

Engineering digital monopolies

The financialisation of Big Tech



Rodrigo Fernandez & Ilke Adriaans & Tobias J. Klinge & Reijer Hendrikse

December 2020

Colophon

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The Centre for Research on Multinational Corporations (SOMO) is an independent, not-for-profit research and network organisation working on social, ecological and economic issues related to sustainable development. Since 1973, the organisation investigates multinational corporations and the consequences of their activities for people and the environment around the world.

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SOMO

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Glossary

Bonds

Bonds represent debt obligations – and are therefore a form of borrowing. If a company issues a bond, the money they receive in return is a loan, and must be repaid over time, including interest to the investor that holds the bond.

Goodwill

The result of M&As in which one corporation purchases another for a price above the book value of the latter's total assets. It thus represents a premium paid during an acquisition, which is recorded on the acquiring corporation's balance sheet.

Intangible asset

An asset that lacks physical substance. Intellectual property, such as patents, trademarks and copyrights are examples of intangible assets. Goodwill and brand recognition are also intangible assets.

Market capitalisation

The market value of the shares listed on the stock market. Market capitalisation is calculated by multiplying the company's stock value by the number of outstanding shares.

Money market fund (MMF)

An investment fund that invests in safe short-term assets and aims to maintain a stable asset value.

Network effects

Network effects 'lock in' users and practices, create interdependencies and become stronger as digital platforms expand by scaling up their user base.

Platforms

Platforms are digital intermediary infrastructures that bring different user groups together.

Quantitative easing (QE)

A monetary policy in which central banks buy sovereign bonds, other debt instruments (and in some countries like Japan and Switzerland also equity) with newly created money in order to lower interest rates and increase the money supply.

Rent income

Income derived solely from the ownership and control of assets, rather than from innovative entrepreneurial activity and the productive use of labour.

Surveillance capitalism

A mutation in capitalism following widespread digitisation, with data-gathering tech companies accumulating digital footprints for the benefit of behavioural modification.

Abbreviations

AI	Artificial Intelligence
BVI	British Virgin Islands
EPS	Earnings per share
GDP	Gross Domestic Product
ICT	Information and Communication Technologies
IoT	Internet of Things
IPR	Intellectual Property Rights
M&A	Merger and Acquisition
PC	Personal Computer
QE	Quantitative Easing
R&D	Research and Development
SEC	Securities and Exchange Commission (United States)
SOMO	Stichting Onderzoek Multinationale Ondernemingen (The Centre for Research on Multinational Corporations)
S&P 500	Standard & Poor's stock index of the 500 largest US corporations based on market capitalisation
UNCTAD	United Nations Commission on Trade and Development

1 Introduction

1.1 Background

The coronavirus and its political management have brought forward clear economic winners and losers. Giant technology companies, often referred to as 'Big Tech', unambiguously lead the first category, as investors swarmed to tech blue chip stocks during the pandemic. This was caused by the massive increases in digital communication, shopping, and streaming services across the globe. Businesses and universities moved some if not all of their activities online, while governments worldwide have tried to harness Big Tech's mounting capabilities to manage and ultimately overcome the virus.¹

Big Tech² refers to a set of multinational corporations that dominate the information and communication technology (ICT) industry. This industry emerged around Stanford University, California, in the latter half of the 20th century and has progressively come to reshape the global economy as a whole. In particular, the rollout of the internet in the late 1990s digitised a range of consumer services, which saw the reach of Big Tech expand beyond ICT into areas like media and retail. Professional studies now refer to Big Tech as 'technology and consumer services'.³ In response, established industries like financial services have embraced digitisation as a means to counter the rising power of Big Tech, following the logic 'if you can't beat them, join them'.⁴ That said, Big Tech is a popular rather than an academic notion, which is advanced in the business press and consultancy circles. Big Tech firms habitually portray themselves as 'innovators' and societal problem solvers. Their self-proclaimed goal, exemplified here by the words of the founders of Google (now Alphabet), is to 'make ... the world a better place'⁵ by connecting 'users' worldwide. In so doing, Big Tech companies have spearheaded the digitisation of economy and society, with their seemingly unavoidable digital interfaces – from Google Maps to Facebook's WhatsApp – increasingly overlaying the real world.

In reaching into most corners of society, however, the monopoly power of the world's dominant Big Tech platforms risks undermining political and economic freedoms worldwide. Whereas much research has already shed light on different aspects of Big Tech's operations and their ramifications, less attention has been paid to its underlying financial dynamics and business model. Facebook and Google, for example, dominate the advertising industry at the expense of traditional actors in media or public relations, whereas Apple dictates application developments on its own devices,

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- 1 Klein N (2020) Screen new deal. *The Intercept*, 8 May. Available at: <https://theintercept.com/2020/05/08/andrew-cuomo-eric-schmidt-coronavirus-tech-shock-doctrine> (accessed 23 November 2020).
 - 2 For a discussion on Big Tech in the business press, see: Martin Sandbu (n.d.) The Economics of Big Tech. *Financial Times*. Available at: <https://www.ft.com/economics-of-big-tech> (accessed 1 December 2020).
 - 3 UNCTAD (2019) *Digital economy report 2019*. Report, Geneva, Switzerland, July. Available at: https://unctad.org/system/files/official-document/der2019_en.pdf (accessed 12 October 2020).
 - 4 Hendrikse R, Bassens D and Van Meeteren M (2018) The Appleization of finance: Charting incumbent finance's embrace of FinTech. *Finance and Society* 4(2): 159–180.
 - 5 Page L and Brin S (2004) Letter from the Founders. *New York Times*, 24 April. Available at: <https://www.nytimes.com/2004/04/29/business/letter-from-the-founders.html> (accessed 26 October 2020).

and Amazon boasts its ever-expanding reach into retail markets and cloud computing. In the process, the seemingly unstoppable rise of Big Tech has come to redefine the inner workings of capitalism itself, seeing financialised capitalism fuse with the data-driven logics of 'platform capitalism'⁶ or 'surveillance capitalism'.⁷

Besides 'disrupting' economic processes, moreover, Big Tech has come to revamp political practices and operating systems,⁸ which has recently triggered a political backlash. Where the European Parliament has been on the forefront of limiting the reach of Big Tech and protecting its citizens,⁹ in 2019 the curbing of Big Tech also hit the 'home front', when the first congressional hearings took place in the United States. This was thanks in large part to Senator Elizabeth Warren's call to action to counter Big Tech's monopoly power. Amplified by the coronavirus pandemic, these antitrust hearings have breathed new life into the debate,¹⁰ to which this report aims to contribute by qualifying and quantifying of the extraordinary power of Big Tech.

1.2 Research objectives

This report explores the business models of the world's most powerful Big Tech firms through the lens of *corporate financialisation*, examining the ways in which non-financial firms become dominated by the drive to partake in financial narratives, practices and measurements.¹¹ As will be argued in more detail in section 2.3, we see the financialisation of Big Tech as the prime example of a global economic shift in capital accumulation towards monopolisation and rentiership. We aim to expand the dialogue around the mounting influence that Big Tech has in national, local and supranational governments.

To do so, we first provide a brief overview of the specifics of what we call the 'Big Tech model', which reduced to its core revolves around the imperative to dominate. Then, we develop an ideal-type framework of corporate financialisation that consists of three key components:

1. The size of the balance sheet (financial assets and debt) in proportion to revenue.
2. The payouts to shareholders (dividends and share buybacks) in proportion to executive compensations.
3. The rise in intangible assets (in particular goodwill, but also including patents, data and related analytics) in comparison to total assets.

6 Srnicek N (2017) *Platform Capitalism*. Cambridge: Polity Press.

7 Zuboff S (2019) *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. London: Profile Books.

8 Bartlett J (2018) *The People vs Tech: How the Internet Is Killing Democracy (and How We Save It)*. London: Penguin Books.

9 Espinoza, J (2020) EU targets Big Tech with 'hit list' facing tougher rules. *Financial Times*, 11 October. Available at: <https://www.ft.com/content/c8c5d5dc-cb99-4b1f-a8dd-5957b57a7783> (accessed 13 October 2020).

10 McNamee, R (2020) A historic antitrust hearing in Congress has put big tech on notice. *The Guardian*, 21 July. Available at: <https://www.theguardian.com/commentisfree/2020/jul/31/big-tech-house-historic-antitrust-hearing-times-have-changed> (accessed 14 October 2020).

11 Aalbers M (2019) Corporate financialization. In: Richardson D, Castree N, Goodchild MF, Kobayashi A, Liu W and Marston RA (eds) *The International Encyclopedia of Geography: People, the Earth, Environment, and Technology*. Oxford: Wiley, p.4.

These three elements enable us to better understand the financialised nature of Big Tech. Mounting financial assets point to the success of rent-generating strategies. The size of the balance sheet is critical to understanding the financial firepower these companies possess, enabling them to acquire other tech firms and expand their reach through the aid of network effects – a mechanism that locks in users and practices, creates interdependencies, and becomes stronger as platforms grow. The maximisation of shareholder value in case of Big Tech is not as straightforward as that of most other sectors. Specifically, payouts to shareholders show a division between longer-established firms – Microsoft and Apple – that pay out dividends to shareholders, and younger companies thus far refraining from doing so. This might be an issue of company maturity, as Big Techs typically go through an extended period in which costs outstrip revenues to scale up their platforms and maximise network effects. An alternative explanation is that the younger Big Techs are (still) controlled by their founders, and hence less prone to investor demands for dividends and share repurchases. Lastly, the rise in the value of intangible assets, in particular goodwill, displays how much Big Tech firms are willing (and able) to pay for the takeover of other tech companies in order to grow their market-cum-monopoly power.

Combined, these elements reveal how Big Tech has amassed extraordinary financial resources, market dominance, and a sphere of influence increasingly encircling and enclosing societal institutions, companies, consumers, and citizens.

1.3 Methods

This report investigates the financial numbers behind the operations of seven leading Big Tech companies, five of which are headquartered in the US, namely Alphabet (Google), Apple, Amazon, Facebook and Microsoft, and two in China, namely Alibaba and Tencent. We selected these companies on the basis of their unequalled size in financial markets. Specifically, at the time of writing, each of the seven firms' market capitalisation¹² stood above US\$500 billion, in some cases surpassing US\$1 trillion (= US\$1,000 billion), or even approaching US\$2 trillion (Table 2.1). These sums are not only unmatched against companies from other sectors, such as oil & gas or pharmaceuticals, but they also help distinguish the seven companies – Big Tech's 'infrastructural core' – from smaller tech firms, which typically rely on their infrastructures.¹³

12 Market capitalisation is calculated by multiplying the company's stock value by the number of outstanding shares.

13 For example, US technology companies such as Cisco, IBM or Oracle all have market capitalisations that are (significantly) lower than US\$250 billion, as do digital consumer services companies such as Netflix or Uber. Our five US Big Techs also regularly refer to each other as peers in terms of market competition or executive compensation, whilst media often speak of 'The Big Five' and/or advance the acronym 'FAAMG' in discussing these companies. Jointly, these firms constitute Big Tech's 'infrastructural core', i.e., 'the infrastructural platforms ... upon which many other platforms and apps can be built' (Van Dijck J, Poell T and De Waal M (2018) *Platform Society: Public Values in a Connective World*. Oxford: Oxford University Press, pp.12–13). For example, Uber relies on Alphabet solutions, such as Google Maps, whereas Netflix relies on the cloud of AWS (Amazon Web Services). As for their Chinese counterparts, the tech giant Huawei is not a publicly-listed company and is ultimately owned and controlled by the Chinese government, whilst the digital services company Baidu – China's equivalent to Google, often grouped together with Alibaba and Tencent under the acronym BAT – has a market capitalisation of less than US\$50 billion, that is far below the market capitalisation of our seven selected Big Techs.

The qualitative data used in this report was obtained from academic publications as well as from industry intelligence, media reports, and publicly accessible corporate and regulatory documentation, such as annual reports or US Securities and Exchange Commission (SEC) filings. Quantitative information was largely obtained from Refinitiv's Eikon database and, to a lesser extent, amended by information taken from the corporations' annual reports or regulatory filings. We used our own methods for acquiring, structuring and analysing the quantitative data¹⁴ and also worked with 15 items of accounting data from the balance sheets, income statements and flow-of-funds data for the seven selected companies under investigation for the years 2000 to 2019 (see Annex).

However, it is important to note that only three of the seven selected Big Tech firms were listed on the stock exchange in 2000, namely Microsoft, Apple and Amazon. For the two non-US corporations, Alibaba and Tencent, financial data was automatically converted into US dollars based on Thomson Reuters' historical exchange rates or, in case of more granular accounting items obtained from the annual reports themselves, converted based on historical exchange rates as provided by Macrotrends.¹⁵

In addition, we used the Orbis database to establish the number of offshore subsidiaries belonging to the seven Big Tech companies (see Map 2.2). Extensive use of tax havens is a useful indicator of tax avoidance, since companies require subsidiaries in low-tax jurisdictions (for example the Cayman Islands) and conduit countries (such as the Netherlands) to avoid taxes. The list of tax havens is a compilation of all jurisdictions that scored a Haven Score of 70 or higher on the Tax Justice Network's Corporate Tax Haven Index.¹⁶

Lastly, to construct an overview of the spatial distribution of Big Tech according to their market capitalisation we used *platformeconomy.com*¹⁷ to select companies. The data for the market capitalisation was obtained from from Bloomberg.

1.4 Main findings

Based on our analysis of seven Big Tech firms, we conclude that there are considerable differences among models and levels of corporate financialisation. As indicated, Microsoft and Apple are the oldest corporations and stand out from the rest, as they mostly fit the ideal-type display of corporate financialisation derived from the literature. One suggestion could thus be that their development reflects a more 'mature' model of consolidated market power and refined capacity to monetise it. However, the corporations still differ in their precise operations, strategies and patterns of ownership, which is why there is more to the differences we identify than just the corporate life cycle.

14 For an overview of the methods used to examine corporate financialization see: Fernandez R and Klinge TJ (2020) *Private gains we can ill afford. The financialisation of Big Pharma*. Report, Amsterdam: SOMO.

15 Macrotrends (2020) Dollar yuan exchange rate – 35 year historical chart. Available at: <https://www.macrotrends.net/2575/us-dollar-yuan-exchange-rate-historical-chart> (accessed 20 October 2020).

16 Tax Justice Network (2019) Corporate Tax Haven Index. 2019 results. Available at: <https://www.corporatetaxhavenindex.org/en/introduction/cthi-2019-results> (accessed 20 October 2020).

17 Schmidt, H, Hosseini, H. (2020) Top 100 Plattformen der welt (Oct. 2020). Available at: <https://www.platformeconomy.com/> (accessed 2 December 2020). © Copyright Dr. Holger Schmidt | Hamidreza Hosseini | netzoekonom.de | TU Darmstadt | Ecoynamics.io | Platform-fund.com

Whether these differences will grow larger or diminish, however, remains to be seen, as they largely rest on these corporations' capacity to evade regulation and consolidate untrammelled access to data and on governments' willingness to allow this.

A key feature of Big Tech companies is the need to be dominant in their respective niche market in order to flourish, providing the means to expand into other markets. In the process of consolidating their position, some companies choose to abstain from shareholder payouts in order to save and reinvest, while others do not or have already done so. The difference between these payouts is striking: between 2000 and 2019, Microsoft and Apple handed a total of around US\$759 billion to their shareholders (of which US\$235 billion in dividends and US\$524 billion in share buybacks). During this same period, Amazon, Facebook and Alphabet did not pay any dividends, and Alibaba and Tencent jointly disbursed US\$5 billion in dividends. This suggests that once corporations have crossed the difficult scale-up period and acquired a dominant position, they can begin to reward their shareholders. Having said this, whether they actually do so might also depend on the intentions of institutional investors and other shareholders. In particular, it depends on the founder owners, or what we call the 'Big Tech Barons', like Alphabet's Sergey Brin and Larry Page, Amazon's Jeff Bezos, or Facebook's Mark Zuckerberg, who hold much greater sway over their enigmatic empires (either through the percentage or type of shares they own) than the executives of corporations whose shareholding structure is dominated by institutional investors and executives primarily remunerated in stock options. We encounter a similar divide when we look at Big Tech corporations' financial assets and debt. Again, it seems that corporations start to accumulate large financial surpluses and increase their debt only once they have passed the difficult early stages of growth, as we see Apple and Microsoft leading the Big Tech pack. In 2019, their financial assets stood at a staggering US\$206 billion and US\$137 billion, respectively, surpassing the remaining five corporations' assets of US\$289 billion.

Another difference between the Big Tech companies are their investments in physical infrastructures. Microsoft, Apple and Facebook have fixed assets between US\$37 to US\$45 billion, while Alphabet and Amazon – both of which also invest in huge data centres – have fixed value assets between US\$84 to US\$98 billion. Here, Alphabet is the clear frontrunner, through its investments in data centres that are valued at US\$84 billion. This is much larger than Facebook's – admittedly fast-growing – fixed assets of US\$45 billion. As a digital retail platform backed up by a large logistics and warehousing operation, and having expanded into providing cloud infrastructures, Amazon records the largest stock of fixed capital, worth US\$98 billion.

Despite the differences, there is a Big Tech model

Notwithstanding these differences between Big Tech firms – which are arguably caused by different corporate maturity, niche markets and corporate governance – we can draw two critical parallels. The first is their largely unchecked corporate power, and the second is their highly financialised nature. These parallels adhere to an underlying logic that confirms the need to look at Big Tech as a sector. Empirically, Big Tech corporations stand out compared to other sectors according to most indicators presented in this report. Compared to the S&P 500 corporations, they have more financial assets at their disposal and follow a business model that relies more strongly on intangible assets such as patents, data and related analytics, or goodwill.

Combining these two observations, we argue that much of the Big Tech model essentially revolves around creating, maximising and monetising network effects. These companies do this by exploiting their role as gatekeepers and owners of scarce and vital infrastructures, by leveraging this role to control prices of inputs and outputs, by promoting their own products and services, and by extracting rents. They benefit from the insurmountable information asymmetries vis-à-vis virtually everyone, ranging from users and customers to nascent rivals and regulators.¹⁸

The underlying economic principles suggest a ‘winner-takes-it-all’ logic. In this scenario, a corporation that owns an exclusive asset, such as a platform, can command rent income from ownership and operations rather than production. For example, ‘Google uses this monopoly power to impose a tax that siphons monopoly profits for itself every time an app developer transacts with a consumer’, states a report to the US congress on competition in digital markets.¹⁹ This rent income, a result of a monopolised platform, is in turn further augmented or leveraged through financialised techniques. The massive amount of revenue or income enables Big Tech corporations to either develop with fierce organic intensity or to diversify into new fields by acquiring other enterprises, which allows them to integrate operations into a sprawling, data-driven, interconnected net of platformed activities that makes it even harder for users to opt out.

An empirical marker of this growth machine is the rising goodwill on the Big Tech balance sheets, visible in the difference between the purchasing price of an enterprise and the fair value of its assets and liabilities as accounted for by the acquiring corporation. Goodwill’s use as an indicator of corporate financialisation has long historical roots, going back to at least Thorstein Veblen’s work in the early 20th century. It demonstrates the capacity to acquire other corporations at will, expanding the balance sheet, and increasing the collateral to incur more debt and prepare for the next purchase.²⁰

In short, the empirical findings in this report provide support for the notion of a Big Tech model as a self-reinforcing machine for rent extraction that can be properly understood in its contemporary context only, as opposed to an ahistorical and surprising aberration in the socioeconomic landscape. Big Tech monopolies – driven by the platform logics of growth through network effects and user lock-in, and benefiting from disinformation and the commodification of personal data – are not just an economic problem, but also a political one.

18 For a thorough exposition of this argument, see in particular the work of legal scholar Lina M Khan as presented in, among others, Khan LM (2017) Amazon’s antitrust paradox. *Yale Law Journal* 126: 710–805; Khan LM (2018) Sources of tech platform power. *Georgetown Law Technology Review* 325: 325–334; Khan LM (2019) The separation of platforms and commerce. *Columbia Law Review* 119: 973–1098.

19 House Committee on the Judiciary (2020) *Investigation of competition in digital markets*. Majority staff report and recommendations, subcommittee on antitrust, commercial and administrative law, at 219. Available at: https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf (accessed 1 December 2020).

20 Veblen T (1904) *The Theory of Business Enterprise*. New York: Charles Scribner’s Sons. For our own adaptation of Veblen’s work and of more recent research by institutionalist economists, see Klinge TJ, Fernandez R and Aalbers MB (forthcoming) The financialization of Big Pharma. *Revista Internacional de Sociología*.

2 Becoming big and profitable

2.1 A short history

The history of modern capitalism is often narrated by means of cycles or waves, which are periodically characterised by investment booms in a set of new technological innovations.²¹ The late 19th century, for example, saw massive investments in US railroads, and gave rise to monopolies in banking, oil and steel.²² This development saw the so-called ‘Robber Barons’ – including John P. Morgan, John D. Rockefeller and Andrew Carnegie – accumulate unprecedented wealth in what has become known as ‘the Gilded Age’. In contrast, the late 20th century gave birth to another set of innovations, this time clustered around the ICT industry. These developments progressively ignited a novel wave of monopoly capitalism, giving rise to 21st-century ‘Big Tech Barons’ such as Jeff Bezos (Amazon), Sergey Brin and Larry Page (Alphabet), Jack Ma (Alibaba) and Mark Zuckerberg (Facebook). The financial firepower of the captains of what might be called ‘the New Gilded Age’ rivals, if not surpasses, that of their 19th-century predecessors.

Inspired by the work of Carlotta Perez²³, Figure 2.1 seeks to encapsulate the dawn and evolution of the ICT wave giving rise to our seven selected Big Tech firms. In essence, our ICT wave is subdivided into *stylised* periods of tech diffusion: the first is the installation period with hard- and software developments *within* the tech sector, followed by a deployment period based on data-driven platformisation *beyond* the tech sector itself. The 1970s are characterised by hardware developments, with IBM being the dominant firm, and ignites a phase of ‘irruption’ with the 1971 invention of Intel’s microprocessor, foreshowing the advent of small and affordable personal computers (PCs) replacing those big and expensive ‘business machines’. Two of our seven Big Tech firms were established during this era, namely Apple and Microsoft.

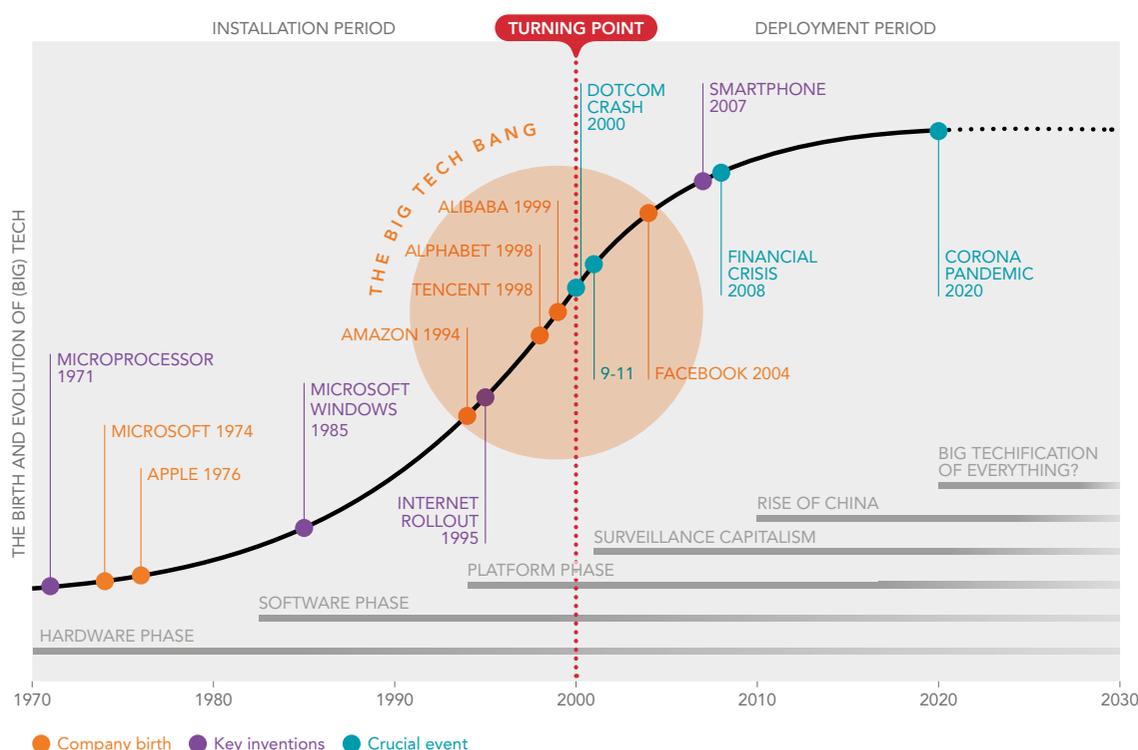
In the course of the 1980s going into the 1990s, the orientation in ICT development shifted from hardware development towards software interoperability, with Microsoft taking over the diminishing clout of IBM. Crucially, building on preceding ICT developments, the mid-1990s rollout of the internet heralded the age of digital platforms, giving rise to the five remaining Big Tech companies over the period 1994-2004, constituting what we call the ‘Big Tech Bang’. Since then, the more ‘established’ firms Apple and Microsoft have steadily reinvented themselves as digital platforms for the new age.

21 For a summary of the cyclical motions of capital, see Rostow WW (1975) Kondratieff, Schumpeter, and Kuznets: Trend periods revisited. *The Journal of Economic History* 35(4): 719–753.

22 Lamoreaux NR (2019) The problem of bigness: From standard oil to Google. *Journal of Economic Perspectives* 33(3): 94–117.

23 For a summary, see Perez C (2010) Technological revolutions and techno-economic paradigms. *Cambridge Journal of Economics* 34(1): 185–202.

Figure 2.1 The Big Tech Bang



With the installation of our seven Big Tech companies completed around the turn of the millennium, political and economic developments like the dotcom crash and 9/11 brought forth the age of *surveillance capitalism*²⁴, igniting Big Tech’s subsequent deployment period, steadily expanding its reach throughout economy and society. Amongst others, the invention of Apple’s iPhone in the latter half of the 2000s massively expanded the scale and scope for data extraction, as PCs effectively morphed into mobile smartphones, boosting global connectivity whilst allowing for the abundant development of personalized applications, with mounting volume of data stored into expanding cloud infrastructures.

As Big Tech increasingly turned into the infrastructural core it is today, myriad digital platforms or consumer services developed around it, such as Airbnb, Netflix, Spotify and Uber, whilst other sectors rapidly embraced the promises of digitisation, including the world of haute finance.²⁵ Moving into the 2010s, the next defining phenomenon shaping the ICT wave now dominated by Big Tech was the global rise of Chinese Big Tech companies, next to Alibaba and Tencent spearheaded by the likes

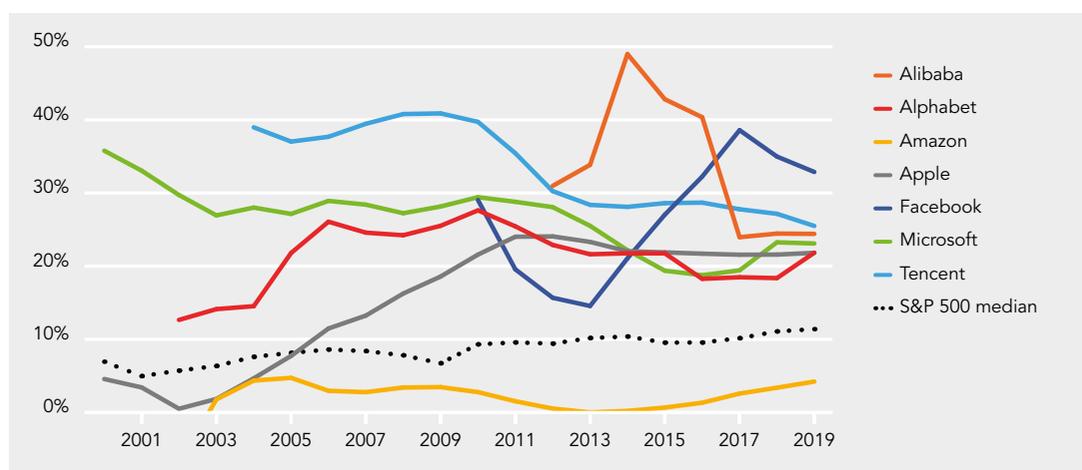
24 Zuboff S (2019) *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. London: Profile Books.

25 Hendrikse R, Bassens D and Van Meeteren M (2018) The Appleization of finance: Charting incumbent finance’s embrace of FinTech. *Finance and Society* 4(2): 159–180.

of Huawei and Baidu – combining mounting technological acumen with rapid societal deployment under authoritarian state control – increasingly challenging the global clout of Silicon Valley.

In all, these developments propelled Big Tech’s digital power as we know it today, and our seven companies are set to lead what might become ‘the Big Techification of everything’ in the course of the 2020s, shaped by rapid technological advances in the fields of artificial intelligence (AI), the fifth generation of mobile communication (5G), and the so-called ‘Internet of Things’ (IoT) – connecting and operating all kinds of applications and devices in the digital economy.²⁶ The question is who will lead this development, and who will enjoy its spoils, as the ‘tech war’ between US and China suggests that technological development is increasingly giving way to geopolitical and hegemonic strife.

Figure 2.2 Net income as percentage of net sales 3 year rolling average



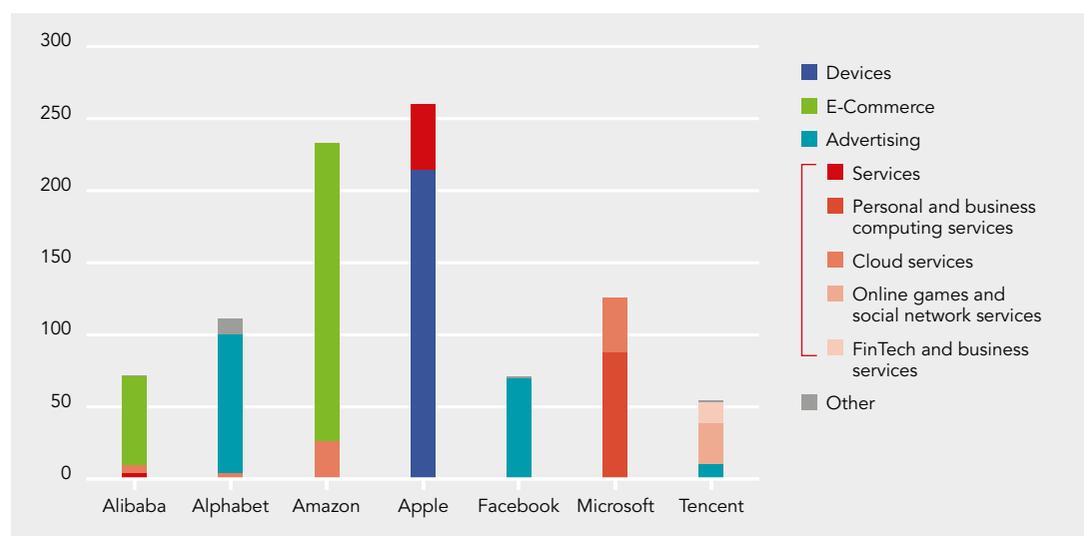
Source: Refinitiv Datastream.

Before explaining how and why Big Tech companies have become cash machines, a quick glance at Big Tech’s profitability shows how extraordinarily lucrative these corporations are. Compared to other S&P 500 corporations, whose net income ratio hovered around 10 per cent in recent years, our seven Big Tech companies achieve a level of profitability that is at least twice as high (Figure 2.1). The odd exception here is Amazon, which habitually reports low profits, but this is arguably the result of an accounting convention obfuscating Amazon’s actual profitability.²⁷

²⁶ In addition, the digital future will be defined by (interconnected) advances in augmented reality, cryptocurrencies, machine learning, and so forth. See Greenfield A (2017) *Radical Technologies: The Design of Everyday Life*. London: Verso.

²⁷ Amazon has reported low profits for most of its existence. Crucially, economist Cecilia Rikap argues that to obtain a clearer picture, funds devoted to R&D should be treated as investments rather than operating expenses and hence added to net income, since Big Tech essentially relies on R&D to develop intangible assets and ensconce its market power. See Rikap C (2020) *Amazon: A story of accumulation through intellectual rentiership and predation*. Competition & Change. Epub ahead of print 17 June 2020. DOI: 10.1177/1024529420932418.

Figure 2.3 Revenue by segment (end of fiscal year 2019) in US\$ billion



Source: Companies' Form 10-K SEC filings and annual reports.

Big Tech firms achieve these extraordinary profits in different segments, as a breakdown of their revenues shows (Figure 2.2). In rough terms, we can draw a difference between the sale of devices (Apple), software (Microsoft), e-commerce (Amazon and Alibaba), advertising (Alphabet and Facebook), and various combinations thereof (Tencent). However, in their actually existing business models, these seemingly disconnected segments often come together. To better understand Big Tech cash machines, the next section will thus unpack the ways in which Big Tech companies generate their revenues and profits.

2.2 The Big Tech model

While the individual business activities of our seven Big Tech companies differ extensively (see Table 2.1), this section details a generic framework – *the Big Tech model* – distilling the common features of these firms. This framework builds on the concepts of monopoly rents, platformisation and financialisation. Where monopolisation and financialisation are recurring characteristics in the history of modern capitalism, platformisation is how these features are expressed and augmented under contemporary digital-and-digitising capitalism.²⁸

According to political philosopher Nick Srnicek, platforms like those operated by our Big Tech firms share four essential characteristics. First, platforms function as *intermediary infrastructures* that bring different user groups together – whether as users/buyers and developers/sellers in the Apple App Store, or as private individuals who build their own content on social media like Facebook.

28 Langley P and Leyshon A (2017) Platform capitalism: the intermediation and capitalisation of digital economic circulation. *Finance and Society* 3(1): 11–31.

Second, these platforms thrive on *network effects*, whereby the larger the platform's size or user base becomes, the more data, rent, and/or value can be extracted. Besides scaling up, platforms can also enhance their scope. An example is Amazon, whose expansion into diverse business lines 'from brick and mortar supermarkets to home security reinforces the stockpile of consumer data'. This sets in motion a 'self-reinforcing cycle, creating an ever widening gap between the platform and its competitors ... Amazon is first and foremost a data company, they just happen to use it to sell stuff'.²⁹ 'Scaling up' is therefore deemed essential, and Silicon Valley's 'move fast and break things' mantra (like Amazon's 'get big fast' slogan) encapsulates this strategy.

Third, in so doing, Big Tech platforms make extensive use of intrafirm *cross-subsidisation* to expand their reach and user base. This is why the likes of Facebook and Tencent offer their services for 'free', while Alibaba and Amazon (and their financiers) habitually accept financial losses to increase market share, and hence network effects. Indeed, an appetite for sustained loss-making to gain market share is a defining characteristic of (aspiring) platforms, with the world's largest technology-focused venture capital fund – Softbank's Vision Fund – playing an important role here.³⁰

Fourth, platforms aim to maximise *user engagement* for the purpose of collecting data, meaning that platforms are designed to keep users online for as long as possible.³¹ This is why Alphabet attempts to integrate as many services as possible so users never leave their ecosystem, and why Facebook builds a social media realm around the different platforms – Facebook, Instagram, WhatsApp – that most effectively captivates users. Every minute spent on platforms is valuable to the operators, which has led leading Big Tech executives themselves to warn of the ramifications.³²

The breadth and depth of rampant digitisation invites us to rethink the logics of capitalism. On the one hand, 'there is really something qualitatively distinct about the forces of production that eat brains, that produce and instrumentalise and control information'.³³ Given these features, Shoshana Zuboff goes as far as claiming that the relentless rise of Big Tech has given rise to 'a new logic of accumulation' known as *surveillance capitalism*, geared toward data extraction and behavioural modification.³⁴ On the other hand, however, critics argue that despite these novelties, data-hungry Big Tech firms merely augment pre-existing capitalist tendencies. These include capitalism's afore-

29 Extracted from House Committee on the Judiciary (2020) *Investigation of competition in digital markets*. Majority staff report and recommendations, subcommittee on antitrust, commercial and administrative law, at 262. Available at: https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf (accessed 1 December 2020).

30 Uber, Alibaba and WeWork are some of the tech platforms in which the so-called Vision Fund of Japan's SoftBank invests. The largest Vision Fund investors, in turn, not only include the world's biggest sovereign wealth funds from Saudi Arabia and Abu Dhabi but also cash-rich Big Tech companies themselves, like Apple. These investments are highly speculative and can result in stellar profits (in the case of Alibaba) or spectacular losses (in the case of WeWork). See: Boyka M (2020) SoftBank: Technology evangelist or hedge fund? *Financial Times*, 1 October. Available at: <https://www.ft.com/content/4403ee1a-050f-4742-b967-ba47b0f1de03> (accessed 1 December 2020).

31 Srnicek N (2016) *Platform Capitalism*. Cambridge: Polity Press.

32 Price R (2018) Apple CEO Tim Cook: I don't want my nephew on a social network. *Business Insider*, 19 January. Available at: <https://www.businessinsider.com/apple-ceo-tim-cook-doesnt-let-nephew-use-social-media-2018-1> (accessed 27 November 2020).

33 Wark M (2019) *Capital Is Dead: Is This Something Worse?* London: Verso Books.

34 Zuboff S (2019) *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. London: Profile Books, p.13.

mentioned late 19th century embrace of the large corporation – when small family businesses were eclipsed by the ascent of *monopoly capitalism*³⁵ and ‘rentierism’.³⁶ What is new in the digital age is not the tendency towards monopoly, but rather the rampant ‘assetisation’ of digital footprints, turning personal data into commercial datasets which Big Tech companies sell on to third-party corporate clients.³⁷

In the abovementioned report to the US congress on competition in digital markets, concerns were expressed about the self-enforcing process of monopoly power and how it impacts the innovative capacity of the technology sector:

*This significant data advantage also enables dominant platforms to identify and acquire rivals early in their lifecycle. Leading economists and antitrust experts have expressed concern that serial acquisitions of nascent competitors by large technology firms have stifled competition and innovation. This acquisition strategy exploits dominant firms’ information advantages in order to acquire rapidly growing companies just before those companies become true threats. Lacking access to this same information or failing to appreciate its significance, enforcers may fail to identify these acquisitions as anticompetitive. This is more likely when the dominant platform buys a nascent threat before it has fully developed into a rival.*³⁸

As indicated in Map 2.1, our seven Big Tech companies are the best-capitalised platforms in the tech universe. In this capacity, they have progressively come to control and operate effective monopolies, whether in advertising, retail, social media, or applications/software development. Academic notions and measurements of seeking, creating and exploiting monopolies remain contested.³⁹ In economic terms, monopoly power exists when a single corporation or a few collaborating corporations have wide-ranging influence in specific economic domains. This allows monopolies to extract significant *rents*, which can be defined as ‘income derived from the ownership, possession or control of scarce assets and under conditions of limited or no competition’. Digital platforms typically enjoy two main types of rents: advertising and ‘commissions levied on transactions initiated through the platform’.⁴⁰

35 Morozov E (2019) Capitalism’s new clothes. *The Baffler*, 4 February. Available at: <https://thebaffler.com/latest/capitalisms-new-clothes-morozov> (accessed 1 December 2020).

36 Christophers B (2019) The rentierization of the United Kingdom economy. *Environment and Planning A: Economy and Space*. Epub ahead of print 11 September 2019. DOI: 10.1177/0308518X19873007, at 3.

37 Beauvisage T and Mellet K (2020) Datasets: Assetizing and Marketizing Personal Data. In Birch K and Munies F (eds) *Assetization: Turning Things into Assets in Technoscientific Capitalism*. Cambridge (MA): The MIT Press. pp. 75–95.

38 Extracted from House Committee on the Judiciary (2020) *Investigation of competition in digital markets*. Majority staff report and recommendations, subcommittee on antitrust, commercial and administrative law. Available at: https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf (accessed 1 December 2020), p.44.

39 UNCTAD (2018) Corporate rent-seeking, market power and inequality: Time for a multilateral trust buster? *UNCTAD Policy Brief 66: 4*. Available at: https://unctad.org/system/files/official-document/presspb2018d3_en.pdf (accessed 1 December 2020).

40 Christophers B (2019) The rentierization of the United Kingdom economy. *Environment and Planning A: Economy and Space*. Epub ahead of print 11 September 2019. DOI: 10.1177/0308518X19873007, p. 11.

Table 2.1 Big Tech in numbers

	Alibaba	Alphabet	Amazon	Apple	Facebook	Microsoft	Tencent
Founded	1999	1998	1994	1976	2004	1975	1998
Initial public offering	2007 (Hong Kong); 2014 (New York)	2004	1997	1980	2013	1986	2004
Headquarters	Hangzhou, China	Mountain View, California, USA	Seattle, Washington, USA	Cupertino, California, USA	Menlo Park, California, USA	Redmond, Washington, USA	Shenzhen, China
Founders	Jack Ma	Sergey Brin; Larry Page	Jeffrey Bezos	Steve Wozniak; Steve Jobs	Mark Zuckerberg; Eduardo Saverin; Dustin Moskovitz; Chris Hughes	William Gates; Paul Allen	Ma Huateng; Zhang Zhidong; Xu Chenye; Chen Yidan; Zeng Liqing
Current CEO	Daniel Zhang	Sundar Pichai	Jeffrey Bezos	Timothy Cook	Mark Zuckerberg	Satya Nadella	Ma Huateng
Breakthrough	Largest IPO at the NYSE, raising US\$25bn (2014)	Google becomes client search engine for Yahoo (2000); purchase of YouTube (2006)	Release of Kindle (2007)	1st GUI computer Macintosh (1984)	Facebook surpasses Myspace as the most-visited social media website (2008)	OS for IBM PC (1981)	Introduction of the multi-purpose app WeChat (2011)
Revenue (2019, US\$bn)	56	162	160	260	71	126	55
Net income (2019, US\$bn)	13	34	12	66	18	44	14
Three-months-ended revenue change (6/2020, %)	34	2	40	11	11	13	29
Market capitalisation (12/2020, US\$bn)	759	1,196	1,598	1,973	785	1,617	730
Top 5 shareholders (6/2020)	T. Rowe Price (3%); Vanguard Group (2%); BlackRock (2%); Baillie Gifford (2%); State Street (1%)	Vanguard Group (8%); BlackRock (5%); Fidelity (4%); State Street (4%); T. Rowe Price (2%)	Jeffrey Bezos (15%); Vanguard Group (7%); BlackRock (4%); State Street (3%); T. Rowe Price (3%)	Vanguard Group (8%); Berkshire Hathaway (6%); BlackRock (4%); State Street (4%); Fidelity (2%)	Vanguard Group (8%); Fidelity (5%); BlackRock (4%); T. Rowe Price (4%); State Street (4%)	Vanguard Group (8%); BlackRock (5%); State Street (4%); Fidelity (3%); T. Rowe Price (2%)	Naspers (31%); Ma Huateng (8%); Vanguard (2%); BlackRock (1%); Capital Research (1%)
Indicator of market share	Fintech platform Alipay counts 1.3 billion active users (2020)	41% of global internet advertising revenue (2018)	46% of North American e-commerce revenue (2019); 11% of global cloud computing market revenue (2019)	32% of global smartphone revenue (2018)	19% of global internet advertising revenue (2018); 2.9 billion active users monthly (2019)	78% of global operating system share (2019)	1.2 billion active users monthly (2020)

	Alibaba	Alphabet	Amazon	Apple	Facebook	Microsoft	Tencent
Industry classification 1: SIC	6921 – Direct sellers catalog	6719 – Offices of holding companies (Alphabet); 7374 – Computer processing and data preparation and processing services (Google)	6599 – Other retail stores	7372 – Prepackaged software	7374 – Computer processing and data preparation and processing services	7389 – Business services, not elsewhere classified	7721 – Computer services; computer programming services
Industry classification 2: NAICS	517911 – Telecommunications resellers	551112 – Offices of other holding companies (Alphabet); 518210 – Data processing, hosting and related services (Google)	454110 – Electronic shopping and mail-order houses	511210 – Software publishers	518210 – Data processing, hosting and related services	561990 – All other support services	511210 – Software publishers
Legal challenges	2020: Banned in India due to data privacy breaches	2018: EC charges Alphabet US\$5.1bn for infringing on European competition law; 2019: EC charges Alphabet US\$1.7bn for infringing on European competition law	2019: US Class action alleges Amazon of Violating federal antitrust laws by monopolising the online marketplace through agreements with third party sellers	2018: EC charges Apple with tax fraud and demands a retrospective US\$15bn in taxes	2019: Facebook enters a settlement with the Federal Trade Commission for US\$5bn for data privacy breaches	1999: Federal court orders Microsoft broken up because it violates the Sherman Act 1890; 2004: EC levies US\$611m fine; 2008: EC levies US\$1.85bn fine	2020: Trump administration signs executive order to prohibit the use of WeChat for US businesses

- 41 Note that some companies – notably Alphabet and Facebook – have a share structure that consists of multiple classes of shares. In this structure, class A shares carry the right to one vote during the annual shareholder meeting, class B shares carry the right to ten votes and class C shares carry no voting rights at all. For companies with such a share structure, the share ownership presented here represents only class A shares. As a consequence, individual shareholders might exert disproportional voting rights compared to the share of the respective company’s stock that they hold. While the ownership shares presented above thus appear to suggest that institutional shareholders, such as the Vanguard Group, BlackRock or State Street, wield the most power over the Big Tech companies, this is often not the case. In the case of Alphabet, Sergey Brin and Larry Page own less than 13 per cent of stock but control more than 51 per cent of the company’s voting power (Alphabet, Notice of 2020 Annual Meeting of Stockholders and Proxy Statement, p.62). In the case of Facebook, Mark Zuckerberg owns just 0.17 per cent of the company’s class A shares, but 81.8 per cent of its class B shares. Together with some proxy voting power he exerts for other shareholders, Zuckerberg’s total voting power amounts to 57.9 per cent (Facebook, Notice of 2020 Annual Meeting of Stockholders and Proxy Statement, p.46). In both cases, shareholder proposals to change this structure to a one-share-one-vote model were frequently rejected by those controlling the existing voting power.

To assess the monopoly power of the Big Tech firms, we look at their market share. Figure 2.4 displays the proportions of selected markets captured by several Big Tech companies. These figures clearly show the different revenue streams that the Big Tech firms depend on. Facebook and Alphabet earned 50 per cent of digital advertisement income worldwide in 2019,⁴³ which is about 55 per cent of total global advertisement income (US\$587 billion).⁴⁴ Apple captured 32 per cent of smartphone sales in 2019.⁴⁵ The revenue Microsoft generated through its cloud services in 2019 was US\$39 billion, or 15.4 per cent of global cloud computing revenue that year. As the abovementioned report of the US congress on competition in digital markets states:

*Google's dominance is protected by high entry barriers, including its click-and-query data and the extensive default positions that Google has obtained across most of the world's devices and browsers. A significant number of entities – spanning major public corporations, small businesses, and entrepreneurs – depend on Google for traffic, and no alternate search engine serves as a substitute.*⁴⁶

2.3 The offshore geography of Big Tech

Another element characterising the rent-seeking Big Tech model is the use of tax havens. Where the offshoring of production is key to the big profit margins of Apple⁴⁷, all Big Tech firms extensively rely on the use 'letterbox' or 'shell' companies – legal entities with no or little physical substance – to claim domicile in a tax haven, enabling our Big Tech firms to shift profits, avoid taxes, store wealth and circumvent regulatory requirements.⁴⁸ Coinciding with the 'Big Tech Bang' around the turn of the millennium, the use of tax havens has become an integral part of corporate financialisation.⁴⁹

*The application of the current corporate tax rules to the digital economy has led to a misalignment between the place where the profits are taxed and the place where value is created. In particular, the current rules no longer fit the present context where online trading across borders with no physical presence has been facilitated, where businesses largely rely on hard-to-value intangible assets, and where user generated content and data collection have become core activities for the value creation of digital businesses.*⁵⁰

43 Revenue data in this section was obtained from the individual corporations' 2019 10-K SEC filings

44 Statista (2020) Digital advertising spending worldwide from 2018 to 2024. Available at: <https://www.statista.com/statistics/237974/online-advertising-spending-worldwide/> (accessed 2 December 2020).

45 Statista (2020) Global revenue from smartphone sales from 2013 to 2020 (in billion U.S. dollars). Available at: <https://www.statista.com/statistics/237505/global-revenue-from-smartphones-since-2008/> (accessed 2 December 2020).

46 Extracted from House Committee on the Judiciary (2020) *Investigation of competition in digital markets*. Majority staff report and recommendations, subcommittee on antitrust, commercial and administrative law. Available at: https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf (accessed 1 December 2020), p.14.

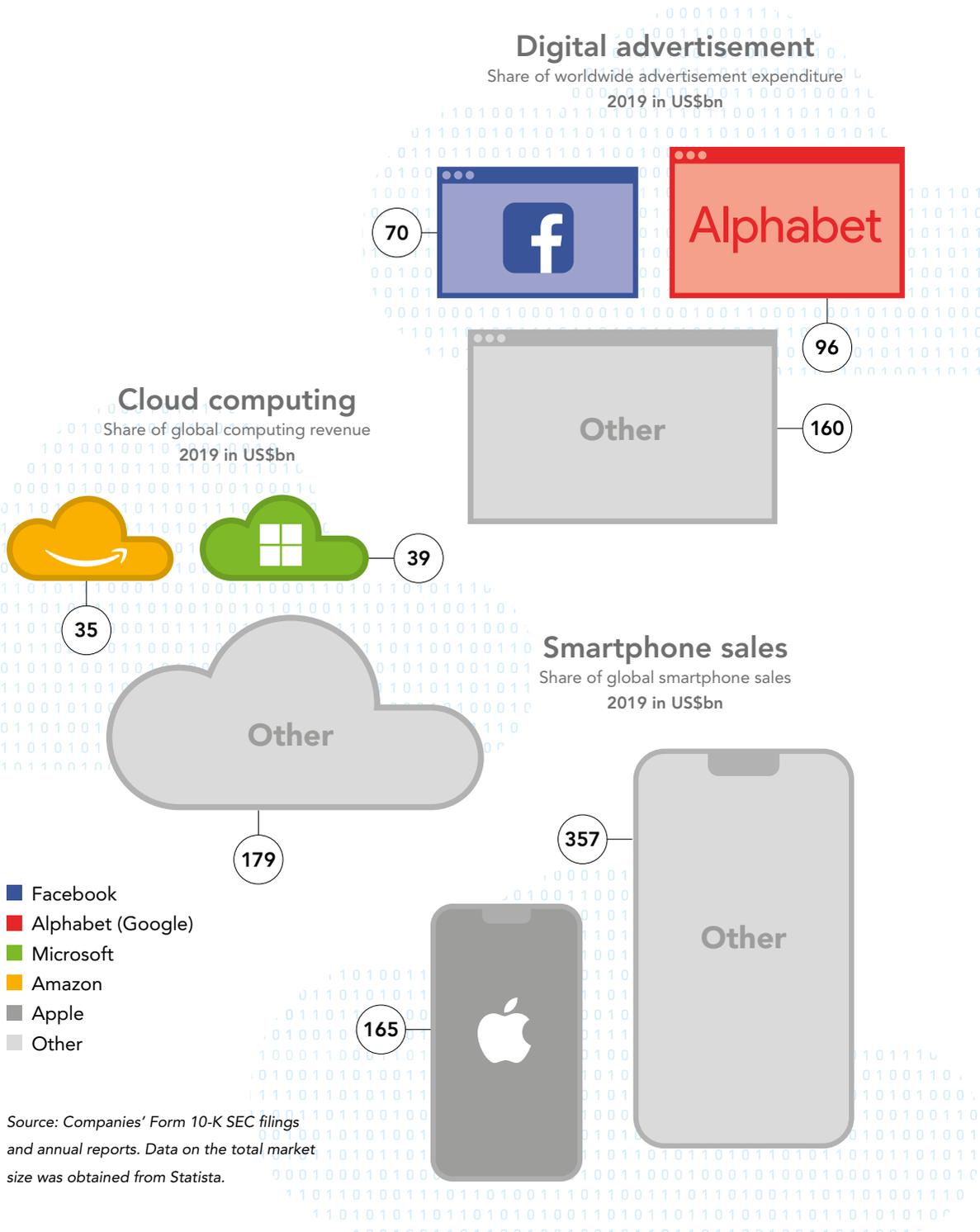
47 Froud J, Sukhdev J, Leaver A and Williams K (2012) Financialization across the Pacific: Manufacturing cost ratios, supply chains and power. *Critical Perspectives on Accounting* 25(1): 46–57.

48 Palan R, Murphy R and Chavagneux C (2010). *Tax Havens: How Globalization Really Works*. Ithaca, NY: Cornell University Press.

49 Fernandez R and Hendrikse R (2020). *Offshore finance*. In: Mader P, Mertens C and Van der Zwan N (eds) *International Handbook of Financialization*. London: Routledge, pp. 224–237.

50 European Commission (2018) Proposal for a COUNCIL DIRECTIVE laying down rules relating to the corporate taxation of a significant digital presence. Available at: https://ec.europa.eu/taxation_customs/sites/taxation/files/proposal_significant_digital_presence_21032018_en.pdf (accessed 1 December 2020), 1

Figure 2.4 Big Tech market shares



First, Big Tech firms can simply select a jurisdiction to domicile their intellectual property, and hence choose where value is 'created'. The ability to allocate revenue-generating assets (intellectual property) across jurisdictions, and hence choose tax rights, is key to understanding Big Tech firms' use of tax havens. The data shows that the preferred jurisdictions to domicile intellectual property for US Big Tech firms are the three largest tax havens of the European Union (EU): Ireland, Luxembourg and the Netherlands. These tax havens are well-known 'conduit' jurisdictions with extremely large in- and outflows of capital.⁵¹ These conduits operate as intermediary destinations for mobile capital, for example allowing holding companies to transfer untaxed revenues from the parent company to subsidiaries in other tax havens.

Second, our selected Big Tech firms hold (extraordinarily) large stocks of financial assets (see next section). These assets are typically held as bonds or other financial instruments, but are mainly owned by subsidiaries that are domiciled in so-called 'sink' jurisdictions that function as final destinations for capital e.g. the Cayman Islands or British Virgin Islands (BVI). These offshore jurisdictions play a critical role in corporate strategies to preserve the accumulated wealth for Big Tech firms.

Third, subsidiaries in tax havens are often used to circumvent regulations. For example, the parent companies of Alibaba and Tencent are registered in the Cayman Islands. This is a result of Chinese government restrictions on foreign investment in Chinese Big Tech companies. To circumvent these restrictions, these companies register a holding company in an offshore jurisdiction that enables them to access global capital markets.⁵² The Cayman Islands and the BVI are popular jurisdictions for these reasons, while also offering opportunities for tax avoidance.⁵³

Map 2.2 details the number of offshore subsidiaries of our seven Big Tech Firms, revealing that Hong Kong, Ireland, the BVI and Singapore stand out as Big Tech tax havens. These numbers do not reveal the actual size of the financial flows in and out of these tax havens – they merely suggest that tax havens are widely used by Big Tech companies for legal, organisational and financial purposes. We know from in-depth case studies that the vast majority of tax havens are not used for operational activities, such as research and development (R&D), production, services and management.⁵⁴ Instead, subsidiaries domiciled in tax havens organise assets and intra-firm financial flows as tax-efficiently as possible.

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- 51 Garcia-Bernardo J, Fichtner J, Takes FW, and Heemskerk EM, 2017. Uncovering offshore financial centres: Conduits and sinks in the global corporate ownership network. *Scientific Reports* 7: 6246. DOI: 10.1038/s41598-017-06322-9.
- 52 Braspenning N (2018) Comprehensive probe into how and why Chinese companies use tax havens and offshore financial centres – A tax integrity reference work. In: Norbert Braspenning (blog). Available at: <https://norbertbraspenning.wordpress.com/2018/05/25/comprehensive-probe-into-how-and-why-chinese-companies-use-tax-havens-and-offshore-financial-centres-a-tax-integrity-reference-work/> (accessed 1 December 2020); Greguras F and Liu DW (n.d.) An updated look at doing business in China via Cayman Islands. Report for Fenwick & West LLP. Available at: https://assets.fenwick.com/legacy/FenwickDocuments/Doing_Business_in_China.pdf (accessed 1 December 2020).
- 53 Fichtner J (2016) The anatomy of the Cayman Islands offshore financial center: Anglo-America, Japan, and the role of hedge funds. *Review of International Political Economy* 21(6): 1034–1063.
- 54 Reurink A and Garcia-Bernardo J (2020) Competing for capitals: The great fragmentation of the firm and varieties of FDI attraction profiles in the European Union. *Review of International Political Economy*. Epub ahead of print 19 March 2020. DOI: 10.1080/09692290.2020.1737564.

Map 2.2 Big Tech subsidiaries in tax havens



Interestingly, the data show that the share of subsidiaries domiciled in tax havens is significantly higher for the two Chinese Big Tech companies compared to their US counterparts: Alibaba is comprised of 352 entities, of which 128 subsidiaries (36 per cent) are domiciled in tax havens, whereas Tencent operates a total number of 130 entities, of which 46 (35 per cent) are domiciled in tax havens. The US Big Tech firms have a smaller share of entities domiciled in tax havens, bringing the average for the seven Big Tech firms to 15 per cent (310 subsidiaries in tax havens of a total of 2020 entities).

Besides having a large offshore footprint in the EU, the US Big Tech companies also operate out of Asia's largest tax havens: Hong Kong and Singapore. Of the EU tax havens, Ireland is the largest Big Tech tax haven in the corporate structures, operating multiple subsidiaries for our seven companies, including operational activities for US Big Tech firms. Facebook, for instance, has 14 subsidiaries in Ireland, amongst others operating its European headquarters out of Dublin. Meanwhile, Amazon and Microsoft make extensive use of Luxembourg, with 11 and 9 subsidiaries respectively. Lastly, Tencent and Alibaba have a significant presence in four tax havens: Hong Kong, BVI, Singapore and the Cayman Islands. Of the seven Big Tech companies, Alibaba operates most offshore subsidiaries: 39 subsidiaries in the BVI, 20 in the Cayman Islands, 45 in Hong Kong, and 19 in Singapore.

2.4 Corporate financialisation

How particular monopoly rents are being monetised – i.e. turned into money – leads us into discussing *financialisation*. As explained in a previous report,⁵⁵ financialisation can be broadly defined as 'the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies',⁵⁶ while *corporate financialisation* focuses on the ways in which traditionally nonfinancial firms operate in a financialising universe, 'increasingly partaking in practices that have been the domain of the financial sector'.⁵⁷

Corporate financialisation is typically seen as a phenomenon or process through which publicly-listed companies aim to inflate their stock prices. Although the underlying principle of *shareholder value maximisation* appears homogenous, it is 'inconsistent and heterogeneous in practice'.⁵⁸ There are myriad ways in which shareholder value can be pumped up along a company's value chain. They range from relentlessly cutting production costs by outsourcing and offshoring, demanding mounting tribute payments from users of a company's infrastructure, to meticulously organised tax avoidance.⁵⁹

55 Fernandez R and Klinge TJ (2020) *Private gains we can ill afford. The financialisation of Big Pharma*. Report, Amsterdam: SOMO.

56 Epstein GA (2005) *Financialization and the World Economy*. Cheltenham: Edward Elgar, p.3.

57 Aalbers M (2019) Corporate financialization. In: Richardson D, Castree N, Goodchild MF, Kobayashi A, Liu W and Marston RA (eds) *The International Encyclopedia of Geography: People, the Earth, Environment, and Technology*. Oxford: Wiley, p.4.

58 See Erturk I (2020) Shareholder primacy and corporate financialization. In: Mader P, Mertens D, and Van der Zwan N (eds) *The Routledge International Handbook of Financialization*. London: Routledge, pp.43–55.

59 Fernandez R and Hendrikse R (2015) *Rich corporations, poor societies: The financialisation of Apple*. Report, Amsterdam: SOMO.

The resulting profits can then be used to pay out hefty dividends or inflate share prices, as we will see below. In this report, we therefore use the concept of financialisation – which is considered a prime example of ‘rentierism’⁶⁰ – to uncover how Big Tech companies have become the world’s preeminent rentiers. To do so, we distinguish between three stylised manifestations.

First, companies grow their balance sheets by holding a larger amount of financial assets compared to fixed capital. Moreover, they take on more debt to increase the profitability of their equity. In the case of larger financial assets, early researchers argued that corporations increasingly moved towards a ‘pattern of accumulation in which profits accrue primarily through financial channels rather than through trade and commodity’.⁶¹ More recent investigations, however, cast doubt on this notion and highlight the variegated uses of financial reserves more broadly.⁶² The growth of financial assets was often observed together with diminishing investment in fixed capital or R&D. These trends have been documented in many developed economies, especially in those where multinational corporations dominate the economic landscape.⁶³ At the same time, corporations take on more debt, especially so in the wake of the financial crisis of 2007/2008 and the ensuing monetary policies of quantitative easing (QE).⁶⁴ This has led some scholars to argue that increasing financial assets were at least in part financed by debt.⁶⁵ In a low-interest-rate and high-liquidity environment, not just struggling firms but also the most profitable ones have seized the opportunity to substitute debt for equity. Growing financial reserves and liabilities mean that corporations more and more resemble financial institutions.⁶⁶ They increasingly finance mergers and acquisitions (M&As) by cheap debt and – to a lesser extent – financial reserves, thereby fostering economic concentration and monopoly power. In a virtuous circle, the most powerful companies, especially those popular among investors, can thus obtain the means to grow larger still and consolidate their position.

Second, companies prioritise shareholder returns over other stakeholders’ interests (such as employees, customers, the environment or fiscal authorities), following the ‘shareholder value’ approach to corporate governance.⁶⁷ Simply put, this approach recommends the pursuit of whatever strategy yields the biggest benefit to shareholders, in the form of dividends and a rising share price. It was this approach that arguably led to new technologies – from search engines to social networks – becoming the world’s most important advertising outlets. To align the interests of managers and shareholders, corporate executives should be remunerated in ‘performance-oriented’ ways, such as

60 Christophers B (2020) *Rentier Capitalism. Who Owns the Economy, and Who Pays For It?* London: Verso.

61 Krippner GR (2005) The financialization of the American economy. *Socio-Economic Review* 3(2): 174.

62 Rabinovich J (2019) The financialization of the non-financial corporation. A critique to the financial turn of accumulation hypothesis. *Metroeconomica* 70(4): 738–775.

63 International Monetary Fund (2006) *World economic outlook*. Washington, DC: International Monetary Fund, pp.135–159.

64 In its simplest form, ‘QE can be described as the purchase of bonds and other debt instruments by central banks with money that has been newly created’. For a more detailed discussion, see: Fernandez R, Bortz P and Zeolla N (2018) *The politics of quantitative easing. A critical assessment of the harmful impact of European monetary policy on developing countries*. Report, Amsterdam: SOMO.

65 Kliman A and Williams SD (2015) Why ‘financialisation’ hasn’t depressed US productive investment. *Cambridge Journal of Economics* 39(1): 67–92.

66 Serfati C (2011) Transnational corporations as financial groups. *Work Organisation, Labour & Globalisation* 5(1): 10–38.

67 Froud J, Haslam C, Johan S and Williams K (2000) Shareholder value and financialization: Consultancy promises, management moves. *Economy and Society* 29(1): 80–110.

stock options, and corporate resources should be distributed to shareholders if they yield returns that are deemed insufficient.⁶⁸ Beginning in the US in the 1980s, due in part to a change in the tax code, corporations often have often pursued share repurchasing schemes that benefited shareholders and managers alike. Since share ownership remains relatively concentrated in high-income groups and share-based compensation applies to only a fraction of employees across the economy, share repurchases drive income and wealth inequality. To this day, share repurchases remain popular, as US corporations alone spent more than US\$800 billion in 2019 on repurchasing their own shares.⁶⁹ As noted earlier, the availability of cheap debt means that corporations increasingly borrow money to buy back their own shares.⁷⁰ By now, much evidence points out that increasing shareholder orientation has had detrimental effects on long-term corporate productivity and societal benefits by prioritising shareholder returns over well-paid employment, investment in fixed capital or R&D or taxes paid to fiscal authorities.⁷¹

Third, companies transform their asset structures from fixed capital, such as buildings and machinery, into intangible assets, like intellectual property rights (IPRs) and goodwill. This indicates a shift in corporate activity from producing and selling commodities to commanding rent incomes. These incomes can be defined as ‘income[s] derived solely from the ownership and control of assets, rather than from innovative entrepreneurial activity and the productive use of labour’.⁷² In contrast to profits derived from using the latest organisational structure and technology to sell commodities under conditions of ‘cut-throat’ competition, rent incomes result from ownership and scarcity. The origins of such scarcity can be natural (as in the case of resources or land) or constructed (as in the case of IPRs such as patents or brand names).⁷³ In addition to codified intangible assets that can form the base of rent incomes by, for example, charging other corporations royalties or functioning as a tool to evade taxes, there is another intangible asset worth noting: goodwill. As an established accounting item, goodwill is the result of M&As in which one corporation purchases another for a price above the book value of the latter’s total assets. It thus represents a premium paid during an acquisition, which is recorded on the acquiring corporation’s balance sheet. The acquiring corporations’ willingness to pay such premiums is based on the unique operational advantage that the acquired corporations have and on their name, brand or customer relations, including data. The increasing importance and value of goodwill reflects the growing significance of building monopoly power through combining individual parts whose sum is more ‘valuable’ than their value as independent entities. The increasing value of goodwill on the balance sheet of a Big Tech firm points to the accumulated premiums paid for companies acquired in the race to the economic heights of monopoly power.

68 Jensen MC and Meckling WH (1976) Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3(4): 305–360.

69 Aramonte S (2020) Mind the buybacks, beware of the leverage. *BIS Quarterly Review* September 2020: 49–59. Available at: https://www.bis.org/publ/qtrpdf/r_qt2009d.pdf (accessed 1 December 2020).

70 Light L (2019) More than half of all stock buybacks are now financed by debt. Here’s why that’s a problem. *Fortune*, 20 August. Available at: <https://fortune.com/2019/08/20/stock-buybacks-debt-financed/> (accessed 1 December 2020).

71 Lazonick W (2013) The financialization of the U.S. corporation: What has been lost, and how it can be regained. *Seattle University Law Review* 36(2): 857–909.

72 UNCTAD (2017) *Trade and development report 2017. Beyond austerity: Towards a global new deal*. Report, Geneva Switzerland, September. Available at: https://unctad.org/system/files/official-document/tdr2017_en.pdf (accessed 1 December 2020), p.120.

73 Mazzucato M (2018) *The Value of Everything: Making and Taking in the Global Economy*. London: Allen Lane.

In sum, the research objectives of this study are to illustrate these different approaches to corporate financialisation and to empirically examine how they relate to the world's top seven tech companies: Alibaba, Alphabet (Google), Amazon, Apple, Facebook, Microsoft and Tencent. Although these companies are comparable to a certain degree, they offer different products and services, which might be reflected in different financial results and trends. One of our aims then is to distil the commonalities underlying 'the Big Tech model' while being aware of their differences.

3 The financialisation of Big Tech

Combining the analytical frameworks of corporate financialisation and the Big Tech model enables us to make sense of the seven corporations' financial data. In keeping with the order presented above, we will now walk through the different manifestations of corporate financialisation: first, the balance sheets; second, the payouts to shareholders; and third, intangible assets. We will argue that while we do see clear indications of corporate financialisation trends among Big Tech corporations, several observations diverge from the general model that we outlined.

3.1 Balance sheet

3.1.1 Financial assets

The asset side of the Big Tech companies' balance sheets discloses an impressive development. They have built up significant financial assets, in absolute terms as well as compared to their fixed capital (see Figure 3.1). Individually, Apple has the largest accumulated financial assets, followed by Microsoft, Alphabet and Alibaba.⁷⁴ While it appears as if the increase in financial assets gathered steam only after the financial crisis of 2007/2008, the relatively recent establishment of many corporations plays a significant role in this trend. Furthermore, the financial assets represent accumulated earnings: for example, Apple's net sales grew from about US\$8 billion in 2000 by more than 3,100 per cent to US\$260 billion in 2019, and Microsoft's net sales increased from US\$22 billion in 2000 by almost 450 per cent to US\$126 billion in 2019.

The composition of these financial assets is at least as interesting as their nominal volume, because it allows us to gather preliminary evidence about each corporation's financial strategy (Figures 3.2 and 3.3). For the five US corporations, their portfolios clearly show that their preferred investment category is made up of municipal and federal government bonds, from both the US and other advanced economies. These stand at a recent total of US\$263 billion.⁷⁵ The second largest investment class is corporate bonds, which attracted investments worth US\$163 billion, followed by money market funds stakes of US\$52 billion and mortgage-backed securities of US\$41 billion.

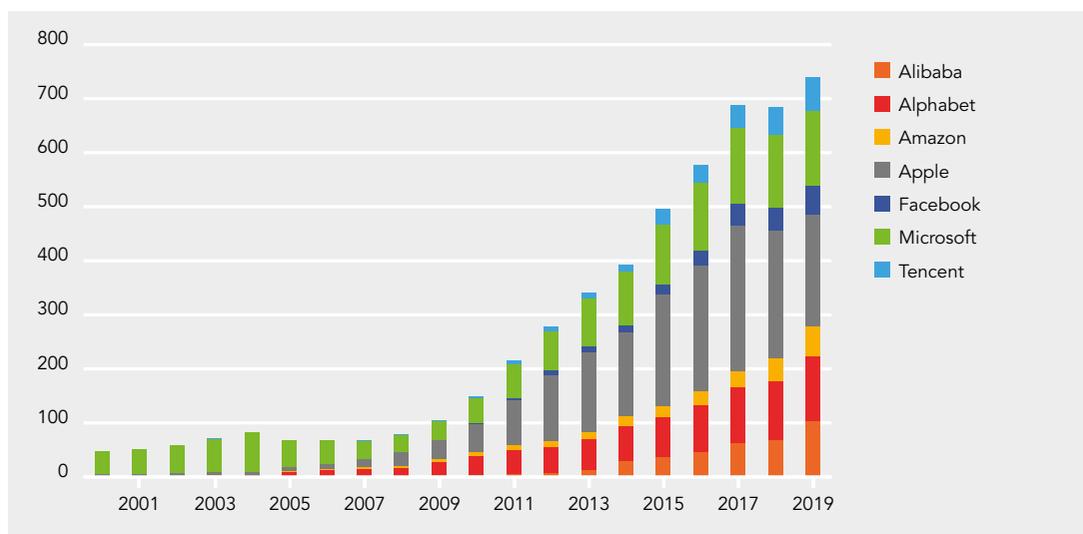
These aggregate figures, however, obscure noticeable differences between the individual corporations' portfolios. For instance, comparing Apple's financial assets to those of Microsoft provides evidence of a more aggressive strategy on the part of Apple, which holds a massive US\$98 billion in corporate bonds and operates its own asset management firm, Braeburn Capital, from the tax haven of Reno, Nevada.⁷⁶

74 See Annex for an overview of variables used and number of observations.

75 Portfolio data was obtained from the individual corporations' Big Tech 2019 10-K SEC filings, taking a snapshot of financial assets in December 2019.

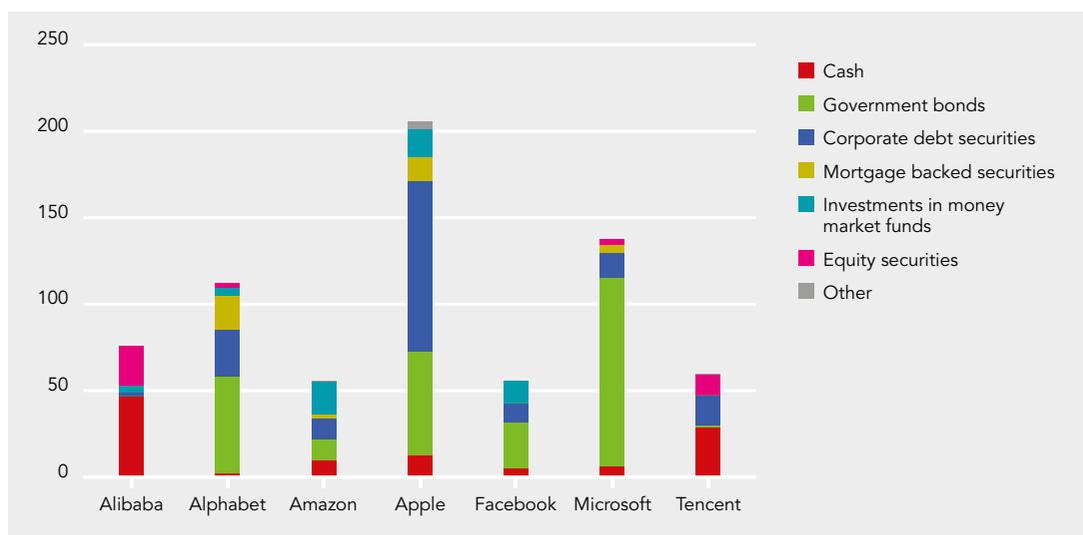
76 Fernandez R and Hendrikse R (2015) *Rich corporations, poor societies: The financialisation of Apple*. Report, Amsterdam: SOMO, pp.17–18.

Figure 3.1 Financial assets in US\$ billion



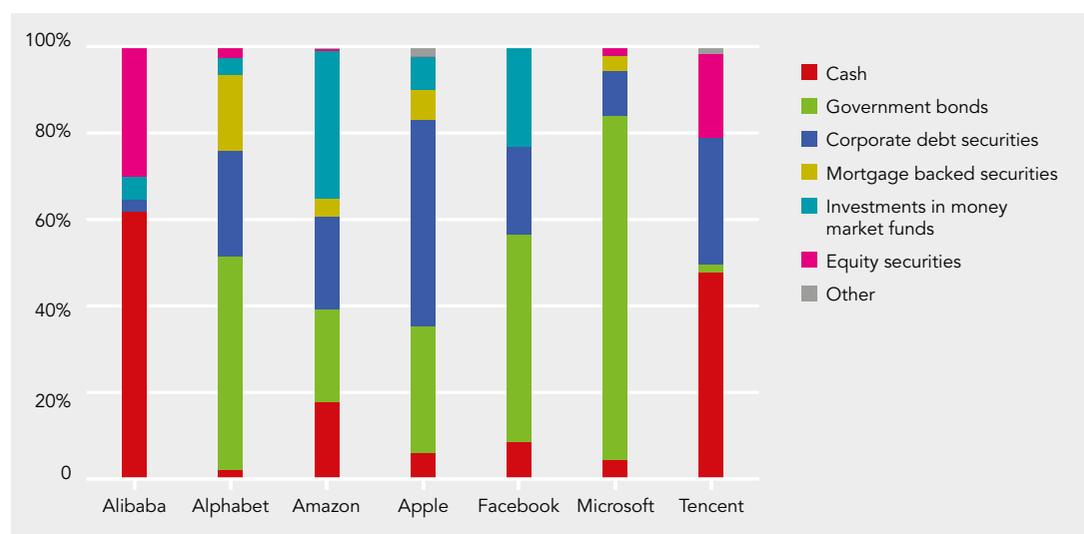
Source: Refinitiv Datastream.

Figure 3.2 Portfolio of financial assets (end of fiscal year 2019) in US\$ billion



Source: Companies' Form 10-K SEC filings and annual reports.

Figure 3.3 Portfolio of financial assets (end of fiscal year 2019) by composition



Source: Companies' Form 10-K SEC filings and annual reports.

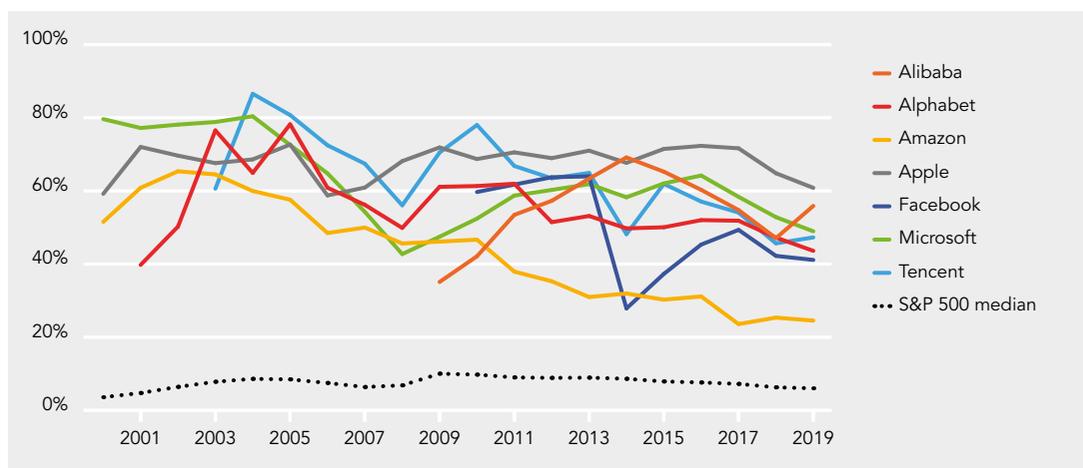
Microsoft, on the other hand, pursued a more defensive investment position by holding US\$109 billion in government bonds. Yet other corporations, such as Amazon and Facebook, hold their (significantly smaller) financial assets in money market funds.

In contrast to their US counterparts, Alibaba and Tencent hold much greater proportions of cash and short-term investments: US\$47 billion and US\$29 billion, respectively. Together with the fact that their second most important financial assets were corporate securities in listed and unlisted entities, this suggests investment positions closer to Apple's than to Microsoft's position. Notwithstanding the considerable volume of financial assets, this brief glance at Big Tech tells us that we cannot distil a common 'Big Tech investment strategy' from this data.

As share of the firms' total assets, financial assets exhibit a relatively stable level, despite the strong increase in financial assets (Figure 3.4). However, they have declined from a median value of 60 per cent of total assets in 2010 to 47 per cent in 2019. This relative decline largely reflects the growing size of investments in fixed capital, since Big Tech firms have radically increased their physical infrastructure. The 'heaviest' corporations in this regard are Amazon and Alphabet (Figure 3.5). While Amazon's fixed capital of US\$98 billion in 2019 mostly consists of warehouses and related machinery as well as data centres, Alphabet has focused its US\$85 billion in fixed capital primarily on data centres. This shows that a larger part of Big Tech corporations' assets are becoming physical as the firms grow larger, depending on their individual business model. Apple's fixed capital, for instance, has not grown nearly as fast, which partly reflects its outsourced and offshored material production.⁷⁷

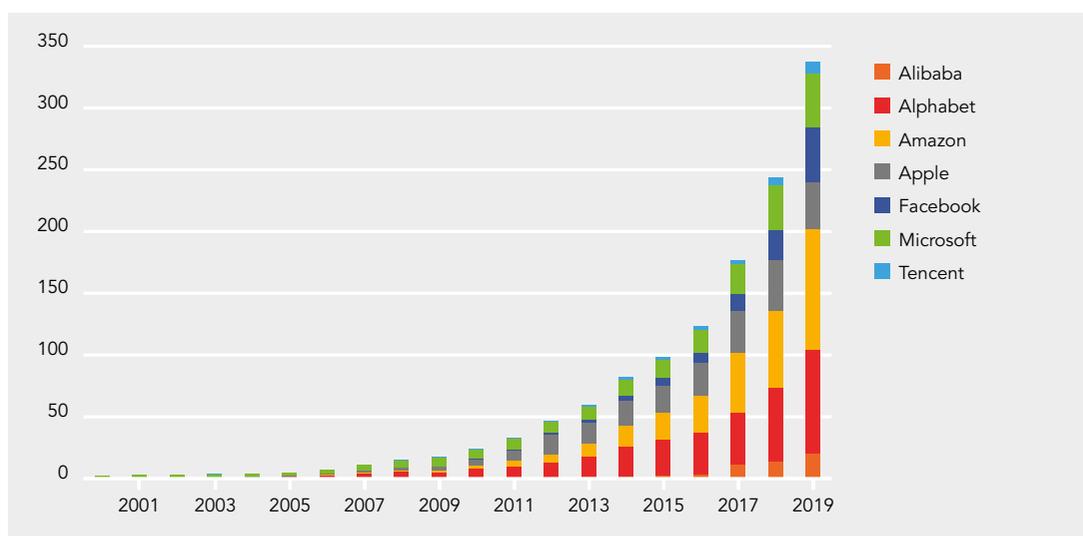
77 Froud J, Johal S, Leaver A and Williams K (2014) Financialization across the Pacific: Manufacturing cost ratios, supply chains and power. *Critical Perspectives on Accounting* 25(1): 46–57.

Figure 3.4 Financial assets as percentage of total assets



Source: Refinitiv Datastream.

Figure 3.5 Fixed capital in US\$ billion



Source: Refinitiv Datastream.

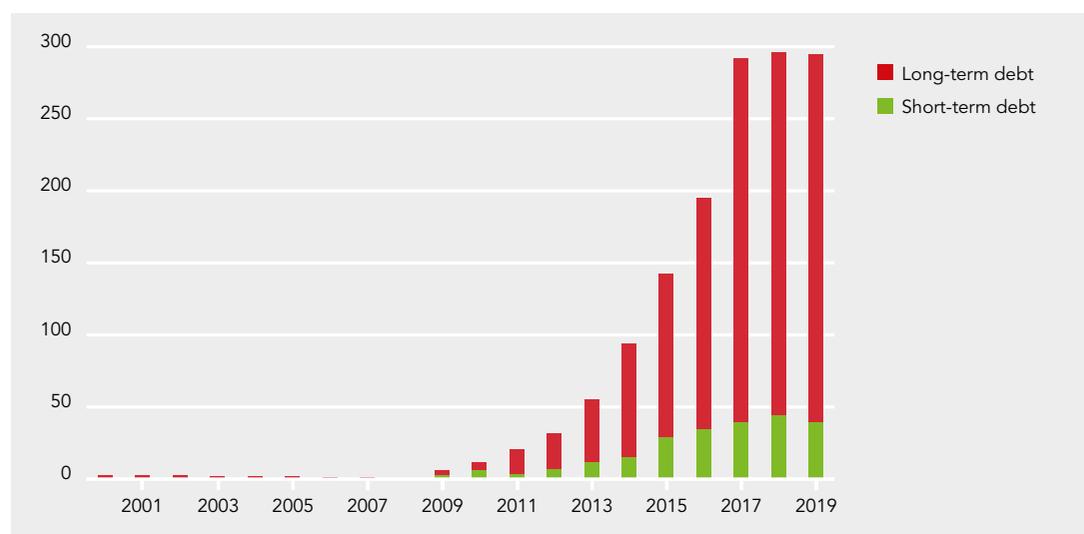
These observations, however, do not necessarily imply a departure from a financialised corporate model. While Big Tech corporations have certainly made massive investments in their physical infrastructure, the size of their financial assets remains much larger than that of companies in other sectors. As a case in point, their ratio of financial assets to total assets stood far above the ratio of the corporations indexed in the S&P 500 – a representative subset of the largest US corporations – throughout the study period, although it followed a slightly falling trend (Figure 3.4). This might well

indicate that rather than financialisation occurring across the corporate board, some sectors – like Big Tech – exhibit significantly stronger trends in this direction.

3.1.2 Debt

Shifting our gaze to the other side of the corporate balance sheet, we see that Big Tech corporations have shown an increasing appetite for debt. Although we should not forget the corporations' varying ages when looking at the aggregate volume of debt, all corporations have been listed on stock markets since at least 2014. Since then, however, total debt has grown from US\$94 billion to US\$295 billion in 2019, with long-term debt accounting for most of this rise (Figure 3.6).

Figure 3.6 Total debt in US\$ billion



Source: Refinitiv Datastream.

Three US corporations are primarily behind this hunger for debt: Apple, which increased its total debt from practically zero as recently as 2013 to US\$108 billion in 2019; Microsoft, which followed a similar development from almost no debt in 2008 to US\$79 billion in 2019; and Amazon, whose total debt grew from US\$393 million to US\$52 billion in the decade leading up to 2019. In all cases, most debt was incurred through long-term debt instruments, namely through the issuance of corporate bonds with ever-decreasing interest rates. In today's low-interest-rate environment, aided by the recent QE policies of the world's most powerful central banks following the pandemic downturn, some Big Tech corporations were able to obtain their cheapest funds yet. Apple, for example, raised US\$8.5 billion through bonds – with maturities reaching from three to 30 years – with coupons as

low as 0.75 per cent.⁷⁸ Amazon most emblematically capitalised on the economic shock, however: it recently raised US\$10 billion through bonds, paying as little as 0.4 per cent for a three-year bond in what the business press described as ‘the cheapest ever borrowing costs in the US corporate bond market’.⁷⁹ Despite these extraordinarily low yields, these bond issuances were ‘oversubscribed’, meaning that investors scrambled to hand their money to these corporations in order to stash it away safely. As we will explain below, this very cheap debt enabled Big Tech corporations to further engage in shareholder payouts and M&As. One of the effects of QE policies has thus been to facilitate a shift from equity to debt in the capital base of some of the world’s best-rated corporations, which improved key investor metrics like earnings per share (EPS) in the process.

It is, however, important to note that the increase in total debt has not moved the corporations into territory as dangerous as that observed in the pharmaceutical sector, for example.⁸⁰ If we consider the proportion of total debt to sales as a measurement to understand the corporate ability to shoulder debt, we find that Big Tech, by and large, remains on the safe side. Even though some corporations exhibited rather high ratios – in 2019, Microsoft’s debt-to-sales ratio stood at 63 per cent and Apple’s at 42 per cent – these need to be taken with a grain of salt given these corporations’ easy access to cheap sources of refinancing and stable sales growth. Altogether, the analysis of Big Tech’s debt confirms what we observed above, namely that Microsoft and Apple exhibit a trajectory of financialisation that diverges from that of the other firms. Their balance sheets, which are significantly larger with respect to financial assets and debt, may indicate that these companies are at a later stage of development. Their distinctness is also reflected in the second manifestation of corporate financialisation.

3.2 Payouts to shareholders

Corporations can hand out money to their shareholders in two different ways. First, they can pay dividends, which happens mostly on an annual basis following the annual shareholder meeting. Second, as described above, they can use internally generated or borrowed funds to repurchase, or buy back, their own shares. Share repurchases generally increase the valuation of equity. First, share prices rise in response to management announcements of intended repurchases. Later, they are boosted either directly by the actual repurchases or indirectly through the willingness of investors to purchase the remaining shares at higher prices, given their now supposedly higher EPS. In interesting contrast to what some variants of shareholder value theory stipulate, share repurchases are announced more often during brisk times of already high share prices than during dull times of ‘undervalued’ equity.⁸¹ Next to cashing in on higher EPS, share repurchases thus generate capital

78 Duguid K and Franklin J (2020) Apple borrows on the cheap to fund buybacks, dividends. *Reuters* May 5. Available at: <https://uk.reuters.com/article/us-apple-debt/apple-borrows-on-the-cheap-to-fund-buybacks-dividends-idUKKBN22H001> (accessed 1 December 2020).

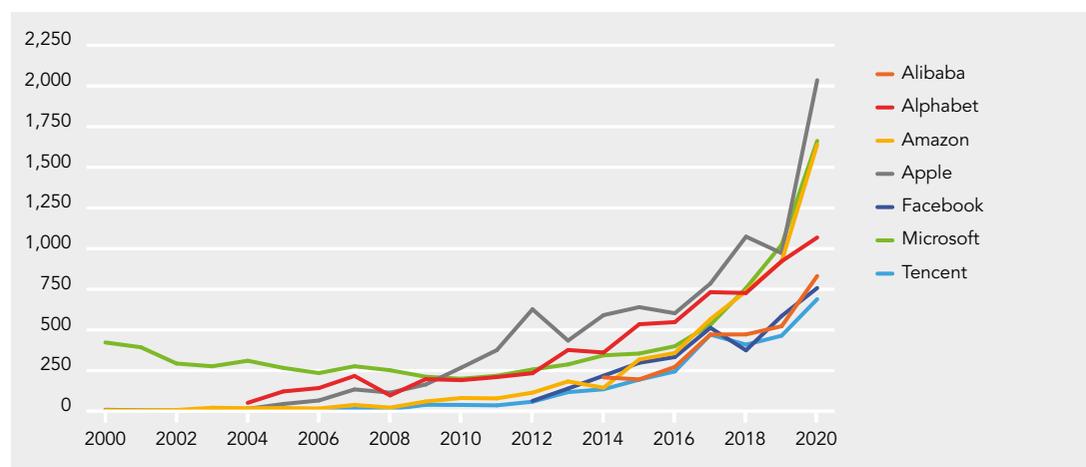
79 Rennison J, Platt E and Lee D (2020) Amazon secures record low borrowing costs. *Financial Times*, June 2. Available at: <https://www.ft.com/content/a5b6138b-df18-497f-bed1-57a0f75bfc1f> (accessed 1 December 2020).

80 Fernandez R and Klinge TJ (2020) *Private gains we can ill afford. The financialisation of Big Pharma*. Report, Amsterdam: SOMO.

81 Lazonick W (2013) The financialization of the U.S. corporation: What has been lost, and how it can be regained. *Seattle University Law Review* 36(2): 886.

gains for existing shareholders, who hold on to their shares and see their portfolio's financial worth rise or sell them later at a higher price.

Figure 3.7 Market capitalisation in US\$ billion



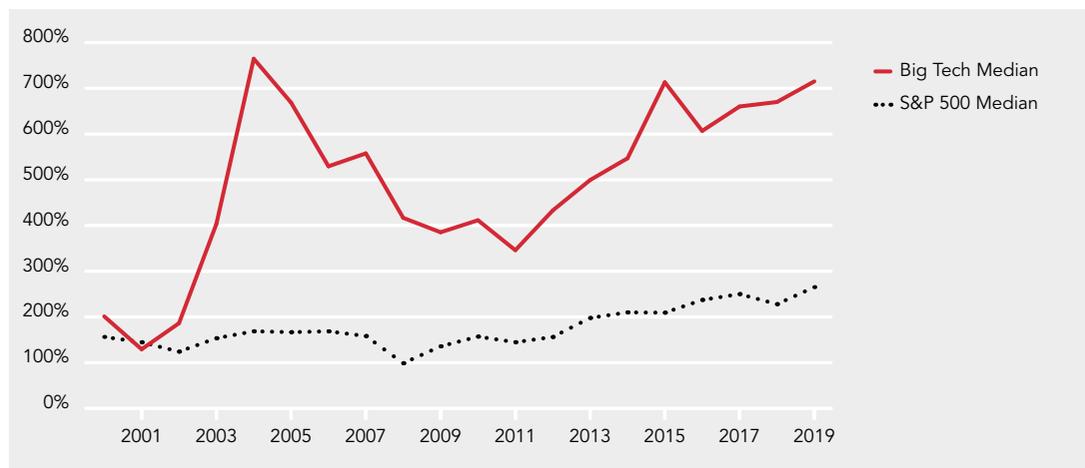
Source: Refinitiv Datastream.

Indeed, Big Tech's market capitalisation – the share price multiplied by the number of outstanding shares – had already risen to levels unheard of before the pandemic sent shockwaves around the globe. Back in 2018, Apple famously became the first corporation trading at a total market capitalisation of US\$1 trillion (= US\$1,000 billion), later to be joined by Microsoft (Figure 3.7). When the pandemic struck, new rounds of QE and investors' hunger for the shares of companies likely to benefit from the new situation in their respective markets prompted Big Tech stocks to surge further still, notwithstanding ensuing selloffs. In October 2020, four corporations – Apple, Microsoft, Amazon and Alphabet – had crossed the threshold of a market capitalisation of US\$1 trillion, with Apple even surpassing US\$2 trillion. This rise due to market sentiment outpaced any rise in actual revenue. In 2019, the median market capitalisation of the seven Big Tech corporations stood at 715 per cent of their sales, which by far exceeded the median value of 265 per cent of all S&P 500 corporations (Figure 3.8). At the time of writing, in October 2020, this ratio now stands at 730 per cent, and it remains to be seen how this disconnect evolves once the immediate fallout of the pandemic has passed.

In line with our understanding, a study by the Bank for International Settlements has argued that corporations' main motive for repurchasing their own shares is to expand their debt in proportion to their equity (debt-to-equity ratio) in order to increase EPS.⁸² This means that companies that engage in share buybacks effectively adopt logics we know from financial actors such as private equity firms, whose business model also hinges on their ability to generate higher returns through higher leverage, which is the degree to which companies use debt over equity.

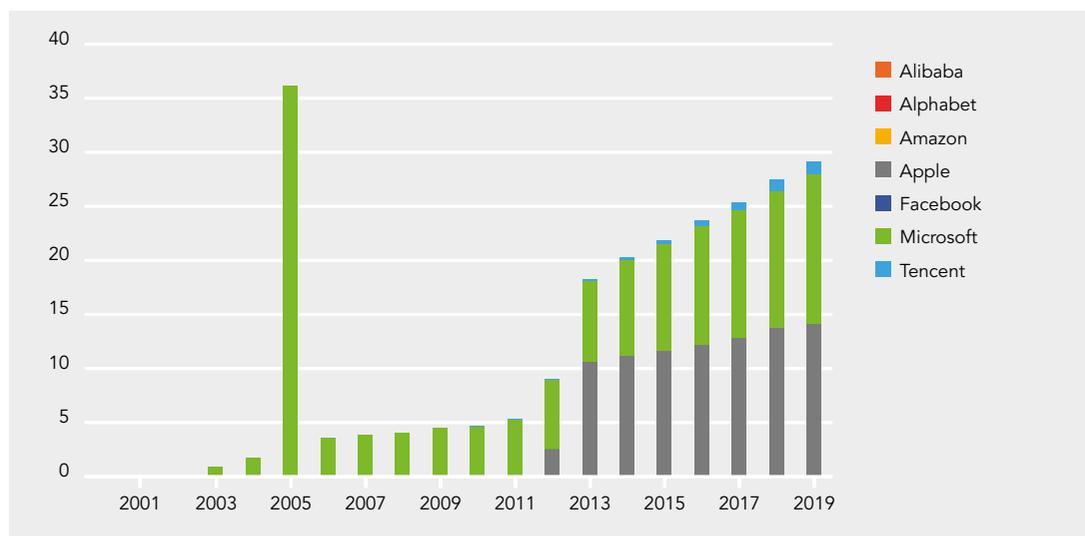
82 Aramonte S (2020) Mind the buybacks, beware of the leverage. *BIS Quarterly Review* September 2020: 49–59. Available at: https://www.bis.org/publ/qtrpdf/r_qt2009d.pdf (accessed 1 December 2020).

Figure 3.8 Market capitalisation as percentage of net sales



Source: Refinitiv Datastream.

Figure 3.9 Dividends in US\$ billion

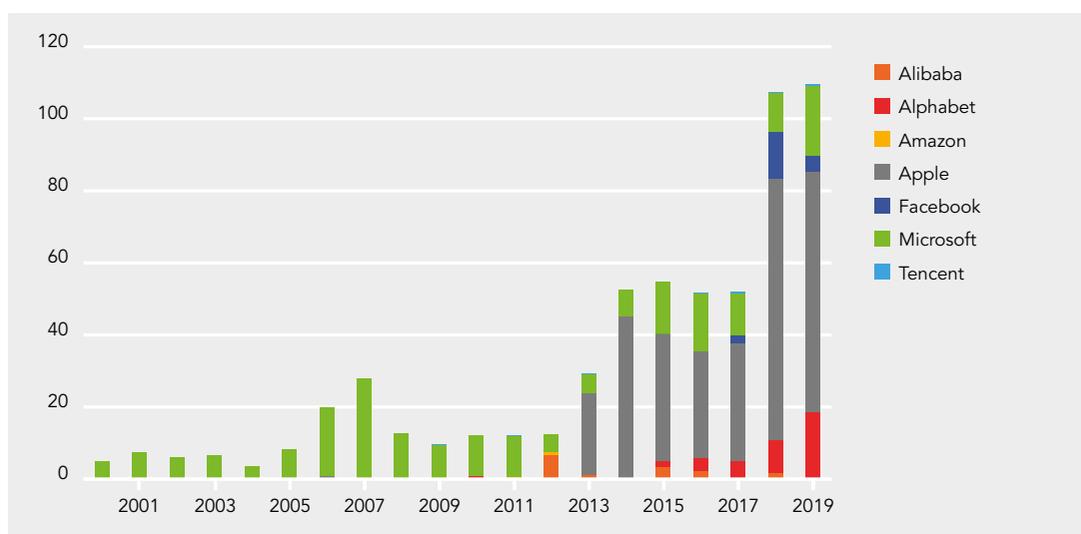


Source: Refinitiv Datastream.

In terms of dividends, we can observe a strong divergence between payouts across the corporations (Figure 3.9). Microsoft and Apple easily dominate the Big Tech sector so far, and their direct payouts have risen steadily, with only Tencent recently beginning to pay any dividends at all. The stunning exception to this long-term trend was Microsoft’s 2005 special one-time dividend of more than

US\$30 billion, at the time described by the media as ‘the largest cash grant in history’,⁸³ which even took investment bank analysts by surprise. Nothing of the sort should be expected from other Big Tech firms in the near future. Amazon, for example, currently informs investors that it ‘never declared or paid cash dividends’,⁸⁴ while Facebook simply states that – without any reference to either the past or the future – ‘[it] does not pay a dividend’.⁸⁵ While there is no general obligation for companies to pay dividends, it nevertheless helps to learn that both Alphabet and Alibaba inform prospective investors that their primary use of cash remains ‘invest[ing] for the long-term growth of the business’⁸⁶ or ‘expand[ing] [their] business’.⁸⁷ While their massive financial assets cast a shadow of doubt on these simple explanations, the reasoning nevertheless suggests that some Big Tech firms’ decision-makers – especially where founder-owners dominate – do not think there is a need to pay dividends (yet).

Figure 3.10 Share repurchases in US\$ billion



Source: Refinitiv Datastream.

83 Rivlin G (2004) Technology; Microsoft to pay special dividend to stockholders. The New York Times, 21 July. Available at: <https://www.nytimes.com/2004/07/21/business/technology-microsoft-to-pay-special-dividend-to-stockholders.html> (accessed 1 December 2020).

84 Amazon (2020) Investor Relations. FAQs. Available at: <https://amazonir.gcs-web.com/investor-faqs> (accessed 1 December 2020).

85 Facebook (2020) Investor Relations. FAQs. Available at: <https://investor.fb.com/resources/default.aspx> (accessed 1 December 2020).

86 Alphabet (2020) Investor Relations. General FAQs. Available at: <https://abc.xyz/investor/other/additional-financial-information/#faqs> (accessed 1 December 2020).

87 Alibaba (2020) Investor Information. Available at: <https://alibabagroup.com/en/about/faqs> (accessed 1 December 2020).

Regarding share repurchases, the picture becomes more diverse (Figure 3.10), although Microsoft and Apple remain the most generous towards their shareholders. While Alphabet has regularly adopted share repurchases, other corporations have used this practice on an irregular basis only. In contrast, Apple’s share repurchases soared in recent years. Although CEO Tim Cook stated in 2018 that the corporation would ‘have a deep sense of responsibility to give back to our country and the people who help make our success possible’, this sense of responsibility to repatriate parts of its offshored wealth materialised only after the Trump administration’s giant corporate tax cut.⁸⁸ Subsequently, Apple announced that it would use much of the estimated US\$47 billion that it saved thanks to the lower corporate tax rates for the arguably biggest share repurchasing scheme yet, pledging to devote US\$100 billion to this purpose.⁸⁹ On the whole, these observations are in keeping with the general argument that changes in the US tax code in the 1980s prompted corporations to prefer share repurchases over dividends as the prime channel for lining their shareholders’ pockets.⁹⁰

Table 3.1 Big Tech compensation

	Total share-based compensation 2015–2019		Total named executive compensation 2015–2019		
	(US\$m)	As share of total net sales (%)	(US\$m)	Of which stock awards (US\$m)	Of which stock awards (%)
Alibaba	18,088	8.8	N.A.	N.A.	N.A.
Alphabet	39,732	6.9	839	732	87.2
Amazon	21,591	2.3	252	239	95.0
Apple	24,044	2.0	621	469	75.5
Facebook	18,893	8.9	464	350	75.4
Microsoft	17,100	3.4	365	252	69.0
Tencent	4,701	2.6	202	148	73.3

Data for Tencent converted into US dollars using historic exchange rates.

Source: Companies’ 14A and 20-F SEC filings and annual reports.

Notably, it is not just ‘outside’ shareholders who benefit from actions boosting share prices but also managers and employees paid in stock awards. Between 2015 and 2019 alone, Big Tech companies paid a total of US\$144 billion in share-based compensation to their employees (Table 3.1). As share of revenues, Facebook, Alibaba and Alphabet were the most generous, far ahead of their older peers, Apple and Microsoft. Furthermore, if we zoom in on how key corporate management (the so-called ‘named corporate executives’) alone was remunerated during this period, a similar picture emerges. While every company lists a different number of executives in their regulatory filings,

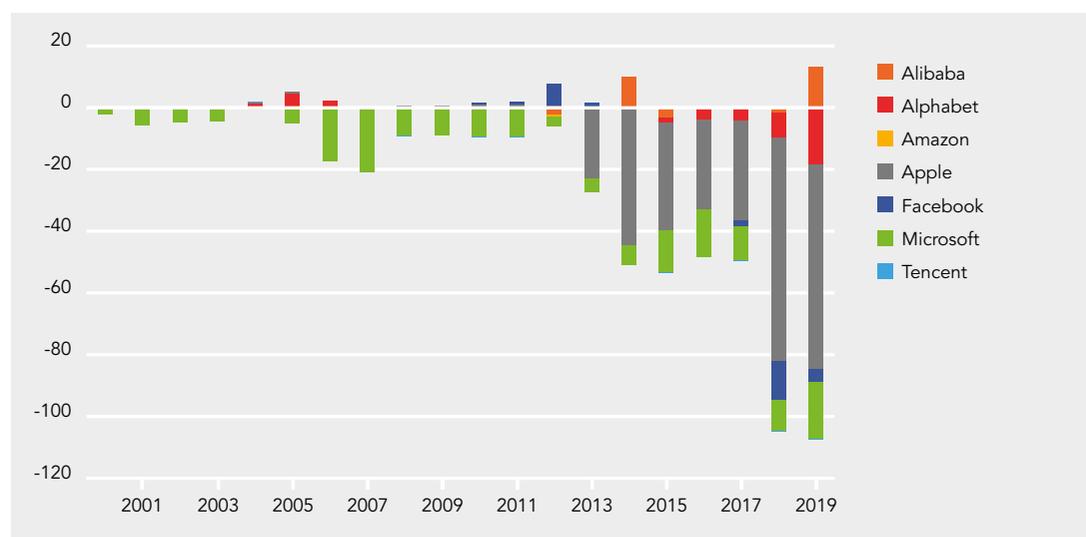
88 Wakabayashi D and Chen BX (2018) Apple, capitalizing on new tax law, plans to bring billions in cash back to U.S. *The New York Times*, January 17. Available at: <https://www.nytimes.com/2018/01/17/technology/apple-tax-bill-repatriate-cash.html> (accessed 1 December 2020).

89 Stewart E (2019) Apple is spending even more of its huge tax cut on Wall Street stock buybacks. *Vox*, May 1. Available at: <https://www.vox.com/recode/2019/5/1/18525672/apple-stock-earnings-tax-cut-buyback-cook> (accessed 1 December 2020).

90 Lazonick W (2013) The financialization of the U.S. corporation: What has been lost, and how it can be regained. *Seattle University Law Review* 36(2): 857–909.

it nevertheless becomes clear that share-based compensation was the preferred way of paying them. In the aggregate, Big Tech companies paid some 80 per cent of their key staff's salary in stock awards, providing them with ample motivation to pursue whatever corporate operations would most likely be reflected in increasing share prices – including share repurchasing schemes.

Figure 3.11 Net share issuance in US\$ billion



Source: Refinitiv Datastream.

Another way to evaluate the size of share operations is to relate them to the issuance of new shares through the net share issuance, which is the balance of issuing and repurchasing shares (Figure 3.11). A negative net share issuance means that repurchases were greater than new share issuances. Unsurprisingly, Microsoft and Apple feature most prominently here too, with most of the Big Tech sector – with the notable exception of Alibaba – following suit. As argued above, the importance of equity thus seems to have fallen significantly, as it is increasingly replaced by cheap debt. The question of what, aside from share repurchases, this money has been used for brings us to the third manifestation of corporate financialisation.

3.3 Intangible assets

The final manifestation of corporate financialisation considered in this report is the rise of intangible assets. To recap, these assets can be defined as ““identifiable non-monetary asset[s] without physical substance” that have “probable future economic benefits to a company””.⁹¹ This definition clearly distinguishes intangible assets from other assets on the balance sheet. Intangible assets are neither physical in the way buildings and machinery are, nor financial in the way shares or bonds are.

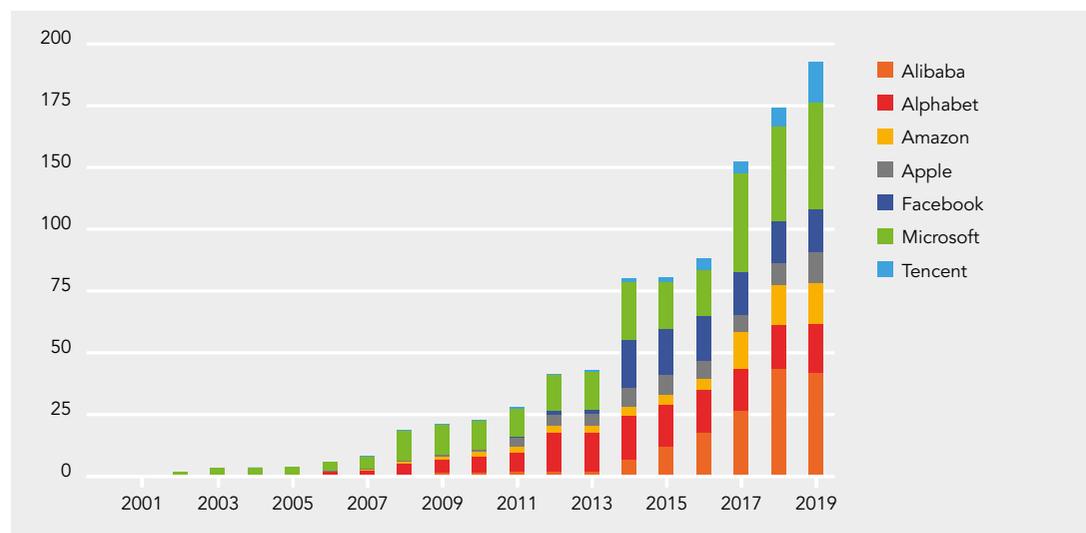
91 Orhangazi, Ö (2019). The role of intangible assets in explaining the investment profit puzzle. *Cambridge Journal of Economics* 43(5): 1258.

At their very basis, intangible assets represent some direct or indirect future income stream, discounted into the present. This broad classification thus captures several components, including patents, trademarks and goodwill. We will first consider total intangibles before delving into the details of goodwill as arguably the most peculiar intangible asset.

3.3.1 Total intangible assets

Big Tech's intangible assets increased sharply in recent years, from around US\$26 billion in 2010 to more than US\$192 billion in 2019 (Figure 3.12).⁹² In the US, Microsoft was the main driver behind this mounting valuation, as it grew its intangible assets from US\$14 billion in 2008 to almost US\$50 billion in 2019. In China, the equivalent was Alibaba, which grew its intangible assets from US\$2 billion in 2009 to US\$48 billion in 2019. Note, however, that Alphabet and Facebook also recorded a sharp increase, from almost zero during their early years to US\$22.6 billion and US\$19.6 billion in 2019, respectively. As we show below, most of the companies' intangible assets turn out to be goodwill rather than patents or trademarks.

Figure 3.12 Total intangible assets in US\$ billion



Source: Refinitiv Datastream.

⁹² The intangible and goodwill data for Apple is not available as a separate category in its SEC filings after 2016. Instead, Apple records an aggregate category of 'other non-current assets', which includes both intangible assets and other unspecified items. For the sake of this report, we choose to include the valuation of these noncurrent assets that Apple provides as a proxy for its intangible assets. As a consequence, this figure is likely an overestimate. Therefore, we take the average share of intangible assets in the total category of other noncurrent assets from 2016 and extrapolate this to estimate the share of intangibles in the years 2017 to 2019.

3.3.2 Goodwill

To understand what the growing valuation of intangibles entails and how it fits in the broader Big Tech model, we need to dig deeper into goodwill. Goodwill, as explained above, is generated when one corporation purchases another and represents the difference between the purchasing price and the fair value of the sale's underlying assets. Rising goodwill on the balance sheet of firms has become a critical indicator of a financialised corporate strategy.⁹³

Recent trends in corporate activity created the conditions that allowed goodwill to increase. The first condition, as shown above, is the growing share of financial assets among large corporations. Postcrisis monetary policies pursued by central banks, which purchased corporate bonds on a large scale, added to these liquid financial assets by allowing corporations to easily increase their debt levels.

As a second condition, corporate concentration levels have increased in recent years, particularly in sectors such as retail and information technology.⁹⁴ This concentration is a result of the largest firms buying their competitors in order to supplement their portfolio of activities with new businesses that have a promising future. This process is potentially self-reinforcing, creating ever-larger concentrations of corporate power due to higher earning capacity and access to credit.⁹⁵

As the aforementioned report of the US congress on competition in digital markets states:

These firms can use supra-competitive profits from the markets they dominate to subsidise their entry into other markets. Documents uncovered during the Subcommittee's investigation indicate that the dominant platforms have relied on this strategy to capture markets, as startups and non-platform businesses tend to lack the resources and capacity to bleed billions of dollars over multiple years in order to drive out rivals. For dominant platforms, meanwhile, this strategy appears to be a race to capture ecosystems and control interlocking products that funnel data back to the platforms, further reinforcing their dominance.⁹⁶

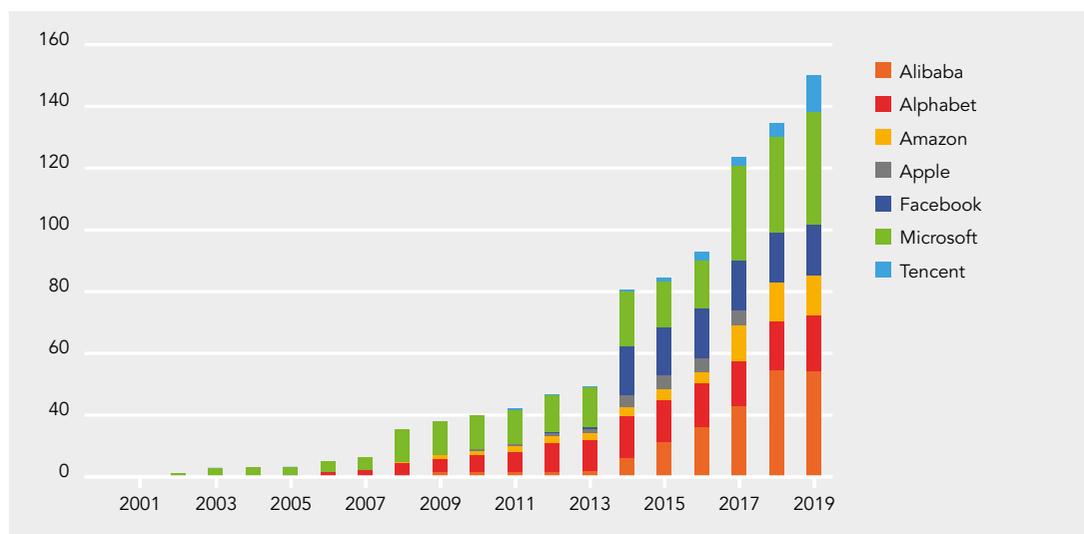
93 Baker A, Haslam C, Leaver A, Murphy R, Seabrooke L, Stausholm S and Wigan D (2020) Against hollow firms: Repurposing the corporation for a more resilient economy. Report, The Centre for Research on Accounting and Finance in Context (CRAFIC), Sheffield, England, July. Available at: https://www.sheffield.ac.uk/polopoly_fs/1.892482!/file/Against-Hollow-Firms.pdf (accessed 27 November 2020).

94 UNCTAD (2017) *Trade and development report 2017: Beyond austerity: Towards a global New Deal*. Report, Geneva, Switzerland, September. Available at: https://unctad.org/system/files/official-document/tdr2017_en.pdf (accessed 1 December 2020), chapter 5; Davis L and Orhangazi Ö (2020) Competition and monopoly in the U.S. economy: What do the industrial concentration data show? *Competition & Change*. Epub ahead of print 30 June 2020. DOI: doi.org/10.1177/1024529420934011.

95 We identified similar processes in a previous SOMO report on the financialisation of Big Pharma. Big Pharma corporations, sitting at the top of the value chain and having deep pockets, compete with each other for opportunities to purchase smaller firms for their intellectual property, in this case mostly patents. Promising start-ups become valuable commodities in a market-place where potential buyers have nearly unlimited financial means. Their purchase drives up prices and, in turn, goodwill.

96 Extracted from House Committee on the Judiciary (2020) *Investigation of competition in digital markets*. Majority staff report and recommendations, subcommittee on antitrust, commercial and administrative law. Available at: https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf (accessed 1 December 2020), p.378.

Figure 3.13 Goodwill in US\$ billion



Source: Refinitiv Datastream.

Figure 3.13 portrays the development of the valuation of goodwill on the balance sheet of the seven Big Tech companies. Unfortunately, Apple has not provided data on goodwill after 2017. Therefore, no data are recorded for the last two years, but the trend pointed upwards. Notwithstanding this omission, we find that goodwill increased by 557 per cent from US\$23 billion in 2010 to US\$149 billion in 2019, compared to just 63 per cent growth in goodwill for the aggregate S&P 500 corporations. As noted above, the main companies driving this increase were Microsoft and Alibaba.

Accordingly, we can say that goodwill accounted for much of the total growth in intangible assets among Big Tech corporations. In the most extreme case – Facebook – we detect the most radical transformation, with goodwill accounting for 95 per cent of intangibles in 2019 compared to ‘just’ 50 per cent six years earlier. Table 3.2 identifies the share of goodwill behind the transacted numbers in the past nine years.

Table 3.2 Goodwill as share of intangible assets

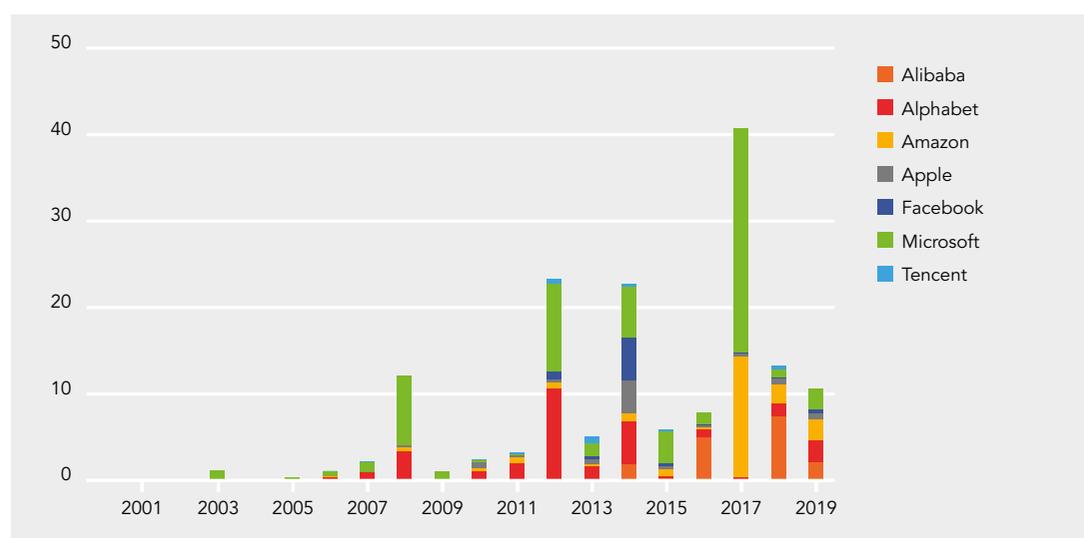
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Alibaba										
Intangible assets (US\$bn)	1.8	1.9	1.9	2.2	7.8	13.5	20.3	30.2	49.6	47.7
Goodwill (US\$bn)	1.8	1.8	1.8	1.9	6.8	12.7	18.2	25.9	39.5	39.0
Share of goodwill	100%	97.0%	97.1%	86.1%	86.5%	93.8%	89.9%	85.5%	79.5%	82.0%
Alphabet										
Intangible assets (US\$bn)	7.3	8.9	18.0	17.6	20.2	19.7	19.8	19.4	20.1	22.6
Goodwill (US\$bn)	6.3	7.3	10.5	11.5	15.6	15.9	16.5	16.7	17.9	20.6
Share of goodwill	85.7%	82.3%	58.5%	65.5%	77.2%	80.5%	83.3%	86.2%	89.0%	91.2%
Amazon										
Intangible assets (US\$bn)	1.9	2.6	3.3	3.3	4.1	4.5	4.6	16.7	18.7	18.8
Goodwill (US\$bn)	1.3	2.0	2.6	2.7	3.3	3.8	3.8	13.4	14.5	14.8
Share of goodwill	70.6%	75.1%	77.9%	80.5%	81.3%	83.1%	81.6%	79.8%	78.0%	78.5%
Apple										
Intangible assets (US\$bn)	1.1	4.4	5.4	5.8	8.8	9.0	8.6	8.2	22.3	33.0
Goodwill (US\$bn)	0.7	0.9	1.1	1.6	4.6	5.1	5.4	5.7	N.A.	N.A.
Share of goodwill	68.4%	20.2%	21.2%	27.4%	52.7%	56.8%	62.8%	70.1%	N.A.	N.A.
Facebook										
Intangible assets (US\$bn)	0.1	0.2	1.4	1.7	21.9	21.3	20.7	20.1	19.6	19.6
Goodwill (US\$bn)	0.0	0.1	0.6	0.8	18.0	18.0	18.1	18.2	18.3	18.7
Share of goodwill	38.5%	50.6%	42.3%	48.7%	82.1%	84.7%	87.7%	90.6%	93.4%	95.4%
Microsoft										
Intangible assets (US\$bn)	13.6	13.3	16.6	17.7	27.1	21.8	21.6	45.2	43.7	49.8
Goodwill (US\$bn)	12.4	12.6	13.5	14.7	20.1	16.9	17.9	35.1	35.7	42.0
Share of goodwill	91.5%	94.4%	80.9%	82.6%	74.2%	77.8%	82.7%	77.7%	81.6%	84.4%
Tencent										
Intangible assets (US\$bn)	0.0	0.6	0.7	0.7	1.5	2.2	5.5	6.0	8.8	18.6
Goodwill (US\$bn)	0.0	0.4	0.5	0.4	1.0	1.2	3.5	3.5	5.1	13.5
Share of goodwill	52.8%	69.2%	62.1%	62.2%	68.3%	52.2%	62.9%	58.6%	57.6%	72.5%

Source: Refinitiv Datastream.

3.3.3 Producing goodwill

The origin of rising intangible assets in general and goodwill in particular can be traced back to Big Tech's M&As. The volume of companies' net assets from acquisition has shown increasingly high spikes in recent years (Figure 3.14). Throughout the entire period, Microsoft has acquired most assets through acquisitions (US\$64.3 billion), followed by Alphabet (US\$30.3 billion), Amazon (US\$23.4 billion) and Alibaba (US\$16.8 billion). Apple (US\$8.1 billion) and Tencent (US\$2.8 billion) have recorded much smaller acquisitions. However, to precisely understand how goodwill was produced, we provide an overview of Big Tech's largest acquisitions (Table 3.3).

Figure 3.14 Net assets from acquisitions in US\$ billion



Source: Refinitiv Datastream.

In an early strike just two years after going public, Facebook acquired WhatsApp in 2014, expecting that this acquisition would 'provide them with strategic advantages in the mobile ecosystem and expand (their) mobile messaging offering'.⁹⁷ Microsoft's acquisition of LinkedIn in 2016 was pursued on the grounds that it would 'result in a significant increase in [their] goodwill and intangible asset balance ... in an anticipated growth for Office 365'.⁹⁸ In an attempt to combine online and high street retail, Amazon acquired Whole Foods Market in 2017, paying a premium of 27 per cent over the organic US supermarket chain's stock price in what Bloomberg journalists described as 'a bombshell of a deal'.⁹⁹ In 2011, Alphabet began one of its most expensive acquisitions, namely

⁹⁷ Facebook Inc Annual Report (2014), p.67.

⁹⁸ Microsoft Corporation Annual Report (2016), p.30.

⁹⁹ Turner N, Wang S, Soper S. Amazon to acquire Whole Food for \$13.7 billion. *Bloomberg*, 16 June. Available at: <https://www.bloomberg.com/news/articles/2017-06-16/amazon-to-acquire-whole-foods-in-13-7-billion-bet-on-groceries> Archived from the original on 10 April 2019, <https://web.archive.org/web/20190410224325/https://www.bloomberg.com/news/articles/2017-06-16/amazon-to-acquire-whole-foods-in-13-7-billion-bet-on-groceries> (accessed 28 September 2020).

that of Motorola Mobility, a provider of mobile and wireline digital communication, information and entertainment. The acquisition was meant to help start up two operating segments – one mobile segment focused on mobile wireless devices, and another on home devices – and took place during a time of several ‘gadget wars’ between Samsung, Apple and Alphabet (then Google).¹⁰⁰

Table 3.3 Selected cases of acquisitions and goodwill

Firm	Year	Acquisition target	Category	Acquisition cost (US\$bn)	Goodwill in the transaction (US\$bn)	Goodwill in the transaction
Alibaba	2018 ¹⁰¹	Ele.me	Food delivery platform	7.1	5.2	73.2
Alphabet	2011–2012 ¹⁰²	Motorola Mobility	Digital communication products and services	12.4	2.5	20.2
Amazon	2017 ¹⁰³	Whole Foods Market	Organic supermarket	13.2	9.0	68.2
Apple	2014 ¹⁰⁴	Beats Electronics	Music streaming and audio software	2.6	2.2	84.6
Facebook	2014 ¹⁰⁵	WhatsApp	Messaging and mobile services	19.5	15.3	78.5
Microsoft	2016 ¹⁰⁶	LinkedIn	Professional network platform	26.6	7.5	28.2
Tencent	2019 ¹⁰⁷	Supercell	Mobile video games	8.6	N.A	N.A

These high-level M&As can be interpreted as both extensions and consolidations by the acquiring firms. By purchasing existing platforms, software and databases, Big Tech companies facilitate further rounds of network effects, refine their ecosystems and boost the appeal of their integrated services. As a consequence, they manufacture new barriers to entry by potential competitors. The increase in goodwill shows how these firms are creating their own monopoly rents through the absorption of new data, analytics, patents, copyrights or trademarks, as well as brands and customer recognition, without directly contributing to the R&D and production process.

100 Fong A and Dobby C (2012). Gadget wars heat up as new Apple iPhone looms. *Financial Post*, 7 September. Available at: <https://financialpost.com/technology/gadget-wars-heat-up-as-new-apple-iphone-looms> (accessed 29 September 2020).

101 Alibaba Group 20-F SEC Filing (2019), p.44.

102 Alphabet Inc. Annual Report (2012), p.75.

103 Amazon Inc Annual Report (2017), p.53.

104 Apple Inc. Annual Report (2015), p.54.

105 Facebook Inc Annual Report (2014), pp.67–69.

106 Microsoft Corp. Annual Report (2016) p.30.

107 Tencent Holdings Annual Report (2019), p.252.

The already cited report of the US congress on competition in digital markets states:

Today Google is ubiquitous across the digital economy, serving as the infrastructure for core products and services online. Through Chrome, Google now owns the world's most popular browser – a critical gateway to the internet that it has used to both protect and promote its other lines of business. Through Google Maps, Google now captures over 80% of the market for navigation mapping service – a key input over which Google consolidated control through an anticompetitive acquisition and which it now leverages to advance its position in search and advertising. And through Google Cloud, Google has another core platform in which it is now heavily investing through acquisitions, positioning itself to dominate the 'Internet of Things', the next wave of surveillance technologies.¹⁰⁸

108 Extracted House Committee on the Judiciary (2020) *Investigation of competition in digital markets*. Majority staff report and recommendations, subcommittee on antitrust, commercial and administrative law. Available at: https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf (accessed 1 December 2020), p.15.

4 Conclusion

By means of conclusion, we distinguish the key stepping stones in developing, monetising and expanding what we have called ‘the Big Tech Model’. We subsequently reflect on the mounting influence of our seven Big Techs on the economy, society and states, and close with some suggestions on how to rein in the power of Big Tech.

Building and monetising platforms

Aspiring tech firms are in the business of scaling up and creating network effects. Network effects lock in users and practices, create interdependencies and become stronger as platforms grow. Users – from consumer citizens and firms to advertisers – are attracted to a platform because other users are. As such, maximising network effects results in market dominance, which is why platforms are compelled to generate monopoly power in niche markets. In other words, monopoly is not a bug but a feature – a recurring feature of capitalism now integral to the Big Tech model at work.

Before securing a dominant market position, platforms have to survive a period in which costs outstrip revenues. It is only after this phase of accepting losses in order to grow market share that they can monetise their market dominance. Concretely, our analysis underscores that Microsoft and Apple have been in the business of monetising their market power longer than their Big Tech colleagues, which is reflected in their combined financial assets exceeding the remaining five corporations’ assets by US\$53 billion in 2019. As indicated, the revenues that platforms generate are essentially rent incomes: it is not the production of goods that generates revenue, but platform *ownership* drawing in a large ecosystem of users whose digital footprints can be monetised. Our focus on the corporate financialisation of Big Tech has exposed how rent extraction is perfected.

Expanding monopoly power through acquisitions

Besides investing into building novel platforms, firms can also expand their platformisation through acquiring existing platforms and bringing these under their control. In essence, this is how our seven well-capitalised Big Tech firms have augmented their market dominance in both scale and scope, thereby jointly becoming and augmenting their role as ‘infrastructural core’ of the larger tech universe, thus extending their role as obligatory passage points and rent extractors.¹⁰⁹ Depending on one’s specific Big Tech business model, one’s market share might be *deepened* within a sector – in the case of Facebook enhancing its dominance within the social media landscape through buying up Instagram and WhatsApp – or it might be *broadened* by delving into other sectors, which is the modus operandi of Amazon, buying up existing retailers with the aim to ‘disrupt’ and monopolise sales and distribution in those markets.

As we demonstrated, Big Tech has been able and willing to pay substantial premiums (that is, goodwill) to acquire new firms. The younger Big Techs (Amazon, Alphabet, Facebook and Alibaba) largely refrained from any shareholder payouts compared to Microsoft and Apple. As a result of the premiums paid, the sector’s share of goodwill is above 70 per cent and constitutes up to 90 per

109 Van Dijck J, Poell T, and De Waal M (2018) *Platform Society: Public Values in a Connective World*. Oxford: Oxford University Press, p.12.

cent of all intangible assets on the balance sheet of the Big Tech firms. In the past year, moreover, Big Tech's combined financial assets stood at a staggering US\$631 billion, on top of a combined total debt of US\$295 billion. In October 2020, Apple, Microsoft, Amazon and Alphabet had each crossed the threshold of a US\$1 trillion market capitalisation. This all shows that the financial firepower of our Big Tech firms is unrivalled, and that the chances of new platforms to mature and remain independent are increasingly limited, as these financial resources are typically used to acquire competitors.

Although new companies might eventually join their ranks, the platforms having emerged since the 'Big Tech Bang' are likely to dominate the tech universe for the time being, with thousands of smaller platforms orbiting around them, and millions of applications built on top of them – all relying on its core infrastructure, and paying patronage for doing so. With each firm having cornered its own monopoly, Big Tech as a whole has effectively come to colonise key forms and means of social exchange, broadly defined, overlaying the ways in which people used to interact via digital interfaces – for communication (Facebook, Tencent) and information (Alphabet); for work (Microsoft) or consumption (Alibaba, Amazon). In setting the standards for software toolkits (Google's Android, Apple's iOS) and programs (Microsoft's Office 365), and spearheading the development of the hardware to enable exchange (Apple's iPhone), Big Tech has become the obligatory interface for all types of exchange in the digital economy. It is as if a new screen now overlays economy and society, with Big Tech functioning as its core operating system, increasingly subjecting the rest of the world to its imposing and intrusive logics, up to the point where states themselves grow increasingly dependent on Big Tech.

The Big Tech-state complex

With platformisation fuelling the platform capitalism that is undergirding the platform society, we anticipate scholars to increasingly direct their attention to what might eventually be labelled *the platform state*. Besides accumulating rents, Big Tech companies have also built up substantial power over economy and society, including *infrastructural power vis-à-vis* states. Political economist Benjamin Braun has studied how central banks exert power through financial markets, creating various interdependencies between public and private domains and interests.¹¹⁰ In a similar fashion, states, government bureaucracies and public institutions who are themselves digitising their myriad operations are increasingly dependent on the infrastructural core of Big Tech for exercising their authority, as Big Tech companies perfect their positions as obligatory digital interfaces. This infrastructural core is continuously refined through data extraction and analysis, accumulating more rent and power in a self-reinforcing feedback loop, augmenting the tech dependencies of states.

As Western liberal democracies fall under the infrastructural spell of US Big Techs, where the deepening of tech-driven governance increasingly seems to require 'the rollback of liberal protections by design',¹¹¹ we need to redirect our gaze towards Beijing to fully grasp how Big Tech's infrastructural power becomes interdigitated with – and central to – authoritarian-cum-totalitarian political control.¹¹²

110 Braun B (2018) Central banking and the infrastructural power of finance: The case of ECB support for repo and securitization markets. *Socio-Economic Review* 18(2): 395–418.

111 Hendrikse R (forthcoming) The rise of neo-liberalism. *Krisis: Journal of Contemporary Philosophy*.

112 Gruin J (2019) *Communists Constructing Capitalism: State, Market, and the Party in China's Financial Reform*. Manchester: Manchester University Press.

This brings us to the geopolitical angle of Big Tech and the geo-economic, military and technological rivalry between the US and China, which promises to sharpen over the decades to come.

We've been here before – rein in the monopolies

Going back to the observation that standard industry classifications fail to capture Big Tech, we are now in a better position to appreciate how Big Tech is not a regular sector, and how this is reflected in the extraordinary financial numbers presented in this report.

The disruptive potential of Big Tech is also visible in existing multilateral and bilateral frameworks for trade and investment. Amongst others, the way platforms monetise their operations is not compatible with the principles that were created to regulate corporate activities in the physical world. For example, Big Tech is at odds with the existing cross-border allocation of tax rights. How to tax Big Tech remains an open question and is subject to fierce diplomatic contestation. The speed at which the sector has developed into a focal point on the stock market, in political communication, in geopolitics and daily life sharply contrasts with the much slower pace at which civil society and decision-making bodies have been able to grasp the transformative nature of these firms. Big Tech's opacity has so far provided it with an advantage and left regulators to play catch-up. However, on both sides of the Atlantic we are now seeing early signs of change.

Big Tech companies have become highly-financialised cash machines for their shareholders and executives, arguably epitomising the concept of corporate financialisation better than any other sector. As explained, these developments are reminiscent of earlier transformative epochs, not least the second half of the 19th century.¹¹³ Back then, new means of transportation and communication came to remodel the socioeconomic order of the day in gales of 'creative destruction', resulting in excessive wealth and power in the hands of the 'Robber Barons'. Then, as now, existing regulatory approaches failed to counteract this new technology-driven regime centred on monopolies, sparking a popular backlash eventually bringing the 'Gilded Age' to an end. As such, the past also suggests how to approach the 'Big Tech Barons' of today, which at minimum requires a serious update of the outdated competition and tax policies presently failing to rein in Big Tech.¹¹⁴

In closing, we need to urgently reflect on the possible ways in which societies can rein in the looming 'Big Techification of everything', going beyond free market imperatives to break up the Big Tech monopolies, or simply break open their data treasure chests.¹¹⁵ Alternatively, we need to contemplate the ways in which consumers or users might reclaim personal ownership over individual data as citizens, ideally short-circuiting the core operating logics of surveillance capitalism. One way might be to embrace 'open source' solutions to circumvent Big Tech enclosure. Another way is to take the infrastructural core of Big Tech into public hands altogether, recognizing them for the crucial public utilities they are, incidentally not unlike those 19th century railroads. In any case, we urgently need to come to terms with the ways which Big Tech has become the core operating system of our age, and contemplate rewriting its codes to appropriate its spoils for more meaningful ends.

113 Hobsbawm E (1987) *The Age of Empire*. London: ABACUS.

114 Khan LM (2018) Sources of tech platform power. *Georgetown Law Technology Review* 325: 325–334; Khan LM (2019) The separation of platforms and commerce. *Columbia Law Review* 119: 973–1098.

115 Mayer-Schönberger V and Ramge T (2018) A big choice for big tech. Share data or suffer the consequences. *Foreign Affairs* 97(5): 48–54.

5 Annex

List of variables

Variable	Description	Number of observations						
		Alibaba	Apple	Amazon	Apple	Facebook	Microsoft	Tencent
Balance sheet – assets								
WC02001	Cash and short-term Investments	11	19	20	20	10	20	17
WC02501	Property and plant equipment net	11	18	20	20	10	20	17
WC92649	Total intangible other assets net	11	17	20	19	10	18	17
WC18280	Goodwill/cost in excess of assets purchased	11	17	20	16	10	18	17
WC02999	Total assets	11	19	20	20	10	20	17
Balance sheet – liabilities								
WC03051	Short-term debt and current portion of long-term debt	11	18	20	20	10	20	17
WC03251	Long-term debt	11	18	20	20	10	20	17
Income statement								
WC01001	Net sales or revenues	11	19	20	20	12	20	17
WC01201	R&D expenses	11	19	20	20	12	20	15
WC04001	Net income/starting line	9	19	20	20	11	20	17
WC04601	Capital expenditures – additions to fixed assets	9	19	20	20	11	20	17
WC04251	Net proceeds from sale/issue of common & preferred	9	19	20	20	11	20	17
Funds flow statement								
WC04551	Cash dividends paid – total	9	19	20	20	11	20	17
WC04751	Com/pfd purchased, retired, converted, redeemed	9	19	20	16	10	18	17
Other								
WC08002	Market capitalisation – fiscal period end	6	17	20	20	8	20	16

Notes: The number of observations includes values of zero.

All variables for Alibaba lagged by one year, as Alibaba is the only company whose fiscal year ends in March, not December.

In addition to the variable WC02001, we included the following data items from the corporations' annual reports or regulatory filings to calculate financial assets: Alibaba: investment securities and equity investments (2013–2019); Apple: marketable securities (2008–2019); Microsoft: equity investments (2000–2019); Tencent: available-for-sale financial assets (2005–2017), held-to-maturity investments (2003–2007; 2009), financial assets at fair value (2018–2019), other financial assets (2016–2017), prepayments, deposits and other assets (2007–2019), term deposits (2011–2019).

