

Risk Disclosures for Financial Products that Invest in or Provide Direct Exposure to Virtual Currencies

You should carefully consider the risks described below before making an investment decision in financial products providing direct exposure to virtual currencies. You should also refer and familiarize yourself with any other information included in the offering documents registered with the relevant securities regulator and/or authorities pursuant the registration requirements for such securities.

Please also refer to the [Goldman Sachs' Terms of Dealing](#) as well as the [Goldman Sachs Global Disclaimers for Electronic Communications](#).

In this Risk Disclosure, we refer to financial products that invest in or provide direct exposure to virtual currencies (as defined below).

“Virtual Currency” refers to a digital representation of value that functions as a medium of exchange, and any other digital unit of account that is used as a form of a currency (i.e., transferred from one party to another as a medium of exchange). Virtual Currencies include, but are not limited to, cryptocurrencies, but they do not include any currency that is designated as legal tender by a central bank or public authority that circulates and is customarily used and accepted as a medium of exchange in the country of issuance (a “fiat currency”), whether or not the fiat currency is represented digitally or can be transferred, stored or traded electronically.

Financial Products that provide direct exposure to Virtual Currencies (including derivative securities and synthetics products with underliers that provide direct exposure to virtual currencies) may trade at a value other than that which may be inferred from current values of the underlier due to factors including, but not limited, high volatility, low liquidity and high market concentration in the underlier as well as the fact that there may be significant variations in publicly available pricing sources. Virtual Currencies give rise to substantial risk and are not available to nor suitable for all investors.

In addition to the above, please ensure that you have read and understood the below General Disclosures related Risks Associated with Virtual Currency Markets before entering into any transactions. If you have any questions about whether you are eligible to enter into these transactions with Goldman Sachs, please contact your sales representative.

General Disclosure of Risks Associated Virtual Currency Markets

High Volatility, Speculation, Low Liquidity and High Market Concentration

The prices for many virtual currencies are highly volatile and can fluctuate significantly in short periods of time, sometimes even absent the occurrence of the types of economic events that normally precipitate price changes for other types of assets. Depending on how quickly prices change, you might not be able to terminate or hedge your Virtual Currency Transaction before you suffer significant losses. The absence of industry standard terms for Virtual Currency Transactions can also increase this risk (see “Special Liquidity Risks” below).

One source of volatility for virtual currency prices is the high degree of virtual currency demand that is generated by speculators and investors seeking to profit from the short- or long-term holding of virtual currencies but do not use them as a medium of exchange. A lack of expansion by virtual currencies into retail and commercial markets, or the contraction of existing retail or commercial use, may result in increased volatility by reducing the extent to which retail or commercial use of virtual currencies could anchor their valuation (see “Uncertain Valuation” below).

Another source of volatility for virtual currency prices is the liquidity (and relative liquidity) of virtual currency markets. The overall size of many virtual currency markets can be significantly smaller than markets for other types of assets, which can limit liquidity and increase volatility. In addition, liquidity in virtual currency markets can change quickly. Because the market forces that determine virtual currency prices are not yet clear, it is difficult to predict what market factors can lead to substantially more or less liquidity in virtual currency markets. Virtual

currency markets are multi-jurisdictional and distributed so local and regional events can affect the liquidity, prices and volatility of virtual currencies in unexpected ways. Liquidity can also be adversely affected by the development of updated or new technologies, market standard terms and new virtual currencies and the migration of trading interest to such new virtual currencies or away from existing technologies and market standard terms. You should monitor liquidity developments in virtual currencies carefully.

The liquidity of virtual currencies and the volatility of virtual currency prices also depend on the concentration of owners of a virtual currency or the traders in such virtual currency. There is little transparency in the ownership of or trading interest in most virtual currencies, nor are there generally limits on concentrated ownership or trading interest. Ownership of or trading in particular virtual currencies can be concentrated in a limited number of countries or regions and may be controlled by a small number persons or entities. Events in such countries and regions, or events that affect such persons or entities, could have a disproportionate impact on the prices of virtual currencies. This includes political and economic events, including, for example, force majeure events. Greater concentration in ownership or trading interest can also lead to heightened volatility due to sharp swings in the level of supply or demand. High levels of concentration can also make a market susceptible to manipulation or distortion.

Malicious Actors

Mining is the act of using a computer to run computations designed to help build the next block (a set of records of the virtual currency transactions) on the distributed ledger where virtual currency transfers are recorded. A material concentration in processing power dedicated to mining on a virtual currency network can also increase the risk of a malicious actor or botnet, *i.e.*, a volunteer or hacked collection of computers controlled by networked software coordinating the actions of the computers, obtaining a majority of the processing power dedicated to mining on any given virtual currency network, in which case it may be able to alter the distributed ledger by constructing fraudulent blocks or preventing certain transactions from completing in a timely manner, or at all. The malicious actor or botnet could control, exclude or modify the ordering of transactions. Such activity by the malicious actor or botnet could have significant effects on the liquidity and price of the virtual currencies.

Uncertain Valuation

Virtual currencies are not controlled by any public authority, nor are they backed by or confer ownership or other rights in any fiat currency, physical commodity, or security or other obligation issued by a company or government. A virtual currency can be used as a medium of exchange, but no law requires companies or individuals to accept virtual currencies as a form of payment. Instead, virtual currency use in commercial settings is limited to businesses and individuals that are willing to accept virtual currencies. A virtual currency can also be used as a unit of account or store of value, but its use in these ways is likewise solely consensual. As a result, the fundamental or economic basis for valuing virtual currencies is often unclear, and their prices may appear to move randomly or based solely on short-term investment sentiments or supply and demand factors.

Lack of Trading History

The markets for virtual currencies are relatively new. Accordingly, there do not exist long histories of pricing information for virtual currencies, and the market forces that determine the prices for virtual currencies continue to evolve. This risk is heightened for newer virtual currencies with less developed markets and less history of trading. It is not clear how the prices of virtual currencies are correlated to other virtual currencies, fiat currencies or other assets. The evolution of these market factors can lead to significant changes to market trading behavior and virtual currency prices.

The Effect of Consumer Preferences

The growth of the virtual currency industry is subject to a high degree of uncertainty. Changes in consumer demographics and public tastes and preferences over time can affect the further development of this industry, which in turn could move the price of virtual currencies in unexpected and unpredictable directions.

Such changes in public tastes and preferences could be in response to, among other factors, the failure to maintain and update virtual currency software and technology, a growing perception that the use and holding of virtual currencies is no longer safe and secure, and public confidence and expectations with respect to fiat currencies. The open-source nature of virtual currency networks means that contributors are not generally directly compensated for their contributions in maintaining and updating the virtual currency software and technology. Consequently, there is a lack of financial incentive for developers to maintain or develop the networks or adequately address issues that may emerge over time. A failure to do so can negatively impact consumer preferences for virtual currencies and consequently the prices of the relevant virtual currencies.

Further, social media and the news can affect consumer perception of virtual currencies. In particular, in circumstances where the virtual currency is issued or sponsored by a single company, negative press of the issuing or sponsoring company could adversely impact the price of that virtual currency.

Lack of Regulation; Possibility of Government Intervention

The “cash” or “spot” markets for most virtual currencies are largely unregulated. In particular, depending on their location, these markets and the participants therein may not be subject to market integrity or transparency rules, and participants in these markets may not be subject to registration, licensing or fitness requirements, disaster recovery or cybersecurity requirements, or anti-money laundering rules. This lack of regulation can make virtual currency markets susceptible to manipulation or distortion, which may cause the conversion rate used to calculate the settlement amount to differ from the forces of supply and demand in a way that adversely affects your Virtual Currency Transactions.

Also, regulators have warned that virtual currencies and related technologies have the potential to give risk to fraud and theft. Virtual currencies are not backed nor supported by any government or central bank. In addition, depositors in banks and credit unions and owners of securities accounts at broker-dealers benefit from certain safeguards for their positions, including government insurance. Parallel safeguards may not exist for virtual currencies held by unregulated custodians who are either uninsured or underinsured. These differences increase the extent to which virtual currency markets can fluctuate due to losses suffered by individual investors or trading venues and platforms.

Virtual currency trading has also been associated with illegal activity, including drug dealing, money laundering and other forms of illegal commerce. Law enforcement may respond to such actions by limiting or shutting down trading venues or participation on such venues.

Governments also may impose regulatory controls or taxes on virtual currency transactions. In addition, governments may restrict participation in virtual exchange markets and funding markets, either in general or based on the nature of specific participants or transactions. All of these actions can significantly affect liquidity, volatility and prices for virtual currencies.

Intellectual Property Claims

Third parties may assert intellectual property claims relating to the operation of a virtual currency exchange or network and the source code relating to the holding and transfer of virtual currencies. Regardless of the merit of any intellectual property or other legal action, any threatened action could reduce the confidence in the long-term viability of virtual currency networks or exchange or adversely affect prices for virtual currencies.

Trading Hours May Not Align

The market for many virtual currencies operates on a global, twenty-four hour basis. Therefore, your and our hours of operation, during which you and we may transact in and value Virtual Currency Transactions, calculate margin and settlement amounts, issue margin calls and settle collateral delivery or return amounts, may not conform to the hours during which the underlying virtual currencies are most traded. To the extent this occurs, significant changes in virtual currency prices as well as market, economic and political conditions due to reasons beyond our control,

and thus the value of Virtual Currency Transactions and the amount of credit exposure they create between us, may take place during times when it may be difficult for you to monitor or react to them.

Risk of Market Disruption

Several events or factors can result in disruption of virtual currency markets, including:

- Cyberattacks, theft, fraud or other operational losses at exchanges, wallet providers or other platforms or market intermediaries;
- Commencement of insolvency proceedings in respect of one or more virtual currency exchanges;
- Suspension or limitation on trading in virtual currencies or related derivatives, including the triggering of limits on the amount of price fluctuation, an unscheduled market close, or intervention by a government authority;
- Sudden changes in regulation or taxation of virtual currencies or related derivatives or securities, including heightened enforcement activity or the imposition of limits on owning or trading in virtual currency or related derivatives or securities; and
- Announcement or occurrence of changes in a virtual currency's underlying technology protocols (such as a "fork" in the distributed ledger used by a virtual currency), initiation or discontinuation of use or support by a significant merchant, investor or other market participant, exchange or other intermediary.

If you have any questions about the risks described above, please contact your sales representative.