The Role of FinTech in Driving Sustainability and Inclusive Practices in Banking

Abstract

The financial crisis of 2007 had a profound impact on the global banking industry by leading to a loss of trust and confidence in traditional institutions. This has created an opportunity for technology-centric firms such as challenger banks to emerge, offering lean and technology-based structures that provide logistic and cost-efficient outcomes. While decentralised approaches based on the decentralised blockchain approach are yet to be proven as serious contenders for dominance in the retail markets, larger international banks can adopt the technology they use to streamline their processes and reduce their cost base. Additionally, the crisis has led to increased attention to sustainability and inclusive practices in banking, with sustainability and greening becoming a more integral part of a bank's brand image.

FinTech offerings have the potential to increase accessibility to consumer financial services, some applications also pose energy usage and environmental impact challenges. Completely decentralised networks involving a cryptographic proof of work can lead to significant energy consumption, while centralised networks can reduce energy usage and create trust in the central party to uphold the rules of the system. Finally, it is evident that consumer banking customers are increasingly making choices based on non-monetary factors such as trust, brand image, and the institutions commitment to the green agenda. This highlights the need for banks to prioritize sustainability and socially responsible practices to appeal to a broader range of customers and maintain market competitiveness

The chapter explores the role of the financial crisis in creating opportunities for FinTech to enter the retail banking markets and create new institutions and asset types. It discusses the potential for FinTech to contribute to green finance and financial inclusion and highlights the varied costs and benefits of different types of FinTech offerings. Ultimately, it suggests that consumer banking customers are increasingly making choices based on non-monetary factors such as brand trust, usefulness, and corporate social responsibility.

Introduction

The financial crisis of 2007 created a step change in global financial marks. The loss of trust, amongst consumers, in the global banking system created an opportunity for change, as consumers increasingly turned to technology-based banking offerings. These so-called challenger banks, which are new banks opened after 2007, have been able to build lean on technology-based structures that incorporate efficient and digitally intermediated services rather than developing a series of cost-heavy physical bank branches. Some new incumbents in the commercial banking space try to stray away from the banking model altogether and operate as peer-to-peer decentralised organisations using technology that is based upon that which underpins major crypto assets, such as Bitcoin. These decentralised approaches however lack the regulatory oversight afforded to established banks and are yet to be proven as serious contenders for dominance in the retail markets. However, a good deal of the technology these offerings use can also be adopted by larger international banks to streamline their own processes and reduce their cost base. For example, the use of distributed ledger would negate the need to use existing clearing processes for interbank currency transfers; this would slash transaction times from three days to three minutes and reduce the costs associated with the clearing counterparty.

The 2008 financial crisis also contributed to an increased interest in sustainability and the role that major financial institutions play in supporting sustainable projects. Environmental awareness and sustainability have become a more integral part of a bank's brand image. Also new offerings from challenger banks and alternative providers have increased the availability of banking services to a greater number of marginalised people, especially in developing countries, thus having a positive effect upon entrepreneurship and small business owners. In terms of energy usage and environmental impact, there is a varied cost and benefit posed by new FinTech offerings. It is now well understood that completely decentralised networks which involve a cryptographic proof of work lead to significant energy consumption; however where a network involves a central counterparty energy usage is significantly less and there is a dual benefit in the creation of a trust that the central party will uphold the rules of the system rather than the system itself being well designed to prevent market abuse. What emerges is an increasing reality that consumer banking customers are increasingly reacting to the low-interest rate environment and negative real interest rates by making choices based upon non-monetary factors, focusing upon perceived usefulness, as well as perceptions of brand trust (Ngoc Phan and Ghantous, 2013), brand image and corporate social responsibility related factors (Alsheikh and Bojei, 2012).

This chapter will explore the role of the 2007 financial crisis played in creating an opportunity for FinTech to enter the retail banking markets and create both new institutions and new asset types. The chapter then turns to outline the green finance cap, explores the scope for FinTech to close the green

finance gap and also contributes to wider social issues and objectives such as financial inclusion in developing countries.

FinTech Before and After 2007

FinTech (short for Financial Technology) is the idea that technology can be applied to finance and has the potential to disrupt existing services, institutions and behaviours. Examples of FinTech go rather far back in time, such as the first Automated Teller Machine in 1967, however recent examples centre around the use of Machine Learning and Artificial Intelligence to process data and computing power which facilitates digital services and institutions with high levels of automation. Around and following the 2007 financial crisis one of the key FinTech developments that consumers were experiencing was the rollout of mobile phone and app-based banking which split the relationship between the consumer and the physical high street branch.

Data obtained from Bloomberg, covering some major US banks show a strong increase in the use of mobile banking services provided by established banks, as shown in Figure 1. This suggests an increasing trust and tolerance for mobile banking services.

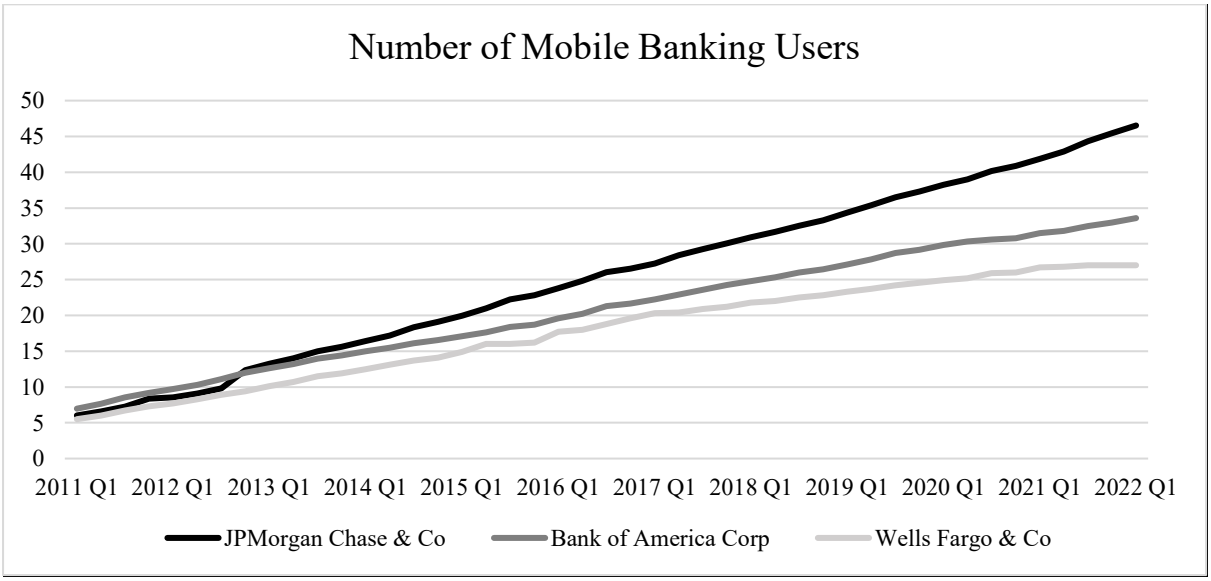


Figure 1 – Number of mobile banking users within three major US banks.
Data from Bloomberg LP (2022)

This trend does indeed represent an opportunity for the challenger banks and their digital-only structure as consumers accept the technology, although they may also attach significant weight to the bank's name, brand and history.

Large international banks now face the challenge of digital transformation. It is necessary to innovate to retain market share and retain capitalization in a marketplace where FinTechs now operate in direct competition with established banks. This competition must be done up based on ease to the consumer and minimization of cost to the bank. There is an asymmetry in this, as the technostructure of a large banking group is rather different from the technostructure of a newer fintech firm simply due to historical reasons and older working practices. Technostructure refers to the internal structure of a firm and particularly encompasses the corporate decision-making structure and the use of human expertise in decision-making, technical development and planning (Galbraith, 1985).

The Challenger Banks which have a presence in many countries, including the USA and UK, are largely seen as a product of the 2007 financial crisis, or what Arner *et al.,* (2015) terms as FinTech 3.0. The 2007 crisis placed the integrity of established institutions, particularly those in retail banking, under question in the court of public opinion (*ibid*). Further, the low-interest rate environment that prevailed at this time led to a retail banking market which was driven by competition on service rather than monetary benefit or interest paid on deposits. Evidence of these banks succeeding in the UK market is that Starling Bank has been voted Britain's best bank three times and in 2022 Monzo won the British Banking awards (British Bank Awards – Previous Winners, 2022).

These examples centre around developments within existing financial institutions. FinTech has other facets, such as digital payment technologies which provide consumer financial services within new institutions. A notable example is M-Pesa, which is a mobile phone-based payment system primarily operating in East Africa. This is a subsidiary of Vodafone and uses their existing 2G cellular network to provide a service which works via established technology available to users of dumbphones[1]. A United Nations report highlights that in Kenya mobile payment providers such as M-Pesa are responsible for lifting 2% of households out of poverty and decreasing reliance upon subsistence farming by creating opportunities for householders to work in higher-yield occupations, this has been especially effective in allowing women the opportunity to run their own business (United Nations, 2018).

Another interesting development are platforms which partner with existing banks to integrate services. For example, Gusto is a US-based HR platform which allows employers to manage records payroll and compliance. They have developed, in partnership with NBKC bank, a

[1] A basic mobile phone which is not capable of running apps. A Nokia 3310 is an example.

system whereby employees may have bank accounts embedded into the HR platform. This results in employees being paid on average two days faster. This account also allows for direct debits to be set up and is compatible with the US tax credits system. The account pays 0.54% APR (at the time of writing) and provides a mobile app plus a debit card (Gusto spending account and debit card, 2022).

This partnership does not appear to be a one-off. In 2019 JP Morgan invested $25Million into FinTech start-ups which it deemed to have high potential to provide services within its banking group. In June 2022 Citigroup announced plans to recruit 4,000 additional staff in technical roles to aid in moving commercial clients online following the shift created by the Covid-19 pandemic (Shaw and Gani, 2022).

Alternates to established payment card providers (Visa, MasterCard etc) may be especially effective in the United States (US). This is because US anti-trust law allows for transaction fees to pass through to the end consumer in a transaction, especially given enforcement of competition law is 'lax' according to Caves and Singer (2020) and merchant fees are much higher in the USA compared to the UK and EU.

In the UK there is a development in terms of making new services easier to adopt. The Open Banking project has created data-sharing standards between banks and approved institutions which allows for easier switching of accounts and sharing of information between integrated providers to aid user experience. This is not entirely limited to the existing banks, rather the gatekeeping mechanism is in compliance with data protection standards.

The lending space is now especially challenged as traditional credit cards now compete with Buy Now Pay Later providers. Klarna is the largest of these with 147 million global users spread across 400,000 retail partners (Jenkins, 2022). These platforms, extend a line of interest-free credit for consumer goods such as mobile phones, furniture or even clothing. The business model is interest-free to the consumer, but charges around 4% commission to the retailer, with the provider bearing the risk of the consumer's default. Open Banking allows credit activity via some platforms to count toward an individual's credit score and allows the provider to see an individual's default history within other Open Banking institutions.

Another application of open banking has been the use of consumer-to-business bank transfers which are embedded within an application. The use of Open Banking allows the retailer's app to automatically take the consumer to their own bank's app for payment verification and then return to the retailer's app automatically and seamlessly. Further benefits attributed to this

approach is the speed of payment, reduction of steps (for instance typing out card numbers) as well as reduced bank fees in cases. UK second-hand car dealing platform Cazoo makes use of this approach as it is less likely to lead to a blocked transaction (given the relatively large value) when compared to a debit transaction; it seems here the aim is to smooth the customer experience.

FinTech is a double-edged sword for the established banking sector (Thakor, 2020). Fantastic scope exists concerning chatbots, apps and fraud prevention. On the other hand, some elements of FinTech are now competition. Going forward there will be three types of banks assuming that all banks engage in some form of digital transformation. Firstly, incumbent banks will adopt some additional technology, as they have done in the past to become a 'better bank'. However, pressure to innovate by bringing the right offering at the right time may now be higher due to an increasing number of other institutions in the retail banking marketplace. New banks, often also referred to as challenger banks or neo-banks, often attempt to compete with established banks however lack scale and, in some respects, lack cost efficiencies. Whilst new banks are structurally lean and facilitate cost-based competition for services such as ForEx, they also lack a relatively large customer base which raises questions around the long-term ability to compete with the established banks by remaining capitalised. Given the nuances around new banks, it is increasingly the case that new incumbents are less and less a smaller carbon copy of the existing banks. Thirdly, distributed banks possibly have a place in the future of international banking, however, it must be immediately noted that they are challenging from a risk management and internal governance perspective. A distributed bank uses a combination of platform services provided by different companies which integrate into one platform which faces the end user. The challenge in terms of regulation is to ensure an integrated risk culture and to ensure that regulators can effectively control risk arising from the structure.

It's also very necessary to consider the intermediation between consumers and financial providers. Historically this has been a direct relationship which may have simply been based upon which banks operate on a particular High Street or which banks parents and family members happened to use. the Internet has become an intermediary between consumers and financial service providers and caught up in the internet's ability to prescribe is the reputation image and various trust factors which relates to a financial service provider whether they be an established bank or otherwise. The new incumbent is likely to obtain clientele through a prescription-style approach largely through the *Internet of Things* as a reactive strategy

conventional banks must also seek to promote themselves in ways that they may not have done so before.

Challenger banks and new lenders have come under criticism at times for their use of technology, particularly artificial intelligence. One of the most widely discussed cases of this was Apple Card, which is a partnership between Apple and Goldman Sachs. In 2019 it emerged that there were inconsistencies in the AI technology used to set credit limits as women tended, ceteris paribus, to receive significantly lower credit limits than men with the same credit score. This was even noted by Steve Wozniak, co-founder of Apple, who despite sharing all other bank accounts with his wife, received 10 times higher credit limit than her. Even though the AI was not intentionally created with a systematic bias, it was deemed illegal in the US state of New York where parent Goldman Sachs is based as gender discrimination is against the law, even when not directly intended. Interestingly, the United States Equal Credit Opportunity Act prevents Apple Card from collecting gender information at all, as this is the case for all non-mortgage lending in the USA. Kelley *et al.*, (2022) show that machine learning models can be as equally effective when compared to Artificially intelligent systems, whilst at the same time possessing less scope for gender bias. By forcing a model to omit gender, there is shown to be a risk, where machine learning training data has an abundance of med in the approved group, that the resulting system will allocate more women to the decline group or set a lower credit limit. Had Apple been able to control better for gender variations in their AI by resolving an omitted variable bias issue, even if gender was not used as an explanatory factor, this issue may not have occurred. Certainly, as a partial self-regulation organisation, Apple could have detected the gender bias problem at an earlier stage. The findings of Kelley *et al.*, (2022) contrast the US legal position in a very interesting way and illustrate the difficulties in ensuring regulation is fit for FinTech as well as established institutions which both need to deliver the best and fair outcomes for consumers.

In the longer term, the presence of challenger banks and alternate providers may improve competition in the retail sector. However, the relationship between the number of providers and competitiveness is not generally believed to be direct and purely causal; rather contestability within the structure of existing banks determines the degree of competitiveness (Claessens and Laeven, 2004). However, the presence of very low real interest rates compared to previous decades, as shown in figure 2 below, suggests that saving as a means of intertemporal optimisation and a straightforward search for yield may no longer be the direct aim of users of banking providers.

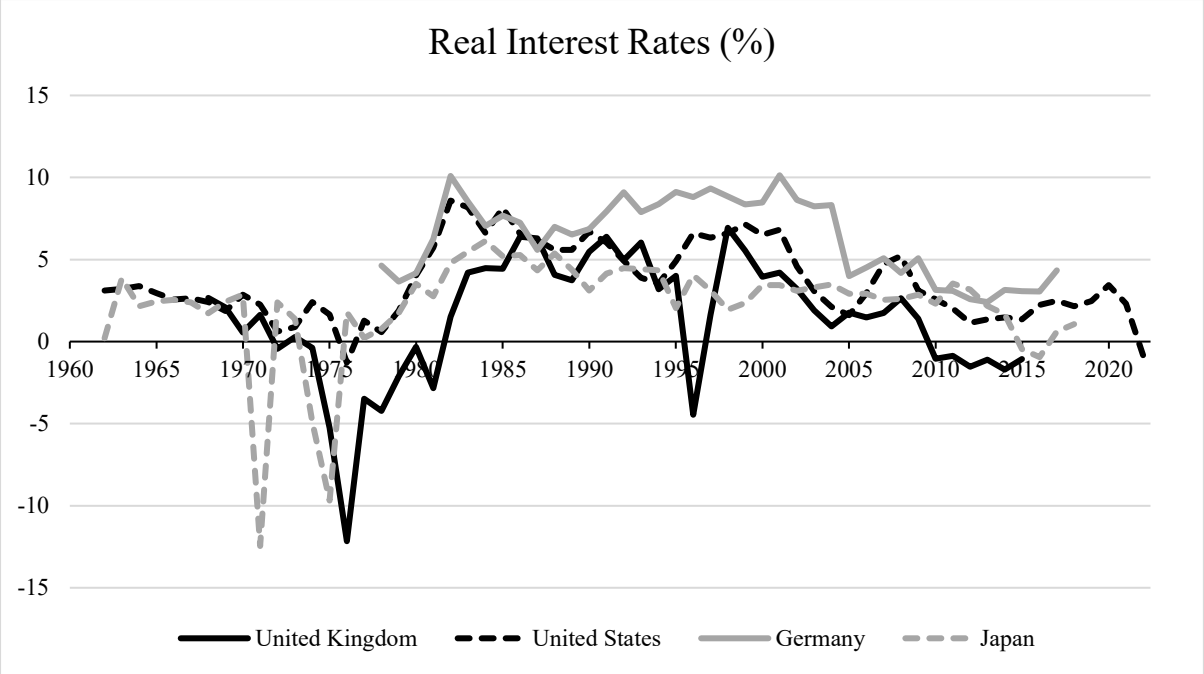


Figure 2 – Real Interest rates over time in a selection of developed economies
Data from Bloomberg LP (2022)

Real interest rates are the combination of nominal interest and inflation. Data presented in figure two is actual inflation. Here saving is beneficial only where the real rate is positive and can be achieved by individuals.

The combination of uncertainty that competitiveness is increasing and the diminishing yield for investors means the long-term effects of deposit-taking activity is uncertain. However, interest rates can lead to questions about the persistence of liquidity in a tail or extreme scenarios where the already historically weak trend productivity growth may decline further (Rogoff, 2020).

Rethinking Money and Institutions

Owing to the drop-off in real interest rates those holding money for a speculative motive were incentivised to widen their horizon and consider other assets with higher returns, similar liquidity and but perhaps with higher associated risk. The post-2007 period has seen a noticeable interest in cryptocurrencies, crypto assets, and decentralised finance. The key here is that there is an increasing focus upon the failures of established banks and the loss of trust has led to an increased interest in finding ways to achieve the same ends without the means of institutions (Taskinsoy, 2019).

Attempts are often characterised by volatility which likely stems from the lack of a fundamental basis for the price of a cryptocurrency such as Bitcoin or Ethereum.

A cryptocurrency is a digital currency that uses cryptography for security and operates independently of a central bank. Unlike state-backed fiat money, which is government-issued and backed by a physical commodity such as gold or silver, cryptocurrencies are decentralized and rely on a distributed ledger technology known as a blockchain. The most well-known cryptocurrency is Bitcoin, which was created in 2009. These assets challenge traditional financial payment systems and have allowed for more anonymity and decentralization.

The equity indexes appear far more price stable partly because they are indexes and also because equities are derived from the underlying profitability of a firm, which gives a fundamental value to the asset as a claim upon the future profit of a firm. Figure 3 below illustrates this.

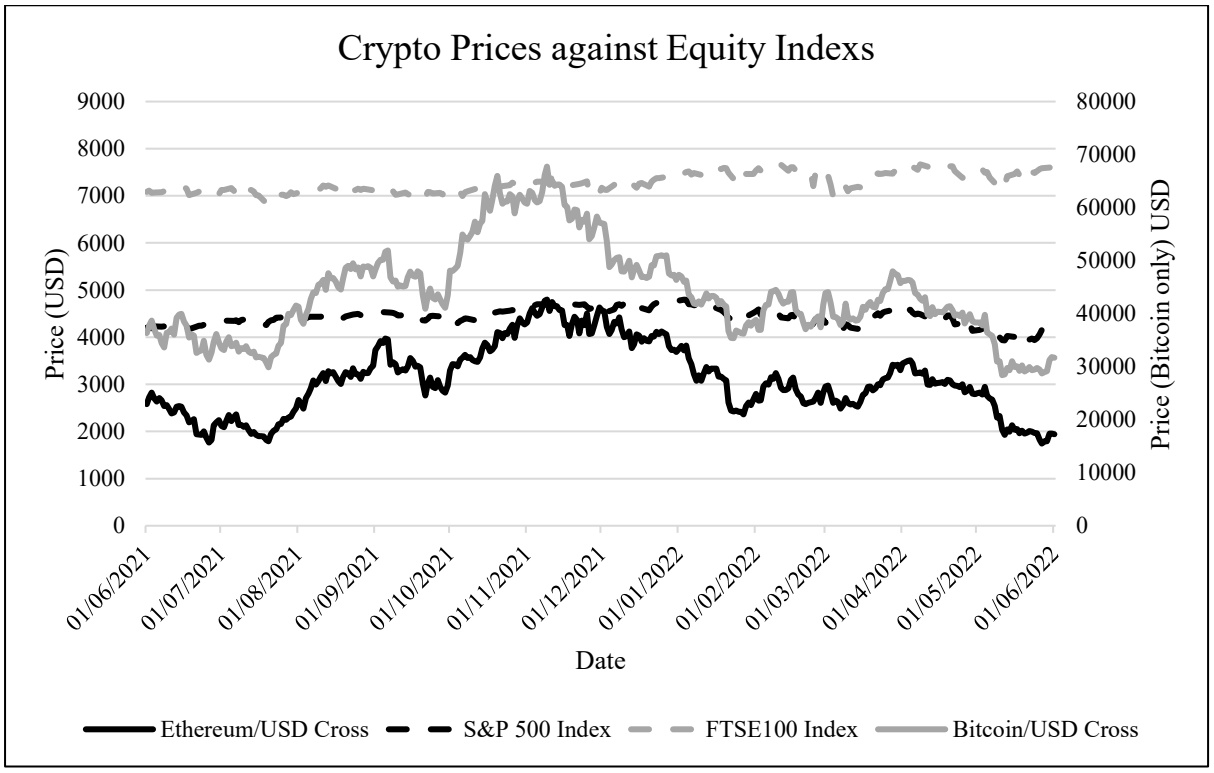


Figure 3 – Plot of Equity index prices and major crypto-asset prices to illustrate the relative stability and variability between them.

Data from Bloomberg LP (2022)

Bitcoin is likely the most well-known example, however, it is far from the only crypto asset available. These at the time of writing are unregulated and are known to be price volatile in some cases. There are approximately 8800 crypto assets in existence, and this varies as new assets are created and some projects fail.

The first successful crypto asset and the first successful currency which is not issued by a bank or a state is Bitcoin. First created in 2009 based upon principles set out in a paper written by anonymous authors with the pseudonym Satoshi Nakamoto (Nakamoto, 2008). The rate at which new Bitcoins can be mined (or created) is intended to slow over time, halving approximately every four years, meaning the last coin will be produced in 2048. This will result in an eventually fixed supply of Bitcoin at 21 million coins. The Bitcoin system operates on a set of rules, and coin wallets that violate these rules are expelled from the network. However, falsifying entries in the distributed ledger (blockchain) requires significant effort and is believed to be economically counterproductive. It is not readily possible for coins to be spent twice or for coins to be created out of thin air. To mine a coin a complex calculation must be performed, and each miner is limited in the number of attempts and guesses they may make in a day. Therefore, miners face a strong incentive to maximise the computational power at their disposal, subject to cost limitations around technology and energy. Also, the vast energy use involved in the mining process raises environmental concerns. Energy prices are a key consideration to the business of a Bitcoin miner and have a great deal to do in terms of determining the location of a miner. de Vries (2018) makes a study of the energy consumed by the Bitcoin network as a whole and estimates that 2.55 Gigawatts of power as of 2018 was used per day and estimated that this may rise as high as 7.67 Gigawatts in the foreseeable future. In 2022, the Cambridge Bitcoin Electricity Consumption Index (2022) estimated the use of 11.99 Gigawatts per day, which is considerably higher than de Vries (2018) estimated. For reference, 11.99 Gigawatts per day is equivalent to the entire electricity consumption of Argentina, a country of 45.4 million, per day. Such energy usage is significant, and for this reason, Chinese regulators have banned many crypto-mining activities, whichs caused many miners to promptly move to neighbouring Kazakhstan. This shocked the power grid and caused energy prices to rise rapidly, this sparked protests and raised calls for government intervention (Spanò *et al.*, 2022).

There are other cryptocurrencies which operate in a similar way, just a few examples to illustrate this include Litecoin and Bitcoin Cash. Litecoin operates in a similar way to Bitcoin, using the same algorithm, however the coin mining rules are different as the mining limit is

higher. Bitcoin Cash, on the other hand allows greater amounts of information to be recorded in the blocks on the blockchain, using different rules. There are also a range of synthetic tokens which are pegged, with fixed redemption rates, to existing state backed fiat currencies, a good example of this is Gemini Dollars. Free-floating coins are known to be rather price volatile, however, there has also been interest in establishing coins which are more effective as a dependable store of value and means of payment. Also, large institutions have shown interest in managing tokens, most notably Facebook's Libra proposal (Taskinsoy, 2019). This would not be decentralised, so would be different to Bitcoin, rather the blockchain would be centralised and monitored by a central authority called the Libra Association. This reflects a possibility to create a system of credit money which not only disrupts the model of state-backed fiat currencies and traditional banks, but also would be capable of disrupting existing cryptocurrency models (Taskinsoy, 2019).

Another interesting crypto-asset is Nano, this claims to be price stable, greener than many alternates as well as a strong alternative to many established money transfer services by having a 24-hour service and a limit to transaction amounts. So-called price stability appears to be a product of stable demand rather than design, ergo this may not always hold. Like Libra, there is a central body controlling Nano, which provided liquidity[2] thus preventing the need for mining/proof of work. Only in cases where transitions are conflicting, nodes will need to vote to establish a consensus for which transaction is valid (Nakamoto, 2008).

It's key to consider the potential exists within the technology which underlies crypto assets rather than just the concept of a decentralised currency. The Blockchain algorithm and the distributed ledger technology concepts provide an alternative to established verification mechanisms, which rely upon a third party, such as clearing houses or centralised counterparties. In certain applications, it is also possible to make the ledger available for scrutiny by independent parties, this offers strong scope for transparency as stakeholders with enough motivation and computing power can log and observe the transactions of an asset. The general premise is that two entities may exchange, so long as there is a non-reversible cryptographic proof of exchange. This cryptographic proof is timestamped so ensure chronology of ownership is accurate. In applications such as decentralised currency, the

[2] No more Nano will be created according to the Nano Foundation. When established new tokens were given away rather than mined.

sequential cryptographic proofs are recorded by multiple parties, such that if one party is dishonest, the consensus will be correct (Nakamoto, 2008).

Given the scope for the Blockchain technology to produce transparency and accountability, decentralise organisations and in cases reduce to cost of business, its likely that established companies in the retail and commercial banking sectors would show interest in the technology.

Applications of a Blockchain algorithm can aid in speeding up processes in established banks whilst simultaneously reducing the scope for fraud and increasing traceability in transaction processes. In essence the algorithm is an ever-increasing list of records which are cryptographically locked in the correct order. Each records has a time stamp and a link to the previous record in the sequence. As a Blockchain ledger is widely distributed or curated by a trusted party, or both, it is hard for any individual to alter the record or transform it. Ergo, there system is ideally suited to scenarios where this is not absolute trust between parties (Guo and Liang, 2016). It is generally believed that applying a Blockchain based record keeping system can speed up processes for consumers of financial services as well as reduce to cost of operations for banks (Garg *et al.*, 2021).

As the technology is able to embody an internet of things and sit within a wider part of the adoption of automation, machine learning and artificial intelligence there is a possibility that the adoption of Blockchain technology can change business models in banking (OECD, 2018). The OECD places expectation that Blockchain will be an enabler along with new sources of financing in tandem with the existing banking systems in lowering the cost of infrastructure projects. Further, the transparency of the Blockchain allows for institutions to supply capital in tandem with one another in order to allow for funding of large infrastructure projects in the private or public sectors. This tandem approach might be able to support regional banking providers to engage in their local area whilst assisting in spreading of risk across institutions in the international baking network. At present, the OCED contend that this approach needs regulatory support, and legal frameworks need to address challenges with data networks in many regulatory jurisdictions (OCED, 2018).

Osmani *et al.*, (2021) support the idea that use of blockchain technology reduces costs within existing banking groups, although they acknowledge little is written on exact costings. As economies become increasingly virtual, that is online focused, an early strategic shift into alternative technology allows for a bank to gain competitive advantage. In the case of the Swiss financial sector, Atca Gorgun and Wolfs, (2021) highlight the need for many approaches to the

use of algorithms, rather than just focusing upon blockchains, as many existing banks as well as new banks can benefit from leveraging their use of large data sets rather than simply adopting a blockchain process.

Many countries have explored the development of Blockchain applications and the scope for decentralised organisations that they offer. The UK, US, Japan, China, India and South Africa have all commissioned research into the technology and its applications for currency and other applications. Large banking firms too are known to have courted the technology, Goldman Sachs, JP Morgan, Deutsche Bank, Barclays and UBS are known to be actively considering applications; Goldman Sachs is known to have already made patent applications for a Blockchain-based settlement technology (Guo and Liang, 2016).

Both NASDAQ and NYSE have given serious consideration to amending their clearing practices, this resulted in NASDAQ creating a transaction platform named 'Linq', which is Blockchain based and began limited operation in December 2015. Linq enabled private securities transactions however this has not yet replaced the traditional clearing mechanism used by most exchange members comprising of central counterparties which require three days to complete the settlement. On the London Stock Exchange, the practice is the same; orders pass through a clearing counterparty, such as LCH Clearnet, EMCF or EuroCCP, and the settlement may take up to three days post-trade to be completed. Using a Blockchain approach this could be much faster, and fees significantly reduced.

In a similar way interbank payments between banks often takes place via a counterparty and can take up to three working days, in cross-border cases, to process due to various bookkeeping procedures needed to undertake the transaction (Guo and Liang, 2016). Given the ability of the Blockchain approach to facilitate accountability and transparency between parties which may not necessarily trust one another, it is conceivable that inter banks transactions could become point-to-point transactions, without a third counterparty. Again, this has both a cost and a time advantage.

Green Banking and Finance

Green investment is the financing of low-carbon projects and activities which support ambitions to slow/reverse climate change. This is a form of ethical screening of investments that can also be undertaken on social criteria; there is also a tendency to focus on loosening requirements, thus considering longer-term gains rather than shorter-term returns; as environmentally friendly projects may have longer payoff horizons compared to carbon-

intensive alternates (Wilson, 1997). Many countries, at the state level, do not have agreements on environmental protection and national regulations on green finance. Despite this, many are adoptees of the Paris Climate Accord which means that they do have set targets and definitions of what activity is green or detrimental (Akomea-Frimpong *et al.*, 2022). Whilst some banks do internalise the green element in their decision-making, this is not universal or required, many investment banks still sponsor fossil fuels in countries such as the United States and Australia (Akomea-Frimpong *et al.*, 2022).

One of the key challenges facing the banking sector in transitioning to green finance is the "green investment gap," which refers to the lack of financing available for low-carbon activities. To address this challenge, regulatory policies can be designed to push banks to lend more to green investments and ease the green investment gap (Raberto *et al.*, 2019). State-level banking regulatory frameworks could require banks that lend to firms undertaking green investments to respect looser requirements. This would certainly be effective to facilitate larger-scale projects. However, in terms of smaller projects and investments, new entrants (FinTech) into the lending space may also be able to close the gap through micro-enterprise financing which targets smaller companies and even individuals. In either case, access to up to date production technology is thought to reduce energy consumption, so investment via either channel has a positive effect (Raberto *et al.*, 2019).

According to (Chen and He, 2018) China is rather advanced in green finance initiatives, such as, green bonds, green credit, green operations, and carbon finance. This has happened because regulators have supported the development of these asset classes and have internalised the goal of promoting environmental protection initiatives. In the UK, the government estimates that £50-60 billion of capital investment, per annum, will be needed to support the current carbon net-zero ambitions (Department for Energy Security and Net Zero, 2023, pg73). Whilst most of this will come from private-sector investment, government funding is expected to fund larger infrastructure projects, which otherwise would sit in a green finance gap which would not be filled by existing banks nor FinTech platforms. Whilst FinTech has a modest role in greening it plays a larger part in helping the financial sector to meet wider sustainability and inclusion goals.

FinTech and Environmental & Social Governance

FinTech plays a key role in the future of developing economies as it offers potential toward financial inclusion and progress toward sustainable development. The Sustainable Development Goals and Targets set out a vision of what sustainable development might look like. The 17 goals set out in the 2030 agenda for sustainable development, include provisions around; poverty, equality, infrastructure, economic activity, climate change and sustainability (United Nations, 2015). Whilst financial inclusion is not a sustainable development goal, it can be related to, and a vector of, many of the goals. Therefore, whilst financial inclusion alone will not be a silver bullet in terms of development, it may be part of a wider range of happenings which lead to progress. Arner *et al,.* (2020) argues that access to finance and financial services, in general, indirectly reduces poverty. There is major potential in this as of 2014, in developing countries, on average only 33% of the population is financially literate.

Widening access to financial services may also have a more direct effect in closing inequality, especially gender inequality, by allowing women to take more control of their own financial affairs as well as making female entrepreneurship possible to a greater extent. This also reflects the goal for 'Decent work and economic growth as access to finance can spur small businesses and fund innovation as well as finance growth projects in existing businesses.

Examples of financial inclusion advancing the sustainable development goals include financial innovation bringing competition into the oligopolistic banking sector in Bangladesh, as a result, financial markets became more open to poorer adults and women. Here mobile payment has been the crux of the innovation. One of the largest platforms in Bangladesh is SureCash which is an app-based mobile payments platform which operates in partnership with existing banks allowing for deposit and savings accounts to be linked to the payment platform.

Another interesting example is the widening of financial inclusion in Argentina was used as a tool to increase tax revenue which in turn could be used by the government to fund public services and infrastructure. The wider use of the formal banking system reduced the dependence on cash and drew a greater number of people into the formal economy and to declare income which previously was invisible to tax authorities as cash (Ozili, 2021).

Banking institutions can display alignment with the UN Sustainable Development Goals by signing up to the UN Principles for Responsible Banking (*Creating the future of banking*, 2019). These are:

I. Alignment of strategy and activity to the Sustainable Development Goals and Paris Climate Agreement

II. Measurement of positive impact and negative impact arising from business activities with a focus on maximising the former and minimising the latter
III. Working with clients and customers to encourage sustainable economic practices
IV. Engaging with external stakeholders to ensure that the banks' activities work toward rather than against the Sustainable Development Goals and Paris Climate Agreement and society in more general terms
V. Demonstrate commitment to the above principles by adopting effective internal governance and a culture of responsibility and ethical behaviour
VI. Implement the above in a transparent way and periodically review compliance and progress

Adoption of the principles is far from universal however it is possible that many banks will embed some elements of the framework into their activities without becoming signatories to the Principles for Responsible Banking. Indeed, there is a strong incentive to do so as evidence suggests that profitability can be increased by adopting sustainable and ethical practices, however, little appears to be written with direct application to the banking sector (Forcadell, Aracil and Úbeda, 2019).

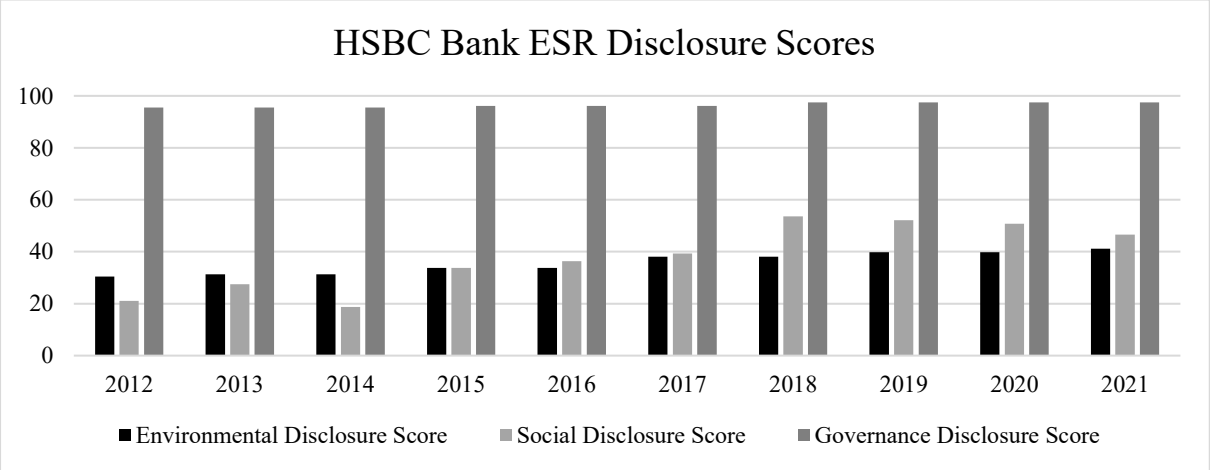
According to Forcadell, Aracil and Úbeda, (2019), banking service innovation is closely aligned with increasing corporate sustainability in the banking sector. This is especially the case as sustainability is becoming a mainstream public concern and established banks are seeking to re-establish positions of trust in society following the 2008 financial crisis. Further, as banks seek to differentiate themselves from one another, especially in reaction to the emergence of the Challenger Banks, there is a clear incentive to gain a first-movers advantage in efforts to retain existing customers and attract new ones. This is likely to be a constant pressure in the retail banking sector, as innovations are easily replicated by competitors.

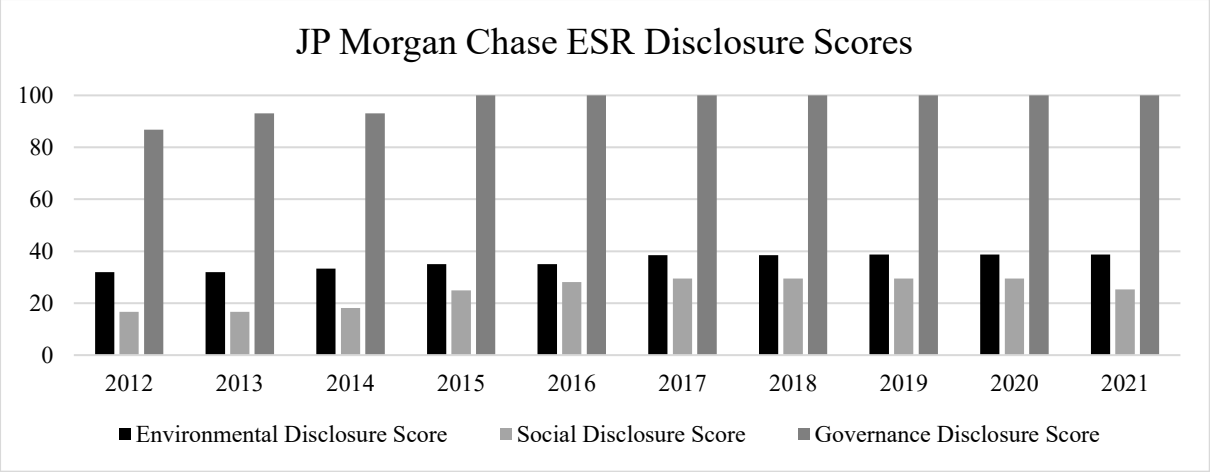
The principal reason behind the relationship between profits and sustainable and ethical practices is the reputation and image of the bank and how customers interpret this (Olmo,. *et al,* 2021). A better reputation, especially following the financial crisis, serves as a means of brand diversification and a means to generate brand loyalty and retain customers and capitalisation. Banks which are sustainable in their practices may opt not to levy higher prices onto customers, even if they manage to increase market share as a result of improved brand image. As a result, it can be inferred that the traditional approach of market power to gain

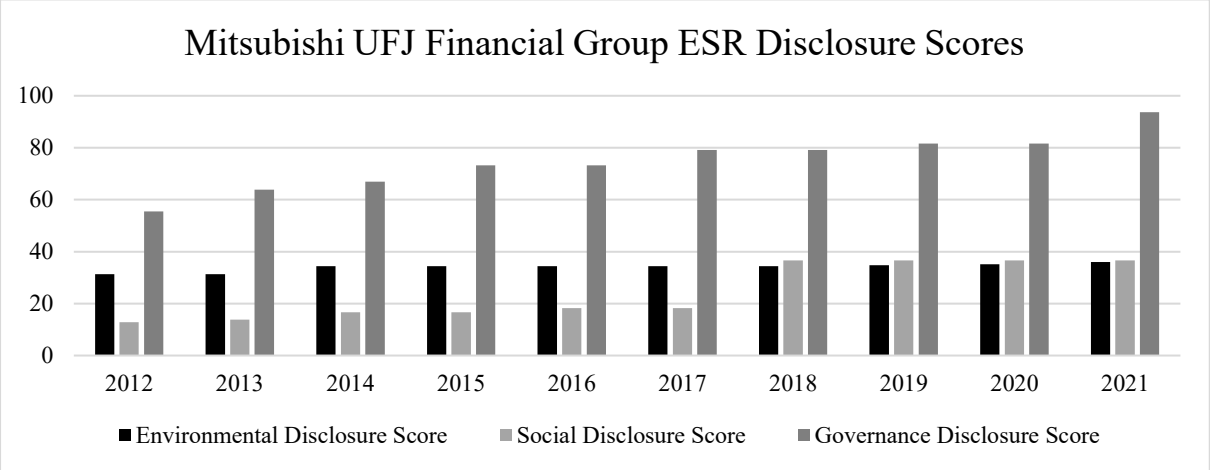
profitability no longer holds so well in a marketplace characterised by increased awareness of ESG issues and a greater amount of competition between providers which takes place on non-monetary terms.

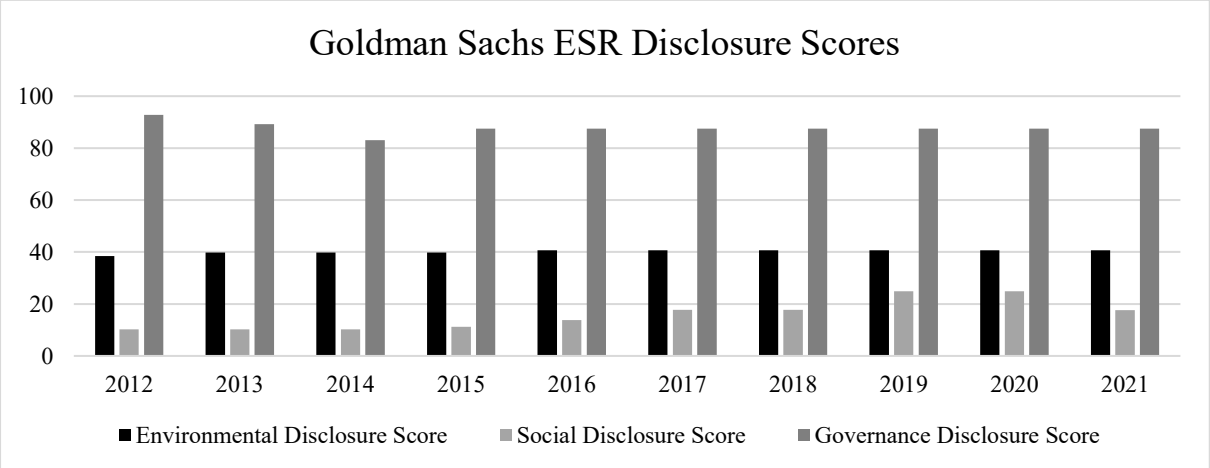
Olmo *et al,* (2021) also argue that sustainable banking practices lead to a reduction in bank risk; this is because transparency lowers reputational risk and is more likely to adhere to compliance standards more thoroughly and openly (avoiding moral hazard type issues). This must be balanced by the assumption that claims of sustainability need to be legitimate, the UK's Financial Conduct Authority, as of 2022 is proposing new rules and standards to ensure banks can not 'greenwash' themselves in their marketing materials (FCA, 2022). This logic would likely apply to registered banks as well as alternate FinTech providers in the retail sector. Decentralised crypto assets will very likely not obey this behaviour, as mentioned earlier in the chapter, the mining process for these currencies is very energy intensive.

The availability of ESG scoring data suggests greater monitoring and comparison in the future for all major firms in the finance sector; whether they are established banks or new incumbents. Research based upon existing data has indicated the strong intersectionality between digital transformation and general sustainability (Forcadell, Aracil and Úbeda, 2019).









Figures 4-7 - Bloomberg ESG Index Data for a selection of large banking groups

In terms of retail products in the FinTech space, there are two avenues by which the ESG agenda can be furthered. The first is through increased competition between providers accompanied by increasing transparency. Data obtained from Bloomberg illustrates the general improvement in the ESG performance of large established banks, however, comparable index

type data is not yet available for emerging and smaller providers at the time of writing, although this will likely be available in the future and also more readily available to consumers. This will involve changes to the way in which banks operate and manage their internal governance as well as increasing the focus on what constitutes an ethical investment and to whom investment banks should loan money or provide payment services to.

The second way in which ESG will advance is hinted at in the first. Increased transparency and monitoring will make transparency a key element of the financial sector and place greater emphasis upon the consumer decision-making process and competition by non-financial terms.

Conclusion

The context of financial markets has significantly changed over the previous 20 years as crisis has led to the loss of trust and a changing pattern in returns and yields. Existing banking groups have turned their focus to adapting to sustainable business practices and more importantly being seen to be sustainable and ethical. Increasing incumbents in the banking sector may well lead to increased competition in the retail banking sector and apply pressure on established banking groups to adopt lower-cost and higher-speed business practices and cut out intermediaries such as clearing counterparties. This means the existing financial system built upon the presence of large international banking groups will likely adapt to the presence of non-bank competition largely by adopting the same technology within their own institutions which combines efficient technology with an organisation that is clearly accountable and may be able to endear trust; subject to good behaviours.

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