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10 Years after the 2008 Crisis and
one Year into MiFID II: Taking Stock from
the Perspective of Liquidity Providers

The Fallacy Problem of
Entrepreneurs

Autonomous Agent-Based
Negotiation Using Smart
Contracts

The State of FinTech



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Redaktion
Prof. Dr. Peter Gomber
M. Sc. Jascha-Alexander Koch
Dr.-Ing. Sonja Bergsträßer

Herausgeber
Prof. Dr. Wolfgang König
Vorstandsvorsitzender des E-Finance Lab
Frankfurt am Main e. V.
Prof. Dr. Peter Gomber
Stellvertretender Vorstandsvorsitzender des E-Finance Lab
Frankfurt am Main e. V.

Kontakt
info@efinancelab.com
www.efinancelab.com

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Editorial

10 Years after the 2008 Crisis and one Year into MiFID II: Taking Stock from the Perspective of Liquidity Providers

Jan Boomaars, CEO, Optiver

With 2018 marking a decade after the financial crisis, it is time to take a look at how the present regulatory landscape is affecting the role of liquidity providers, exchanges, and central counterparty clearing houses (CCPs). This is especially important given the Brexit and new global regulatory requirements.

We as a society have since long relied on exchanges to facilitate the capital transfer from investors to the real economy. Over centuries, vast improvements to the infrastructure have been made to reduce risk and streamline the process of buying and selling of financial instruments. CCPs were introduced to bring certainty and efficiency to exchanges and participants by taking on credit risk. Out of the need to assure that there is always a buyer and a seller, market makers stepped in to provide continuous pricing and improve the bid-ask spread, notably in the derivatives market.

Markets function best when fair competition

amongst trading members and between trading platforms is cultivated through policy. In turn, modern, developed economies benefit from healthy markets. Robust markets are accessible, liquid, and comprised of diverse participants. Optiver strongly believes that in order for markets to remain efficient and support sustainable growth, they should be transparent, multilateral, and centrally cleared.

The last ten years have seen a wave of EU regulatory legislation with the aim of restoring confidence after the recession. In contrast, what we now witness is the dramatic increase of systematic internalisation (SI) and strict capital requirements creating an environment that threatens efficient markets in Europe.

Under MiFID II, firms operating as SIs benefit from a substantial advantage where they are exempt from the tick size regime reserved for EU trading venues and have more flexibility in the timing of trade publication.

In a properly functioning exchange ecosystem, the reference price is in the lit market. But the influx of SIs has recently pushed increased trading volumes towards models with reduced transparency, leading to limited competition and a more fragmented landscape.

ESMA's Steven Maijoor captured the issue well when he recently asserted that "there are concerns that the attractive environment for trading on systematic internalisers may ultimately result in changes in the market structure away from trading venues".

Furthermore, new capital rules have a significant impact on the exchange ecosystem and how it finances the real economy. Capital rules drafted for banks have made it costlier for clearing members and market makers to hold positions and provide liquidity to end-investors. Inflated capital requirements imposed by the leverage ratio framework are actually bolstering the OTC derivatives markets and could

increase systematic risks as a result of an expected decrease in liquidity when markets become volatile and volumes go up.

The European legislative focus should move away from overregulation and shift towards long-term, stable growth for EU capital markets. Moreover, it is essential to evaluate the unanticipated effects of MiFID II and determine mitigating actions while there is still time to regain strength, especially alongside the safeguarding of continued access to UK markets. International competitive forces must be taken into account to prevent obvious regulatory arbitrage actions. When well more than half of all European trades are executed on London-based exchanges, imposing a border between EU and UK financial markets will weaken Europe's exchange ecosystem. Failing to address this could prompt a chain reaction on a wider scale and contribute to an unbalanced global exchange ecosystem in the years ahead.

Research Report

The Fallacy Problem of Entrepreneurs

ENTREPRENEURS OFTEN OVERESTIMATE THE LIKELIHOOD OF SUCCESS WHEN PLANNING THEIR OWN ACTIVITIES, WHICH USUALLY RESULTS IN EXCESS MARKET ENTRY. SINCE ENTREPRENEURS CONSIDER THEIR PROJECT AS UNIQUE, THE FORECASTS OF THE FUTURE OUTCOME ARE OFTEN ANCHORED ON THE CASE AT HAND RATHER THAN ON PAST RESULTS OF COMPARABLE PROJECTS – A PHENOMENON KNOWN AS THE PLANNING FALLACY. WE INVESTIGATE WHETHER ENTREPRENEURS SUFFER FROM A PLANNING FALLACY BIAS WHEN PROVIDED WITH HISTORICAL OUTCOMES OF COMPARABLE PROJECTS AND ITS CONSEQUENCES.

Daniel Blaseg

Armin Schwienbacher

Introduction

Overoptimism may be an important factor contributing to failure among new firms. Unreasonable overoptimism is often explained by context-dependent factors in planning such as the lack of knowledge of outcomes of historical projects (e.g., statistics on startup failure) and the bias to ignore or misuse these data. Our objective is to test the impact of providing such information to entrepreneurs. In other words, we study the impact of the planning fallacy problem, i.e., the cognitive bias that leads individuals to ignore or misuse provided data on outcomes of historical projects to evaluate their own project success. Theory is unclear about the ultimate impact of providing reference values to over-optimistic entrepreneurs. Information theories predict that entrepreneurs take into account

any valuable information, so that they may adjust their expectations towards these historical base rates.

In contrast, Kahneman and Lovallo (1993) develop a rationale for why entrepreneurs would ignore any external estimates, consistent with taking an “inside view”. Finally, Alicke and Govorun (2005) and Camerer and Lovallo (1999) argue instead that optimistic entrepreneurs may misuse the provided information to account for their beliefs to be better than others. In this case, entrepreneurs increase their judgment errors.

We examine the planning fallacy bias of nascent entrepreneurs and the provision of historical outcomes in the context of reward-based crowdfunding campaigns, which offers a great

setup to conduct research on entrepreneurial excess market entry: three out of four crowdfunded projects are intended to start a new business or to introduce a new product, but only one third is successful in raising the requested amount. While our analysis is on crowdfunding, we think the conclusions extend to entrepreneurial initiatives more generally, that are characterized by high levels of entries and early failures.

Planning Fallacy

The planning fallacy bias is considered as one manifestation of overoptimism. Following Kahneman and Lovallo (1993), entrepreneurs often adopt an “inside view” when making projections for their project outcome. By doing so, entrepreneurs restrict themselves to a few possible scenarios, overestimating the more successful ones, and neglecting the ones that are difficult to evaluate. In contrast, the “outside view” is based on historical outcomes of comparable projects, which helps to take unforeseen scenarios into account (Kahneman and Lovallo, 1993). The outside view requires to ignore some of the idiosyncratic details of the own project and avoids forecasting any scenario of the future course based on these details. Instead, the person examines the outcomes of a class of similar projects and then positions the current project in the distribution of outcomes for the chosen reference class.

This view is typically taken by outsiders, such as professional investors. When taking the inside view, entrepreneurial overoptimism results

from the planning fallacy bias (although over-optimism may arise for other reasons). During the planning phase, the planning fallacy leads to overly optimistic figures, such as sales forecasts and excess market entry, as evidenced by Camerer and Lovallo (1999). More generally, we expect entrepreneurs subject to the planning fallacy bias to be more likely to pursue their project, but also to fail more often to achieve their objectives.

Empirical Findings

We consider as empirical setting nascent entrepreneurs who consider crowdfunding to obtain finance for their project, with some of them having even started a campaign later on. The uniqueness of our data is based on a website called “The Crowdfunding Calculator” (<http://www.crowdfunding-calculator.com/>), a free tool developed by Blaseg, Skiera and Foersch in 2016 at the Goethe University that helps nascent entrepreneurs who consider doing a reward-based crowdfunding campaign to calculate expected profits of their project as a way to guide them regarding the decision whether to eventually launch the campaign.

Entrepreneurs need to provide information including cost structure, the number of units/rewards they expect to sell during the campaign, and expected probabilities of success. They are given the opportunity of obtaining information on historical success probabilities of comparable projects, which allows us to compare initial subjective estimates with historical outcomes of similar campaigns. We further observe whether entrepreneurs take

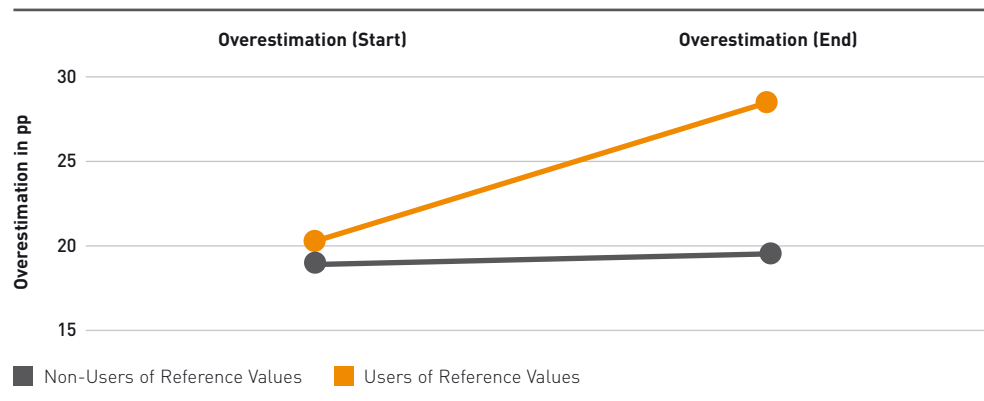


Figure 1: Overestimation by Non-Users versus Users of Reference Values

into account this information when using the calculator in any subsequent trial, since they again need to predict the probability of success. Most entrepreneurs use the calculator several times in a row, so we are able to see how they change these probabilities over time. To supplement these data, we automatically sent questionnaires to all users of the calculator to obtain information on demographics and their project (if they ever started it). This allows us to gather information on whether they eventually started a campaign, and on the campaign outcome in case one was launched.

Our final sample covers information on the full planning process of 971 nascent entrepreneurs that used the calculator, among which 428 did eventually launch a campaign.

Our analysis offers several results, where we measure the planning fallacy bias as the difference between their own estimated probability and the historical base rate.

We show that entrepreneurs systematically overestimate their chances of success, despite knowing the historical success probability of similar projects. On average, entrepreneurs think their probability of having a successful crowdfunding campaign to be 62.52% while their historical base rate is 38.23% (adjusted for the choice of platform and project category). In our sample, 91.86% of the entrepreneurs consider themselves “above average”; i.e., they use overestimated probabilities, even when they are told the historical outcomes from a sample of projects within the same platform and project category. This finding is consistent with the “inside view” theory of Kahneman and Lovallo (1993).

As shown in Figure 1, we find that entrepreneurs who are informed on the true historical base rate use similar probabilities as entrepreneurs who do not know the reference values at the beginning. However, the users change these probabilities more often when

re-calculating profitability of their project in follow-up plans. In fact, they tend to increase even more their estimates, consistent with the view that users fail to adopt an outside view and are subject to an above-average effect (Alicke and Govorun, 2005; Camerer and Lovallo, 1999). The users are not just ignoring the values once they are shown but misuse the provided information to account for their beliefs to be better than others.

The misjudgment leads them to an even higher level of optimism than before knowing the reference values. Interestingly, we document this fallacy bias across different levels of education, occupational choices, work experience, age, and gender type, all of which cannot explain entirely differences in the level of the planning fallacy bias. In our sample, 44% (i.e., 428 out of 971) of the entrepreneurs eventually launch a crowdfunding campaign, and this percentage is highest among entrepreneurs subject to a stronger planning fallacy bias and who did seek to obtain historical probability values.

Thus, the bias has important economic consequences as it influences the decision of entrepreneurs to start a project. In particular, we document the fact that entrepreneurs subject to a stronger planning fallacy bias are more likely to launch a crowdfunding campaign, but also more likely to fail to raise the desired funds. Thus, the bias not only generates economic consequences but also social costs as more entrepreneurs started campaigns although they should not have done it.

Conclusion

Our results question the provision of reference values to overoptimistic entrepreneurs since we find that they overinflate their estimates even more when reference values are provided to them. Understanding how the planning fallacy bias is associated with entrepreneurial thinking and action provides at least an understanding for influencing those processes. Our findings suggest that the provision of reference cases during the planning may not impose entrepreneurs to adopt an outside view. Following Kahneman and Lovallo (1993), this is best done by involving professional investors, such as business angels and venture capitalists, or by pitching the ideas to them early on. Our findings therefore provide a rationale for the participation of professional investors beyond providing financial resources.

References

Alicke, M.; Govorun, O.:

The Better-Than-Average Effect.

In: Alicke, M.; Dunnin, D.; Krueger, J. (eds.): *The Self in Social Judgement*, Psychology Press, New York, 2005, pp. 85–106.

Camerer, C.; Lovallo, D.:

Overconfidence and Excess Entry: An Experimental Approach.

In: *American Economic Review*, 89 (1999) 1, pp. 306–318.

Kahneman, D.; Lovallo, D.:

Timid Choices and Bold Forecasts: A Cognitive Perspective on Risk Taking.

In: *Management Science*, 39 (1993) 1, pp. 17–31.

Research Report

Autonomous Agent-Based Negotiation Using Smart Contracts

THE BLOCKCHAIN TECHNOLOGY ENABLES ENTITIES TO QUERY AND ALTER INFORMATION WITHOUT TRUSTING A MIDDLE PARTY WHILE PROVIDING A SECURE DATA STORAGE IN A DECENTRALIZED MANNER. WE FOCUS ON AN IT DATA SUPPLY CHAIN SCENARIO WHERE MULTIPLE ACTORS NEGOTIATE A TENANCY AGREEMENT FOR VIRTUALIZED NETWORK RESOURCES. WE PRESENT OUR APPROACH, A BROKERLESS BLOCKCHAIN-BASED SYSTEM THAT USES SMART CONTRACTS AND A VIRTUAL NETWORK PARTITIONING ALGORITHM. WITH THIS APPROACH WE CAN OVERCOME THE INFORMATION DISCLOSURE PROBLEM IN THIS SCENARIO.

Sonja Bergsträßer

Amr Rizk

Introduction

Can a user/company always safely trust third-parties? Why not distributing these privileges among multiple users which co-operate for handling such complex tasks? Consider a service negotiation cycle in which different service providers (SPs) are willing to embed virtual nodes across multiple infrastructure providers (InPs) in order to provide wide-area network services. This process is called network virtualization or network slicing, in which typically the brokers, named virtual network providers (VNPs), are responsible for performing the service negotiation that enables the virtual network (VN) embedding. Since InPs are typically

Paul Müller

Ralf Steinmetz

not willing to disclose detailed internal network information, even to the VNPs, this is a major deal breaker that hampers the efficiency of the service negotiation process.

For this reason, a blockchain architecture can enhance the process by removing the presence of these third-parties (VNPs) while maintaining a co-ordinated process that ensures a secure storage of data. This negotiation can be based on a time-limited auction where each virtual network request automatically creates a new smart contract on the blockchain that enables the bidding of the requested resources by the different service providers.

In our work, we focus on an IT data supply chain scenario where multiple actors negotiate a tenancy agreement for virtualized network resources (Rizk et al., 2018). The presented approach comprises of a brokerless blockchain-based system that uses smart contracts and a VN partitioning algorithm based on the Vickrey auction model (Vickrey, 1961).

The Design Approach

In the following, we introduce a conceptual design of a multi-provider virtual network embedding approach using an Ethereum blockchain as well as the underlying auction model.

In the presented scenario, a SP is willing to embed virtual nodes {A,B,C,D} across different InPs where the InPs are not willing to disclose detailed information about their resource availability or network topologies (see Figure 1). Here, the partitioning problem is treated as a cost minimization problem where the SP pursues the minimum embedding cost. Nevertheless, there is some information not considered confidential by the InPs, such as the location or the virtual node types offered by the peering nodes. For instance, in Figure 1, it is shown that InP1 has two peering nodes with locations in Germany and Switzerland that may embed virtual node types {A, B, D, E} and {F, G}, respectively. These virtual node types are used to classify the resources in different groups, each having common attributes, such as CPU, memory, storage, and network capability.

The proposed blockchain design consists of the following four main components. First, we

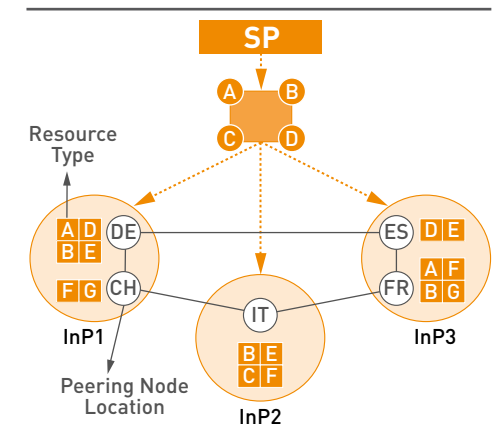


Figure 1: Virtual Network Embedding

have a private group of users, the InPs and the SPs. Only this group is allowed to access and alter the smart contract data. New users must ask for permission before joining the network. The second component, the user interface (UI), interacts with the blockchain through a given API. The blockchain itself, as the third component, is based on the Ethereum architecture. This allows the creation of smart contracts – the fourth part – that reflect the needs of the users into code and can be created or called either from another contract or simply by a user.

In the following, we introduce the virtual network embedding (VNE) process itself. An SP requests a virtual network. A virtual network can be represented as a graph $G^R = (N^R, d^R)$, where N^R consists of a set of k virtual nodes, and d^R the set of all bandwidth demands between the virtual nodes. In our example, the graph consists of four virtual nodes {A,B,C,D}

(see Figure 1). Moreover, each virtual node is formed by a collection of attributes, such as the desired location (l) or the upper bound cost (u) which may be the maximum amount that an SP is willing to pay for a virtual node.

Before the auction starts, the associated set of attributes (e.g., locations, bandwidth) of the requested virtual nodes is matched with the InPs entered data in the smart contract. For instance, virtual nodes {A, B} and {C, D} will be matched with InPs possessing physical nodes in Germany (DE) and Switzerland (CH), respectively.

Then the auction starts and a corresponding smart contract as a limited time auction is created. Since the bidding and the virtual network lifetime must terminate, the SP is required to specify a bidding period and a lifetime to the request.

After the new auction contract is created, the included InPs are notified. Before bidding, the SPs typically evaluate the requested requirements into their network, such that the set of physical nodes and physical links can fulfill the request. We assume that InPs are interested in serving requests at maximum profit and also note that a single InP may not be able to serve all of the virtual nodes requirements.

Once the auction has finished, each virtual node is assigned to the winning InP that minimizes the VN embedding cost. These winners are now publicly known by all participating users and thereupon, VN segment map ping and stitching between the InPs may be performed.

The proposed auction model makes use of a Vickrey auction model, in which it is known that if each bidder quotes the true cost of the service, bidder's expected utility is maximized. The Vickrey auction model has the particularity of corresponding to a sealed-bid auction, in which during the bidding time bidders do not know other bids and, eventually, how the auction is evolving. In addition, this auction model corresponds to a second-price tender where the bidders will offer a price for the service and the highest bid will win. Nevertheless, this service will be rendered at the second highest value. Thus, a Vickrey auction is considered a fair-price system since it provides a reasonable price to the buyer by motivating bidders to bid truthfully.

Virtual Network Embedding with Limited Information Disclosure

We adapted the auction model to the multi-provider VNE problem with limited information disclosure. Firstly, we seek an efficient virtual network partitioning where the requested virtual nodes are assigned to the participating InPs such that the VNE costs are minimized. However, we only consider the price quotes of the notified InPs to determine the minimum VNE cost. Hence, the InPs act as sellers who submit bids for the services requested by the SPs, and, once the auction finishes, the VN is split between the winning InPs. Since in our scenario SPs request the embedding of different virtual nodes, we are facing a multi-unit auction. Thus, before defining the minimum VN cost using the Vickrey auction, it is important to

note that InPs can submit bids per virtual node or for a group of virtual nodes.

Consider the example from Figure 1. Now, four InPs compete for virtual nodes which are requested from a SP with: $\{A(u_a=8; l_a=DE), B(u_b=9; l_b=DE), C(u_c=10; l_c=CH \text{ or } DE), D(u_d=8; l_d=CH \text{ or } DE)\}$ or $\{G(u_{abcd}=30; l_{ab}=DE \text{ and } l_{cd}=CD \text{ or } DE)\}$.

Here, an InP bids either for the entire virtual network G or for individual virtual nodes, depending on the number of paired resources. If all the virtual nodes' locations and types match with certain InP nodes, then the system enables that the InP bids for the entire virtual network. If not, an InP is only allowed to quote prices for the paired virtual nodes.

The bidding process gives the following result (see Figure 2): InP1 located in Germany is only able to bid for nodes A, B and C with equal cost of 8. InP2 is able to bid for the whole network G with cost of 30. InP3 bids for node C and D with cost of 7 and 6, respectively. InP4 only bids for node C at cost of 6. At the end of this auction, since the sum of the individual quotes is less than the package pricing $\min\{30; 29\}$, the virtual network is partitioned across different InPs, i.e., $A \rightarrow \text{InP1}; B \rightarrow \text{InP1}; C \rightarrow \text{InP4}; D \rightarrow \text{InP3}$. In addition, the prices that the SP must pay to each InP ($C^*(N_i)$) are the ones resulting from the low-bidding second-price auction as one can see from the table in Figure 2.

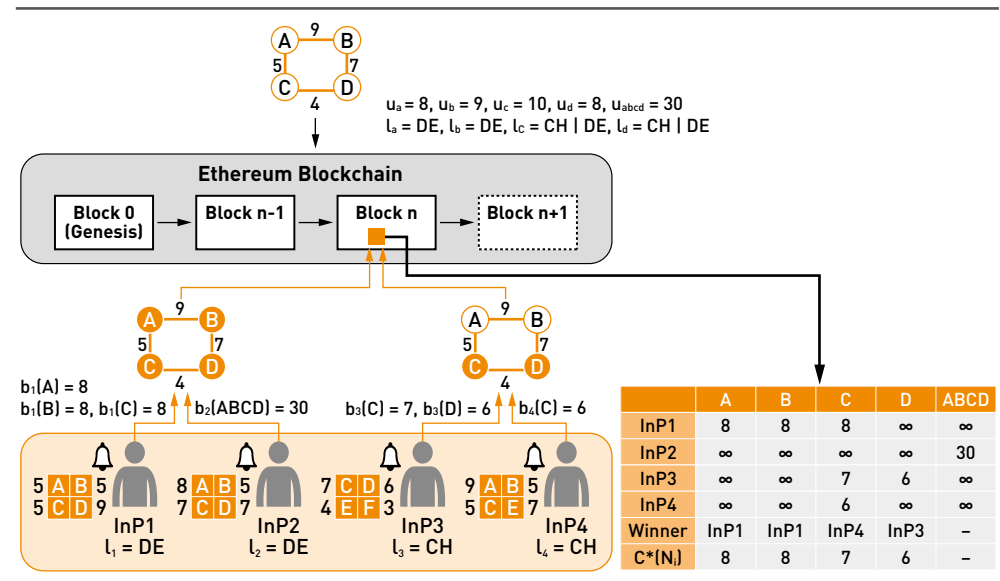


Figure 2: The Auction Algorithm: Four InPs Bid for One VN Request

Since network virtualization is a real-time process where the demand and availability of the resources are constantly changing, our approach encourages that users apply dynamic pricing models. A dynamic pricing model is a strategy where the prices are flexibly adapted to the current market demands. In our approach, InPs can consider the current SP demands and the current availability of the resources to optimize their bids. In our scenario, this demand is related either with the computing or the bandwidth requirements, and the supply with the resource utilization.

Evaluation

In our work, we evaluate the efficiency of the proposed brokerless inter-domain virtual net-

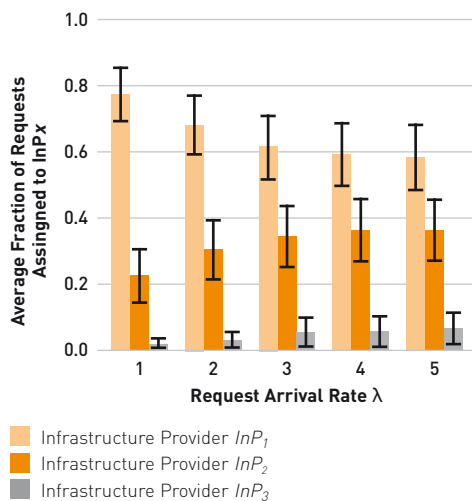


Figure 3: Average Fraction of VN Requests Assigned to Each InP with Different Profit Margins at Varying Request Arrival Rates λ [request/sec]

work embedding system. We introduce a pricing model used for the InPs to dynamically quote their services, as well as a performance comparison of different consensus algorithms that are used in the deployed blockchain [Rizk et al., 2018].

The main goal of our evaluation is to show the feasibility of the introduced approach and to demonstrate its potential. To this end, we are using the following metrics:

Acceptance rate: Based on our approach and the proposed pricing model, we examine the VN embedding efficiency through its acceptance rate. This VN acceptance rate is the percentage of embedded virtual nodes from the total incoming VN requests.

Bidding strategy: The bidding strategies are evaluated based on how the profit margins employed by the different InPs produce significantly different revenues in certain scenarios.

Blockchain performance: The blockchain performance will be verified basically in terms of the block generation time (mining) and the number of forks. The former is an accurate method to express the speed of the transactions since each block contains multiple transactions. The latter expresses the amount of useless work and the possibility of non-synchronized state among the nodes.

Our evaluation shows that the *average acceptance rates* depend on the lifetime of the virtual

network request, but that in all cases the system reaches steady state as the number of VN requests grows.

The evaluation results for the bidding strategy can be seen in Figure 3. It shows the average fraction of requests assigned to each InP. The InPs are heterogeneous with different profit margins ($InP1 < InP2 < InP3$). We observe that for low arrival rates (λ) the fractions differ significantly as the resources are not yet fully occupied. Hence, the InP with lower profit margins, in this case InP1, embeds most of the VN requests. In contrast, for larger λ , the second InP starts to gradually increase the number of embedded VN requests since the resources of InP1 are now more utilized, which affects its bidding strategy. Finally, the fraction of InP3 increases in the same vein. With large arrival rates λ , InPs with higher profit margins start to embed more virtual network requests.

Regarding the *blockchain performance*, we have evaluated the proposed proof of elapsed time (PoET) consensus model. We showed how it depends on the number of InP miners in the system and that increasing this number with all other parameters being fixed increases the transaction throughput, i.e., decreasing the block generation time, but also increases the number of blockchain forks which is highly undesirable. We note that this trade-off has to be subtly designed when fixing the system parameters.

Conclusions

In this article, we have shown the design,

implementation, and evaluation of an approach that uses the blockchain technology to enable a brokerless supply chain for inter-domain virtual network embedding.

The main idea behind came from observing the lack of a single solution that provides distributed trust and management to solve the VNE problem given limited information disclosure of the participating parties. By introducing a blockchain, it was achieved to get a scalable system with reduced set up complexity, lower maintenance costs, distributed trust and decentralized management, and data confidentiality. The results show that the defined approach is fair in terms of cost and embedding distribution across the InPs. Finally, we do not claim that our approach is the only viable way of performing VN partitioning, however, thanks to smart contract's flexibility we now provide brokerless inter-domain virtual network embedding in an automated way under limited information disclosure.

References

- Vickrey, W.:** Counterspeculation, Auctions, and Competitive Sealed Tenders. In: The Journal of Finance, 16 [1961] 1, pp. 8–37.
- Rizk, A.; Bisbal, J.; Bergsträßer, S.; Steinmetz, R.:** Brokerless Inter-Domain Virtual Network Embedding: A Blockchain-Based Approach. In: it – Information Technology, 60 [2018] 5-6, pp. 293–306.

Insideview

The State of FinTech

INTERVIEW WITH PETER BARKOW

FinTech has received growing interest in the last few years. Which topics have been the most important ones – and which topics will be of special importance in future?

FinTech is a very dynamic sector with a constantly changing face. It is striking how far the sector has developed in just a few years. We are observing continuous growth both in number of startups as well as in investments. At present the bitcoin/blockchain category is performing best benefiting from a buoyant ICO market. Personally, I think that FinTech startups combining advanced analytics and (big) data will have a bright future given the data intensity of the finance industry. Incumbents have vast room for improvement in this area and can leverage startup know how extensively. In addition, startups that help incumbents to become more efficient are likely to thrive given high costs of traditional banking players especially in Germany.

If you compare the situation in Germany to other EU Member States or the US, what are the most striking differences in the field of FinTech?

Each country seems to be at a different development stage and Germany is doing relatively well in a EU context. The UK sector is, however, the clear European benchmark combining financial, tech, and venture capital in an ideal fashion and in one spot, namely its capital London. London is de facto a combination of Silicon Valley and Wall Street in just one location. Germany is, given its federal structure, more decentral. Without doubt, Berlin is the German startup capital, whereas the banking center is based in Frankfurt and Munich/Cologne are clusters of insurance companies. As a consequence, most FinTech startups are spread across four major German cities. Globally, the US is ahead of Europe, and Asia seems to be pulling ahead of the USA. Compared to these regions, Germany still has a lot of catch-up to do.



Peter Barkow
Managing Director
Barkow Consulting GmbH

You gain deep insights into the daily business of FinTech startups. What are the main problems and obstacles that FinTech startups are facing – especially in Germany?

In B2C, most startups underestimate customer acquisition costs. German retail customers are generally cautious, especially when considering providers of financial services. We see that customer acquisition costs are very high for most startups and extremely low for top players. The B2B segment is strongly benefiting from the desperate search of incumbents for innovation and efficiency. Consequently, we are observing an explosion of co-operations between startups and established players. Most of these co-operations are, however, facing a tough time in practice as they need to be "filled with life". Established players need to back co-operations with human and financial resources to make them successful. Focusing on a few co-operations seems a winning strategy. Co-operating less can, therefore, surprisingly be a more efficient strategy.

Growth needs capital. How do you judge the current situation of venture capital for FinTech companies?

The German startup ecosystem has achieved a lot during the last years. Early stage capital is currently readily available from domestic backers. Larger rounds, however, are almost impossible to raise without international venture capital firms. Thus, we are observing only a few so-called Private IPOs, meaning rounds of at least USD 50 million in Germany. There is an increasing funding gap compared to Asia, the US, or UK for larger deals. For instance, the Asian FinTech ANT Financial raised USD 18.5 billion in just two rounds. This is a whole decade of venture funding for all German startups a comdirect study has recently found. Surely, this is an extreme comparison, but indicative for the later-stage funding gap in Germany.

Thank you for this interesting conversation.

Infopool

News

Prof. Skiera Elected to Managing Board of Schmalenbach-Gesellschaft für Betriebswirtschaft

In October 2018, Prof. Skiera (layer 3) was re-elected for five years as a member of the Managing Board of the Schmalenbach-Gesellschaft für Betriebswirtschaft e.V., the oldest association concerned with business administration in Germany. Congratulations!

Double Success for Daniel Blaseg

Daniel Blaseg (layer 3) has received the KSG Best Entrepreneurship Research Award at the 22nd Annual Interdisciplinary Conference on Entrepreneurship, Innovation and SMEs in Stuttgart for his paper "The Fallacy Problem of Entrepreneurs", co-authored by Prof. Armin Schwienbacher (SKEMA Business School). He has also been awarded with the Add-On Fellowship for Interdisciplinary Economics from the Joachim Herz Foundation. The aim of the fellowship is to support the interdisciplinary work of young scientists and consists of funding which may be used for research purposes, and all measures which directly support the recipients' research. Congratulations!

Björn Richerzhagen Receives VDE|ITG Dissertationspreis 2018

Björn Richerzhagen (layer 1, supervisor Prof. Steinmetz) has received the "VDE|ITG Dissertationspreis" for his thesis "Mechanism Transitions in Publish/Subscribe Systems – Adaptive Event Brokering for Location-based Mobile Social Applications". Every year the VDE|ITG honors outstanding dissertations in the area of information technology. Congratulations!

Dr. Thomas Pauls Receives the Justus-Liebig University Gießen's Dissertation Award

Dr. Thomas Pauls (layer 3, supervisor Prof. Hackethal) has been awarded with the Justus-Liebig-University's Dissertation Award 2017/2018 for his dissertation "Five Essays in Empirical Finance". The Gießener Hochschulgesellschaft and the Justus-Liebig University Gießen grant this award annually as an acknowledgement for excellent academic research. Congratulations!

Meet the Best Students

On November 5th, 2018, the E-Finance Lab together with its industry partners hosted a "Get-in-Touch" event for the best bachelor and master students from the areas of finance, marketing, computer science, and information systems of Frankfurt and Darmstadt universities. These students and our industry partners used this platform to discuss potential future perspectives and collaborations.

Joint Spring Conference 2019 of E-Finance Lab and TechQuartier

The E-Finance Lab and TechQuartier invite you to the 2019 edition of the annual Spring Conference on "Artificial Intelligence in the Financial Service Industry". The event will take place on February 26th, 2019, at TechQuartier in Frankfurt and is organized by Prof. Hackethal and his team (layer 3). The conference will commence at 16:00. Participants will gain insights from research on Artificial Intelligence conducted at Goethe-University Frankfurt and the Technical University of Darmstadt and learn from state-of-the-art AI use cases in the industry. The registration form and further information are available on our conference website <https://efl-spring-con-2019.de/>. As always, the participation is free of charge. Due to capacity reasons, we kindly ask you to register only if you are likely to attend the conference.

EFL Abroad

From mid-September to mid-November, Sven Panz (layer 2, Prof. Gomber) visited the University of Cambridge, Faculty of Economics, as a visiting research scholar. From mid-October to mid-December, Nico Wunderlich (layer 1, Prof. König) visited the City University of Hong Kong, College of Business, as a visiting fellow research scholar.

Selected E-Finance Lab Publications

Rizk, A.; Bisbal, J.; Bergsträßer, S.; Steinmetz, R.:

Brokerless Inter-Domain Virtual Network Embedding: A Blockchain-Based Approach.
In: *it – Information Technology*, 60 (2018) 5-6, pp. 293–306.

Hans, R.; Richerzhagen, B.; Rizk, A.; Lampe, U.; Steinmetz, R.; Klos, S.; Klein, A.:

Little Boxes: A Dynamic Optimization Approach for Enhanced Cloud Infrastructures.
In: *Proceedings of the 7th ESOC Conference*; Como, Italy, 2018.

Gomber, P.; Sagade, S.; Theissen, E.; Weber, M.; Westheide, C.:

Spoilt for Choice: Order Routing Decisions in Fragmented Equity Markets.
In: *25th Annual Meeting of the German Finance Association (DGF)*; Trier, Germany, 2018.

Clapham, B.:

Is There a Magnet Effect of Rule-Based Circuit Breakers in Times of High-Frequency Trading?
In: *6th Paris Financial Management Conference (PFMC)*; Paris, France, 2018.

Panz, S.:

Intra- and Inter-Market Spillover Effects during Extraordinary Market Conditions.
In: *Annual Meeting of the Financial Management Association*; San Diego (CA), US, 2018.

Kruse, L.; Wunderlich, N.; Beck, R.:

Artificial Intelligence for the Financial Services Industry: What Challenges Organizations to Succeed.
In: *Proceedings of the 52nd Hawaii International Conference on System Sciences (HICSS)*; Maui (HI), US, 2019.

Wunderlich, N.; Beck, R.:

Revisiting IT Capabilities for Digital Transformation.
In: *Proceedings of the 6th pre-ICIS International Workshop on the Changing Nature of Work (CNoW): Bridging the Workplace of People, Data and Things*; San Francisco (CA), US, 2018.

Meyll, T.; Pauls, T.:

The Gender Gap in Over-Indebtedness.
Forthcoming in: *Finance Research Letters*.

For a comprehensive list of all E-Finance Lab publications see <http://www.efinancelab.com/publications>

Infopool

RESEARCH PAPER: DATA PRIVACY – EFFECTS ON CUSTOMER AND FIRM PERFORMANCE

In this article, the authors investigate how a firm's data management and resulting data vulnerability affect customer behavior and firm performance. Three studies show that, firstly, firms' access to customers' data reduces trust, secondly, data breaches have negative effects on the affected firm and on its closest rival, and, thirdly, a more severe data breach further increases the negative effect on the firm's returns but reduces the negative effect on the rival firm. Furthermore, a higher transparency of data management reduces the spread of negative word-of-mouth, suppressing negative stock price effects. These findings suggest that firms must consider their data management carefully and apply mitigation strategies to reduce negative effects.

Martin, K.; Borah, A.; Palmatier, R.
In: *Journal of Marketing*, 81 (2017) 1, pp. 36-58.

RESEARCH PAPER: HOW ALLIANZ UK USED AN IDEA MANAGEMENT PLATFORM TO HARNESS EMPLOYEE INNOVATION

Digital idea platforms are means to transform employees' creative potential into innovations, a highly demanded capability to stay competitive in the rapidly forward-moving era of digital transformation. In 2006, financial institution Allianz UK started an innovation initiative, encompassing the introduction of an internal idea platform and the implementation of a corresponding five-employee innovation team. In the regarded timeframe from 2006 to 2011, the generated ideas evolved from 0 up to 15,000 per year. Two main factors can be emphasized for deploying the digital innovation platform successfully: the intensive tracing of each idea by the central innovation team as well as managing the participants' motivation and behavior. Besides encouraging distributed innovation champions, issuing challenges to employees lead to more promising ideas than merely asking for input. The UK Allianz case impressively underlines how leaders, articulating a vision and providing an organizational framework for innovation, transform employees' ideas into large-scale organizational changes in the digital era.

Benbya, H.; Leidner, D.
In: *MIS Quarterly Executive*, 17 (2018) 2, pp. 139-155.

E-Finance Lab Quarterly

The E-Finance Lab publishes the Quarterly in the form of a periodic newsletter which appears four times a year. Besides a number of printed copies, the EFL Quarterly is distributed digitally via E-mail for reasons of saving natural resources. The main purpose of the newsletter is to provide latest E-Finance Lab research results to our audience. Therefore, the main part is the description of two research results on a managerial level – complemented by an editorial, an interview, and some short news.

For receiving our EFL Quarterly regularly via E-mail, please subscribe on our homepage www.efinancelab.de (→ news → sign up / off newsletter) as we need your E-mail address for sending the EFL Quarterly to you. Alternatively, you can mail your business card with the note "EFL Quarterly" to the subsequent postal address or send us an E-mail.

Prof. Dr. Peter Gomber
Vice Chairman of the E-Finance Lab
Goethe University Frankfurt
Theodor-W.-Adorno-Platz 4
D-60629 Frankfurt am Main

newsletter@efinancelab.com

Further information about the E-Finance Lab is available at
www.efinancelab.com.



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For more information about the House of Finance, please visit www.hof.uni-frankfurt.de.

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For further
information
please
contact:

Prof. Dr. Peter Gomber
Vice Chairman of the
E-Finance Lab
Goethe University Frankfurt
Theodor-W.-Adorno-Platz 4
D-60629 Frankfurt am Main

Phone +49 (0)69 / 798 - 346 82
E-mail gomber@wiwi.uni-frankfurt.de

Press contact
Phone +49 (0)69 / 798 - 346 82
E-mail presse@efinancelab.com

or visit our website
<http://www.efinancelab.com>