserves (FX reserve)	Daily	Appendix 3.6.5	Data from OLS regression in appendix 3.2

Appendix 3.2: Data collected for OLS regressions

Data	Frequency[23]	Usage	Source
Nominal Exchange Rate CHF/EUR	Daily	OLS regression once adjusted for inflation (CPI differential), dependent variable	Factset
Consumer Price Index (CPI) Switzerland	Monthly	To calculate real exchange rate CHF/EUR	Factset
Consumer Price Index (CPI) Euro area	Monthly	To calculate real exchange rate CHF/EUR	Factset
Immediate short-term interest rates Switzerland	Monthly	OLS regression, independent variable	OECD
Immediate short-term interest rates Euro area	Monthly	OLS regression, independent variable	OECD
Price of CBOE Volatility Index	Daily	OLS regression, independent variable	Factset
Price of Brent Crude Oil	Daily	OLS regression once adjusted for inflation (PPI US), independent variable	Factset
Purchase Price Index (PPI)	Monthly	To deflate the price of Brent Crude Oil and adjust it for inflation	FRED
Net International Investment Position (NIIP) Switzerland	Quarterly	OLS regression, independent variable	OECD
Foreign currency reserves (FX reserve)	Monthly	OLS regression, independent variable	SNB

[23] For non-daily frequencies, we performed linear interpolations to get daily values. This method estimates values between two known data points assuming a straight line between them.

Appendix 3.3: OLS regression output A

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,971918516
R Square	0,944625601
Adjusted R Square	0,94457941
Standard Error	0,051359737
Observations	6000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	269,7199102	53,94398205	20450,19355	0
Residual	5994	15,81110847	0,002637823		
Total	5999	285,5310187			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0,786657359	0,005713409	137,6861663	0	0,775457022	0,797857696	0,775457022	0,797857696
Rate Diff. EU-CH	-0,013447969	0,001441303	-9,330423189	1,45253E-20	-0,016273442	-0,010622496	-0,016273442	-0,010622496
VIX	0,002813003	8,55094E-05	32,89700123	2,4224E-218	0,002645373	0,002980632	0,002645373	0,002980632
Oil	0,002534539	6,57598E-05	38,54238823	1,5206E-290	0,002405626	0,002663452	0,002405626	0,002663452
NIIP	-3,95385E-13	8,33007E-15	-47,46485251	0	-4,11715E-13	-3,79055E-13	-4,11715E-13	-3,79055E-13
FX reserve	6,94294E-07	3,2436E-09	214,0501105	0	6,87935E-07	7,00652E-07	6,87935E-07	7,00652E-07

Source: Regression function under data analysis in Microsoft Excel (function from the add-in Analysis Toolpak) using the data from appendix 3.2

Appendix 3.4: OLS regression output B

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,97150468
R Square	0,943821344
Adjusted R Square	0,94378386
Standard Error	0,051727052
Observations	6000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	269,4902698	67,3725675	25179,5316	0
Residual	5995	16,04074885	0,00267569		
Total	5999	285,5310187			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0,755203757	0,004645892	162,553012	0	0,746096137	0,764311377	0,746096137	0,764311377
VIX	0,002676877	8,48582E-05	31,5453057	3,303E-202	0,002510524	0,002843229	0,002510524	0,002843229
Oil	0,00280551	5,94214E-05	47,2138008	0	0,002689023	0,002921997	0,002689023	0,002921997
NIIP	-3,89612E-13	8,36647E-15	-46,5683319	0	-4,06014E-13	-3,73211E-13	-4,06014E-13	-3,73211E-13
FX reserve	7,14719E-07	2,41056E-09	296,495124	0	7,09994E-07	7,19445E-07	7,09994E-07	7,19445E-07

Source: Regression function under data analysis in Microsoft Excel (function from the add-in Analysis Toolpak) using the data from appendix 3.2

Appendix 3.5: OLS regression output C

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,72204573
R Square	0,52135004
Adjusted R Square	0,52103067
Standard Error	0,15098753
Observations	6000

ANOVA

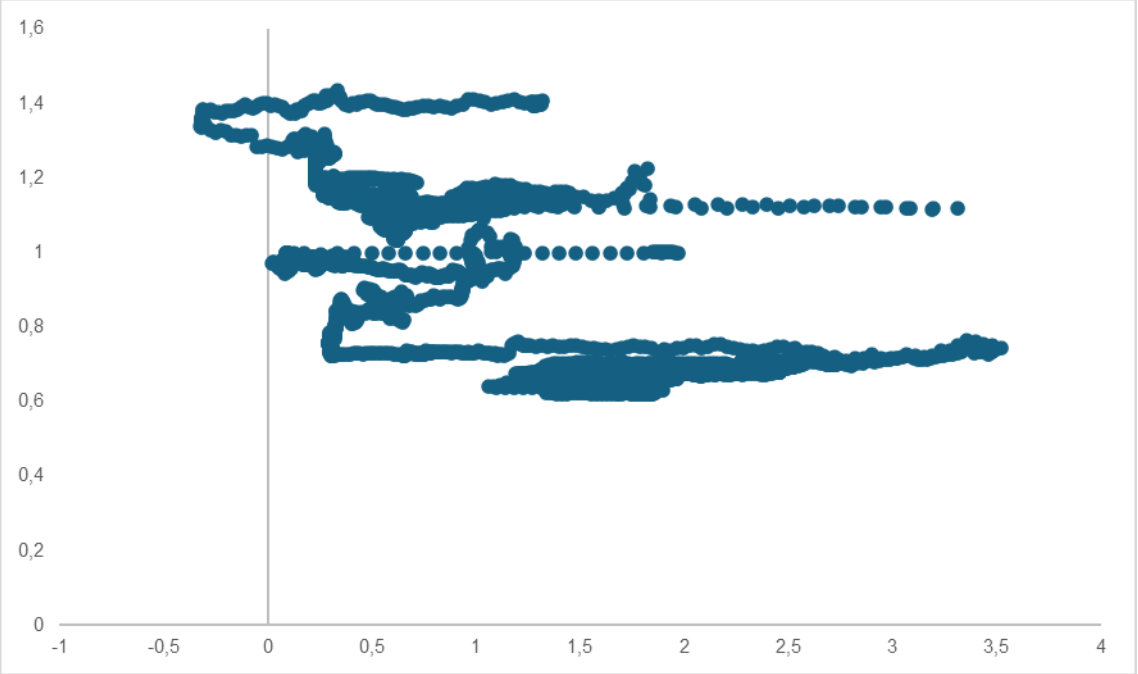
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	148,8616072	37,2154018	1632,4526	0
Residual	5995	136,6694115	0,02279723		
Total	5999	285,5310187			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	1,16133924	0,015988585	72,6355246	0	1,129995864	1,19268262	1,12999586	1,19268262
Rate Diff. EU-CH	-0,2216665	0,003126576	-70,89752	0	-0,22779569	-0,2155373	-0,22779569	-0,21553727
VIX	0,00099336	0,000250135	3,97129825	7,232E-05	0,000503007	0,00148372	0,00050301	0,00148372
Oil	-0,0040147	0,00017112	-23,461521	1,57E-116	-0,0043502	-0,0036793	-0,0043502	-0,00367928
NIIP	1,395E-13	2,33609E-14	5,97133076	2,488E-09	9,37E-14	1,8529E-13	9,37E-14	1,8529E-13

Source: Regression function under data analysis in Microsoft Excel (function from the add-in Analysis Toolpak) using the data from appendix 3.2

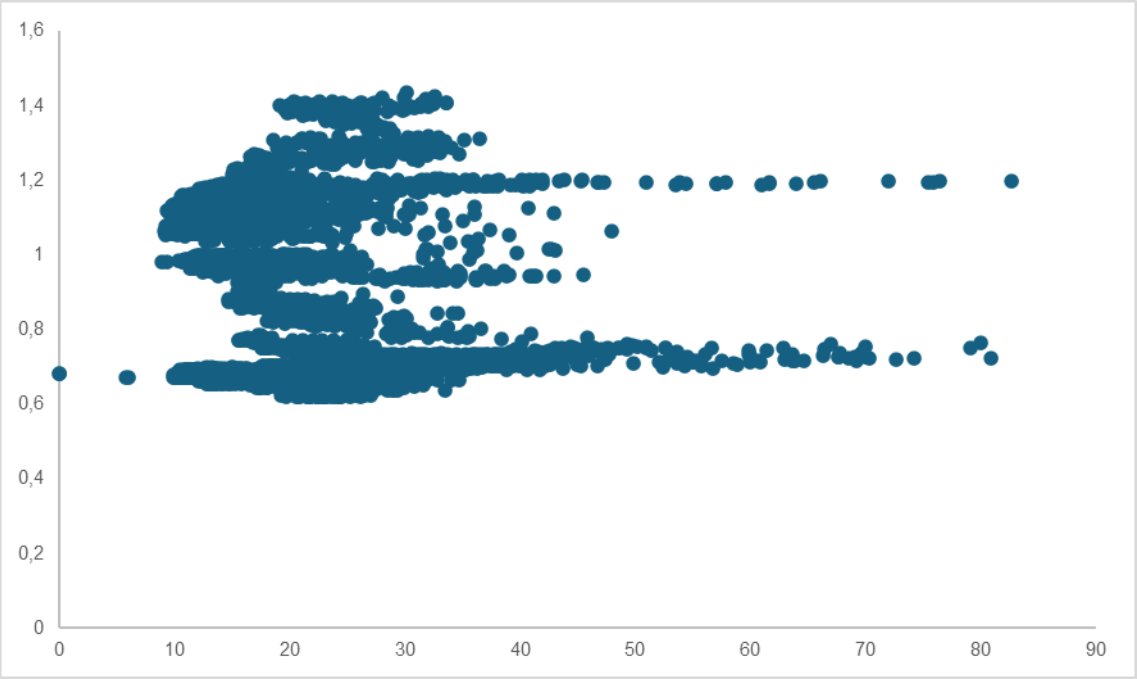
Appendix 3.6: Linear relationship of variables in OLS regression

Appendix 3.6.1: CHF/EUR RER as a function of Rate Diff. EU-CH



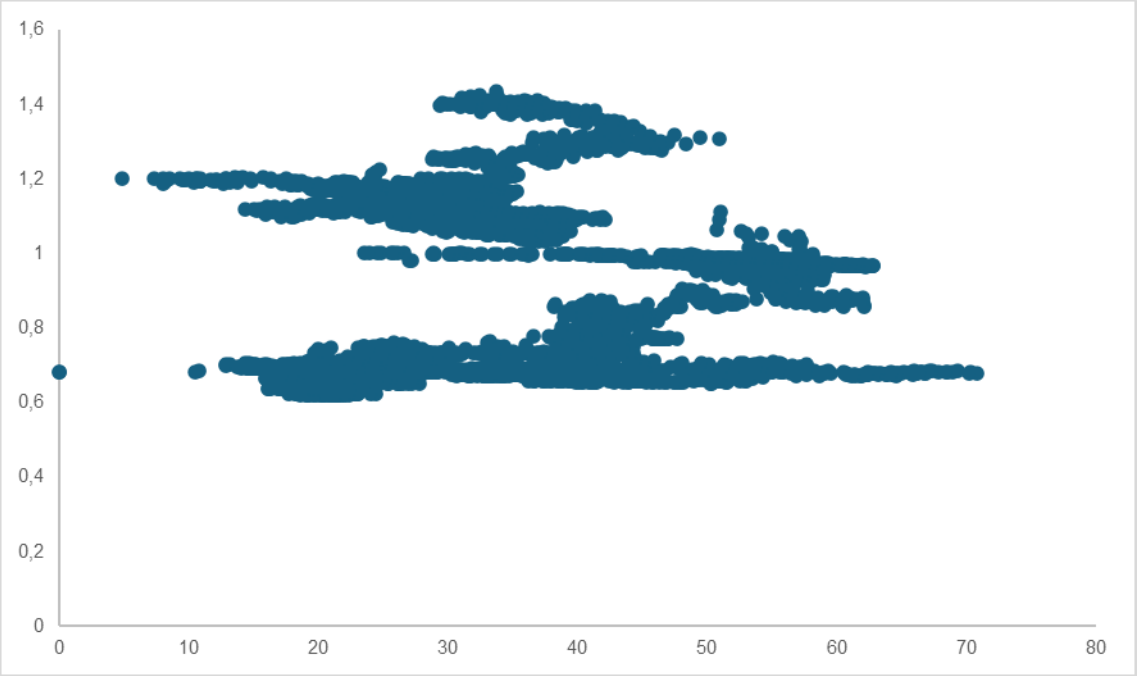
Source: See appendix 3.2

Appendix 3.6.2: CHF/EUR RER as a function of VIX



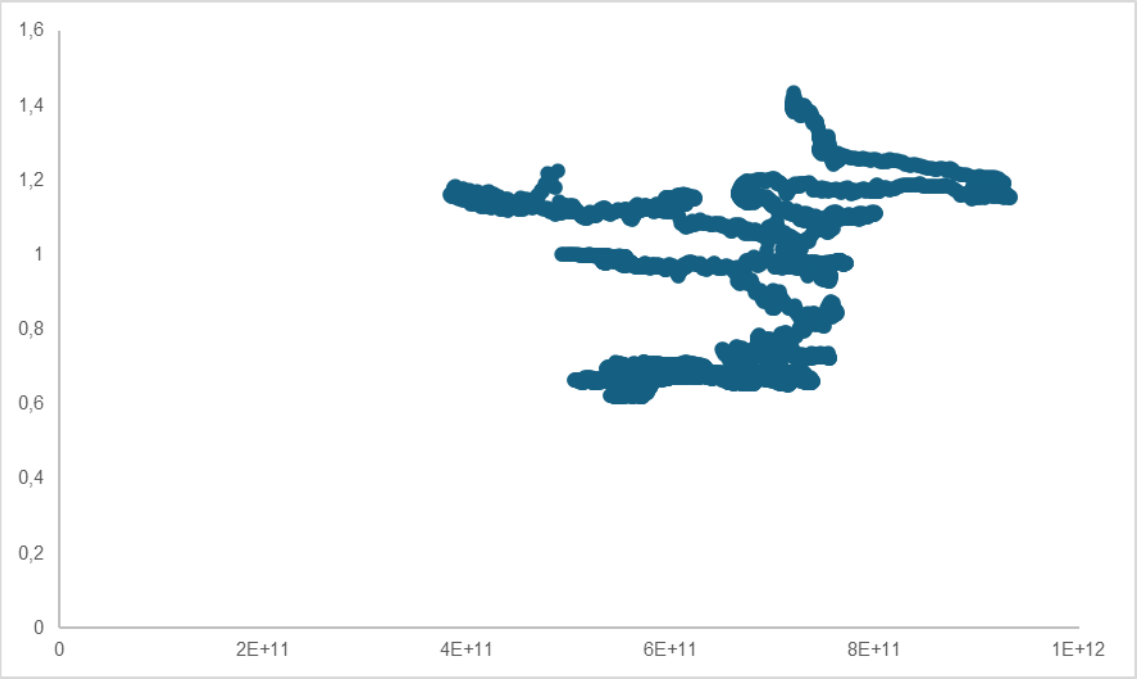
Source: See appendix 3.2

Appendix 3.6.3: CHF/EUR RER as a function of Oil



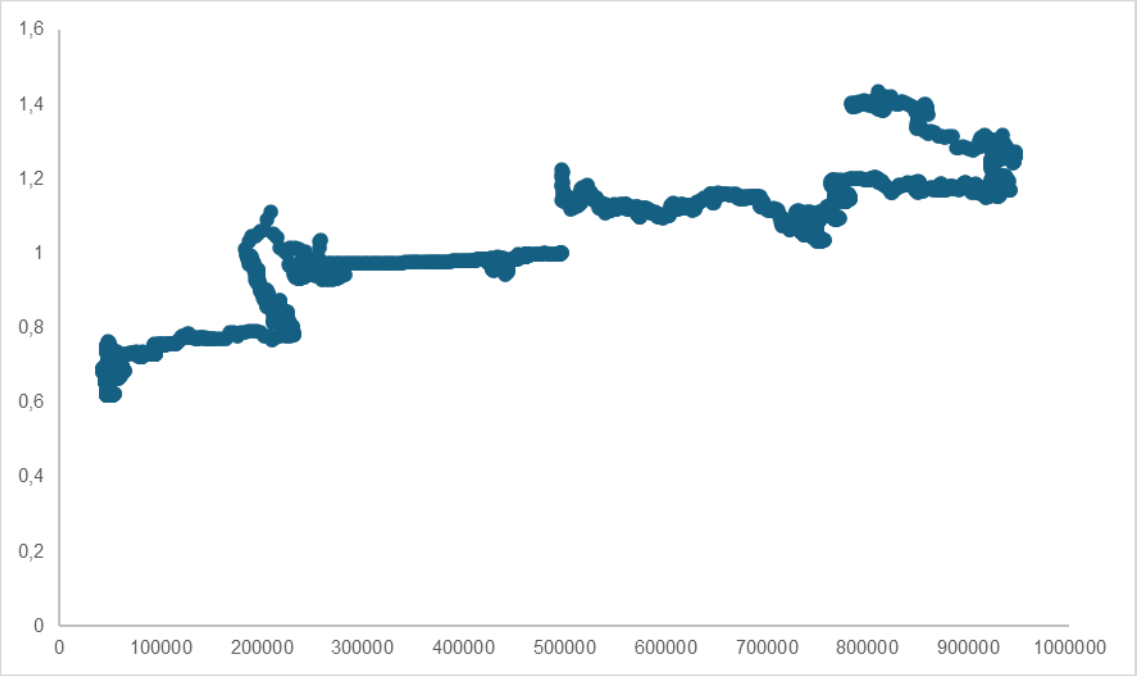
Source: See appendix 3.2

Appendix 3.6.4: CHF/EUR RER as a function of NIIP



Source: See appendix 3.2

Appendix 3.6.5: CHF/EUR RER as a function of FX reserve



Source: See appendix 3.2

Appendix 3.7: List of crises

#	Description	Start date	Start date choice[24]	Type of event	Region[25]
1	Dot-com bubble	10.03.2000	Stock market shock (S&P500 on Factset)	Economic crisis	Americas
2	9/11	11.09.2001	Day of shock	Political and Geopolitical events	Americas
3	Argentina Financial Crisis	30.11.2001	Stock market shock (MERVAL on factset)	Economic crisis	Americas
4	US invasion of Iraq	19.03.2003	Day of the shock	Political and Geopolitical events	Asia
5	Indian Ocean earthquake and tsunami	24.12.2004	Day of the shock	Natural disaster and environmental crisis	Asia
6	Hurricane Katrina	23.08.2005	Day of the shock	Natural disaster and environmental crisis	Americas
7	Global financial crisis	15.09.2008	Crash of Lehmann Brothers	Economic crisis	World
8	European debt crisis	15.12.2009	CHF/EUR evolution on Factset[26]	Economic crisis	Europe
9	Fukushima	11.03.2011	Day of the shock	Natural disaster and environmental crisis	Asia

[24] Based on either the day of the shock, a critical event for contagion crisis (i.e. crash of Lehmann Brothers), or stock market crash of affected country (i.e. S&P500 index for the US, MERVAL for Argentina, and BOVESPA for Brazil), according to data on Factset.

[25] « Americas » includes North and South America, « Asia » includes Middle East, « World » includes the rest of the world as well as crisis which affected more than one continent.

[26] The CHF/EUR was stable until 15.12.2009 before the CHF started gradually appreciating against the EUR in 2010.

10	Hurricane Sandy	29.10.2012	Day of the shock	Natural disaster and environmental crisis	Americas
11	2012 US elections	06.11.2012	Day of the shock	Political and Geopolitical events	Americas
12	Typhoon Haiyan	08.11.2013	Day of the shock	Natural disaster and environmental crisis	Asia
13	Brazilian economic crisis	01.01.2016	Stock market shock (BOVESPA on Factset)	Economic crisis	Americas
14	Paris terrorist attacks	13.11.2015	Day of the shock	Political and Geopolitical events	Europe
15	Brexit vote	23.06.2016	Day of the shock	Economic crisis	Europe
16	2016 US elections	08.11.2016	Day of the shock	Political and Geopolitical events	Americas
17	US-China trade war	24.12.2018	Stock market shock (S&P500 on Factset)	Economic crisis	World
18	US-Iran tensions	03.01.2020	Day of the shock	Political and Geopolitical events	World
19	COVID-19 pandemic	20.02.2020	Day of the shock	Economic crisis	World
20	2020 US elections	03.11.2020	Day of the shock	Political and Geopolitical events	Americas
21	China Evergrande Group	20.09.2021	Day of the shock	Economic crisis	Asia
22	Russia invasion of Ukraine	24.02.2022	Day of the shock	Political and Geopolitical events	Europe

23	Banking Turmoil[27]	08.03.2023	Day of the shock	Economic crisis	Americas
24	Israel-Palestine conflict	09.10.2023	Day of the shock	Political and Geopolitical events	Asia
25	Intervention of Iran in Israel-Palestine conflict	15.04.2023	Day of the shock	Political and Geopolitical events	Asia

[27] Potentially includes the impact of the announcement of Credit Suisse being acquired by UBS, which occurred several days after the origination of the crisis in Americas.