



Tensor Box

When Cryptocurrencies Markets Move - We Profit

27 Sep 2017

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SUMMARY

We are a group of “quants” with an academic background in Numerical Methods, Computational Mathematics, Game Theory and hands-on experience in High-Frequency Trading and Machine Learning.

Our goal:

To exploit cryptocurrency market inefficiencies to generate steady absolute returns (in both bull and bear markets) with low volatility. Simply put, we aim to provide steady profit without major downside risk.

What we do: -

Develop algorithms with attractive and sustainable risk-adjusted returns on investment. Our strategies focus on producing exceptional returns by strictly adhering to mathematical and statistical methods, with low targeted correlation to cryptocurrencies.

Our edge:

- Combination of statistical arbitrage strategies and market-making strategies with extremely low holding periods that deliver absolute returns that are unaffected by market direction
- Our cutting-edge geographically distributed IT infrastructure monitors market anomalies and shifts in statistical patterns with microsecond delays
- Lightning-fast order execution
- Proprietary risk management models and optimal capital allocation are the core of our trading methodology
- Quantitative alpha models that generate trading signals based on statistical machine learning and numerical optimization methods
- Order execution models based on optimal stochastic control and reinforcement learning

What problem are we solving?

Cryptocurrency markets are highly fragmented, extremely volatile, and are often illiquid for newly listed assets. However, empirical evidence shows that sufficient market

inefficiencies currently exist, which provides opportunities to implement proven trading strategies based on quantitative algorithms derived from mathematical, statistical and computer science methods.

Our current algorithms have already been deployed and tested on real exchanges, with current returns of more than 25% per month.

Key points of crowdfunding:

- Crowdfunding will take the form of an Initial Token Offering
- Duration: 14 days
- Target cap. - \$ 0.5 mln.
- Token name: TBX (ERC-20 compliant token)
- 1 TBX = 1 USD
- The collected sum will be used for:
 - further project development (\$100k or 20% if the Max Cap is reached)
 - forming a trading pool (up to \$400k or 80% of collected funds is the Max Cap is reached), which will be kept in USD for stability and risk-reduction
- Our goal: generate steady absolute returns on a trading pool (past returns more than 25% per month)
- A share in trading pool is represented by TBX token
- Trading profits returned to investors via monthly dividend payment
- Performance fee - 20% (from monthly profit)
- Management fee - 0%

CORE TEAM

Management team



Georgy Bulygin, MSc in Applied Mathematics and Physics. Specializing in Numerical Methods and Computational Mathematics, he has been working for 6 years at the Moscow Institute of Physics and Technology. He then became fascinated with the world of HFT (High-Frequency Trading) and joined a boutique firm as a quant developer. As a founder of TensorBox, he's responsible for the core trading strategies.



Vadim Kuchinskiy, MSc in Applied Mathematics and Physics at MIPT, M.Sc. in Economics at NES. Investor in FinTech, ex-director & FX-trader at ING London



Dmitry Shalagin, MSc in Applied Mathematics and Physics at MIPT, M.Sc. in Economics. Specializing in investments and management of high-technology startups. He has been working in management consulting for 4 years. Then he was responsible for due diligence at "Skolkovo" Foundation and closed 40+ deals with overall financing of \$80 million. Later, he became a partner at "Phystech Ventures", an early-stage venture capital firm. During the last 3 years, he has been carrying out arbitrage deals with fiat-currencies, ROI - 70%+ per year. Nowadays, Dmitry is co-founder & investor in e-commerce, insurance and fintech industries. As a co-founder of TensorBox, he's involved in business development and fundraising processes.



Rinat Yaminov, Ph.D. in Applied Mathematics and Physics. Specializing in Game Theory and Computational Mathematics. More than 10 years of experience at Dorodnicyn Computing Centre of the Russian Academy of Science. He developed an automated trading system for a boutique fund in the USA. He worked in an investment department, was responsible for the risk and strategic analysis of projects, and managed a total portfolio of more than \$3 billion. As a co-founder of TensorBox, he is responsible for the risk and portfolio management part of the strategy.

MARKET OVERVIEW

The World Economic Forum has estimated that the market cap valuation of the crypto market will be 10% global GDP by 2027 on blockchain-based systems, which will be in the trillions of dollars. Many believe this figure to be conservative, which suggests the crypto market has considerable room to grow.

All cryptocurrencies exhibit high volatility. For example, Bitcoin has increased more than 400% within just a few months and decreased more than 45% within a week. Whether prices increase or decrease in the future is largely unknown: Are cryptocurrencies simply a speculative bubble waiting to pop, or are recent price increases only the beginning of cryptocurrencies taking a larger role in the future of money and how people transact with each other?

Fig. 1 Dynamic price chart, BTC/USD



Crypto market details (25.09.2017):

- Market Cap: \$135 bn
- 866 Currencies
- Markets & exchanges 5000+
- Average daily trading volume for last month: \$5.1 bn

Cryptocurrency markets are highly fragmented, extremely responsive to market shocks, and (for many markets) relatively liquid. Empirical evidence shows that sufficient market inefficiencies currently exist, which provides opportunities to implement proven trading strategies. To take advantage of these, one must have the following:

- infrastructure in place to monitor a large variety of currencies and exchanges;
- smart and fast algorithms to process all of the data and to detect these market inefficiencies;
- very fast order execution (to catch rapidly disappearing opportunities); and
- sophisticated risk and portfolio management systems

VALUE PROPOSITION

When cryptocurrencies markets move, we profit.

Our aim is to obtain stable returns in the volatile cryptocurrency market. TensorBox consistently exploits market opportunities to secure profits that are not reliant on market direction and are protected against the wild volatility of cryptocurrencies.

How does TensorBox work?

TensorBox seeks opportunities to generate alpha by combining rigorous fundamental research with mathematical and statistical models to identify and execute on investment opportunities.

Our team stands at the forefront of data analysis and modeling. We analyze historical and current information to identify opportunities from market mispricing, shifts in statistical patterns, market anomalies arising from supply and demand imbalances, and other factors.

Basically, we only use market-neutral strategies that deliver absolute returns unimpacted by market direction. We use statistical arbitrage (or “stat-arb”) strategies which are, essentially, value-motivated strategies that capitalize on assets mispricing that may appear for short periods of time due to market inefficiencies, and market-making strategies that have no material market insight and aim to profit from providing liquidity. We are currently developing a few strategies based on detection of market anomalies and statistical patterns with machine learning algorithms.

Research & Scientific Method

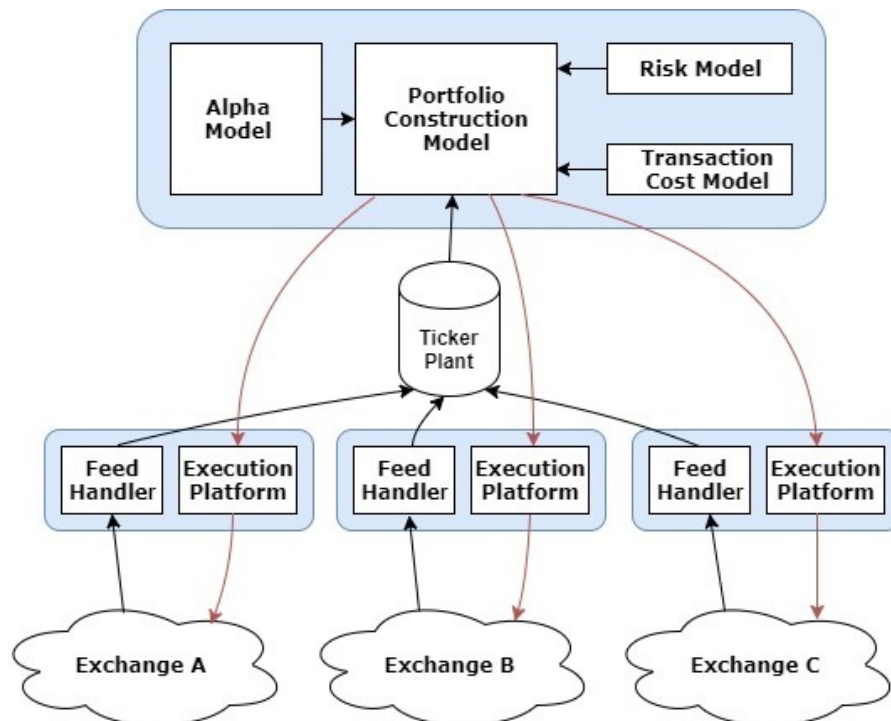
Guided by the scientific method, we devise models that begin with inspired ideas or economic hypotheses. In a systematic, process-driven fashion, models are expanded, tested and integrated into our investment strategies. Our proprietary software and systems automate the underlying the research that powers our core investment strategy.

According to James Simons, the founder of the legendary Renaissance Technologies, one of the greatest advantages quants bring to the investment process is their systematic approach to problem-solving. As Dr. Simons puts it, “The advantage scientists bring into the game is less their mathematical or computational skills than their ability to think scientifically.”

Technology & Data

Technology drives our business. We use machine learning, distributed computing and other technologies to find connections in data.

We arrange “gateways” as close as possible to every exchange that we operate in. These are the servers with modified Linux kernels optimized for real-time and low latency performance. They act as feed handlers, processing all data from the exchange, and as execution platforms, executing orders coming from the main trading algorithm. In most cases, we are able to achieve sub-millisecond latencies. The data from all exchanges are collected by ticker plant. This system stores it in the historical and real-time database and is very efficient at querying that data so that the strategy system can spot market anomalies as well as historical patterns with minimal delays.



Our **Strategy System** consists of:

- **Alpha Model** that generates trading signals based on theoretical valuations or statistical indicators. We use statistical arbitrage (or "stat-arb") strategies which are, essentially, value-motivated strategies that capitalize on assets' mispricings that may appear for short periods of time due to market inefficiencies, and market-making strategies that have no material market insight and aim to profit from providing liquidity. Basically, we only use market-neutral strategies that deliver absolute returns not affected by market direction;
- **Risk Model** tries to minimize the total risk exposure. It assesses all trading signals and decides what share of total available capital may be used to open that trade. Even though an opportunity exists, it doesn't mean we should take advantage of it or invest too much capital in it!
- **Transaction Cost Model** takes into account commissions and fees, tries to predict slippage (the change in price between the time an order is sent to an exchange and the time it is actually executed) and market impact (the difference between quoted price and actual average executed price, since large orders consume liquidity from multiple levels of an order book and, as a result, shift market price);
- and the **Portfolio Construction Model** which acts like an arbitrator, hearing the arguments of the optimist (Alpha Model), the pessimist (Risk Model), and the cost-conscious accountant (Transaction Cost Model). Too much emphasis on the opportunity can lead to ruin by ignoring risk. Too much emphasis on the risk can lead to underperformance by ignoring the opportunity. Too much emphasis on transaction costs can lead to paralysis because this will tend to cause the trader to hold positions indefinitely instead of taking on the cost of refreshing the portfolio.

CROWDFUNDING

Crowdfunding will take the form of an Initial Token Offering (ITO) and proceed in 2 stages: ITO-1 and ITO-2. Each comes with its own set of terms and conditions. To differentiate participants during ITO stages, two different tokens will be issued (one in ITO-1, another in ITO-2).

For optimal performance and maximization of returns for all supporters, crowdfunding is capped and available to a limited number of participants on a first come – first serve basis.

The details of crowdfunding procedure will be published on the TensorBox website www.TensorBox.com before the start of the token-sale.

Etherium ERC20 standard

Token type: security

ITO - First stage

Crowdfunding starts: Oct 02nd 2017

Crowdfunding ends: Oct 16th, 2017 or until the maximum cap is reached

Maximum cap: \$0.5m

Minimum cap: \$0.2m

Currency accepted: ETH and BTC

Token price: 1 TBX = 1 USD

Bonuses: *Early Bird Promotion:* during the first 24hrs, tokens will be sold at 20% discount to our subscribers (only first 100 k tokens). Pre-registration is required. See details on our site. *There will be no other bonuses or bounties.*

Token distribution process: tokens will be distributed after the end of crowdfunding, a number of tokens received by crowdfunding participant will be calculated by the following formula:

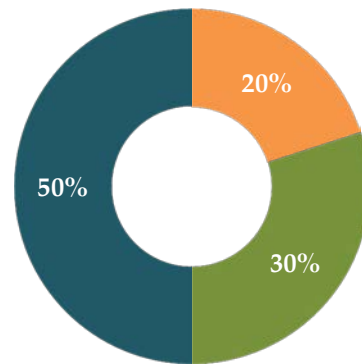
*Number of Tokens = "contribution in ETH" * "ETH to USD exchange rate" * (1 + "bonuses"),*

where “ETH to USD exchange” is the exchange rate on Bitfinex at the end of crowdfunding. Same formula applies for BTC

No more tokens will be issued after that point.

The token sale will finish on the 16th of October or at the point where the total amount raised reaches the nominal value of 500 000 USD. Sale minimum is set to the nominal value of 200 000 USD. If the floor is not reached, the funds in full amount, and in the same currency, will be returned to the supporters after the end of the crowdsale.

Fig. 2 Trading net profit distribution (ITO-1)



- Performance fee
- To increase trading pool
- Payments to token holders

Conditions:

- 20% - performance fee
- 0% - management fee

Earned profit from the trading algorithms will be distributed on monthly basis (Fig. 2). All token holders may withdraw their share of the trading pool (investment + profit from trading - costs) once per month by sending us tokens.

ITO - Second stage

In 1Q 2018 we are planning to run a large-scale offering of ITO-2. New tokens will be issued under new terms: TensorBox will then collect **2%** of the initial deposit as a **management fee** + **30%** of net profit as a **performance fee**.

ITO offering size

- TBXF tokens to be sold at ITO price
- Target Cap: \$10m
- Hard Cap: \$20m

Conditions:

- 30% - performance fee

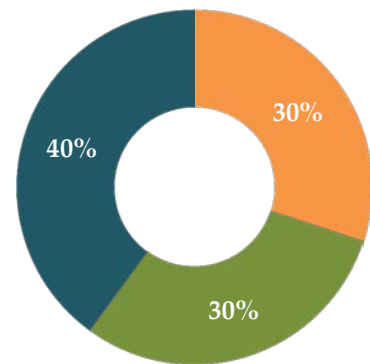
- 2% - management fee

Earned profit from the trading algorithms will be distributed on monthly basis (Fig. 3).

All token holders may withdraw their share of the trading pool (investment + profit from trading - costs) once per month by sending us tokens.

In case of high demand, we do not exclude the possibility of a Second Coin Offering (SCO) in 2018 or later.

Fig. 3 Trading net profit distribution (ITO-2)

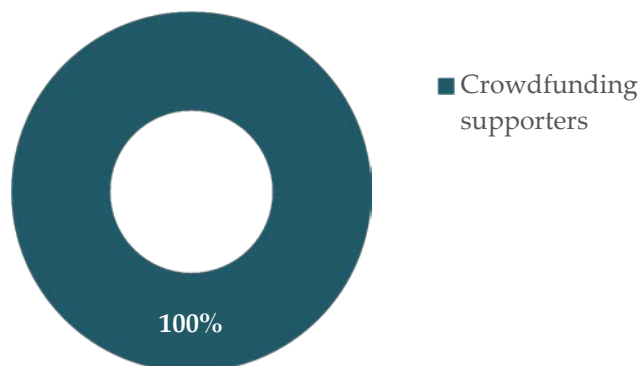


- Performance fee
- To increase trading pool
- Payments to token holders

FUNDS, PROFIT & TOKEN DISTRIBUTION

Tokens distribution

Fig. 4 Tokens distribution



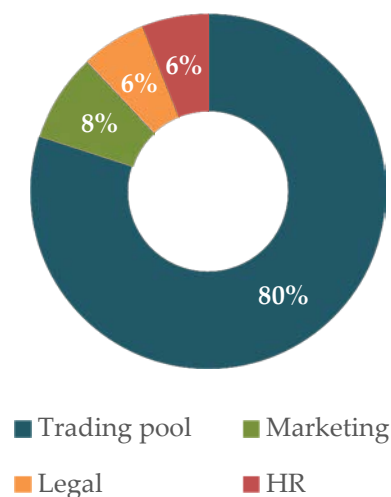
100% of the tokens will be distributed among the crowdfunding supporters. TBX tokens serve as a Proof-of-Membership (PoM) in TensorBox.

Raised funds distribution

Raised funds will form a trading money pool and will cover costs for development (Fig. 5):

- \$100k further project development (or 20% if the Max Cap is reached): continue infrastructure development and forming the legal structure necessary to comply with regulators in regions where we currently can't operate (software maintenance & development, IT security and compliance, licensing & regulation, team strengthening and salary, outsourcing costs, legal expenses, and incorporation expense). To cover these costs, TensorBox will pay 30% of the profit to TBX token holders until the total payments cover \$150k.
- The remainder, totaling \$400k, will form a trading pool for trading algorithms (or 80% of collected funds if the Max Cap is reached) to provide income for token holders (we

Fig. 5 Distribution of raised funds



take effectively 0% management fee+20% performance fee). Thus, the higher the collected sum during ITO, the higher trading pool.

Raised funds	Trading pool	Project development costs
\$500 k	\$400 k	\$100 k
\$400 k	\$300 k	\$100 k
\$300 k	\$200 k	\$100 k
\$200 k	\$100 k	\$100 k
<\$200 k	All the contributions will be refunded	

After the ITO-2 stage, to cover operating costs we will charge a management fee of 2% of trading pool formed from ITO-2.

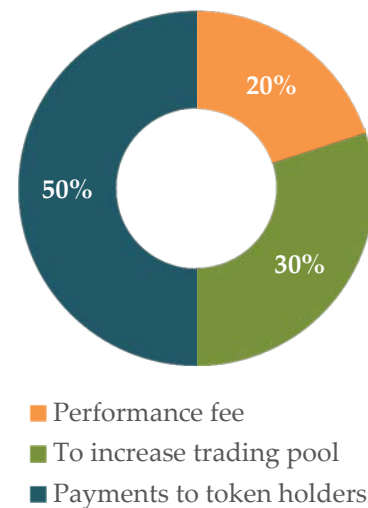
Profit distribution

TensorBox is offering continuous returns to the token holders, executed by an Ethereum smart contract.

Each TBX token holder has the right to:

- **their share of the trading profit:** every month a 20% management fee will be taken from the net profit (using the high watermark principle); 50% of the trading profit will be distributed to token holders in ETH; 30% remain undistributed to grow the trading pool (to gain compounding interest in future)
- **withdraw any amount up to their total share of the trading pool** by sending us TBX tokens once a month after 6 months from the end of ITO-1.
- **receive 30% of profit earned by TensorBox**

Fig. 6 Trading net profit distribution (ITO-1)



(from 20% management fee) as monthly coupon payments, **until the total sum covers \$150k** (\$100k taken for the further project development + \$50k premium)

ROADMAP

The development of the TensorBox consists of two tracks: the technology development track and the legal and licensing development track.

- The technology development track is dedicated to creating the infrastructure for fund administration, reporting, and further development integration with leading cryptocurrencies exchanges in Asia, Europe, USA. Thanks to the extensive experience of the TensorBox team, these tasks rest on a solid foundation of expertise.
- On the legal and licensing track, TensorBox legal and executive teams focus their efforts on setting up a fully transparent, licensed, and auditable investment structure, making sure that the envisioned structure is fully compliant with regulations. To do this, TensorBox will perform in-house research as well as a contract with reputable law firms.

Milestones

- 09.10.2017 - ITO-1, target on crowdfunding: \$0.5m.
- Q4 2017 - trading by our algorithms, further algorithms development, and optimization, infrastructure and business development, a team growing, legal work, PR & marketing.
- Q1 2018 - ITO-2, target on crowdfunding: \$30m.
- Q2 2018 - placing TensorBox Tokens on the TOP exchanges

RISK MITIGATION STRATEGY

The purchase of TensorBox Tokens carries significant risks. Purchasers of tokens and the executive team are exposed to the following risks: inherent risk, loss risk, theft risk, regulatory risk, and miscomprehension risk.

By sending ether to address the purchaser agrees that he or she understands and accepts these risks and potential losses of all funds without a possibility of restoration. The TensorBox executive team & founders do not hold any risks except for the risk of losing their personal investment.

The mitigation of risk is what determines success or failure, especially in the crypto space. Our risk mitigation strategy includes the following protection measures:

1) Closing of the exchanges

From time to time, some exchanges are closed or may suspend their work, as a result of which the money placed on them becomes unavailable for active trading.

Gaining exposure to diversified cryptocurrency portfolios might require opening a trading account with various exchanges on which cryptocurrencies are being listed. Since this market is still highly unregulated, there are still some exchanges that can be considered less trustworthy.

We will give preference to using exchanges that have implemented Proof of Solvency (PoS) implemented and have cold storage reserves that can be audited.

Furthermore, TensorBox carefully selects only reliable exchanges that pass comprehensive background checks (known owner, compliance, secure access points, audit, etc.).

2) Security & Data protection

The arbitrage risk that TensorBox is exposure to mostly consists of the partial amount of funds that are stored at several exchanges to be well positioned for arbitrage. Those funds are potentially vulnerable to hacker attacks, denial of service, etc.

To mitigate that risk, TensorBox uses a dynamically balancing system of storing the majority of funds in cold wallets and only transferring the optimal amount of needed capital for positions. The optimal balance is constantly recalculated using dynamic calibration, to signal the need before the spilling effect among exchanges.

3) A state ban on cryptocurrency market & sharp crypto-currency depreciation

In a recent example with China, a scenario of the full or partial prohibition of cryptocurrency in some countries is possible.

We adhere to the market-neutral strategy and do not take a long or short position on any of the cryptocurrencies. So we will be slightly affected by risk onset.

TensorBox aims to proactively manage risk. One strategy that will be taken is to ensure all funds are kept in fiat currencies when not engaged in trade. The TensorBox will not hold cryptocurrencies other than for the duration of trades.

From the fact that we use market neutral strategies and anchor our positions to the dollar, our profitability may be lower than the yields from investments in cryptocurrency.

TRUST & TRANSPARENCY

There is no doubt that much of the anonymity and privacy provided by blockchain technologies can result in a reduction of trust. We welcome transparency and are open to any further innovations in transparency that TensorBox token-holders desire. Ultimately TensorBox runs for our token-holders and if we can do anything to engender further trust, we will.

To help support transparency we will do the following after the second stage of the ITO:

- Publish details to the blockchain of any cryptocurrency accounts that are used for holding balances or depositing to exchange
- Hire a fund administrator - an outsourced third party service provider that protects the interests of investors by independently verifying the assets and valuation of the fund
- Provided notarised versions of company accounts using TLSNotary showing held balances in fiat currencies each month
- Publish notarised details of account history to the blockchain

TensorBox will have an independent auditing process after the second stage of the ITO, which will be performed by a third party on a semi-annual basis. The report will cover:

- Stated balance in terms of assets at funds' inception
- Overview of placed, burned, and executed transactions,
- Statistical report on distribution of trades by cryptocurrency, exchange, and gateways
- Effectiveness of the Digital Asset Pool allocation and proposed optimization strategies
- Evaluation of compliance procedures and identified shortcomings
- Return on invested capital and risk ratio calculations

LEGAL CONSIDERATIONS

Governance

Responsibility to holders is one of the key values of the TensorBox token. That is why a strict legal and governance structure will be set up to ensure the use of proceeds from the Token sale in the best interests of the users.

What does it represent for token holders?

TBX tokens represent a Proof of Membership in the TensorBox Trading Pool. It grants ownership rights to the TensorBox trading pool. However, TensorBox token does not give token holders any kind of share or equity in any of TensorBox legal entities.

Taxes

Any amounts that you pay for TBX-tokens are exclusive of all applicable taxes. You are responsible for determining what, if any, taxes apply to your purchase of TBX, including, for example, sales, use, value-added, and similar taxes. It is also your responsibility to withhold, collect, report and remit the correct taxes to the appropriate tax authorities. We are not responsible for withholding, collecting, reporting, or remitting any sales, use, value-added, or similar tax arising from your purchase of TBX tokens.

Regulatory

It is difficult to predict how or whether regulatory authorities may apply existing regulation with respect to such technology and its applications. It is likewise difficult to predict how or whether any legislative or regulatory authorities may implement changes to law and regulation affecting distributed ledger technology and its applications, including TensorBox. Regulatory actions could negatively impact TensorBox and TBX-tokens in various ways, including, for purposes of illustration only, through a determination that TBX are a regulated financial instrument that requires registration or licensing. The Company may cease operations in a jurisdiction in the event that regulatory actions, or changes to law or regulation, make it illegal to operate in such

jurisdiction, or commercially undesirable to obtain the necessary regulatory approval(s) to operate in such jurisdiction.