

15 June 2017

DG FISMA
European Commission
1049 Bruxelles/Brussel
Belgium

Re: Consultation document on Fintech: a more competitive and innovative European financial sector.

Dear Sir/Madam,

CFA Institute appreciates the opportunity to respond to this consultation on Fintech in the European financial sector. CFA Institute is the global association of investment professionals that sets the standard for professional excellence and credentials. The organization is a champion for ethical behaviour in investment markets and a respected source of knowledge in the global financial community. The end goal: to create an environment where investors' interests come first, markets function at their best, and economies grow. CFA Institute has more than 140,000 members in 150 countries and territories, including 133,000 Chartered Financial Analyst® charterholders, and 147 member societies.

Please find below our comments on selected questions from the consultation dealing with: artificial intelligence algorithms, consumer protection challenges, financial inclusion issues, as well as regulatory approaches.

Q1.3 Is enhanced oversight of the use of artificial intelligence (and its underpinning algorithmic infrastructure) required? For instance, should a system of initial and ongoing review of the technological architecture, including transparency and reliability of the algorithms, be put in place? What could be effective alternatives to such a system?

The current pursuit of artificial intelligence is typically enabled through machine learning algorithms. This has certain consequences for the efficacy of enhanced oversight by regulatory bodies. Previous attempts at developing artificial intelligence often focused on programming-in all the necessary knowledge that a machine would need for 'intelligent' decision making. This was a largely unsuccessful approach. Machine learning takes a fundamentally different approach to intelligence. Machine learning involves presenting the computer with a large amount of input data on which to practice or learn to perform certain tasks. The machine learning algorithms take this training input data and, having been given a certain desired output to achieve with that input data, proceeds to attempt different ways of using the input data (e.g. through recognising patterns unobservable-to-humans) to achieve the desired outcome. Somewhat successful attempts are rewarded and reinforced while somewhat unsuccessful attempts are punished and amended. Over millions of iterations, a complicated input/output algorithm is 'learned'.

The resulting input/output algorithm typically takes the form of converting the input data into basic building blocks of information (e.g. edges, lines, curves for image-recognition) and then combining and re-combining these fundamental blocks, blocks of blocks (and so on) over several layers (the more layers the 'deeper' the machine learning) in order to arrive at the desired output. By repeatedly changing the algorithm to achieve incrementally better results (i.e. estimate the desired output with higher probability), over millions of iterations, this algorithm may eventually find the best combination of input

data transformations (and transformations of transformations) so as to correctly arrive at the desired output. The result of this, however, is that the transformations necessary to convert the input data into the desired output, while completely visible, are often incomprehensible to human intuition.

For this reason, we do not believe that regulatory oversight of machine-learning algorithms (artificial intelligence is a misleading description of the underlying technology) will prove particularly effective. It is already extremely difficult for regulators to oversee human-designed algorithms in fields as diverse as high-frequency trading or vehicle emissions controls, let alone oversee machine-designed algorithms.

We believe the high-frequency trading experience with algorithms is instructive because while there have been and still are attempts to ensure oversight of algorithms, the use of circuit breakers is widespread – this is designed to place an external ‘hard-stop’ on any potential contagious effects of an algorithm. We believe that regulators should focus on creating a system where artificial intelligence-enabled algorithms are able to fail in a safe way because we suspect it will be impossible to ensure they never fail at all. Such circuit-breakers would need to depend on the particular use-case for the machine learning algorithm and could take the form of exogenous triggers that could stop the algorithm from operating in certain crisis situations (e.g. similar to trading circuit breakers when certain risk exposures are exceeded), or guardrails in terms of the allowable outputs to be recommended by a machine-learning algorithm (e.g. absolute limits on allowable risk taking recommended by a robo-advisor).

Q1.5 What consumer protection challenges/risks have you identified with regard to artificial intelligence and big data analytics (e.g. robo-advice)? What measures, do you think, should be taken to address these risks/challenges?

We believe the key thing to understand about modern machine learning techniques is that while they are able to produce very impressive results in certain contexts, mimicking intelligent behaviour and performing far better than humans at certain tasks, they are also prone to making certain types of fundamental errors that a human would not make. For example, an image recognition algorithm can perform image recognition with a lower error rate than a human¹. However, it is possible to imperceptibly (to the human eye) change the input image data so that the machine algorithm is completely fooled whereas a human would not be. Further, the machine learning algorithm cannot be expected to react predictably (or correctly) when faced with events that were not present in the training input data set and thus were never learned during the training phase of developing the algorithm.

For this reason, we think that for the foreseeable future, machine learning algorithms will be used as a tool by human operators and not as a stand-alone decision-making entity. A good analogy is the autopilot function on modern airliners that largely operates the plane by itself, but with human observers ready to intervene should something unexpected occur.

We think that what this means for consumer protection in the field of financial services is that regulators must ensure that accountability remains with the human operator and is not abdicated to the algorithm, which will operate largely as a black box. The determination of credit scoring, investment suitability, and so on, is likely to be improved by machine learning algorithms drawing on big-data analytics, but is unlikely to deliver perfect outcomes every time.

¹ <https://www.forbes.com/sites/michaelthomsen/2015/02/19/microsofts-deep-learning-project-outperforms-humans-in-image-recognition/#44149c9f740b>

Q1.7 How can the Commission support further development of Fintech solutions in the field of non-bank financing, i.e. peer-to-peer/ marketplace lending, crowdfunding, invoice and supply chain finance?

We believe that technological innovation (as distinct from invention) is overwhelmingly driven by market forces, and not regulation. Unless invasive market intervention through incentives or regulation is considered desirable (for example, mimicking Norway's electric car incentives²) then we believe the best approach for regulators is to act as enablers, and not as drivers of this development.

Regarding non-bank financing, or Fintech credit³, we think that the desire to borrow or lend money for investment is not based on the technology platform, but on the expected return. While improved efficiency in credit scoring or lower overhead costs may give new entrants an advantage, the rapid rate of development in Fintech means such competitive advantages are unlikely to be sustainable.

For this reason, for non-bank financing platforms – such as peer-to-peer or marketplace lending – to be a solution for the SME financing gap, they must ultimately be willing to lend to riskier borrowers and offer higher expected returns to savers. Regulators (e.g. the Financial Conduct Authority⁴) are increasingly asking whether this is based on some fundamental ability to have better credit-scoring or dramatically lower fixed costs, or if it is simply a form of regulatory arbitrage.

The true ability of Fintech credit to more accurately perform credit risk analysis has not yet been tested by a credit cycle so we are not able to make a judgement on the value of machine-learning and big data analytics at this stage. For this reason, we do not believe regulators should 'pick winners' in this instance and should instead ensure that investors that choose to lend through these platforms are protected (e.g. through disclosure requirements) to a sufficiently high standard. High standards of investor protection will reduce the probability of any future Fintech credit scandal and increase investor comfort with the business model. In this way, regulators can enable Fintech credit to grow in a sustainable manner.

Q1.11 Can you please provide further examples of other technological applications that improve access to existing specific financial services or offer new services and of the related challenges? Are there combinations of existing and new technologies that you consider particularly innovative?

We think that Fintech has an interesting potential for improving financial inclusion. The combination of online identity management (e.g. online-verification of physical identity), online payments (resulting in detailed spending/ credit history), online capital raising (e.g. crowdfunding or initial coin offerings – ICOs - a kind of crypto-currency-based equity) may soon greatly increase the scope of economic activity possible to do entirely online. This, in turn, should increase the number of people able to access financial services in a disintermediated fashion. The greatest scope for impact would likely be in the developing world, although the activation of so much dormant human, physical, and financial capital will clearly present enormous challenges and opportunities for the developed world as well.

One can see the component parts of such a vision in place already: the mobile payments system M-PESA in Kenya that has recently been used to raise Government financing via a mobile-only bond

² <http://www.pbs.org/newshour/bb/norways-government-made-electric-cars-irresistible/>

³ A useful term to describe this non-bank financing coined by the Committee on the Global Financial System (CGFS) and Financial Stability Board (FSB) in their Fintech credit report: <http://www.fsb.org/2017/05/Fintech-credit-market-structure-business-models-and-financial-stability-implications/>

⁴ <https://www.ft.com/content/236e43f6-ba1e-11e6-8b45-b8b81dd5d080>

issue⁵, the highly-developed app-ecosystem-based economy in China (e.g. WeChat, Alibaba), the increasing sophistication of online identity verification and management (e.g. machine-learning-based photo identity verification tools), as well as the persistent development and growth of public blockchains (e.g. Bitcoin or Ethereum) and their associated ecosystems.

It is possible to envisage a future where a person in the developing world who is currently excluded from the financial system entirely is able, via access to a relatively inexpensive smartphone, to:

- Have their physical identity verified and managed online through their phone camera and phone fingerprint sensor. Using this verified identity they would then be able to:
 - o Record and demonstrate ownership of assets online;
 - o Have access to a global payments system (e.g. a virtual currency such as Bitcoin);
 - o Have direct access to global capital markets via Fintech credit (possibly using their online-recorded assets as collateral) or initial coin offerings.

The challenges to this (possibly utopian) scenario are not technological but rather exist at the interface of the online economy and the real-world economy and legal system. For example, for the online identity to be meaningful, Government must agree to accept such verification as proof of identity. This would, in turn, allow the online financial ecosystem to satisfy Know Your Customer (KYC) and Anti-Money Laundering (AML) obligations assuming regulators also approve. This kind of approval is necessary even for supposedly unregulated ecosystems such as Bitcoin because unless the entire ecosystem is self-contained (which is impossible) it must, at some point, interact with existing economic and legal structures. For example, for Bitcoin, the main interface exists at Bitcoin exchanges where Bitcoins can be bought and sold in exchange for fiat currency. This, in turn, means that Bitcoin exchanges must deal with the incumbent banking and payments architecture. For Bitcoin this is a significant bottleneck to growth (caused by KYC/AML concerns) and is an issue that only regulators can resolve.

Q2.4 What are the most promising use cases of technologies for compliance purposes (RegTech)? What are the challenges and what (if any) are the measures that could be taken at EU level to facilitate their development and implementation?

While RegTech typically describes technologies that allow companies to automate or improve compliance with regulations, for example anti-money laundering (AML) or know-your-customer (KYC) regulations, we believe that blockchain systems could provide an interesting way for regulators to remove the burden of compliance in certain activities by having complete visibility of all relevant actors and their actions. Since a blockchain is, fundamentally, a consensus-driven database distributed among several users, it is possible for the regulator to be one of those users. One can imagine that if the clearing and settlement process for equities moved to a blockchain (as has been mooted by the Australian Stock Exchange to replace its Clearing House Electronic Subregister System⁶) then the regulator could have complete visibility, in real-time, of all post-trade information.

While this kind of omniscience may raise privacy issues in many areas, there are some highly-regulated activities where such an approach would not represent a leap in regulatory oversight, merely a leap in the efficiency of that oversight.

Q2.7 Which DLT applications are likely to offer practical and readily applicable opportunities to enhance access to finance for enterprises, notably SMEs?

⁵ <https://qz.com/938054/kenyas-mobile-only-government-bond-m-akiba-builds-on-the-mpesa-platform/>
⁶ <http://www.asx.com.au/services/chess-replacement.htm>

In our response to Q1.11 we outlined several ways that Fintech can improve financial inclusion for individuals. The same benefits should be available to enterprises, particularly SMEs. There is already evidence that small-scale capital formation is entirely possible on crowdfunding, P2P/ marketplace lending and blockchain platforms. For example, the UK government-owned British Business Bank extends loans to small business via the Funding Circle platform⁷. What remains questionable is whether these platforms will scale to a macroeconomically-significant extent⁸ and whether their business and credit-scoring models are sustainable over the course of a credit cycle. For example, raising seed or venture capital via online platforms is likely an improvement in efficiency (by disintermediating banks and/or VC funds), but it is unclear if this approach will work when larger amounts of capital are required (e.g. for SMEs rather than start-ups).

A new way of raising capital is the Initial Coin Offering⁹ (ICO) where issuers sell stakes in start-up projects to investors in exchange for relatively liquid crypto-currency such as Bitcoin or Ether. Although fiat currency is not typically raised directly through an ICO, these crypto-currencies may then be converted to fiat currency to finance operations.

While the ICO token typically does not confer any ownership rights to the investors, as in the case of an equity offering, it may allow early access to products developed as a result of the fundraising. Additionally, the token may function as a method of payment for products or services from the company (e.g. an issuer developing a computer game may allow tokens to be used to fund in-game purchases). Alternatively, the investors may hope that successful projects will see the value of their related tokens rise, yielding a return. Currently this activity is unregulated¹⁰ and vulnerable to a large boom and bust cycle in the near future, but the underlying technology and approach remains interesting.

Q3.7 Are the three principles of technological neutrality, proportionality and integrity appropriate to guide the regulatory approach to the Fintech activities?

The current state of Fintech is unlikely to pose any systemic threat to the financial system, but the risks to retail investors are potentially more significant. While robo-advisors and P2P/ marketplace lending are becoming increasingly mature and sophisticated, including in terms of their compliance with existing regulatory frameworks (although more is to be done), more frontier Fintech developments, such as initial coin offerings, pose greater risks to retail investors. The technological complexity underlying some of these products and applications, combined with well-known issues relevant to all types of investment such as financial illiteracy, product suitability and governance, can make investors vulnerable to mis-selling or even fraud.

The rate of change of technology is too rapid for regulations to be designed for each emerging technology, so CFA Institute has argued on numerous occasions¹¹ that there should not be a “Fintech”

⁷ <https://www.fundingcircle.com/blog/press-release/british-business-bank-expands-partnership-funding-circle/>

⁸ For estimates of the flows and stock of marketplace lending to small businesses, see the CGFS/FSB report: <http://www.fsb.org/2017/05/Fintech-credit-market-structure-business-models-and-financial-stability-implications/>

⁹ <http://www.coindesk.com/icos-changing-way-vcs-deal-startups/>

¹⁰ <https://www.economist.com/news/finance-and-economics/21721425-it-may-also-spawn-valuable-innovations-market-initial-coin-offerings>

¹¹ For example, see our comment letter on the Capital Markets Union mid-term review: <https://www.cfainstitute.org/Comment%20Letters/20170317.pdf>

approach to investor protections, rather a technologically-agnostic approach that allows the best and most efficient technology to be developed while keeping investor protections in place.

Therefore, we support the principle of technological neutrality, as well as the principles of proportionality and integrity.

Concluding Remarks

We welcome this opportunity to comment on the Fintech consultation document. Please do not hesitate to contact us should you wish further elaboration of the points raised.

Yours faithfully,



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