

## Fintech: Good and Bad News for Sustainable Finance

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Today, we need to explore deeper societal issues surrounding the rapid deployment of computerized electronic platforms, cryptocurrencies and algorithms now disrupting legacy financial firms and their models. Such electronic platforms and technologies have been disrupting many sectors of industrial societies since the 1960s' automation of manufacturing and more recently of publishing, retail, travel, legal and medical services. One of the first financial disruptors was WitCapital, founded by Andrew Klein, described in his book *WallStreet.com* (1998), which participated in 127 offerings, raised \$9 billion and at its peak in 1999 was worth \$2 billion. WitCapital was bought by Sound View Technology Group in 2000, and Klein now helps non-profits in his Amsterdam home. Recent applications now disrupting traditional finance are systemic and global, see for example the FINTECH 100 and the rush to use Blockchain-based ledgers both to protect incumbents' markets and to disrupt them. All this is described in depth, as well as with broad global analyses in *Blockchain Revolution* by Don and Alex Tapscott (2016), the most comprehensive overview so far of blockchain's promise, future and policy implications. The core issue in finance is trust, on which all markets rely, and these distributed ledgers offer many new ways of verifying transactions, ownership, legal rights, identity and reputations so as to restore trust in many systems. The new topologies and networks reshaping earlier human trust relationships with protocols, principles, standards and gated sites are described by Joshua Cooper Ramo in *The Seventh Sense* (2016). Research by Venture Scanner tracked 1,379 fintech companies in March 2016 with combined funding of \$33 billion. The Chamber of Digital Commerce, founded by Perianne Boring is leading in convening fintech companies and how standards and applications to regulations and government functions are evolving ([www.digitalchamber.org](http://www.digitalchamber.org)).

While FINTECH offers so many opportunities for reforming and democratizing finance, the race is on to compete with, own and control these disruptive firms and capture their profits. For example, giant Citigroup's Citi FinTech has 40 employees in its Queens, New York "skunk works" devising ways to use digital technologies to reinvent every facet of its traditional financial services (Fortune, July 1, 2016). Digital Asset Holdings, led by financier Blythe Masters with many big legacy companies as investors is spearheading applications of distributed ledger systems to private and public sector clients, including the Australian stock exchange ASX. Prior to Britain's "Brexit" vote to leave the European Union, London's financial sector had been the acknowledged center of FINTECH. Whether these startups continue their relationships with London's now shrinking bank presence or whether those in Europe, the USA, Canada and in other countries will expand remains to be seen. Big legacy finance is alert to its already shrinking markets as evidenced by their sponsorship of The Economist's conference: "Finance Disrupted: Collaborate or Die?" October 13, 2016 in New York. As with many earlier digitization makeovers of incumbent companies and organizations, we may see many more sub-optimal applications, often seen as "paving old cow paths". In *The End of Banking* (2014), using the pseudonym Jonathan McMillan, an investment banker and a macroeconomist sum up many of the issues: "The rise of information technology has undermined all efforts to regain control over

banking. At the same time, information technology enables a better organization of the financial system.” ([www.endofbanking.org](http://www.endofbanking.org))

Steering FINTECH firms toward globally inclusive, sustainable development goals as in the UN’s Sustainable Development Goals (SDGs) must now be built into today’s financial industry, still based on competition, profit, hoarding information and making money out of money. Since 195 UN member countries adopted the SDGs in 2015, this called into question the conventional paradigm of GDP-measured economic growth and its financial models. Six major global advertising agencies have pledged to support those 17 goals of the SDGs. The UN Principles of Responsible Investing, representing institutional investors with \$59 trillion of assets under management are considering adding a Principle supporting the implementation of the SDGs. Ethical standards will now be key in optimal systemic design, including the internet values of cooperation and info-sharing. New ways to measure social and environmental impacts, performance metrics and accounting are covered in Financial Management May 2016. Monitoring still fragile financial markets and prudential architecture at global and national levels remains a key unfinished task. How can FINTECH be designed for sustainability and inclusiveness in an elite, male-dominated industry, especially since the fintech startup disrupters are still dominated by similar players who also favor libertarian views and face challenges by diverse groups demanding access? For example, the FINTECH 100 have less than 10 women in leadership and almost no ethnic minorities. In *Chaos Monkeys: Obscene Fortune and Random Failure in Silicon Valley* (2016), former Goldman Sachs financier Antonio Garcia Martinez found Silicon Valley much like Wall Street: “morality, such as it exists in the tech whorehouse, is an expensive hobby indeed.” (review in *BusinessWeek* July 4, 2016). Don and Alex Tapscott report that women are assuming leadership in blockchain innovation, venture financing and start-ups as well as in organizing around standards and governance issues (p. 287).

Recent advances in artificial intelligence (AI) are summarized in *The Economist*, June 25, 2016, and need close monitoring since algorithms and computerized trading dominate most markets. Information Communications Technologies (ICT) are accelerating these widespread disruptions, as the Internet of Things (IoT) advances with little evaluation of its long-term system-wide societal impacts on employment, security and privacy. The billions of sensors in devices from cars to refrigerators, door locks and medical monitors all increase use of the electronic spectrum, internet, broadband, all common public assets largely developed with taxpayer funds, as described by Mariana Mazzucato in *The Entrepreneurial State* (2013), and also affect physical infrastructure and military assets and strategies. Major ICT companies Google, Facebook, Amazon, LinkedIn are hiring economists to create algorithms on all their big data collected from their users on human behavior. Algorithms now mediating many areas of our lives need to be monitored to check their assumptions since they are designed by fallible humans (“Algorithms Aren’t Just For Coders”, *Businessweek*, June 6, 2016). All these technologies, along with satellites, jet travel accelerate the rates of globalization they undergird. Many AI companies using big data based algorithms now track employees’ emails for behavioral clues alerting companies to watch them for aberrant or criminal intent as reported in “SpyTech That Reads Your Mind”, *BusinessWeek* July 4, 2016).

These winner-take-all networks are both distributed and concentrated. They both democratize (creating new grassroots movements) and centralize control by creating new topologies along with new “network despots” and technological authoritarians. These are often the narrowly owned and managed companies which

have created dozens of additional billionaires along with their founders' fortunes. Yet, the global power they wield is unprecedented, enhanced by their foundations, similar to those who control global financial networks. They include Chinese giants, Alibaba's Jack Ma and Xiaomi's Lei Jun and others. Tim Berners-Lee's vision for a decentralized Internet, as he recently commented, had become the problem of centralization, with the "dominance of one search engine, one big social network" ("Reweaving the web", *The Economist*, June 18, 2016).

Elements of today's network topologies and their owners look a lot like the old power brokers and elites still in charge of 20th century energy, infrastructure and geopolitics. The very best tech firms have begun to address this – they understand the irreparable disadvantage of a monoculture. Similar critiques are made in *Disrupting Asset Management in Institutional Investor*.

The technological choices we make are strikingly political. Big data and electronic voting machines can change elections, manipulate consumers and citizens, shape cultures. Traditional opinion polling, now obsolete due to cellphones, is still tracked by mainstream media, misinforming voters, who are now tracked by big data firms such as Civi Analytics, which increasingly determine elections. Speed and efficiency dominate over longer-term values and goals, also because broader contexts are ignored. Programmers are de facto lawgivers. Space and time are compressed. For example, Google's MAPREDUCE turns local places and real communities into "geographies" and rearranges them with new topologies of connection. The massive proliferation of sensors, hyped as convenience for consumers, has created a backlash as I reported in [The Idiocy of Things Requires an Information Habeas Corpus](#).

**Good News:** This disruption of finance was long overdue and welcome where it overturns inefficient, inequitable, over-priced services, democratizing lending, investment, banking, payments, remittance and widens easy availability of transactions. Widespread adoption of Blockchain-based distributed ledgers offer closer monitoring of financial ethics and performance, with 5000 blockchains on Microsoft servers, \$1.1 billion in deals and \$440 million in venture funding of startups as of March 31, 2016, according to Bloomberg Businessweek ("Focus on the Cloud: Blockchain", May 23, 2016). The market-based reforms offer beneficial change more efficiently and rapidly than regulatory reforms which require public debate, deliberation and political action, however necessary these may be in the longer run for prudential oversight. Barclay's fintech accelerator program mentors startups, and many other incumbent financial firms are either fostering, partnering or acquiring fintech startups which may co-opt these innovations. Regulators, for example in Britain, with their "regulatory sandbox" at the UK Financial Conduct Authority, are facilitating fintech startups, and many new companies are gearing up for opportunities to facilitate regulations: the "RegTechs", key components of fintech. Brexit will change this game, opening new challenges and opportunities. In the USA, crowdfunding is exploding beyond its Kickstarter model to include small investors in renewable energy, real estate and local businesses. Kickstarter, now a Certified B Corporation, continues to lead innovation strategies, now paying dividends to investors (*BusinessWeek*, July 4, 2016). M-Pesa in Kenya led the cellphone banking revolution, spreading to other countries in Africa, bypassing over-priced, unavailable banks. Remittances, globally estimated at much larger than foreign aid flows, can now be sent home by immigrants for much lower fees.

As networks expand from a few users to billions due to their power law effects, new trust-systems are necessary to replace older bonds of kinship, place, language and culture. Blockchain innovators see such distributed ledgers and payments systems as

key in such new trust systems. Meanwhile, gate keepers and gated spaces appear, based on new forms of segmentation. Internet sites, blogs cater to all different opinions and groups: from haters and racists to those who meditate or seek higher levels of consciousness. Match.com spawns into EliteSingles, ChristianMingle and LinkedIn models spawn more selective professional services. Walls no longer work, only gates, i.e., protocols, rules, standards, principles and creating new forms of trust and relationship (without which markets and societies cannot function). Transparency International, UN Principles for Responsible Investment, CDP, RepRisk, the UN Inquiry, IEX, Healthy Markets, Everledger. Ethical Markets and others disrupt conventional financial models with such higher ethical standards. Distributed information, social media and big data make for greater transparency, knowledge in MOOCs and Wikipedia, and also enable WikiLeaks, the Panama Papers and Edward Snowden. Information continues to be the world's currency, as I described in "Information: the World's New Currency Isn't Scarce", now amplified not only by fintech but by 24-7 financial media, social networks and platforms as well as the persistence of traditional insider trading and rumor mongering in financial markets, as described in "The Ugly Truths Behind the Biggest Insider Trading Case in UK History" (BusinessWeek, July 4, 2016).

**Bad News:** The blockchain revolution itself is fraught with age old human conflicts, greed and crime, as well as its voracious consumption of electricity and cooling requirements for its servers. All electronic, information-rich disruption of legacy finance ranges from algorithmic high-frequency trading (HFT) we explored for the UN Inquiry (2015) to the rapid co-option and buyouts of companies in the FINTECH 100 by the big legacy banks; the excessive run-up in pre-IPO valuations, focusing on big wins, short-term profits – evidence of the same existing excesses and unsustainable financial practices needing reform. Even the ingenious market-based reform in IEX, the SEC's newly authorized national stock market, and its platform's technological designed "speed bump" which levels the playing field for investors, also can be subverted to extort fees by unscrupulous firms. Lobbying by legacy financial players in the USA, include efforts to repeal Dodd-Frank reforms ("Dodd-Frank", Businessweek, April 25, 2016). Special interests in EU countries can block new fintech firms and regulatory reforms, such as popular financial transaction taxes opposed by incumbent financial firms.

Vulnerability, internet and spectrum capacity as well as security issues need attention. The focus of fintechs on speed and competition for market-share, taking advantage of "winner take all" network effects, often guided solely by rapid return on investment (ROI) is already leading to bubble-like effects seen in Silicon Valley. The vaunted "creative destruction" driven by "animal spirits" is leading to classic "overshoot" effects: over valuations of pre-IPO companies and those which went public, such as Lending Club. These coincide with large gluts of capital held by big firms and increasing indebtedness in smaller firms ("The Next Debt Crisis", Businessweek, June 6, 2016). Distrust of corruption is overhanging many public markets, causing searches for alternative investments. Increasing share buybacks, private equity and liquidity networks and decline of IPOs as well as the rise of populism are described by Rana Foroohar in *Makers and Takers* (2016). Markets always overshoot due to herd behavior, such as the rush to adopt Blockchain-based distributed ledger applications by incumbent financial firms as mentioned, which may drive out or co-opt the smaller innovators and startups.

We see these effects in the ICT revolution, also becoming a "bubble", another example of how markets regularly overshoot. The Atlantic Council and Zurich Insurance Risk Nexus (2016) measured the overall costs and benefits of ICT and reports

the bad news: ICT costs so far outweigh the benefits – even while costs are added to GDP. For example, an Intel fab for producing today’s chips costs \$8.5 billion, not including \$2 billion of R&D, according to Gartner research. Continual layering of new security devices adds additional costs to producers and consumers as described in *Scientific American*. Markets generally overshoot as expectations drive herd behavior of private investors, and producers go into overdrive. Other social cost signs include job losses, growing ranks of involuntary part-time workers in the “gig” economy, disruption of ever more sectors, from newspapers to local Main Street retailers, manufacturing, robotizing of asset management, legal and medical services, accounting and other white collar jobs. Over 2 million US workers who drive trucks, taxis and other vehicles will need retraining. Vulnerability to automation and jobs which are routine will impact both white collar lawyers and doctors and preserve low wage services jobs of caregivers, cleaners and janitors. All these social effects of information technologies and automation, unless adequately addressed, will be borne by taxpayers.

Kentaro Toyama, author of *Geek Heretic* (2015), co-founded Microsoft Research India, and documents the limitations of ICT as applied to India. He recounts how ICT was over-promoted to increase economic efficiency. Toyama cites Bill Gates dictum “automation applied to an efficient operation will magnify the efficiency. Automation applied to an inefficient operation will magnify the inefficiency.” Toyama redefines “efficiency”, showing how our models and metrics are mis-focused too narrowly. He exposes the failure of many social theories of ICT interventions ignoring deeper understanding of people and cultures. All these issues were debated publicly in the 1970s and 1980s, for example in “East Meets West” on conflicting approaches to science and technology in Islam and the West with futurist Alvin Toffler.

Today’s rush to apply fintech now disrupting finance needs this kind of careful systemic assessment, also advocated by Don and Alex Tapscott in their review of standards and governance by multi-stakeholder networks focusing on global solutions (p. 300). We must understand enough of the technology underlying the networks on which we now depend for our convenience, security, livelihoods and investments. We must also understand that advances in artificial intelligence are now also accelerating, using algorithms ignoring deeper values of humans: compassion, empathy, beyond the current obsession with narrowly defined efficiency and speed. All these new networks, topologies and powerful technologies and their rapid deployment are rarely assessed for their social and environmental impacts, making the rise of cybercrime inevitable. Hackers, sloppy coding, viruses, malware proliferate worldwide. Worms like Stuxnet first demonstrated how coded information could destroy physical equipment. Electrical grids, water treatment plants, infrastructure, financial markets, even the SWIFT system, are all vulnerable.

The US Office of Technology Assessment (OTA), launched in 1974, reported on many of these social costs and environmental impacts of new products, technologies and industrial development. OTA looked at which were “producer push” or “consumer pull”, and who would be the winners and losers. As a member of OTA’s Technology Assessment Advisory Council, I insisted that for every technology we researched, the report would include on its scientific advisory group representatives of segments of society not involved but most likely to be impacted: consumers, low-income and minority groups, workers and watchdog environmentalists. OTA’s approach fundamentally challenged *laissez-faire* economics’ Panglossian assumption: if new products and technologies appeared, consumers must have demanded them. OTA countered that markets today are driven by giant corporations with advertising to create demand, now a global \$570 billion annual industry. OTA was shut down in 1996, and

its reports deep-sixed until Ethical Markets and the University of Florida Press relaunched *An Assessment of Technology for Local Development* (1981, 2016). Other OTA reports most prophetic and relevant to today's technological concerns include its *Electronic Bulls and Bears* (1990), and warnings on climate change, *Preparing for Uncertain Climate* (1993). Early Internet pioneer Alan F. Kay, whose company AutEX introduced computerized block trading of securities in the 1960s, later outlined today's problems in "Calling Wall Street to Account".

Concerns over the advance of big data, robots and artificial intelligence are even more crucial in fintech and global finance since they are systemic vis-à-vis both risks and benefits. These are reviewed in *Ghosts in the Machine*. Similar concerns are now voiced by insiders Bill Gates, Elon Musk, Eric Schmidt of Google and physicist Stephen Hawking. They fear that humans may lose control of their machines and their algorithms, as I discussed with NASA Chief Scientist in our TV series, including "Robots Taking Over: What Will Humans Do?" and the privacy and security issues we covered with law professor Jon Mills in "Privacy in the New Media Age" (2015). The downside of big data, IoT and the new part-time "gig" economy are unpacked by Doug Rushkoff in *Throwing Rocks at the Google Bus* (2015) and *Raw Deal* (2015) by Steven Hill. In the advertising industry, big data is ever more focused on deep psychological incursion into consumers' behavior, for example Cambridge Analytica's OCEAN scale can target neurotics with fear-based ads (WIRED, May 2016). Consumers fight back with ad-blocking apps and purchasing the Japanese-made Privacy Visors to thwart facial recognition systems. The Princeton University Web Transparency and Accountability Project audits one million websites with its Open WPM tool to check on "cookies" and other fingerprinting and information gathering on users (New Scientist, June 4, 2016).

Deeper analysis requires questioning fintech business models and their goals, but also of most ICT companies: Google, Amazon, Facebook, Twitter, LinkedIn, Instagram, Snapchat which all freely collect user's data and then sell it to advertisers, data brokers, recruiters, insurance companies, banks, credit card and insurance companies. In the recent purchase of LinkedIn, Microsoft paid \$260 for each registered LinkedIn user whose personal information is sold mostly to recruiting firms ("LinkedUp", *The Economist*, June 18, 2016). Jaron Lanier in *Who Owns the Future* (2014) calls for new business models where these ICT companies must pay users for every bit of their personal data – quite feasible using available software. How would this change fintech applications and legacy finance? Standards setting in finance is central, indeed it drove the movement for ethical, responsible investing and informs the UNEP Inquiry itself. Designing operating systems such as SWIFT and other clearance and custodial systems are the bedrock of global markets and finance. Conflicting standards, for example, affect asset managers such as those at Yale University's endowment, now at odds with activist students who demand that Fortress Investment Group (a portfolio company) not foreclose on a Yale employee's home ("Yale the Investor vs. Yale the Do-Gooder", *Businessweek*, June 13, 2016).

All this is why Ethical Markets proposes a new standard to shift the balance of power back to consumers and citizens: a new Information Habeas Corpus. Britain in 1215 adopted the rule of Habeas Corpus, which assured individuals' rights over their own bodies, further codified by Parliament in 1679. Today, we need to extend this right to our brains and all the information we generate in all our activities, in this Information Habeas Corpus. Blockchain distributed ledger applications can shift the balance, such as those proposed by Brett Scott to monitor the performance of financial intermediaries and assure compliance with standards of transparency. These are important, positive

innovations to protect consumers, monitor conflicts of interest, tax shelters, anonymous corporate charters, etc. A highly contested issue worldwide involves standards for encryption, pitting privacy values against public safety concerns and law enforcement. New standards are emerging for blockchain applications such as the Chain Open Standard, a collaboration between Silicon Valley startups and big incumbents including Citi, State Street, VISA, NASDAQ, Fidelity and Capital One, to secure blockchain protocols for high-scale financial networks ([www.Chain.com](http://www.Chain.com)).

The public is awakening to this new threat of big data as “Big Brother” while acknowledging all its potential benefits. We do not need many of the idiocies promoted for profit in the Internet of Things. For example, the Parks Associates survey found that 47% of US broadband households have privacy or security concerns about smart home devices. Tom Kerber, Director of Research, cites recent media reports of hacking into baby monitors and connected cars and suggests that if firms offered a bill of rights to consumers, this might ease concerns. At least, a standard for all smart devices should allow users to switch off their connectivity and operate them manually. Oxford University’s Future of Humanity Institute’s paper by DeepMind’s founder Demis Hassabis advocates such “off switches” for AI systems (*The Economist*, June 25, 2016). How would such safeguards work in finance, say to secure the promised benefits of electronic remittance platforms?

New Cities Foundation Greg Lindsay reports in *Smart Homes and the Internet of Things* that 66% of smart phone users are afraid of these devices tracking their movements. How would cellphone banking systems such as Kenya’s M-Pesa prevent hacking or government surveillance? The Atlantic Council’s March 2016 seminar on “Smart Homes and Cybersecurity” concluded it’s already too late to protect homeowners and other users. Let’s not make similar mistakes with fintech. Google founder Larry Page is pouring billions into developing flying cars (“Propeller Heads”, *Businessweek*, June 6, 2016). Is this more “producer push” or real “consumer pull”? Automotive engineer Mary Louise Cummings of Duke University testified at a recent Senate hearing on driverless vehicles at which Google, General Motors and Ford were requesting over \$3 billion in subsidies. She noted that these companies had done no real testing of driverless vehicles and doubted they could be both autonomous and safe. What would flying cars and drones for the 1% do to our already crowded skies and quality of life for the 99%? A recent article on startups making other personal robotic aircraft and drones fails to mention the dangers to the public and environmental impacts of such elitist toys (*The Economist*, June 25, 2016).

The UNEP Inquiry has brought to light the key role of standard setting in financial markets in many countries and focused on reforms needed in financial models worldwide if humanity is to achieve the UN’s SDGs, the COP21 agreements and implementation of the INDCs. Standard-setting and voluntary compliance created the longer-term markets, ethical investor movements and such groups as UN PRI, the Global Compact, as well as NGO innovations including CDP, Global Witness, Tax Justice, Transparency International – still barely recognized in mainstream commercial media. Today’s explosion of derivatives reached a notional \$710 trillion in 2013, or ten times global GDP. In *The End of Banking*, the authors trace their role in the 2007-8 crises and propose a new “systemic solvency rule” to prevent future bailouts of counter parties (see Appendix). Digital Asset Holdings demonstrated the importance of standard-setting by moving their recent acquisition of Hyperledger to the Linux Foundation which is exploring common shared digital infrastructure for many applications which will be open to critical inspection. Evolving all governance structures and standards

should follow norms of subsidiarity, inclusiveness, resilience and sustainability as I described in *Mapping the Global Transition to the Solar Age* (2014).

Standards raising the ethical bar in media and advertising include the EthicMark® Awards for ad campaigns in its 11th Annual Awards. Prior winners can be viewed at [www.ethicmark.org](http://www.ethicmark.org). A standard to move consumerist behaviors of conspicuous display to more ethical global concerns is the EthicMark® GEMS standard certifying only diamonds and other gems not mined from the Earth at [www.ethicmarkgems.com](http://www.ethicmarkgems.com). The SDGs include the goal of responsible consumption. Our standard can help shift consumption to the growing science-created gem market and allow phasing out of obsolete, cruel, polluting global gem mining which is now unnecessary and obsolete. This disruption of diamond mining by science-grown gems and manufacturing of industrial diamonds is reported in *The Economist*, July 6, 2016).

More closely focused standards to reform finance are found among the FINTECH 100 as well as the proliferation of non-profit electronic platforms for peer-to-peer lending, such as Kiva, Grameen, Women's World Banking, Craigslist, Freecycle, bartering, trading and transferring of remittances. Crowdfunding is now a global sector and new SEC rules in the USA will allow small investors to participate, strengthening local businesses and Main Street economies ignored by Wall Street and big banks. Reform of HFT with innovative technology stock exchanges like IEX are joined by many new platforms and liquidity networks based on ethical standards and due diligence, such as the Long-Term Stock Exchange (LTSE) and ImpactUs launching in the USA; Instituto Ethos in Brazil and the Alliance for Banking on Values in the EU and the Sustainable Stock Exchange initiatives worldwide. Raising standards in broker-dealerships is the BestEX certification provided by US-based Healthy Markets. Raising the bar further are Ethical Markets standards in the Green Transition Scoreboard®; the Principles of Ethical Biomimicry Finance® and the Ethical Money Directory of sustainable asset managers offered free as a public service (disrupting conventional finance's referral fees and commissions). Certification of provenance of diamonds for insurers is offered by Everledger, London. Deeper financial reforms of money-creation itself are promoted by UK-based Positive Money, the Sustainable Money Working Group and Lord Adair Turner in his *Between Debt and the Devil* (2015).

Thus, the values driving fintech innovations and startups both for profit and non-profit will determine whether they will deliver on their promise and help transform finance for the common good and global sustainability. Without such inclusive values, fintech disruptions will merely reproduce the corrupt, patriarchal, unsustainable legacy financial system and its "global casino" characteristics now failing the needs of real local economies and threatening further crises and losses. The UN Inquiry on FINTECH for Sustainable Development, the SDGs, COP21, the INDCs and all the ethical initiatives and networks can spearhead this vital debate on finance for our common future.

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Ethical Markets Media, founded in 2004, is a global multi-media fintech company disrupting legacy finance by promulgating and disseminating its ethical standards globally, analyzing trends, providing alternative intellectual approaches through articles, research, educational TV and trademarked knowledge systems for investors and asset-managers. For more details see our 10<sup>th</sup> Anniversary Overview and all our products at [www.ethicalmarkets.com](http://www.ethicalmarkets.com).

## APPENDIX

Chart on derivatives: “Concept of Worst Financial State”; *The End of Banking*, p. 150

*Table 9.2 The concept of the worst financial state exemplified*

<b>Financial Contract</b>	<b>Worst Financial State</b>	<b>Value in the Worst Financial State</b>
Loan	The borrower defaults, and the recovery value is zero.	\$0
Equity	The company goes bankrupt, and nothing is left after serving the creditors of the company.	\$0
Long CDS (i.e., buying credit protection, assuming upfront premium payment)	The credit protection is not tapped, or the counterparty of the CDS defaults.	\$0
Short CDS (i.e., selling credit protection, receiving upfront premium payment)	The underlying security defaults, and the recovery value is zero.	minus the notional amount insured
Long a call option on one equity share	The share price ends below the strike price of the call option, or the counterparty defaults.	\$0
Short a call option on one equity share	Theoretically, there is no upper limit on the price of an equity share.	minus infinity
Short a call option on one equity share and owning one equity share	The equity share price drops to zero. In this case, the value is zero, and the call option will not be exercised.	\$0
Long a put option on one equity share	The share price ends above the strike price of the put option, or the counterparty defaults.	\$0
Short a put option on one equity share	The equity share price drops to zero, and the put option is exercised by the buyer.	minus the strike price
Repo	The repo borrower defaults, and the value of the financial asset used as collateral falls to zero.	\$0

**From *The End of Banking* (2014) by Jonathan McMillan**

Chart on “Financial System Without Banking”; *The End of Banking*, p. 176

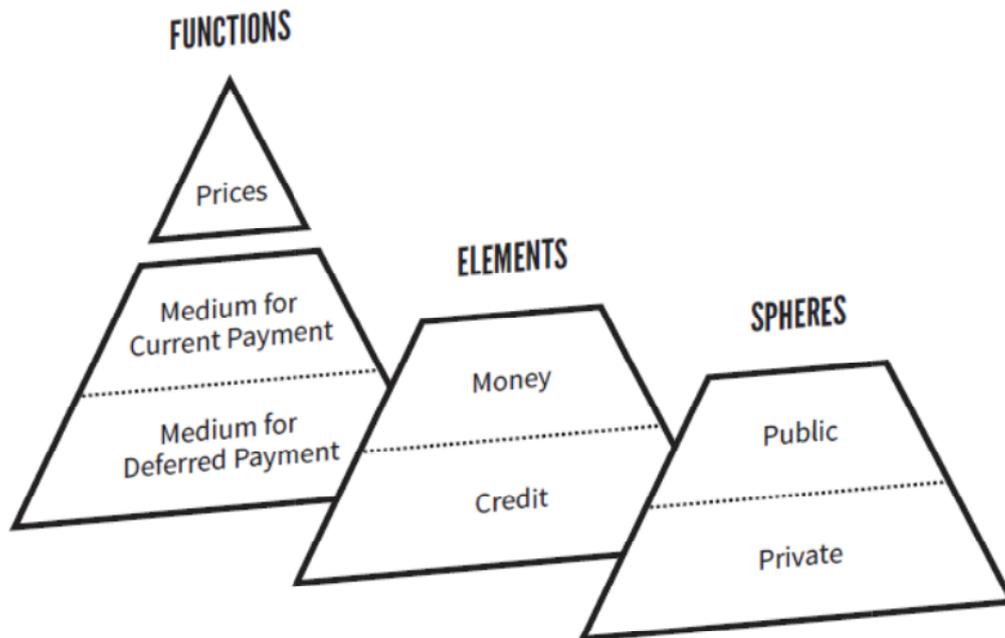


Figure 11.4 A financial system without banking: part two

We are now in a position to draw a clear line between the public and the private sector. Figure 11.4 illustrates this separation. While the organization of money belongs to the public sphere, credit is left to competitive forces and to be organized privately. Both the functional separation and the clear assignment of roles to the private and public sectors provide the foundation for a stable, effective, and fair financial system in the digital age.

**From *The End of Banking* (2014) by Jonathan McMillan**