

Crouching tiger, hidden dragons:

How 10-K disclosure rules help Big Tech conceal market power and expand platform dominance

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Executive summary

Alphabet, Amazon, Apple, Meta Platforms (formerly Facebook) and Microsoft — better known as ‘Big Tech’ — are today five of the six largest companies in the United States (US) and world by market capitalisation.¹ These firms have come under increasing scrutiny from antitrust authorities in the European Union (EU), US and other jurisdictions due to the **considerable market power** that they wield over their business ecosystems.

Antitrust investigations, however, have been **hobbled by a lack of mandatory public disclosures on Big Tech’s business activities from the annual public 10-K reports**, which they file with the US Securities and Exchange Commission (SEC), the primary financial markets regulator. The public is instead left to rely on whistle-blowers and litigation to piece together financial data on Big Tech’s increasingly varied product offerings, and information on platform user operating metrics.

Public investors, regulators and competitors **simply do not know** how exactly Big Tech creates and extracts value from the ecosystems that it has come to dominate. This constrains fair competition by concealing profitable business opportunities from potential competitors; impedes antitrust activity by limiting public scrutiny of possible abuses of market power; and prevents investors from allocating capital efficiently, as companies’ true business prospects cannot properly be assessed.

The regulatory void is connected to Big Tech’s unique **multi-sided digital platform business model**, predicated on free services (in the sense that they are not provided in exchange for direct payment) and relentless product diversification:

- i. Nominally **free products** are integral to Big Tech’s **multi-sided digital platform business model** and generate enormous sums of revenue when **monetised** through advertising or subscriptions. User engagement underpins the ability of these platforms to be monetised, yet no 10-K **monetisation disclosures** on user operating metrics or data are mandated for a platform’s free products.
- ii. Big Tech’s sources of profits have become increasingly **diversified** across multiple products and monetisation models. Yet Big Tech companies still portray themselves as ‘single segment’ or ‘two segment’ product companies in their 10-K reports. 10-K **segment disclosure** rules are designed to ensure diversified companies disaggregate their financials to reveal hidden data, but have failed to ensure Big Tech undertakes meaningful financial disclosures (on profits/losses, revenue, etc.) by product.

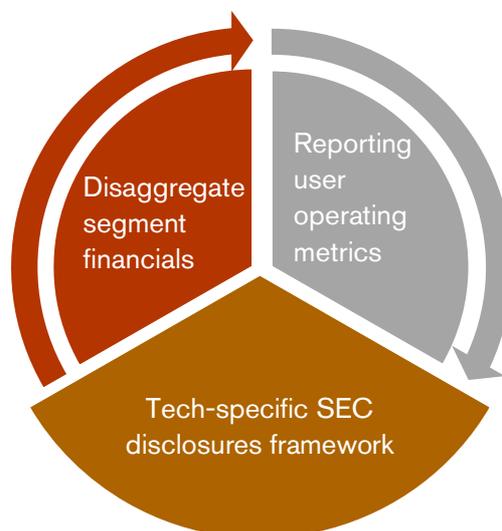
Using **several case studies** from Big Tech’s products, combined with Compustat’s Segment Daily database, we illustrate how present 10-K disclosure rules help Big Tech conceal market power, increase profit margins and expand platform dominance. Our **core findings** are:

- **Big Tech’s 10-K ‘monetisation’ disclosures** — covering user activity and data usage — are minimal and entirely discretionary ([Section 2.2](#)), despite being fundamental to informing the public on the platform business model ([Section 2.1](#)).

¹ Excluding Saudi Aramco, which is primarily state owned. Tesla recently overtook Meta’s market capitalisation.

- **User operating metrics** ([Section 2.3](#)) increasingly guide management's internal product performance assessments, but are not released externally to the public, except at Big Tech's discretion.
- **Alphabet** ([Section 2.4](#)) has at least nine **largely free products** each with more than one billion active monthly users and dominant global market shares. They have, however, few 10-K disclosure requirements since they are provided free to the consumer.
- The SEC ([Section 3.6](#)) tried to compel **Alphabet** to release 10-K financial disclosures on **YouTube and its Play Store**, as these products have become contributors to their revenue and profits. Few detailed financials followed though and only YouTube's revenue was released, highlighting the ineffectiveness of current segment reporting rules.
- To extend its lead in cloud computing, **Amazon** ([Section 3.4](#)) appears to have intentionally withheld disclosing standalone product financials for **Amazon Web Services (AWS)** from its public 10-K report for longer than permitted by segment disclosure rules. This appears to have had an initial chilling effect on competition in the market by raising barriers to entry and delaying new entrants.
- **Apple** ([Section 3.5](#)) relied on segment disclosure rules in its trial against Epic Games to claim that the profit margin of its **App Store** did not exist, potentially withholding a key piece of damning evidence on its anti-competitive conduct.

To prevent such abuses of market power and disclosure manipulation, **we advance mandatory public 10-K reporting on platform (monetisation-related) operating metrics and enhanced disaggregation of company financials by product.** We make **three primary recommendations** ([Section 4](#)):



Reporting recommendations

- 1) **Mandatory 10-K reporting of user operating metrics for products with a minimum number of monthly active end users and business users** (platform gatekeeper provisions). This draws on the EU's proposed definition of a platform gatekeeper, but makes it applicable to the product level and global in scope ([Section 4.2](#)). Operating metrics used internally by management for product assessment should be publicly disclosed on all gatekeeper products and product segments.

Antitrust investigations in particular might benefit from having at their disposal disaggregated data on Big Tech’s products, especially on user operating metrics. A platform’s user numbers and engagement increasingly inform arguments on a product’s market share, given that many platform-linked products are provided to the consumer for free ([Section 4.1](#)).

- 2) **Detailed standalone segment financials in the 10-K report on any product with \$5 billion or more in annual revenues or profits/losses** ([Section 4.3](#)). Mandatory 10-K reporting on products which meet an absolute monetary threshold of \$5 billion ensures large global products with dominant market shares are publicly disclosed, even if they account for less than 10% of the company’s assets, revenues or profits/losses (and so do not meet present segment reporting thresholds). Moreover, an absolute monetary threshold ensures that Big Tech cannot use subjective managerial discretion afforded to it by present segment reporting rules to conceal major product segments.
- 3) **Establishing a tech-specific SEC disclosures framework focused on digital platforms**, in line with the growing ubiquity and market dominance of the digital platform business model ([Section 4.4](#)). This approach draws on the recent Environmental, Social and Corporate Governance (ESG) Task Force created by the SEC and industry-specific segment disclosure requirements for the airline industry. The latter highlights the ability to recognise industry-specific intangible assets.

Such disclosure reforms are a necessary first step to facilitate more effective regulatory oversight and policy interventions targeted to Big Tech’s unique business model and diversified product offerings.

1. Introduction

*'Behind the rock in the dark probably hides a tiger and the coiling giant root
[actually] resembles a crouching dragon'*

— Ancient poet, Yu Xin²

'Hide your strength, bide your time'

— Deng Xiaoping

Alphabet, Amazon, Apple, Facebook and Microsoft — better known as 'Big Tech' — are five of the six largest companies in the world by market capitalisation³ and responsible for 23% of all R&D expenditure by non-financial US public companies.⁴ Their private algorithms decide what search information and products we are shown; their privacy rules govern users' digital data usage;⁵ and their marketplaces decide the cost of doing business for millions of firms and app developers around the world.

It is a peculiar feature of our times that these organisations, with such considerable global impact, **are not subject to rigorous and comprehensive financial and business reporting frameworks**. Arguably the most important financial disclosure framework they are subject to is through the annual company 10-K financial disclosures they make to the US Securities and Exchange Commission (SEC). The SEC is the key US financial markets regulator and aims to 'protect investors; maintain fair, orderly and efficient markets; and facilitate capital formation'(US Government 2021).

The 10-K requirements we focus on are called 'segment disclosures', a seemingly arcane set of rules which govern how and when a diversified conglomerate disaggregates its financials by major operating segment. **Their aim is to ensure the release of otherwise 'hidden data'** (Flood 2020). Taken as whole, 10-K reports exist to help public investors assess a company's present and future business prospects. This ensures that a company's risks and returns can be accurately assessed by the investing public. Such disclosures can, if properly structured, also have important secondary effects. They can help competitors identify profitable product markets to enter; and they can provide regulators with the initial financial and operating information needed to identify the existence — and possible abuse — of a firm's market power.

The SEC disclosures framework, as currently configured, fails to achieve the above objectives. We highlight two dimensions of this failure. First, **existing SEC segment reporting rules provide Big Tech with significant discretion as to which product financials they disclose and when**. This enables them to keep large products, often with dominant user bases,

² See Wikipedia 2021b.

³ Of non-state-owned public companies, i.e. excluding Saudi Aramco. Tesla recently overtook Meta Platforms by market capitalisation. By sales ranking the list is different: Amazon is the second largest company in the US by revenue, Apple is #3, Alphabet #9, Microsoft #18 and Facebook #35.

⁴ S&P Compustat North America database. See note to Figure 5.

⁵ Notwithstanding the important inroads made by the EU's GDPR in regulating the use and processing of personal data.

hidden from investors and potential competitors, and limits the ability of regulators to police highly profitable digital platforms.

Second, **Big Tech maintains a veil of secrecy over how it monetises its platforms' free services.** Operating metrics on user activity underpin Big Tech's ability to monetise its digital platforms and free products: through selling ads and subscriptions to users, and through marketplace and gatekeeper fees. Operating metrics also increasingly shape a company's product market share, yet financial and operating disclosures on free products are not required in 10-K reports.

This report argues that Big Tech's intentional release of only minimally informative data on its diverse product segments and user operating metrics (monetisation disclosures) has increased its market power and the abuse of that market power. The title of this report — *Crouching tiger, hidden dragons* — is based on the Chinese idiom, which describes a situation full of unnoticed masters. In the Big Tech context, this reflects a company's users and product 'strength' being kept hidden from competitors, public investors and regulators due to the present permissive SEC disclosures regime. These 'hidden dragons' are Big Tech's important business segments and important monetisation practices, which together drive growth and profits, today and in the future. Without this essential business information being made public, markets are impeded in fulfilling their roles as competitive allocators of capital and inputs.

Section 2 of this report provides an overview of Big Tech's business model, focusing on digital marketplaces and platforms. It details why these firms offer so many free products and services, and how monetisation supercharges — and even drives — their platforms' network effects. Using Alphabet as a case study, we show how free products are core to the platform business model, which is reliant on significant user adoption. We also show that while Big Tech already discloses some monetisation metrics on user numbers and advertising cost-per-click, it does this in a highly aggregated manner. Given how important this is to their businesses and in turn investors, it is quite remarkable that such disclosures remain at their discretion and are provided in ways that are often opaque.

Section 3 details the current state of Big Tech's 10-K segment disclosures on paper and compares them to their actual diversification across product segments. Apple's App store, Amazon's Web Services and Alphabet's YouTube are used as case studies to illustrate how the aggregation of product financials in Big Tech's 10-K reports is used as a tool to entrench product market power by keeping major profit and growth centres hidden from regulators and competitors. We include YouTube in this section because of the impact SEC segment reporting rules had on its product financials eventually being very partially disclosed.

Section 4 considers policy reforms to the annual SEC 10-K disclosure framework to enhance transparency and accountability in product and platform reporting. We propose reforms to compel companies to report key financials on all products which meet a minimum monetary threshold; to release detailed and disaggregated user and related operating metrics; and a tech disclosures framework for digital platforms through the SEC. We also consider the implications of such a framework for better enabling the work of antitrust authorities.

2. Platform economics and monetisation metrics

The essence of the Big Tech business model is control over a multi-sided market or platform where powerful network effects are derived from achieving a large user base. This is often achieved through providing free or subsidised (bundled) products. Free products are reliant on monetisation on a vast scale, through selling ads, subscriptions or platform fees (see Box 1). The free or subsidised products offered to users often become the ultimate drivers of Big Tech's profits and market shares, including from Google Search, WhatsApp and Amazon Prime subscriptions.

Current 10-K disclosure requirements largely ignore the user side of the market and the key operating metrics that these firms themselves use to monitor their products' progress and future potential. Instead, regulators concentrate on aggregate financial disclosures. This leaves them, along with investors and the wider public, largely ignorant of how Big Tech's business model functions through its constituent parts.

2.1 Disclosures and monetisation overview

The basis of the disclosures which we review and recommend reforming in this report relate to those found in a company 10-K report filed annually with the SEC. 10-K reports are required to provide public investors with an annual overview of the business (including a narrative describing the business and the risks it faces); a financial overview (including financials by major operating segment); and a governance overview.

Given that public companies exist to make a profit for their shareholders, historically the emphasis in 10-K reports has been on **financial measures** of performance and financial business. Some correction to this one-sided emphasis is now required. Today, the business model underpinning digital marketplaces and platforms is reliant on **user growth** to facilitate network effects. Network effects occur when increased numbers of participants improve the value of the good or service being used. When a business evaluates a product's performance, these network effects shift the emphasis from using solely financial measures to operating metrics, including monthly active users and measures of user engagement. For example, customer acquisition cost (CAC) and the lifetime value (LTV) of that user to the company have become key metrics that most platform-based technology companies obsess over.

User growth in a product's adoption drives the platform's utility and in turn the company's revenue growth. This makes the company's business model increasingly reliant on those free products and the users which underpin it. It also means public investors wishing to assess the future performance of the company now require information concerning these free products, yet are rarely given it since 10-K SEC disclosure obligations are largely limited to products that generate revenue directly.

For several reasons, monetisation disclosures on user consumption of free products are important not just for the ads-based business models of Facebook and Alphabet, but to all Big Tech. First, ad revenue is playing (or is set to play) a growing role in Amazon, Microsoft and Apple's profit growth. Second, free products can be monetised in any number of ways once adoption is sufficiently widespread, not just through ads. This includes subscriptions or through the bundling of free products with paid-for products or hardware. This makes operating metrics on product usage a key

predictor of future income for the company, regardless of the current monetisation strategy. Third, all digital platforms to varying extents rely on the monetisation of user activity to help drive the network effects on the platform. This uses the word 'monetisation' in a different sense (see Box 1), where it means converting user data into inputs to improve the utility of the platform, through improved search results, product reviews and ranking, or overall user experience. This monetisation can be what we call indirect, whereby data from one product is used to increase sales or the product performance of a different product, as opposed to the same product, which is direct monetisation.

Box 1: Defining monetisation

In the tech industry 'monetisation' refers to the conversion of user attention into sales revenues. It covers the output side of production: making sales to users or from users within a firm's ecosystem. For example, Alphabet's 'monetisation metrics', as they call it, as reported in their 10-K reports, cover user engagement with advertising through paid clicks and cost per click.⁶

In the context of an e-commerce marketplace such as Amazon, monetisation occurs directly via it taking a share of all e-commerce revenue transactions between consumers and suppliers through its marketplace. More recently, Amazon's monetisation also occurs through advertising, which increasingly also serves as a kind of tax on the supplier side of the marketplace: suppliers are asked to pay for increased visibility of their products to the consumer side (a 'pay to play' requirement).

Our definition of monetisation includes the above common usage, but is extended to cover the input side of production too: the conversion of user activity along with any other data into digital assets that can then be used in the production process of sale, usually for a service (see also Birch, Cochrane and Ward 2021). In practice, this process may involve algorithms, machine learning tools and data external to that product or the company's ecosystem as a whole.⁷

Furthermore, we distinguish two types of monetisation: 1) direct monetisation, whereby sales (or product improvement) take place in the same product as where the user data is extracted for conversion into digital assets; and 2) indirect monetisation, whereby sales (or product improvement) take place in a different product from where the user data is gleaned. For example, according to Google, 'local intent' powers nearly one third of mobile searches (Mobile Marketing Watch 2010). Location data extracted from user activity on Google Maps and Android phones therefore is indirectly monetised' by ads placed on Google Search.

One recognised implication of this business model is that antitrust regulations can no longer rely solely on price-based measures of consumer and producer surplus, and monopoly power. The lack of disclosures on monetisation sources (such as monthly active users and engagement) makes it more

⁶ In common day usage, users' attention is often said to be monetised through a single product, such as, 'Facebook mobile ads is our leading monetisation product.'

⁷ Product sales are then the result of a production process which combines the above monetised inputs with labour, material and machinery.

difficult to accurately calculate market shares in antitrust cases (such as Facebook's various social networks or on Google Search). This is also relevant when the actual market power of a firm may exist through an overarching capability to keep users within a certain ecosystem of related business segments. It also makes it harder for outside firms to verify that Big Tech are charging them correctly for their ad spend, for example.

Next, we sketch very briefly the theory underpinning digital marketplaces and platforms, and why a mass of users and their engagement are so central to its success. We then detail the state of play of Big Tech's current monetisation disclosures in their 10-K reports and earnings calls.

2.2 The digital platform and the user

Big Tech's dominance in a range of markets has been established in a remarkably short period of time (United States Department of Justice 2020; Federal Trade Commission 2021).⁸ Network effects underpin the scale of Big Tech's business model(s), and how they create and extract value and economic rents (Khan 2018a; Mazzucato 2018). The strong network effects inherent in digital marketplaces and platforms also make their benefits very difficult for new entrants to replicate (Rohlf's 2001; Bamberger and Lobel 2017).

As noted above, network effects occur because more people using the platform improves its utility to both the consumers and/or the producers on it (O'Reilly 2018).⁹ This makes sheer scale a key condition for its success. In growing the user base, 'There is no more important feature when it comes to widespread adoption than being "free",' notes tech commentator Ben Thompson (2018). This naturally privileges, at almost any cost, user growth and high levels of R&D spending to expand the user base (Eisenmann, Parker and Van Alstyne 2011; Coyle 2019). Once dominant, the product can be monetised more and more, as fewer competitors exist and consumer lock-in is greater.

A two-sided digital platform or marketplace brings together users on the one side and firms on the other (Rochet and Tirole 2006; Rysman 2009). The firms could be advertisers, suppliers, app developers, content producers or, in the case of transportation and delivery marketplaces (like Uber, Lyft or DoorDash) individuals offering services for hire. Other platform examples are Microsoft's software platform for productivity and work, and the digital platforms for cloud computing provided by Amazon, Microsoft and Alphabet.

App stores are another kind of e-commerce marketplace and have the added element that the owner of the app store platform also may provide the hardware through bundling. Apple and Alphabet control not only the storefront through which consumers find free and paid-for applications (apps) for their phones, they write the rules that the developers of those applications must follow and the features that they depend on. These platform owners have unprecedented power over their marketplace and in turn the development of an entire ecosystem of users and developers. All Big

⁸ Google can achieve 88% market share in the US search market, according to the United States Department of Justice (2020). Facebook has a dominant market share in social networks, according to the revised 2021 FTC complaint against Facebook (Federal Trade Commission 2021). Amazon dominates online retail in the US and is the largest player in web services (compute, storage, database and processing).

⁹ More generally, 'The term network effect generally refers to systems that gain in utility the more people use them' (O'Reilly 2018).

Tech companies, including Facebook, have made integrated hardware and software platforms with app stores a part of their walled garden strategy to retain users.

There can be three sides (or more) to the marketplace, such as in Google Search, YouTube or Facebook's social media offerings. These match suppliers of content (side 1) with content consumers (side 2), and then monetise the attention that users expend on that content by also matching it with content provided by advertisers (side 3). This makes users essential to most of today's major platforms, directly as consumers, but also indirectly as providers of content.

Users help drive platforms and marketplaces in other, more subtle, ways too. User data — and more precisely the ability to 'monetise' user data and turn it into an asset (an input to production) — can drive or improve (what we call supercharge) the utility of the network (Birch 2020; Hwang 2020; Birch, Cochrane and Ward 2021) (see Box 1). User data, and the ability to monetise it into a useful asset, can improve the platform's service dramatically, making it a key source of competitive advantage and business growth. This includes better search results and product rankings, more accurate user reviews, better ad targeting and an enhanced user experience.

Box 2: Platforms, marketplaces and 'mixed motives'

Digital platforms and marketplaces have historically relied on a mixture of ad-based (and subscription-based) monetisation strategies for their products. Data harvested from users about their interests and basic demographics allows for potentially highly personalized and targeted — and thus very valuable — advertisements (Zuboff 2019). Advertisers are prepared to pay well for access to users' attention — hence this is sometimes referred to as the 'money side' of the platform, in contrast to the 'user side', which often enjoys the service for free.

The logic of a for-profit platform or marketplace results in the need to satisfy both consumers and advertisers at the same time. This leads to what Google founders Larry Page and Sergey Brin once referred to as the initial problem of 'mixed motives'. In their original Stanford research paper on what would become Google, they wrote: 'We expect that advertising-funded search engines will be inherently biased towards the advertisers and away from the needs of the consumers' (Brin and Page 1998).

In three-sided platforms and marketplaces, the problem of mixed motives can be made more complex by the fact that much of the content being consumed is user-generated without necessarily any commercial motives; while other content is professionally produced by users with commercial intent; and still more content may in some cases be created by the marketplace owner itself.

A second type of mixed motive also exists on digital platforms and marketplaces: once a critical mass of both users and suppliers has been reached, the marketplace owner is incentivised to compete with the pre-existing supply side of its marketplace by substituting the existing products with their own. There is already considerable evidence of how far Alphabet has gone down this path. More than half of all Google searches are now satisfied by Google's own content rather than by referrals to external websites (Fishkin 2018; O'Reilly 2019).

This competition between Big Tech for platform users is taking place increasingly through diversification ([Section 3](#)): offering not just new products but also copycat products with a view to 'enveloping' a competitor's product market and users (Eisenmann, Parker and Van Alstyne 2011; Coyle 2019). As we detail in Section 3, this is leading to a growing convergence in Big Tech's product offerings and revenue sources.

2.3 Big Tech's current monetisation disclosures

This section details how Big Tech makes limited disclosures at its discretion on its user bases and monetisation metrics, despite it being core to its business models. Current monetisation disclosures in earnings calls and 10-K reports are detailed below. This is then contrasted with the ubiquitous use by managers for internal assessment of product — and even company-wide — performance.

Although there are no mandated monetisation disclosures in 10-K reports for digital platform companies, technology companies frequently make such disclosures to shareholders.

Post-IPO especially, retaining investor interest seems to rely on technology companies reporting user engagement metrics, in the hope that they can then be monetised in some unknown future. Even though these metrics are often provided by tech companies as cynical attempts to reach lofty share prices, they have also proven to be useful data points that predict future revenue and profit growth. This is why Big Tech uses them so often and even discloses them publicly, but only in situations and in ways which preserve competitive advantage.

Monetisation metrics are frequently disclosed on earnings calls by Big Tech (see Box 3), yet rarely integrated systematically into their 10-K reporting (see Box 4), where the legal liability is higher. Monetisation disclosures closely track Big Tech's different business models, with the ad-based business models of Facebook and Amazon in particular being more reliant on them (see Box 3).

Box 3: Monetisation disclosures in Big Tech's earnings calls and transcripts

Earnings calls. Monetisation is an important part of these firms' business models, especially for Facebook and Google, as evident in their mentions in earnings calls with investors (Table 1), although Amazon data is more limited.

Table 1. Number of mentions of term in Big Tech earnings calls 2010-2019

	"Personal data"	"Privacy"	"User"	"Monetize"
Amazon	0	11	26	8
Apple	2	54	257	17
Facebook	0	220	430	230
Google	0	47	1050	244
Microsoft	0	54	271	85

Source: Birch et al 2021. Data as Asset: The measurement, governance and valuation of digital personal data by Big Tech. *Big Data & Society*, 8(1).

Note: Each search term includes relevant variations (e.g. 'privacy' includes 'private' and 'privately'). Counts for Amazon are just from Q&A. Counts for Facebook are from 2012-2019.

Box 3: continued ...

Transcripts.¹⁰ Big Tech's transcripts (including earnings calls, corporate presentations and annual shareholder meetings) show that:

- 'monetise' arises (at least once) in 223 documents of Big Tech. Alphabet leads in the number of documents that mention 'monetise', accounting for 94 of the total; followed by Microsoft with 73; and Facebook with 38.
- 'user' or 'users' arises in 638 documents.
- 'diversify' or 'diversification' occurs 38 times.

Facebook in particular acknowledged early on to investors the centrality of users and their monetisation to their business model. In its 2012 10-K report (the first since its 18 May 2012 IPO), it reports monthly active users (MAUs) and daily active users (DAUs), noting clearly that monetisation metrics are material to investors' ability to evaluate the company's future business prospects. It states: 'The size of our user base and our users' level of engagement are critical to our success [...]. Our financial performance has been and will continue to be significantly determined by our success in adding, retaining and engaging active users.' Subsequently, average revenue per user (ARPU) is also used by Facebook in their 10-K reports.

However, Facebook chooses not to publicly release these operating metrics in its 10-K report on a product-by-product basis, instead only for its core 'social network' as a whole (Facebook and Messenger). More recently, Facebook has also released user numbers for all Facebook 'family' products combined, based on the activity of users who visited at least one of Facebook, Instagram, Messenger and WhatsApp. Similarly, Alphabet also reports some operational and monetisation metrics, but only in the aggregate.

Reporting user operating metrics only in the aggregate hobbles effective assessment of company performance by investors (xBRL 2018) and impedes the ability of regulators to understand and limit abuses of market power. For example, the FTC in its revised filings on Facebook (Federal Trade Commission 2021), had to resort to using third party estimates of the above user operating metrics, much as Epic Games had to use private estimates of Apple's profitability and financial metrics for the App Store.

¹⁰ Analysed in Refinitiv, all historical, for Alphabet, Amazon, Apple, Facebook and Microsoft, accessed 7 October 2021.

Box 4. Monetisation usage by Big Tech in 10-K and related documents

The term 'monetise' generally appears in four use cases by Big Tech companies in their 10-K disclosures: (1) monetise apps; (2) monetise intellectual property; (3) monetise search; and (4) monetise user activity and engagement (usually in relation to social networks).

Alphabet (from 2015) mentions monetise or monetisation in around 50 documents.

Context: Mentioned at the beginning of each quarterly or annual SEC filing in some form of: 'The following may affect our operating results: Our ability to monetise traffic on Google properties and our Google network members' properties across various devices'; 'Our ability to monetise traffic on Google Search and other properties'; 'We have seen an increase in YouTube ads and Google Play ads which monetise at a lower rate.'

Amazon mentions monetise or monetisation three times in three documents.

Context: Developers' 'monetisation' or develops 'monetise' their apps.

Apple mentions monetise in 28 documents (monetisation is not mentioned).

Context: Narrow and involves 'monetise patents' (> 95% of mentions); other usage is 'indirectly monetise access to the Apple music service.'

Facebook (now Meta Platforms) (2012–present) mentions monetise or monetisation in around 50 documents, usually multiple times in each document.

Context: 'The geography of our users affects our revenue and financial results because we currently monetise users in different geographies at different average rates'; 'development tools and application programming interfaces that enable developers to build, grow and monetise mobile and web applications'; 'user behaviour or product changes that may reduce traffic to features or products that we successfully monetise, such as News Feed, including as a result of increased usage of our Stories product or our video or messaging products.' In 2012, the language is more rudimentary, noting: 'On personal computers where we currently have greater opportunities to monetise usage by displaying ads and other commercial content.'

Microsoft mentions monetise or monetisation in 39 documents.

Context: 'Our ambition for Windows 10 monetisation opportunities includes gaming, services, subscriptions and search advertising. Windows also plays a critical role in fueling our cloud business and Microsoft 365 strategy, and it powers the growing range of devices on the "intelligent edge"; 'Search advertising: [...] We have several partnerships with other companies, including Verizon Media Group, through which we provide and monetise search queries. Growth depends on our ability to attract new users, understand intent, and match intent with relevant content and advertiser offerings.'

Source: Refinitiv, January 2011–October 2021 in 10-K and related documents, i.e. 8-K, 10-Q.

Note: Looking for mentions of monetise or monetisation outside credit or financial agreements and the management of finances.

2.4 Management uses monetisation metrics internally

As we have shown, segment disclosures in 10-K reports include few operating metrics despite them becoming vital in management's internal assessment of each division's business prospects and success (Katz and Shapiro 1994; Falcon Doss 2021; Murphy 2021).¹¹ We detail this below for Facebook (Meta Platforms), Amazon, Alphabet and Microsoft.

New York University finance professor Aswath Damodaran has recently called for 'triggered disclosures' on non-financial operating metrics (e.g. on users, subscribers, customers or total downloads), meaning that if a company builds its public (external) business narrative to shareholders on certain operating metrics then those should have to be reported externally and in some detail (Damodaran 2021). Our argument goes in the other direction: if operating metrics are used internally by management to assess product performance (as we show they are), then they should have to be disclosed externally if material to investors.

Meta Platforms (Facebook). At Facebook (now Meta Platforms), operating metrics have long been central to assessing product performance internally. A combination of usage and monetisation/targeting have always underpinned product growth and so both of these metrics have been used internally (García Martínez 2016). Monetising data into an effective targeting tool to increase ad engagement was an important metric of success used by ad managers. This remains the case today. Initially, the key metric used by Facebook to assess ad sales performance was average cost per thousand impressions (CPM) (García Martínez 2016).

Facebook (Meta) notes in its 2020 10-K report that usage remains a particular issue: 'Our advertising revenue can also be adversely affected by a number of other factors, including: decreases in user engagement, including time spent on our products; our inability to continue to increase user access to and engagement with our products; user behaviour or product changes that may reduce traffic to features or products that we successfully monetise, such as News Feed, including as a result of increased usage of our Stories product or our video or messaging products'. That Facebook may have hid true unique daily user numbers from investors, for example, lies at the heart of one of the complaints filed at the SEC against Facebook by Frances Haugen (Murphy 2021).¹²

Amazon. Operational metrics are used top to bottom at Amazon to assess product performance. Amazon holds a metrics-driven weekly business review (WBR) that focuses not only on financial performance, but on what the company calls 'controllable input metrics': the operational metrics that produce the desired financial outputs.

¹¹ This can be seen in the context of the complaint to the SEC by Frances Haugen (Facebook whistleblower) that Facebook inflated its user base numbers, thereby misleading investors and advertisers (Murphy 2021). See also Falcon Doss (2021). To a large extent this follows from the economics of network effects, which must privilege growth and scale even more, perhaps, than under economics of scale (Katz and Shapiro 1994).

¹² Murphy 2021: 'One 2018 study showed that by Facebook's own estimates, for nearly 20 per cent of advertisers running a broad ad campaign, their audience would have been reduced by more than 10 per cent if duplicate accounts were removed. [...] Facebook has strongly denied the claims and argued that its "potential reach" figure to advertisers is merely an estimate. Instead, the company says, advertisers pay for the actual clicks and impressions of ads. In one unsealed email in the court documents, a Facebook employee wrote that the company's revenue was dependent on reach estimation for nearly a tenth of revenues when brands pay to boost posts, citing past studies. But in a separate filing submitted in support of Facebook, another employee disputed this, saying they had found no such relevant studies.'

In their book *Working Backwards: Insights, Stories and Secrets from Inside Amazon*, former Amazon VPs Colin Bryar and Bill Carr (2021) note that new products added for sale, delivery time and customer-centred operating metrics 'measure the set of activities that, if done well, will yield the desired results, or output metrics (such as monthly revenue and stock price).' Moreover, they note that these operating metrics are used company-wide, with the most important of them regularly reviewed by the CEO: 'It is worth noting that, at Amazon, even the most senior executives review the full WBR set of metrics' (Bryar and Carr 2021).

Alphabet. Google (now Alphabet) uses a management technique called objectives and key results (OKRs) to set and manage measurable operational goals across the company. In his book *Measure What Matters* (Doerr 2018), Google investor and board member John Doerr notes the importance of data in facilitating OKRs, such that the digital platform allows for much more real-time and granular assessment of performance objectives. Moreover, OKRs are more than just financial metrics. In the context of Google Chrome's initial product OKRs, Doerr notes: 'We deliberately set the bar for 20 million weekly active users by year's end, knowing it was a formidable stretch — we were starting from zero, after all' (Doerr 2018). User growth could be prioritised over revenue as an OKR by management, because the product was cross-subsidised until it could be monetised.

Microsoft. Even at a company like Microsoft, many of whose products are directly monetised by software sales or subscriptions (software as a service or SaaS), operating metrics are central to managing the business. Typical metrics for SaaS businesses include customer churn, revenue churn, customer lifetime value, customer acquisition cost, months to recover CAC, CAC:LTV ratio, customer engagement score, volume of qualified marketing traffic, customer health scores and more (Bernazzani 2021). Other operating metrics are relevant for Microsoft products that are monetised through ad sales.

2.5 Alphabet: how free products make money

Alphabet, Google's parent company, is a prime example of a company that operates a digital platform with cross-subsidisation and bundling of product segments. Alphabet is perhaps unique among Big Tech in the sheer number of high utility free products that it provides to consumers (Brynjolfsson and Collis 2019). These are often bundled together and connected to an Alphabet platform. The idea is that free products drive user engagement on one side of the platform, eventually allowing for their monetisation through subscriptions, ads or bundling, once network effects have taken hold and product usage is high.

Free segments — even those inextricably linked to a revenue generating segment in a two-sided digital platform — have no disclosure requirements, even though their operating metrics, such as monthly or daily active users (MAU and DAU) and user engagement, frequently form the financial basis for the revenue-generating side of the platform and even for the company as a whole. For example, Google Search is free for consumers to use, yet ultimately the underlying revenue engine of Google Ads as user attention is monetised. Despite this connection, few operating metrics, such as monthly active users, user engagement or algorithmic details, are released on Search in Alphabet's 10-K report. The revenue from all of Google's advertising-supported products is simply aggregated as part of the ads business.

Other free Google products are not monetised as directly as search, but contribute meaningfully to user acquisition and retention, both key to Google's integrated revenue engine. They may also contribute data that improves ad targeting in Google's core search franchise and, over time, may develop other sources of revenue, including licensing fees, subscription fees and additional opportunities for ad revenue. We explore several of these Alphabet products, which, from the point of view of shareholder reporting, remain largely invisible.

Chrome

The Chrome web browser, one of Google's nine products with over a billion users, contributed considerably to Google's profits, but with no required operating disclosures. Originally released in 2008, it was sought as an answer to the competitive threat posed by Microsoft's dominance in the web browser market, which could have cut off one of Google's main arteries to its users. Since then, Chrome has become the dominant web browser, with 65% market share (StatCounter 2021). We discuss Chrome again in Section 3 in the context of diversification and competition.

The value of the Chrome franchise to Alphabet can best be calculated by its contribution to user acquisition for Google Search. In addition to the traffic that comes 'organically' to Google, Alphabet pays enormous fees (reported as traffic acquisition costs in their 10-K reports) to other companies for traffic sent to Google Search. The largest recipient of these fees is Apple, whose Safari web browser has an 18.4% market share. According to the 2020 Justice Department lawsuit against Alphabet, in 2018 Google paid Apple \$8–\$12 billion for a multi-year deal to make Google the default search engine in the Safari browser on the iPhone, iPad and Apple computers (Allyn 2020). While there was surely a strategic exclusivity premium in the payments to Apple, the scale of the payments to Apple would peg the value of the traffic generated by the placement of Google Search in the Chrome browser at as much as \$20–30 billion. This dwarfs the direct revenue from the Chrome business as a whole, such as from use of Chromebook laptops in the education market.

Android

Like Chrome, the Android mobile operating system contributes enormously to Google's traffic acquisition (thereby driving ads sales) and through its strategic value in keeping Apple from achieving a monopoly position in smartphones. With 73% market share in the smartphone market, Android's greatest impact has not been on revenue, but on user acquisition and retention (Haase 2021).¹³ However, Android also makes a lot of money for Google through another of Alphabet's billion-user products, the Android App Store. According to filings from a 2019 lawsuit, Android App Store revenue is considerable, at over \$11 billion in 2019 (Dave 2021). However, even these financials are not publicly disclosed (as the App Store is not reported as a standalone operating segment).

YouTube

Google purchased YouTube in 2006 and it is now the second most visited website in the US after Google.com (Semrush 2021). It is the internet's second largest search engine and had more than

¹³ As with many other new products, when Google acquired Android in 2003, its founder Andy Rubin began discussing possible monetisation of the product. Larry Page replied, 'Don't worry about that. I want you guys to build the best possible phone and we'll figure out the rest later.' (Haase 2021)

4.26 billion users in July 2021 with an average visit duration of 30 minutes, according to the Semrush traffic analytics tool (Pavlovskaya 2021). YouTube's press release notes that people watch over a billion hours of video daily and generate billions of views on YouTube. More than 500 hours of content are uploaded to YouTube every minute (YouTube 2021). During the COVID-19 pandemic, YouTube consumption grew so dramatically that EU officials had to request that Alphabet reduce its bandwidth to YouTube to help ensure medical facilities had sufficient bandwidth to share information. Google's hidden subsidies for YouTube and its use of the YouTube platform for data and indirect monetisation has allowed Google to dominate video hosting and search.

YouTube is monetised both directly and indirectly. Indirectly, the data Google has on users from YouTube can be used to support ad targeting on other Google services and across non-Google services. This helps increase click-through rates and revenues generated from Google's ad placements.

Direct monetisation occurs through YouTube having its own ad space. Monetisation using ads is now growing rapidly, with YouTube's total revenue projected to approach that of Netflix by the end of 2021. In 2020, YouTube's ad revenue was already nearly \$20 billion (\$19.7 billion), according to its 10-K report (United States Securities and Exchange Commission 2021a).

Since 2013, non-ad monetisation strategies have accelerated too through YouTube Premium (\$12 per month) and YouTube Music (\$10 per month), which offer ad-free watching and listening experiences. By 2021 YouTube Music had amassed 50 million subscribers, not far behind Apple with 78 million subscribers and Amazon Music with 63 million (United States Securities and Exchange Commission 2021a).

Despite YouTube's clear importance as an independent business segment to Alphabet, its owner, Alphabet only began publicly reporting YouTube revenue in 2020 (for fiscal year 2019), after growing pressure from the SEC (see [Section 3.6](#) on segment reporting). YouTube's profits are still not publicly released though, since payments made to approved data creators are not made public (data creators participate in Google's AdSense programme, taking a cut of such revenue.)

Google Maps

Google Maps illustrates how a product provided for free to consumers can be vital to helping Alphabet monetise its wider ad products through the additional user data it collects. Maps' contribution to Google's bottom line remains opaque though, given that no operating metrics or discussion of how Maps' user data is monetised are presented in Alphabet's 10-K report. This is because no specific obligation for such disclosures exists.

Google Maps grew out of Google's 2004 acquisition of Where2, an innovative Australian mapping company (Hutcheon 2015) and Keyhole, a satellite mapping company (Zuboff 2019). Google Maps' innovative interactive interface wowed users and was easier to access programmatically, leading to widespread integration into third party products and services. By 2009, Google Maps had displaced *MapQuest* as the dominant web-based mapping and directions service. A mobile version was introduced in 2007 and in 2012 Google disclosed that Maps already had over 1 billion monthly active users (Google 2012). In 2013, Google Maps was estimated to be the most widely installed smartphone app, used by over 54% of smartphone users (Smith 2013).

While Google Maps did not carry direct advertising until several year ago, it became an integral component of Google's wider monetisation strategy, especially through local search.

Local search is like the *Yellow Pages* of everything 'local' but online, with a focus on local businesses and location services. Any user search phrase that includes a location modifier, such as 'Bellevue, WA' or '14th arrondissement', is an explicit local search. A search that references a product or service that is typically consumed locally, such as 'restaurant' or 'nail salon', is an implicit local search (Wikipedia 2021e).

As early as April 2004 — prior to Google's acquisition of Where2 and Keyhole — Google had begun offering location-specific search (Pinegar 2015). However, the addition of Google Maps provided Google with access to the real-time location of hundreds of millions (and eventually billions) of smartphone users. This was core to building out Local Search. Maps helped provide relevant neighbourhood business listings, including actual maps and directions that would appear within the search results page from 2006 (Pinegar 2015). In 2010 Google disclosed that more than one third of all mobile searches were 'local searches' (Mobile Marketing Watch 2010). To further propel this strategic initiative forward, senior Google executive (and later Yahoo! CEO) Marissa Mayer was put in charge of Local Search that same year (Womack 2010).

The monetisation was straightforward. Google's ad customers were able to target ads very precisely by geography, capitalising on Google's knowledge of where you typically go in the world and places you seem most interested in based on searches (D'Anastasio and Mehrota 2019).

Maps became further integrated to improving Google's wider ads monetisation with the launch of store sales measurement (Google 2021), released in beta in 2017. This product saw Google try to link users' offline purchases to their online ad-related activity, allowing it to infer if a digital ad viewed online by a user had led to an offline purchase. In linking the online to the offline, Google was attempting one of the holy grails of advertising impact measurement (Liao 2018b, 2018a). This feature was enabled by Google purchasing troves of credit card purchase data (initially from Mastercard) and integrating it with its own data on user activity.

Another form of monetisation came from Maps' API access/licenses: ridesharing, car and tracking companies pay to use the Google API to access Maps (Brian 2013). Uber was estimated to have paid \$58 million to Google for its mapping services from 2016 to 2018 (Davis 2021). Given Google's superior product it has been able to raise prices substantially. Starting 16 June 2018, Google consolidated its pricing plans, such that a basic plan went up by 1400% (Singh 2018).

In summary, today Google Maps is monetised directly and this is growing rapidly. Bernstein analyst Toni Sacconaghi estimates that Google Maps generates about \$4 billion in ad revenue (Savitz 2021). Exact figures are not known, however, since Alphabet does not break out ad revenue from properties such as Maps separately from Search. This is because Alphabet is not required to provide a monetisation narrative in its 10-K report from which the total worth of Maps might be calculated.

3. Product diversification and segment reporting

To maintain and expand their ecosystems, Big Tech have rapidly diversified its product offerings over the last decade, using both internal and external strategic efforts. Yet the SEC's 10-K reporting framework makes few mandatory disaggregated financial disclosure requirements by product segment. Instead, Big Tech largely reports its financials as a single aggregated lump, not allowing investors, the wider public or potential competitors to understand where its specific profit and revenue sources lie. This allows Big Tech to conceal its true market power and in turn increase its profit margins, expand platform dominance and chill competition through concealing profitable business opportunities from the market. This also impedes antitrust activity by limiting public scrutiny of possible abuses of market power; and prevents investors from allocating capital efficiently, as companies' true business prospects cannot properly be assessed.

We begin by examining Big Tech companies' considerable diversification of the products they offer and their chosen monetisation strategies. Next, we contrast this reality with the failure of 10-K segment reporting to transparently reflect this diversification on paper, through Big Tech providing disaggregated financials by product. Through three case studies we show the considerable economic and strategic advantages segment reporting's inadequacies have afforded Big Tech, and which it has actively used to its advantage. The case studies cover Amazon Web Services, Apple's App Store (in the Epic versus Apple court case) and YouTube, which is owned by Alphabet.

3.1 Competition and diversification

To maintain and expand their ecosystems, Big Tech companies have dramatically diversified their product offerings over the last decade, through both internal and external strategic efforts. Diversification protects Big Tech's user bases from growing competition in 'winner takes all markets'; enhances network effects and economies of scale; and facilitates a breakneck pace of innovation into new technologies.

By virtue of their global digital reach, Big Tech's online platforms (even if providing different products) often have overlapping user bases. This makes the bundling of new products an appealing strategy for any single Big Tech firm to try to envelop the adjacent product market of a competing platform provider, starting with capturing their users, suppliers or the 'money side' of their two-sided network, i.e. the advertisers (Eisenmann, Parker and Van Alstyne 2006). As a result, all Big Tech companies now offer similar products, covering:

- **Digital payment:** Apple Pay and Apple Card, Google Pay, Amazon One Touch Payment, Facebook Pay;
- **Cloud software services:** Azure and Microsoft OneDrive, Amazon Web Services, Google Cloud, Apple iCloud;
- **Social networks and chat:** Microsoft Teams, Apple iMessage, Facebook Messenger, Google Chat;
- **Virtual assistants:** Amazon Echo, Google Nest, Apple Homepod, Microsoft Smart Speakers;
- **Entertainment:** Amazon Prime Video, Apple TV+, Microsoft Movies and TV, Facebook Watch, Google TV;
- **Gaming:** Amazon's Twitch, Microsoft Xbox, Google Stadia, Facebook Gaming;

- **Retail:** Google Express Shopping, Amazon Marketplace, Facebook Marketplace and Instagram Shopping, Microsoft Store and Microsoft Cloud for Retail;
- **Fitness:** Google Fitbit, Amazon Halo, Apple SmartWatch; and
- **Technology:** Tablets, App Stores and much more.

Developing new products to try and envelop a competitor's user base has become common. For example, Google launched the Chrome web browser in 2008 as an alternative to Microsoft's then-dominant Internet Explorer web browser and the open source Firefox browser. This had the important role of helping Google solidify its dominance in search through Google Search. So when Microsoft launched the Bing search engine in 2009 and made it the default search in Internet Explorer, this provided an existential threat to ensuring the free flow of consumers to Google Search. Chrome had to succeed or Microsoft could cut off Google's connection to its user base.

Similarly, when Apple launched the iPhone in 2007 it quickly became the dominant player in the smartphone market. This made Google's Android operating system even more strategically important to protecting its path to its user. Google publicly launched Android in 2008, licensing it as open source to phone manufacturers, but requiring that they make apps such as Google Search, YouTube and Google Maps as defaults (Edelman 2014). This positioned Google's free products as 'honeypots' to attract users and protect the company's money maker: Google Search advertising.

Convergence in product offerings is also reflected in Big Tech's sources of revenue and profitability converging. However, only the very broad contours can be understood from official financials reported by Big Tech firms in their 10-K reports. From private and public reports, we know that:

- **Alphabet's** non-ad monetisation is growing, accounting for 20% of revenue in 2020, up from 17% in 2019.¹⁴
- **Amazon's** ad business is its fastest-growing business segment, growing by 50–100% each year (Lee 2020), having gone from a minor player in 2015 to capturing an expected 10% of the US online ad market in 2021 (Podean 2019a, 2019b; Bruell 2021). Revenue from Amazon's various subscriptions and its other services segment (i.e. mostly ads) combined now bring in more revenue than AWS.¹⁵
- **Apple's** services revenue at \$53.7 billion in 2020 was more than iPad and Mac sales combined, and second only to iPhone sales (at \$137.7 billion).¹⁶ Apple is also enacting a number of changes to its App Store and wider ecosystem to increase monetisation through ads (Nuttall 2021). Bernstein analyst Toni Sacconaghi estimates that Apple will generate approximately \$3 billion in ad revenue in the September 2021 fiscal year, up from around \$300 million in the 2017 fiscal year (Savitz 2021).

¹⁴ According to Alphabet's 2020 10-K report, 'Non-advertising revenues have grown over time. We expect this trend to continue as we focus on expanding our offerings to our users through products and services like Google Cloud, Google Play, hardware products and YouTube subscriptions. Across these initiatives, we currently derive non-advertising revenues primarily from sales of apps, in-app purchases, digital content products and hardware; and licensing and service fees, including fees received for Google Cloud services, and subscription and other services.' (United States Securities and Exchange Commission 2021a)

¹⁵ For 2020. Data accessed from Refinitiv (financials, segment), 27 August 2021.

¹⁶ Data accessed via Refinitiv, 27 August 2021.

- **Microsoft's** gaming and search advertising combined finally overtook Windows for revenue intake in the June 2021 fiscal year.¹⁷ Server products and cloud services are Microsoft's main source of revenue today, on track to overtake Windows, and Office and Microsoft-related Cloud, products.

These trends mean that growing concentration in the US economy as a whole is consistent with growing competition between the Big Tech companies within individual product markets. Amazon's recent explosive growth in online advertising at the expense of Facebook and Google is indicative of this convergence in product offerings and profit sources — in part reflecting Amazon's ability to route users' search directly to its platform (Lee 2020). This has come as traditional ad spend is routed away from other platforms. Similarly, growing competition between Google and Microsoft in e-mail, cloud storage and video calling — often bundled together — is another example of the competition for digital markets through similar products being offered between Big Tech.

Internal diversification efforts have also been facilitated by Big Tech's unrelenting acquisitions of smaller companies' products and know-how (technology). This highlights the importance of smaller firms and their human capital to Big Tech's innovation capabilities. Big Tech collectively engaged in 813 acquisitions of competitor firms and product offerings between 2000 and the present, and 573 since 2010.¹⁸ This is in addition to hundreds of smaller acquisitions which are below the reportable minimum purchase amount (Heller 2021). Apple CEO Tim Cook famously boasted on CNBC that Apple acquired one company every two to three weeks on average during late 2018/2019 (Feiner 2019; Wikipedia 2021d).

Many key business segments of Big Tech grew out of these acquisitions. For example, Apple's iTunes partly came out of SoundJam (acquired 2000); the Safari web browser came from Propel Software (2002); Apple Maps from Placebase (2009); the Apple Music streaming service from Beats (2014); and the Apple News+ service from Texture (2018) (Wikipedia 2021d). Apple acquired Siri in 2010 (Wortham 2010) to compete with Google and continues to acquire dozens of companies to ensure Siri remains competitive (SRI International 2007; Schonfeld 2010; Eadicicco 2020). Over at Alphabet, YouTube, Android and Google Maps all began with acquisitions of smaller companies. Alphabet also beefed up its core ad business, and reduced competition, by acquiring Doubleclick and AdMob. While Facebook acquired potential competitors Instagram, WhatsApp and Oculus VR, among many others.

3.2 Diversification everywhere except in financial disclosures: a failure of segment reporting

Diversification of Big Tech's business activity is evident everywhere, except on paper through the segment disclosures in its annual 10-K reports. Segment disclosures are the portion of the 10-K report where a company is supposed to provide disaggregated financials by operating segment. However, a company is given wide managerial discretion as to what a reportable operating segment can be, with Apple defining its reportable operating segments on a geographical basis, and Facebook and other Big Tech companies grouping their products into highly aggregated monolithic

¹⁷ Data accessed via Refinitiv, 27 August 2021. This excludes Office products.

¹⁸ Refinitiv, August 2021.

segments on the basis that, internally, their chief executive officers do not make resource allocation decisions or assesses performance on a segmented (product-by-product) basis.

Excessive aggregation of financials across major product streams has resulted in increasing dissatisfaction from public investors who are unable to understand where Big Tech makes its money (Peters 2018). Few mandatory disaggregated disclosures are required by product segment — such as each product's revenue, profitability, R&D expenditures and monthly active users. Instead, Big Tech largely reports its financials as a single aggregated lump, not allowing the public to understand where the profit and revenue sources lie.

We show below that aggregation of financial results is a tool used by Big Tech to increase a product's market power and its ability to extract economic rents. Individual products are concealed by Big Tech within highly aggregated (consolidated) financials until the product's dominance is established.

Segment reporting rules govern disaggregated 10-K financial disclosures and are meant to ensure that diversified conglomerates report separately on all relevant business lines which they operate. Instead, segment reporting helps firms conceal from public view business lines of strategic importance through the near total managerial discretion it affords companies in how they define an operating segment (see Box 5).

Box 5: Segment reporting explained

The stated goal of segment reporting is to release 'hidden data' (Flood 2020) from consolidated financial information, including by major industry bodies (Pacter 1993; CFA Institute 2018). The rationale for this goal is that, 'Different segments may possess different levels of profitability, risk, and growth. [Such that for public investors] Assessing future cash flows and their associated risks can be aided by segment data' (Flood 2020). There have been very few changes to regulations since 1997 with the passing of SFAS 131 (codified as ASC 280, and with additional and different SEC requirements) (United States Securities and Exchange Commission 1999, 2020; Legal Information Institute 2020b).

Segment reporting is governed by a management approach.¹⁹ The management approach allows a firm to define an operating segment based on how its own management organises the business internally for resource allocation and performance assessment.

The business lines previously identified by management as reportable operating segments are then **subject to 10% tests**: does the operating segment account for at least 10% of unaffiliated profits/losses, or revenues, or assets of all combined operating segments? If so, it is separately identified, with its own financials, in the 10-K report. To ensure sufficient coverage, reportable segments must cover 75% of the firm's total (external) revenue. This information is then disclosed to the SEC and made available to public investors.

¹⁹ Though Flood (2020) argues that ASC 280 uses a modified management approach: 'By utilising the aggregation criteria and quantitative thresholds (10% tests) for determining reportable segments, ASC 280 uses what should be considered a modified management approach.'

Box 5: Segment reporting explained (continued ...)

Meeting the 10% threshold is by itself insufficient for a product or business line to count as a reportable segment though. If a product, such as the App Store, which counts for as much as 20% of Apple's total profits, meets one of the 10% thresholds, it does not have to have its financials reported separately from Apple's aggregated financials if Apple management does not initially identify it as an operating segment. An operating segment is identified by management on the basis of the following three characteristics:

- a) It engages in business activities from which it both recognises revenues and incurs expenses;
- b) Its operating results are regularly reviewed by the public entity's chief operating decision-maker (generally the CEO); and
- c) Its discrete financial information is available.

The above three characteristics have been used by Big Tech — including in disputes with the SEC and in court — to justify the non-disclosure of financial and operating information for some of Apple's biggest product segments. Apple defends its lack of reporting on the profitability of the App Store by claiming the product's discrete financial information (characteristic c) 'does not exist'. Alphabet's historical defence for why it did not release YouTube or the Play Store as independent segments was that its CEO did not review these results (characteristic b) (Klein 2018; MacMillan 2018; Poletti and Owens 2018) and that its advertising revenue did not meaningfully differentiate across these product sources (partially characteristic c).

It should also be noted that the SEC's segment disclosure requirements are more onerous than under Generally Accepted Accountancy Principles (GAAP), even if based on them.²⁰

Unlike GAAP reporting, SEC segment disclosures (S-K Item 101) require a company in its narrative business description to also disclose information on each segment's principal products or services, and to disclose amounts of revenue on any (aggregated) class of similar products or services amounting to more than 10% of consolidated revenues in any of the prior three years (KPMG 2020). Further segment disclosures are required under Management Discussion & Analysis (MD&A),²¹ but no specific guidelines are provided to Big Tech to report externally in its 10-K on the operating metrics it uses internally for segment assessment.

²⁰ Focusing, in theory, on the concept of 'materiality' in segment disclosures.

²¹ The guidance provided in FR 501.06a is that: 'When determining whether a discussion of segment information is necessary to obtain an understanding of the business, a multi-segment registrant preparing MD&A should analyse revenues, profitability and the cash needs of its significant segments. To the extent any segment contributes in a materially disproportionate way to those items, or when discussions on a consolidated basis present an incomplete and misleading picture of the entity, segment discussions should be included.' (KPMG 2020)

Somewhat ironically, segment reporting was initially conceived as a way to help regulate the growing concentration of diversified conglomerates through public disclosures. Professor Joel Dirlam recommended to the US Senate antitrust hearings in 1965²² to mandate large diversified conglomerates to report separately on 'the relative profitability of different divisions and product lines' (Pacter 1993). By 1969 the SEC had decided that companies with sales in excess of \$50 million had to report financials separately for each business line that contributed at least 10% of either sales or income. Smaller companies were subject to a higher 15% threshold. The US Federal Trade Commission (FTC) passed its own line-of-business reporting requirements running from 1974 to 1977 on most of the 500 largest manufacturing firms (Hunt 1975; Federal Trade Commission 1977).

Today, the inadequacies of segment reporting in getting companies to provide disaggregated financials are widely recognised, including by practitioners and accountants (CFA Institute 2018). The number of segments reported by public firms and their level of detail has not improved over time (Botosan, Huffman and Stanford 2020). Among firms reporting segments, fully one-third of firms disclosed only a single segment in 2017 — and only 11.5% of firms reported five or more (Botosan, Huffman and Stanford 2020). The average total number of reported segments by entities disclosing segment information was 3.4 among large entities in 2017, the same as in 1976 and down slightly from 3.7 in 1978.²³

The quality of reporting detail has, overall, declined too. 'Total assets' by segment were reported by only 82% of firms in 2017, declining from 97% of firms in 1997, while 68% of firms reported 'capital expenditure' by segment in 2017, up from 61% in 1997, but down from 72% in 1978 (prior to SFAS 131 implementation). 'R&D expenditure' by segment was reported by 14% of firms, down from 17% in 1997, despite the growing centrality of R&D to business growth. The one bright spot is that costs and expenses are now reported more widely by segment.

A 2017 survey of CFA members (including portfolio managers and analysts) saw significant room for reducing the 'gaming' of segment disclosures, and increasing their clarity and transparency (CFA Institute 2018).

Another reason why segment reporting has not been able to achieve its intended purpose is that its reporting requirements have not scaled with company size. All companies with annual revenues of \$100 million or more are subject to the same segment reporting requirements,²⁴ yet a single product line from Amazon, representing just 10% of its total sales, would still be one of the 100 largest companies in the US today. A product representing even 1% of sales from any one of the Big Tech giants might, if it were an independent company, be by far the largest company in that market segment, often larger than its competitors and yet with no current separate disclosure requirements

²² During the 1965 Subcommittee on Antitrust and Monopoly of the Senate Committee on the Judiciary, economics Professor Joel Dirlam recommended that the Securities and Exchange Act of 1934 be amended to require corporations to report 'the relative profitability of different divisions and product lines'. See: Hearings before the Subcommittee on Antitrust and Monopoly, Committee on the Judiciary, United States Senate, Eighty-Ninth Congress, First Session, as cited by Rappaport and Lerner (1970). In 1970 these requirements were added to the 10-K annual reports filed with the SEC and in 1974 companies filing with the SEC had to disclose segment information in their annual reports to stockholders.

²³ Limiting the sample to only firms disclosing at least one segment we see a decline in average number of segments reported for large firms from 2.9 on average in 1976 to 2.5 by 2017.

²⁴ Smaller reporting companies are subject to different SEC reporting guidelines (Legal Information Institute 2020a).

at all, because it is owned by a much larger conglomerate. The resulting imbalance in reporting requirements between big and small firms has profound implications for market power, as we show below.

3.3 Reported segments are small and have barely scaled with actual product diversification

Figure 1 shows Big Tech's publicly reported operating segments (by revenue) based on their 10-K reports for 2019. A lack of disaggregation of financials into multiple operating segments makes each reported segment exceptionally large in size, thereby obscuring diverse product offerings, and related revenue and profit sources. Figure 1 shows that Apple is a single operating segment company when it comes to products. Apple only disaggregates its financials by geography.

Facebook was a single segment company. Now rebranded as Meta Platforms, it defines itself as two-segment company, containing: (1) the family of apps (FOA) segment which includes Facebook, Instagram, Messenger, WhatsApp and other services; and (2) the Reality Labs (RL) segment, which includes augmented and virtual reality-related consumer hardware, software and content. As such, even with Facebook's rebranding, WhatsApp and Instagram will not be reported as independent operating segments. This conceals their financials (and operating metrics) from the public.

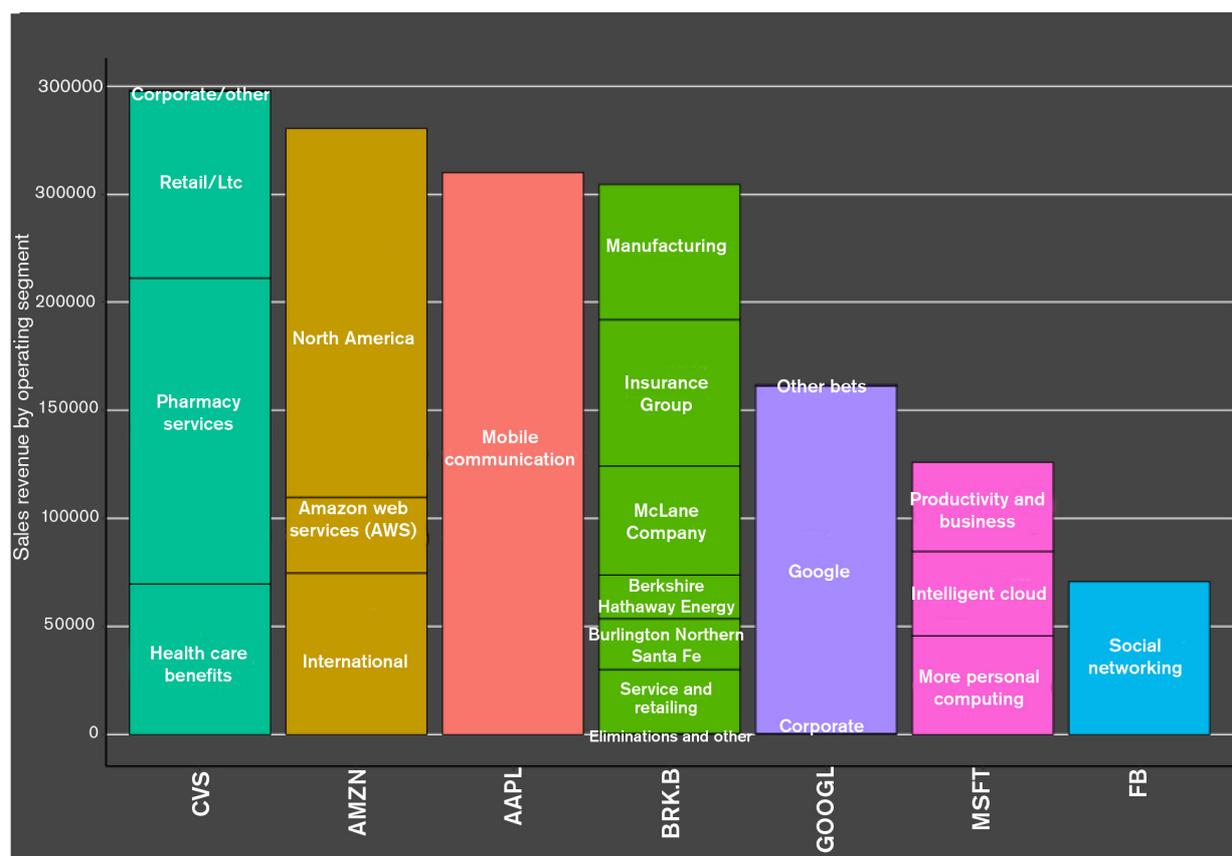
Alphabet effectively reported only a single segment of significance (Google) in 2019. This changed somewhat in Q4 2020, when it split Google revenue into Google Services and Google Cloud (not shown in Figure 1).

Figure 1 also shows that segment reporting fails in general,²⁵ rather than being just a Big Tech issue. CVS pharmacy has similarly bloated segment sizes as Amazon, though they are arguably more informative since they are all non-geographical. While Berkshire Hathaway (BRKB.B in Figure 1), a top ten US listed company by market capitalisation and a conglomerate holding company, has seven (non-geographical) operating segments, but each of these hides dozens of companies which it runs independently.²⁶

²⁵ Tesla and Nvidia, two top ten listed US companies by market capitalisation, each also only report two non-geographical segments. They each generate substantially less revenue and so are smaller segments.

²⁶ Though some are owned outside of the primary parent's holding structure and listed independently on the stock exchange.

Figure 1. Big Tech's reported sales by segments versus CVS and Berkshire Hathaway (US\$ millions, 2019)



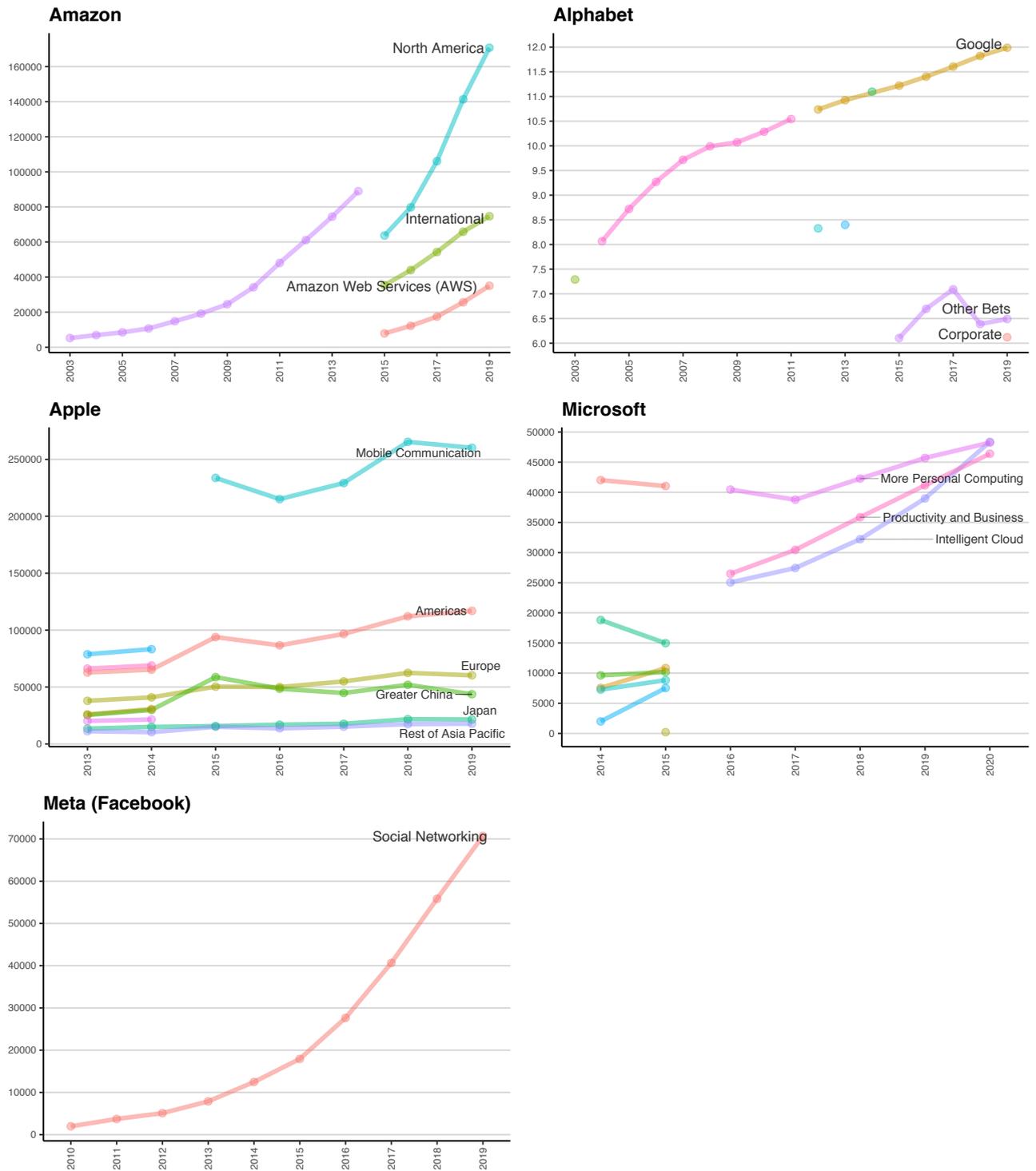
Source: Compustat Segment Daily database.

Note: Excluding segments by geography. This is before Google broke its Google segment in two for revenue reporting, and Facebook rebranded as Meta and stated its intention to report itself as a two-segment company.

Figure 2 shows that, despite Big Tech's incredible diversification over the past decade, its segment reporting has not become more detailed and differentiated. If anything, the 10-K segments reported have become less detailed over time. Briefly illustrated in Figure 2 is the constantly changing segment definitions and use of geographical and producer-facing segment definitions (e.g., advertising) instead of user-orientated product lines to differentiate segments (e.g. YouTube or Search). Together, this further distorts and obfuscates the use of company 10-K reports by investors and the wider public to understand Big Tech's business model and growth prospects.

Segments are not defined according to the user base the company is reliant on for monetisation (which would then vary by product). Alphabet has only very recently begun to do this, dividing its advertising revenue into Search and other, YouTube ads and Google network members' properties, but again no further financials are provided according to this breakdown. Instead, profitability (operating income) is provided by its new segment breakdown: services, cloud and other bets.

Figure 2. Big Tech's reported sales by segments over time (US\$ millions, Alphabet on log scale)



Source: Compustat Segment Daily database and 10-K reports.

Note: Excluding segments by geography, except for Apple. Some segments are renamed slightly to allow for improved comparability when plotting over time. Note that in Q4 2020 Alphabet changed from being a single segment company to a two-segment company with Google Services (ads, Android, Chrome, hardware, Google Maps, Google Play, Search and YouTube) and Google Cloud — and Other Bets. In 2020 when Facebook rebranded as Meta Platforms it changed into a two-segment company.

Figures 1 and 2 are described in greater detail in Box 6 for those interested in the specifics of what segments Big Tech does (and does not) report. As detailed in Box 6, Big Tech's major acquisitions are not reported as separate operating segments (or with few details provided), including Facebook's WhatsApp and Instagram, Alphabet's YouTube (despite recent changes), Amazon's Twitch and Microsoft's LinkedIn.

Box 6. Big Tech's reported 10-K operating segments

- **Alphabet reports only two segments:** Google (which is broken into its own two segments: Google Services and Google Cloud) and Other Bets. From Q4 2020, revenue is provided for Google Services and Google Cloud, but few other details. Revenue from YouTube ads and cloud sales were publicly released for the first time as independent items within Google Services at the beginning of 2020, but without accompanying details to calculate profits. R&D is 15% of revenue, but not allocated by segment. Few to no details are provided on Google's Android, Chrome, Gmail, Google Drive, Google Maps, Google Photos and Google Play Store products, since they are deemed 'not individually material' (10-K, December 2020). Investors are only told that: 'Revenues from the Other Bets are derived primarily through the sale of internet services as well as licensing and R&D services.'
- **Amazon reports three segments:** North America, International and Amazon Web Services. Major companies purchased by Amazon, including Wholefoods or Twitch, do not have their financials released separately. Twitch has revenues of \$228 million (Refinitiv 2021),²⁷ with monthly viewing hours and traffic rivalling the most trafficked and viewed websites on the internet (TwitchTracker 2021), leading analysts to argue that Amazon has built an 'unbreakable monopoly in video game streaming' (Rivero 2021). In 2020 Amazon Prime Video had roughly 54 million subscribers in the US compared to Netflix's 74 million, making it one of the leading video subscription services globally. Nevertheless, its financials are still not publicly released (Kelly 2021).
- **Apple reports five segments**, but from 2015 onwards these are **only by geography**. Net profits are not provided by product type and even basic sales data is not available separately for Air Pods, Apple TV, Apple Watch, Beats products, Home Pod, App Store, advertising and other products.
- Meta Platforms, when it was still **Facebook**, published **only one segment** (advertising) in its financial reporting. This is set to change into two segments now that Facebook has been rebranded as Meta. Facebook's revenue was divided into advertising and other, and is also reported on a geographical basis (US and Canada; Europe; Asia Pacific; Rest of World). No information on financials or user activity is provided on a disaggregated basis by its main platforms or products, namely: Instagram, Messenger, WhatsApp, third-party affiliated websites or mobile applications. Active users and

²⁷ Which puts it at roughly the 46.5th percentile of public firms' sales in 2020 in our Compustat sample of non-financial firms.

Box 6. Big Tech's reported 10-K operating segments (continued...)

revenue are only shown for Facebook; or for the Facebook family as a whole (Facebook, Instagram, Messenger and/or WhatsApp).

Meta Platforms intends to report as two segments: the family of apps (FOA) segment, which includes Facebook, Instagram, Messenger, WhatsApp and other services; and the Reality Labs (RL) segment, which includes augmented and virtual reality-related consumer hardware, software and content.

- **Microsoft reports three operating segments:** productivity and business processes, intelligent cloud and more personal computing. These segments' financials are not broken down further and are highly aggregated. For example, the 'more personal computing' segment includes Windows, MSN advertising, Windows cloud services, gaming, search, devices and more, none of which are reported separately in any detail. Revenue by product is reported, but with few **accompanying details.**²⁸

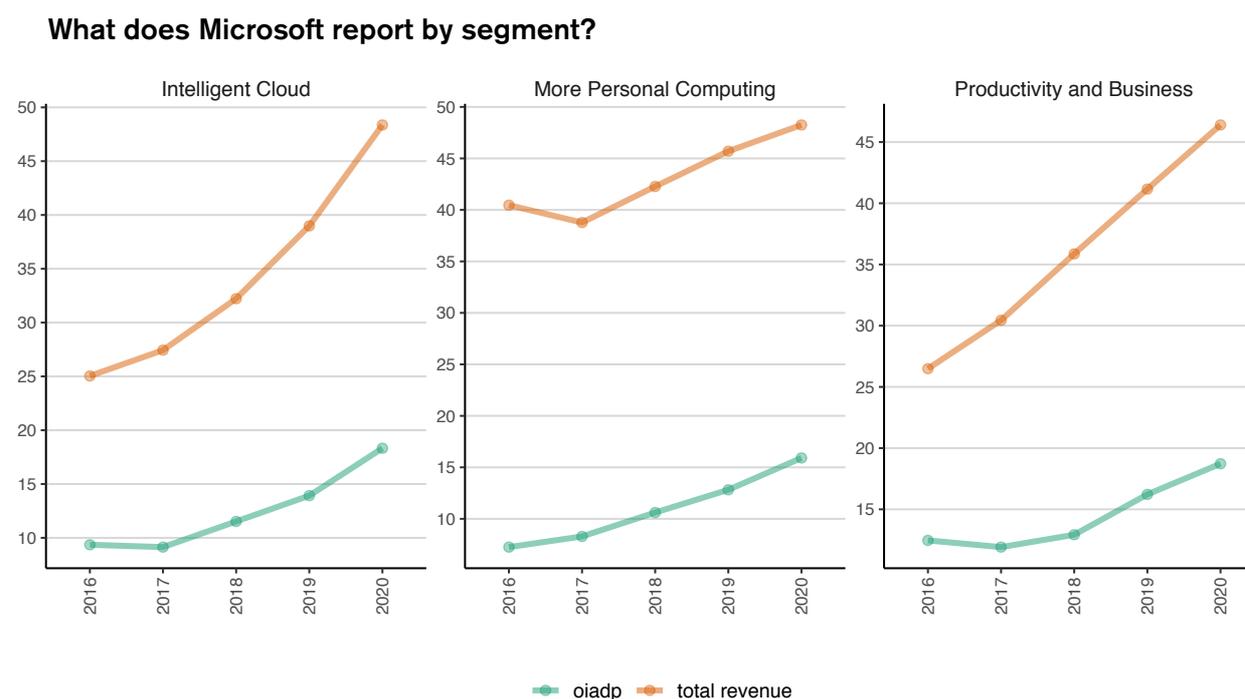
Source: Company 10-K reports.

The level of detail in which each segment is reported is itself as much a problem as the number of segments reported. Microsoft is among the biggest offenders here (see Figure 3). It only releases revenue and operating income after depreciation and amortisation (OIADP) by segment.

The more commonly used measure of profitability, OIBDP, is not released by Microsoft on a disaggregated segment basis, for example. Moreover, capital expenditure, total assets, capital stock (property, plant and equipment), cost of goods sold (COGS) and R&D are not released by segment. Without this information, the public is unable to understand which segments Microsoft makes its profits from or where its largest investments are taking place. But even with this additional reporting it would be difficult to tell given how aggregated these segments are to begin with, unless financials are released for each product, such as LinkedIn or Bing. Microsoft does release some financials by product in narrative form in its 10-K segment reporting, but these are very limited and of the form: 'LinkedIn revenue increased \$1.3 billion or 20%, driven by growth across all businesses.'

²⁸ These products are server and cloud; office and cloud; Windows; gaming; LinkedIn; search advertising; devices' enterprise services; other.

Figure 3. Example of key financials that Microsoft releases by segment (US\$ billions)



Source: Compustat Segment Daily database.

Note: OIADP = Operating income after depreciation & amortization. OIBDP is the more commonly used measure of profitability but is not released by Microsoft on a disaggregated basis.

Lastly, a lack of operating metrics by product segment (such as monthly users and engagement on WhatsApp) means that many of Big Tech's major products that are free have no disclosure obligations, even though, as we have shown, they drive monetisation in other business segments or will themselves become highly profitable once they are monetised. This lack of transparency contributes to their ability to achieve dominant market shares in various categories and to compete — potentially unfairly — with smaller companies operating in those single categories.

3.4 Amazon Web Services: Amazon's hidden engine of profitability

'You've built this lovely castle [AWS] and now all the barbarians are going to come riding on horses to attack the castle'

— Amazon CEO Jeff Bezos overheard speaking to Andy Jassy, head of AWS (Stone 2021)

Within a single decade, Amazon Web Services (AWS) went from a project (in the early 2000s) used to overcome Amazon's internal infrastructural bottlenecks (Wikipedia 2021f) and develop eCommerce APIs (Stone 2021), to providing the essential digital cloud compute, storage and database infrastructure for most major companies today, including for Netflix, Pfizer, Instagram, General Electric, Samsung, Walt Disney, NASA, the CIA and BMW, to name just a few. It is not an understatement to say that, 'It [AWS] was one of the greatest enablers of the post-recession

technology boom — arguably more important than even the iPhone, though outsiders understood very little about it.’

Beginning in 2006 AWS began to provide its services to the public, but it would take another ten years or so, in Q1 2015, before AWS’s segment financials were publicly released for the years 2014 and 2013. This, despite evidence detailed below, that such a delayed release almost certainly violated Amazon’s segment disclosure requirements to the SEC. In 2020 AWS produced \$45.4 billion in sales, up from \$7.8 billion in 2015 and \$4.6 billion in 2014.

The personal attention that Bezos gave to AWS’s development can be viewed as an outgrowth of Amazon’s need to diversify into a true technology company in order to protect its retail market share from Google, which was then trying to eat into Amazon’s e-commerce through its comparative shopping engine called Froogle (Stone 2021). Only by Amazon becoming a true technology company, Bezos reasoned, could Amazon be safe from other digital competitors, including eventually overcoming the advertising ‘tax’ it paid to Google for its products to appear in Search. In other respects, including engineering, AWS can be viewed as utilising Amazon’s economies of scope and scale.

Amazon did everything it could to not draw competitors’ attention to this new cloud service it had invented. This involved several strategies. First, Bezos decided to keep prices very low initially, even if it meant making a loss on the service. Notes the technology writer and journalist, Brad Stone, ‘He [Jeff Bezos] didn’t want to repeat Steve Jobs’s mistake of pricing the iPhone in a way that was so fantastically profitable that the smartphone market became a magnet for competition’ (2021). Amazon’s loss-leading strategy is well-known and frequently given pride of place by the New Brandeis School.²⁹ From our perspective, loss-leader pricing also helps conceal a segment’s ‘true’ (market determined) financials. By artificially suppressing profits and revenue, loss-leader pricing delays the product meeting the 10% profit or revenue thresholds required to be a reportable segment.

Second, Amazon adopted a segment reporting strategy for AWS to help it further build a ‘moat’ around AWS through its public concealment, protecting it from competitors for as long as possible (Stone 2021).³⁰ This may have been equally, if not more, important as its loss-leading strategy.

To reinforce its competitive moat around AWS, Amazon suppressed the release of AWS’s separate segmented financials in its 10-K reports to the SEC, perhaps even beyond the legal limits permitted by segment reporting. Such a strategy was reminiscent of the ‘hide your strength, bide your time’ maxim (which Deng Xiaoping used to say). This proved to be highly successful. According to Brad Stone (2021):

²⁹ Led by Lina Khan, this criticises present competition law’s narrow emphasis on static consumer welfare and price metrics.

³⁰ Acquisitions, including of tech talent, was also vital to this. In January 2015 Amazon paid \$400 million to acquire Israel-based chipmaker, Annapurna Labs, to build low-cost, high-performance microprocessors for Amazon servers and seek a cost advantage in Amazon’s data centres that competitors couldn’t match.

Both he [Bezos] and Jassy lobbied to conceal the division's financial details, even amid the widespread skepticism [sic] that throttled the company and its stock price in 2014. But in 2015, Amazon's finance department argued that the division's revenue was approaching 10% of Amazon's overall sales and would eventually trigger reporting requirements under federal law. 'I was not excited about breaking our financials out, because they contained useful competitive information,' Jassy admitted.

This strategy of hiding segment strength through financial aggregation proved remarkably effective: 'Nice company. [But] they make no money, Charlie!' quipped Steve Ballmer, Microsoft's then CEO, in October 2014. This reflected just how widespread and egregious the popular misunderstanding of Amazon's increasingly diversified business model had become and which Amazon was intentionally perpetuating.³¹ Given the phenomenal growth and profitability of AWS, it was only a matter of years before it pulled Amazon as a whole into the green, but this was only evident to insiders (Stone 2021):

Of course, Ballmer had little grasp of how Amazon's eventual engine of profitability, Amazon Web Services, was performing — and that was how Jeff Bezos wanted it. Over its first decade, AWS's revenues and profits were a closely guarded secret. The division generated \$4.6 billion in sales in 2014 and was growing at a 50% annual clip. But Amazon disguised those numbers, along with nascent advertising revenues, in a sundry 'other' category on its income statement, so that potential competitors like Microsoft and Google would not recognize how attractive a business cloud computing actually was. Observers and analysts could only guess at the financial dimensions of a unique enterprise computing business, anomalously tucked inside an online retailer.

Not only did AWS's public release as a standalone segment in Amazon's 10-K report surprise competitors, such as Microsoft (which entered the market as late as 2010 with Azure), but it surprised investors. When Amazon announced to the world for the first time in April 2015 that it³² had a highly profitable, growing and now fully formed ten-year-old business segment tucked away called Amazon Web Services, investors were shocked. Amazon's share price rose 15%.³³ Competitors and regulators equally were caught flat-footed. Technology analyst Ben Thompson sarcastically called the April 2015 earnings report 'one of the technology industry's biggest and most important IPOs' (Stone 2021). Instead of segment reporting helping reveal hidden information from Amazon's financials, it had done the exact opposite and had facilitated the decade-long gestation and silent global takeover of what had become a digital infrastructure service behemoth.

³¹ Also due to high reinvestment from profitable and mature segments, such as books and electronics, in the US and UK (Stone 2021).

³² Released its first products in 2006.

³³ This also reflects the launch of Prime that year, which capitalised on Amazon's two-day shipping programme.

Today, AWS consists of over 200 products and services, including computing, storage, networking, database, analytics, application services, deployment, management, machine learning, mobile, developer tools and tools for the internet of things. The most popular include its original core offerings of Amazon Elastic Compute Cloud (EC2) and Amazon Simple Storage Service (Amazon S3), along with Redshift (to analyse cloud data), Amazon Connect and AWS Lambda (Amazon Web Services 2021; Wikipedia 2021a).

Despite Microsoft and Google eating into its market share more recently, Amazon's cloud services remain dominant. In Q2 2021, AWS's share of global cloud computing services was estimated at more than 40%, more than Microsoft Azure at nearly 20% (Tilley 2021).

How did AWS escape segment reporting disclosure requirements for so long? It appears that it met the requirements for being identified as an operating segment, since it had its own financials, and these were reviewed and used internally by the key decision-makers for resource allocation. For years, AWS had its own head, Andy Jassy (now the CEO of Amazon), while Bezos was intimately involved in most aspects of it — even though part of its development took place in South Africa away from Bezos's watchful eye. Yet AWS's 'original cloud products were conceived by Jeff Bezos in concert with other technical leaders between the years 2004 and 2006' (Stone 2021). Notes Stone (2021), 'In the early years, Bezos waded into the details of AWS himself, editing web pages for the first products and reviewing revenue reports from EC2 and occasionally replying with smiley faces.' Though later Bezos let Jassy run AWS autonomously, Bezos was still involved in major investment decisions and oversight (Stone 2021).

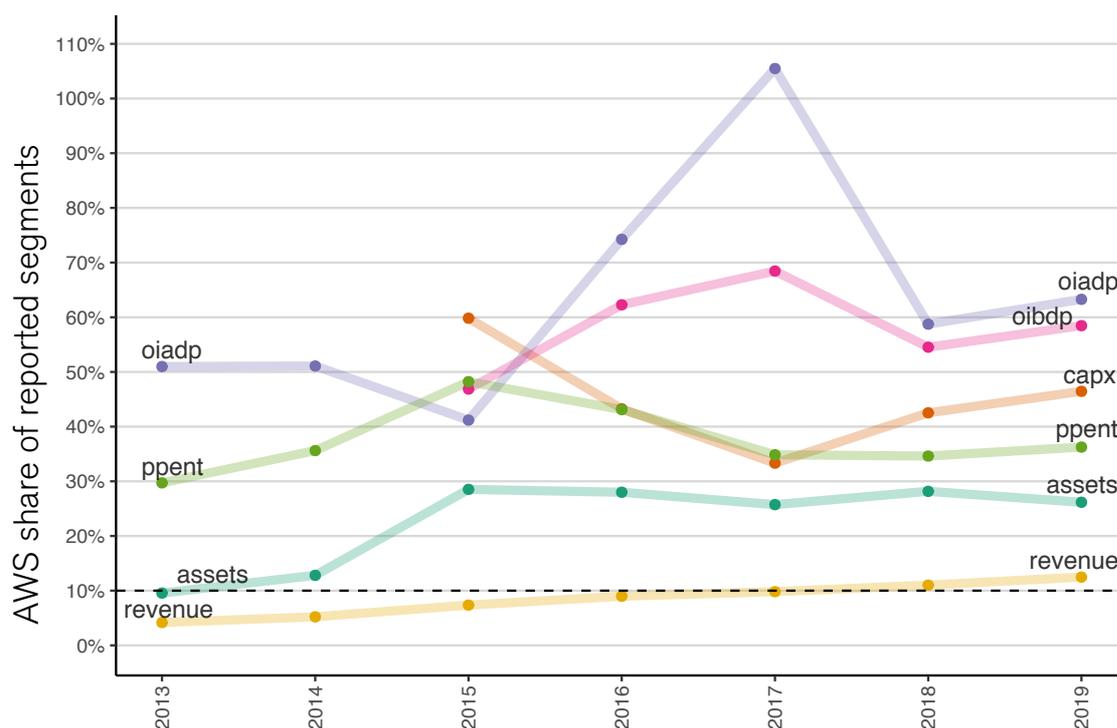
Physically and within Amazon, AWS was a separate operating segment long before its 2015 disclosures. In 2011, three years prior to being released financially as a separate segment, AWS received its own campus: 'a five-hundred-foot-tall glass skyscraper that Amazon dubbed Blackfoot' (Stone 2021). Although a hidden financial giant in Amazon's 10-K reports its enormity was already in plain sight for all those in Seattle.

Since AWS was probably an operating segment, with its own internal financials reviewed and used by chief operating officers, this means that if it met one of the 10% test thresholds, accounting for at least 10% of Amazon's consolidated segment-wide assets, revenues or profits/losses, then it warranted being a separate reportable segment in Amazon's 10-K reports. However, AWS's disclosure of AWS financials (for the years 2013 and 2014) only happened in Q1 2015, despite its considerable profitability before that date.

Figure 4 shows that, according to our calculations, AWS did in fact account for far more than 10% of Amazon segment profits in 2013 and 2014, using operating income after depreciation and amortisation (OIADP) as our measure.³⁴ This should have triggered the requirement that AWS be reported as a standalone segment, as long as Amazon defined it internally as an operating segment.

³⁴ Note, AWS is excluded from segment total profits since it was not a reportable segment in those years. Net income not provided for 2013 and segment presentation is undertaken on an 'operating income' basis, such that this is what we also do. For 2014 data: p. 68 end of year 2015 10-K report using reassessed data shows AWS segment operating income of \$660 million and North America segment profits at \$1,292 million (excluding the international segment, which was loss making). For 2013 data: p.68 end of year 2015 10-K report using reassessed data shows AWS net income of \$673 million and North America segment profits at \$1,166 million, and the international segment of \$154 million.

Figure 4. Did AWS hit segment reporting's 10% thresholds prior to 2015? AWS's share of reported segments (including AWS from 2015 for when it was a reportable segment)



Source: Compustat Segment Daily database combined with Amazon 10-K report for OIADP data for 2013 and 2014, and Amazon 10-K reports for all AWS data prior to 2015. International segment was loss making in 2014 and so is removed from OIADP calculations for that year.

Notes: (1) Segments only report property, plant and equipment as net (after depreciation). (2) Capital expenditure reported by the company for the operating segments includes property and equipment added under finance leases. In contrast, capital expenditure reported in Compustat North America does not include property and equipment added under finance leases or capital lease. As a result, capital expenditure in Compustat segments is greater than capital expenditure reported in Compustat North America. (3) Notes Amazon's 2015 10-K report, 'Total segment assets exclude corporate assets, such as cash and cash equivalents, marketable securities, other long-term investments, corporate facilities, goodwill and other acquired intangible assets, capitalised internal-use software and website development costs, and tax assets. Technology infrastructure assets are allocated among the segments based on usage, with the majority allocated to the AWS segment.'

AWS's share of segment profits in 2013 (defined as operating income) was 50.9% of reported segment profits and 51% in 2014.³⁵ It seems likely that a similar trend would have been evident prior to 2013 — but no publicly available data exists to confirm such suspicions.

It is possible that highly imaginative profit definitions could have helped suppress the release of AWS's segment financials. But for 2013 and 2014 we are using Amazon's definition of segment profits from its own 2015 10-K segment disclosures. Based on these definitions, it appears that Amazon may have been in violation of its segment disclosure requirements by not releasing AWS's financials prior to Q1 2015. Based on broad circumstantial evidence, this probably had an initial chilling effect on competition in the market through raising barriers to entry and delaying new entrants.

³⁵ Only for segments which generated profits (as per segment reporting guidelines). Using net operating income data for 2014 (not available for 2013) does not change these results.

When AWS was released as its own segment in Amazon's Q1 2015 financials, it was shown to have a 19.2% operating margin and a 70% growth rate, compared to North American retail segment's 2.2% operating margin and 25% growth rate. Under such circumstances it seems hard to believe that AWS was not the profit driver of Amazon for several years prior to its release.

Figure 4 also shows that from 2014 onward AWS clearly meets the 10% asset test, falling only marginally below it in 2013. Interestingly, AWS fails the 10% revenue test prior to 2018 even though it accounts for 30%+ of Amazon's net capital stock (PPENT) since 2013.

AWS shows that poor segment disclosures impact the public at large and competitors, not just regulators. By the time of AWS's segment release, Amazon's dominance in cloud computing and storage services was well entrenched, accounting for a greater share of the market than its four closest competitors combined (D'Onfro 2015). No assessment has taken place to examine the potentially harmful impacts on innovation, prices and profit margins from Amazon hiding its AWS segment from competitors.

3.5 Epic Games versus Apple: segment reporting on trial

'It gave us the benefits of openness while retaining end-to-end control'

— Art Levinson, Apple board member, on the App Store
(Isaacson 2011)

We argue that because Apple can define its operating segments largely as it sees fit, Apple has (somewhat farcically) been able to hide one of its highest margin and largest profit sources from public investors, competitors and regulatory oversight.

Apple's App Store heralded a true revolution in how digital media was produced, and its consumption mediated and controlled. With the App Store, Apple transformed all media, from publishing and journalism to television and movies. Notes Steve Jobs biographer, Walter Isaacson, 'The App Store created a new industry overnight. In dorm rooms and garages and at major media companies, entrepreneurs invented new apps' (2011).

Strong network effects helped drive explosive growth in consumption and production (Isaacson 2011): 'The App Store for the iPhone opened on iTunes in July 2008; the billionth download came nine months later. By the time the iPad went on sale in April 2010, there were 185,000 available iPhone apps. [...] in less than five months, developers had written 25,000 new apps that were specifically configured for the iPad. By July 2011 there were 500,000 apps for both devices and there had been more than 15 billion downloads of them.'

The App store's product integration reflected Apple's characteristic bundling of hardware and software with its services to maximise user experience. This also allowed Apple 'absolute say' over every point in the consumption process, from payment to porn (which was banned on the App Store) (Isaacson 2011). In doing so, the App Store was creating a 'walled garden'.

The App Store's business model extracted maximum value for Apple from every app supplier business that engaged with it. Not only would Apple take a 30% fee on all app payments and purchases, but Apple would 'own the customer', billing them directly, and holding their payment information and e-mail address in its database. And because of Apple's privacy policy this information would not be shared with the app vendor (e.g. the *New York Times*) unless the customer gave Apple explicit permission to do so. Through the App Store, Apple had direct relationships with other business's customers at near zero marginal cost (in terms of serving these new customers), along with decreasing acquisition costs, owing to the network effects inherent in such a two-sided digital platform. Far from being a pure intermediary, Apple used its platform, therefore, to become an 'aggregator',³⁶ swallowing up customer data and attention that the actual suppliers of the apps would otherwise have been able to exploit for their own benefit. In doing so, they were seeking to extract larger network rents (Mazzucato, Entsminger and Kattel 2020).

From the beginning this 'aggregator' approach created friction with the businesses on the App Store platform, but Apple's market power was so great that it overcame any resistance to it: 'Time Inc. wanted to create apps that would direct readers to its own website in order to buy a subscription. Apple refused. When *Time* and other magazines submitted apps that did this, they were [simply] denied the right to be in the App Store [until they acquiesced].'

A decade later, and despite the App Store's global financial and economic importance, **its financials are not released publicly and apparently 'do not exist'**. In segment reporting speak, Apple does not consider them to be a separately identified operating segment with its own financials used by internal management to make operating decisions.

Apple's court case with gaming company Epic Games illustrates the real economic value that hiding the App Store's segment information has for Apple. It helps Apple extract super-normal profits from firms in its ecosystems through evading proper oversight from regulators. Epic Games sued Apple after its Fortnite game was removed from Apple's App Store in August 2020. This came after Epic Games built a direct payment system into Fortnite that would allow it to bypass the 30% 'fee', which Apple takes on any in-app purchase in its App Store (Satariano and Nicas 2020; Satariano 2021).³⁷ With 1 billion iPhones in use and games being the largest area of App Store fees for Apple, a lot is at stake: between January 2017 and October 2020, Epic is estimated to have paid \$237 million in fees to Apple for Fortnite (Clayton 2021).

The profit margin of the App Store was a key piece of evidence over which competing expert testimony was given. Although not by itself sufficient to show evidence of antitrust conduct (United States District Court 2021 a), in conjunction with other factors it can be a potent symbol of market power or of monopoly power.³⁸ Apple itself buys into the relationship between market power

³⁶ This wording is used by CEO of Time Warner, Jeff Bewkes in conversation with Steve Jobs, cited in Walter Isaacson (2011). Steve Jobs (emphasis added): "Well, then, we have to figure something else out, because I don't want my whole subscription base to become subscribers of yours, *for you to then aggregate at the Apple store*," said Bewkes.' For an overview of aggregator theory see Haga (2019).

³⁷ The trial is also taking place in Australia; while in 2021 the European Commission opened a similar antitrust investigation into the terms which Apple imposes on its App Store developers.

³⁸ See section B and in particular footnote 589 of the judgement *Epic Games, Inc. v. Apple Inc.* Market power and monopoly power are related but distinct concepts. As the Supreme Court has stated, market power is the ability to raise

and profit margins, stating in its end of 2020 financial year 10-K report (p. 9, emphasis added): ‘The company’s products and services are offered in highly competitive global markets characterized by aggressive price competition and *resulting downward pressure on gross margins.*’

Yet by not reporting the App Store as a separate operating segment with its own financials, Apple has managed to keep the profitability — and the total profits — taken in by its App Store, and in turn its potential (abuse of) market power, hidden. The monopoly Apple holds over its product financials has slowly been chipped away at in the court case, but remains open to dispute until Apple is compelled to publish detailed product financials in its public 10-K segment disclosures. As noted previously, Apple reports its segment financials by geographical region rather than product,³⁹ such that product financials are released largely at Apple’s discretion and with few details provided.

In fact, ‘segment reporting’ was a key component of Apple’s defence in court and served as a notable barrier to properly assessing Apple’s market power through the App Store. When Tim Cook was asked in court about the profitability of the App Store, he said he did not know, because Apple does not calculate profit or revenue on a division-by-division basis. ‘We don’t have a separate profit and loss statement for the App Store,’ argued Apple’s chief compliance officer (Lyons 2021).

Part of the argument was that bundling rendered financial reporting on a product-by-product basis irrational: ‘It’s not a separate standalone business for us,’ Kyle Andeer, Apple’s chief compliance officer, said of the App Store at a congressional hearing in April 2021, and instead should be viewed in tandem with the products that it helps sell, often at low or no margin. This was repeated in the Epic Games court case where Apple proposed that the App Store is ‘an integrated feature of our devices’ (Gurman 2021) that relies on all of Apple’s intellectual property assets (Lyons 2021), making it impossible to detail the App Store’s precise profit margin (or allocate specific assets to it).

The financials of the App Store estimated in court proved to be damning to Apple in several respects. The expert witness testimony provided by Epic Games estimated the App Store’s operating margin at 78%.⁴⁰ This is even higher than estimates of Google’s Play Store profit margin at 62% (Financial Times 2021).⁴¹ The judge ruled that, in light of the high profit margins, Apple’s restrictions on iOS game distribution had ‘increased prices for developers’ and that a ‘third-party store could likely provide game distribution at a lower commission and thereby either drive down prices or increase developer profits’ (United States District Court 2021a).

prices above those that would be charged in a competitive market (NCAA v. Bd. of Regents of the Univ. of Oklahoma, 468 US 85, 109 n.38 (1984) 589); whereas monopoly power is the power to control prices or exclude competition (Grinnell Corp., 384 US at 571).

³⁹ As noted previously, Apple only reports geographical segments, with some indication of sales and operating metrics by product and service, but not granular details. Gross margin is provided, but only for products as a whole and services as a whole in its 10-K SEC filings. By 2020, services net sales were \$53,768 billion, amounting to 19.5% of total net sales of \$274,515 billion. The App Store is an undisclosed portion of this services total. Services include advertising, cloud services, digital content and payment services. The App Store is classified as digital content, according to Apple’s 10-K report, even though a portion of advertising revenue is attributable to the App Store.

⁴⁰ According to the opposing legal team.

⁴¹ Google’s Play Store reported operating margins of more than 62% in 2019, according to court filings in a US lawsuit. Apple’s App Store had operating margins of almost 78% in the 2019 fiscal year, according to expert witness testimony in a lawsuit with Epic Games, maker of the Fortnite video game.

The App Store's financials can be kept hidden from the public, beneath Apple's aggregated 10-K reporting, only because of the **excessive managerial discretion afforded to it by current segment reporting rules**. The App Store does account for at least 10% of profits and maybe also revenue.⁴² Estimates show Apple gets roughly 20% of its total profits from its App Store, similar to estimates of the total profits that Alphabet gets from its Play Store (Peers 2021b).⁴³ Yet, given that Apple can define its operating segments largely as it sees fit, Apple is (somewhat absurdly) able to hide one of its highest margin and largest profit sources from public investors.

From a regulatory perspective, it may be increasingly irrelevant whether the App Store meets a 10% segment reporting threshold, given how large in absolute size its profits and sales are, and given its global significance. Moreover, the App Store's impact is far in excess of the direct revenue it generates for Apple, precisely because it is a platform economy. **The App Store serves a gatekeeper function by deciding how businesses can reach their customers.**⁴⁴ Gatekeepers can easily amplify their product segment's market power, while segment reporting works to keep that market power hidden. As of June 2020, Apple's App Store hosted almost 2 million apps and was visited by half a billion people each week across 175 countries (Apple 2020). Apple argues that its App Store ecosystem facilitated \$519 billion in billing and sales in 2019 (an amount similar to the GDP of Sweden)⁴⁵ — or ten times Apple's total services net sales for that year. However, because Apple only receives a commission from the billings associated with digital goods and services, more than 85% of the \$519 billion total accrues to third-party developers and businesses of all sizes, according to Apple (Apple 2020). App Store billings are attributable to Apple's bottom line and are derived from paid downloads and in-app purchases, including subscriptions.

The EU's proposed Digital Markets Act looks to regulate 'gatekeepers' in the digital sector with a focus on their size and app operating metrics of minimum monthly end users or business users.⁴⁶ Given the ability of digital platform product segments to leverage large profits and growth for the company as a whole, we later recommend the SEC uses similar operating metrics when deciding on Big Tech's disclosures (Section 4).

⁴² Sensor Tower estimated that in 2019 Apple collected \$19 billion via its 30% commission on \$63.4 billion in sales of digital goods and services on iPhone and iPad apps, as quoted in the *New York Times*. However, CNBC's 2020 analysis, which 'reverse engineered' the size of the App Store from Apple's total reported payments to developers, suggested that App Store revenue may have been as much as \$50 billion in 2019 (and \$64 billion in 2020).

⁴³ Calculations contained in Peers (2021b) are based on, for Google, United States District Court 2021c, and for Apple, Peers 2021a, but note, the US House of Representatives' recent deep dive into Big Tech and competition cited various estimates, including some from the media, that put App Store revenues at anywhere between \$15 billion and \$18 billion. It also quoted a former Apple executive as saying the App Store's costs were less than \$100 million (Subcommittee on Antitrust, Commercial and Administrative Law of the Committee on the Judiciary 2020).

⁴⁴ For an overview, see also aggregation theory (Haga 2019).

⁴⁵ Note that GDP is a measure of value added while our measure of App Store sales is comparable to gross output (Analysis Group 2020; Apple 2020).

⁴⁶ For an overview see European Commission (2020).

3.6 YouTube and Alphabet keep the SEC segment reporting at bay

'Google is largely a single online advertising business, with other smaller product areas within the Google ecosystem'

— Alphabet's response to a 2017 SEC request for more information on its operating segments

As noted previously, until 2019 Alphabet reported the financials of all its products under just a single aggregated operating segment called Google, along with a segment called Other Bets. The Google segment contained the aggregated financials of all ad revenue along with Android, Chrome, Google Cloud, Google Maps, Google Play, Hardware (including Nest), Search and YouTube. Other Bets covered Access, Calico, CapitalG, GV, Verily, Waymo and X.

By the end of 2019 this situation gradually began to change and Alphabet was compelled to break out YouTube ads, Search and Cloud as separate revenue items. Finally, in Q4 2020 Alphabet changed from being a single segment company to a two-segment company with Google Services (ads, Android, Chrome, hardware, Google Maps, Google Play, Search and YouTube) and Google Cloud — and an Other Bets. Revenue from YouTube ads was reported separately, but not YouTube non-ads subscription revenue (which remained aggregated in Google's 'other' revenue item).

This section tells the story of the gradual and very partial release of YouTube's financials by Alphabet (its ultimate owner), arising ultimately from the regulatory pressure placed by the SEC on Alphabet's limited segment disclosures.

In January 2005, Google launched Google Video (Wikipedia 2021c). YouTube was a competing start-up that launched barely a month later and rapidly outpaced Google Video in popularity.⁴⁷ In just 18 months, users were uploading around 65,000 videos daily on YouTube, with apparently more than half of all videos watched online being on YouTube (Redding 2018). Google decided to acquire the wildly popular but undercapitalised YouTube for US\$1.65 billion in October 2006 (Wikipedia 2021g). It was one of the most successful acquisitions in Google's history. By 2010 YouTube already had a market share of around 43% and more than 14 billion views of videos, according to Comscore (Comscore 2010). Yet it would take segment disclosure rules another decade to squeeze out of Alphabet any financial or operating metrics on this product segment — and even then Alphabet did not release YouTube as a standalone segment with its profits reported.

All evidence indicates that **YouTube has for years been treated internally as an independent operating segment, even though Alphabet has refused to release it as one externally.**

YouTube was never integrated directly into Google's search engine and even today operates as an independent business within Google, with its own CEO and financials (Wikipedia 2021g). As early as October 2006 YouTube moved to a new office in San Bruno, California. Much later, in February 2014, Susan Wojcicki was appointed CEO of YouTube. In January 2016, YouTube expanded its

⁴⁷ In 2009 Google stopped accepting new uploads into Google Video and gave its users the opportunity to move their videos over to YouTube, before finally shutting down the Google Video hosting service in 2012. From that point forward, Google Video was maintained as a search tab within the Google search engine and can be used to search for videos from all over the web, including YouTube and competitors such as Vimeo, as well as those hosted on independent websites. (Some sites, such as Facebook, prohibit Google from searching and indexing their video hosting services.)

headquarters by purchasing an office park for \$215 million with 51,468 square metres (554,000 square feet) of space, housing up to 2,800 employees (Wikipedia 2021g). Given this and the large capital expenditures likely involved in maintaining the servers that YouTube videos run on (Vaughan 2015), it seems suspect that YouTube doesn't independently report its financial numbers to Alphabet's head. If it does, that would help qualify it as an operating segment. Furthermore, YouTube offers a distinct advertising product from Google — video, as opposed to text and/or image ads — yet for years Google has refused to release separate financials on YouTube, claiming that 'advertising is advertising' and that Alphabet's CEO does not review YouTube's financials for operating decisions. We explore these arguments further below.

Alphabet was only compelled to eventually release some, albeit limited, financial information on YouTube in its 10-K report, because it slipped up in its exchanges with the SEC. The SEC had for years (Owens 2018) been asking Alphabet for more information on its various products, as YouTube and the Play Store became of obvious global significance yet were largely absent from Alphabet's 10-K reports. In July 2017 the SEC asked Alphabet to (emphasis added), 'Please clarify whether *YouTube* and *Google Play* represent or comprise [independent] operating segments that are [then] aggregated into the *Google* reportable segment.'⁴⁸

Alphabet eventually responded, noting that that Google Play was not a sufficiently material product to warrant disclosure. This is at odds with what we know today though: recent court filings indicate that the Play Store accounted for 20% of Alphabet's reported operating income in 2019 (Dave 2021; United States District Court 2021c).

Regarding the YouTube segment, Alphabet argued to the SEC that its business model was all 'just advertising' revenue: 'Google is largely a single online advertising business, with other smaller product areas within the Google ecosystem... There are no significant differences among our business customers that would result in differing impact on our revenues. Accordingly, we believe further disaggregation of [advertising] revenues by type of customer or sales channel would not enhance our disclosures.' This seems hard to believe, but the SEC was largely powerless to intervene given the overriding managerial primacy built in to present segment reporting rules.

Why then were some of YouTube's financials eventually released by Alphabet? This turns on the idea that if a CEO (the chief operating decision-maker) sees and uses the financials for a large segment of the company to allocate resources, then the company should be reporting that segment's results to investors in their 10-K report (Owens 2020).

Alphabet argued that Larry Page, who was then the CEO, was not involved in resource allocation to YouTube or individual products areas, such that no disclosure requirements followed. (Moreover, it argued that, 'None of our other operating segments meet the quantitative thresholds to qualify as reportable segments.') Instead, Alphabet said that only Sundar Pichai used YouTube financials for resource allocation and he was not the CEO — yet! But when Sundar Pichai got promoted to CEO in December 2019, it meant that he had seen and used YouTube financials for resource allocation internally, and so some disclosures had to then follow.

⁴⁸ The quote continues: 'If so, provide your analysis of how you satisfied the aggregation criteria outlined in ASC 280-10-50-11. In addition, factors used to aggregate operating segments into the Google segment should be disclosed, if applicable. Reference ASC 280-10-50-21(a).'

As a result of Sundar Pichai's promotion to CEO, by Q4 2019 (Alphabet 2020) Alphabet was compelled to release revenue separately for YouTube ads, Search and Cloud. When Alphabet changed in Q4 2020 into a two-segment company, with Google Services, Google Cloud and Other Bets, this situation persisted: revenue from YouTube ads was still reported separately, but YouTube non-ads subscription revenue remained undisclosed and aggregated within Google's 'other' revenue item.

Alphabet's 2020 10-K report notes that YouTube had almost \$20 billion in annual ad revenue alone. This means that if YouTube were a standalone ads only entity, it might be roughly the world's fourth largest seller of digital ads, after its parent company, Alphabet, Facebook and Amazon (Pressman 2021).

In the final analysis, despite considerable SEC pressure, the total revenue and profitability of YouTube is still not made public by Alphabet. YouTube subscription revenue is not separately disclosed, nor are the payments it makes to content creators who share in YouTube ad revenue (required to calculate its profits to Alphabet). This highlights the ineffectiveness, and lack of real enforcement and oversight capabilities, of current segment reporting rules.

4. Recommendations to reform Big Tech's disclosures

The current 10-K regulatory framework has long been inadequate in compelling firms to disclose material financial information by product segment. Moreover, it has no specific requirement for firms to release non-financial operating metrics on the user sides of their platforms. This is despite the fact that operating metrics such as monthly active users are used internally by management to assess product performance and often underlie company revenue and profit projections.

These two disclosure weaknesses have been greatly compounded by Big Tech's rapid diversification, incredible size and its unique business model, centred on digital marketplaces and platforms, which provide free or subsidised products to users to be monetised through ad sales, subscriptions or bundling.

Due to variations in the business models of the five Big Tech companies examined in this report, no single disclosure framework is likely to meet the needs of all stakeholders. Alphabet and Facebook rely on advertising; Amazon on e-commerce; Apple primarily sells devices and software subscriptions; while Microsoft, Apple, Alphabet and Amazon also operate comprehensive software development platforms.

Nevertheless, significant improvements can be made. This final section considers three types of reforms to limit the ability of Big Tech to conceal material information from investors, competitors and regulators in their 10-K disclosures to the SEC. These can help limit Big Tech's abuses of market power, potentially increase new competitors in their product markets, and enhance the ability of antitrust authorities and policy markets to provide proper regulatory oversight and intervention where necessary. To advance **monetisation disclosures** and disclosures by **product segment** we propose mandatory 10-K reporting of:

1. Operating metrics for products with a minimum number of monthly active end users and business users (platform gatekeeper provisions); and
2. Detailed financials on all products with \$5 billion or more in annual revenues or profits/losses.

Finally, we also propose establishing a tech disclosures framework for digital platforms through the SEC. This draws on the examples of the current ESG Task Force created by the SEC and industry-specific disclosure requirements, including in segment reporting for the airline industry. While there is currently a project underway at the Financial Accounting Standards Board to update segment reporting rules (Financial Accounting Services Board 2021), its progress has been uneven and does not appear to substantively address the issues raised by this paper regarding disclosures by Big Tech.

4.1 Implications for antitrust

Regulation of competition in any market requires a common understanding of what the objective is for that market and the company reporting structures required to achieve those objectives. If the objective is to limit the ability of any one firm to raise prices above a competitive level (i.e. control market power) or limit the power of firms to control prices or exclude competition (i.e. control

monopoly power), then standard metrics of consumer and producer surplus and concentration ratios are sufficient.⁴⁹

In the technology sector, however, such standard metrics do not usually suffice as the products they provide are often free. Moreover, with digital platforms, market power is not necessarily about the market share held in any single market segment today, but often the relationship between segments. Product segments are mediated through the platform's control of users, data, product bundling and interoperability features.

The enhanced segment disclosures that we recommend can help shed light on many of the above price and non-price features of market power. The Jeff Bezos-inspired motto for the *Washington Post* notes that, 'Democracy dies in darkness' (Stone 2021), yet information is just as much the democratic lifeblood of a competitive market economy, because it cannot exist and thrive without it. Investors require information on a company to assess its overall growth prospects, risks, and current and future returns. With information on profitability, monthly user engagement and capital expenditures, potential competitors can also assess the desirability of entering or exiting a product market. This is especially important for certain platform-based markets where profit margins appear to be higher due to lower contestability (arising in part from stronger network effects).

With improved operating and financial information by product segment, antitrust authorities can better consider the extent and durability of firms' market power vis-à-vis consumers and producers. Segment information disaggregated at the product level, which includes operating information on user numbers, is vital for antitrust authorities wishing to define a market's boundaries and assess market shares by incumbent firms. With such information, decisions around how to increase contestability in markets, the feasibility of breaking up firms' segments, how best to target digital taxes, and regulations to govern current monetisation practices, can be made based on timely and disaggregated official company data, rather than pieced together in an ad hoc fashion from what scant data is available.

Enhanced disclosures in firms' 10-K reports to the SEC can play an important role in supporting the antitrust enforcement work currently undertaken by the FTC and the Department of Justice (Kendall 2021). **Enhanced segment and operating disclosures have at least two applications for these authorities:**

First, an improved regulatory ability to provide antitrust oversight. As shown in the Epic Games versus Apple trial (Section 3), a key piece of evidence — the profitability of Apple's App Store, one of its largest products — was not made publicly available by Apple, which claimed that information 'did not exist.' instead, the presiding judge had to rely on expert testimony from an Epic Games witness. This helped Apple contest that it had market power through its App Store, which it was unfairly using over firms in its ecosystem to extract rents.

⁴⁹ As noted previously, in the judgement of Epic Games versus Apple (United States District Court 2021 a), market power and monopoly power are noted as being related but distinct concepts: market power is the ability to raise prices above those that would be charged in a competitive market (NCAA v. Bd. of Regents of the Univ. of Oklahoma, 468 US 85, 109 n.38 (1984) 589) and monopoly power is the power to control prices or exclude competition (Grinnell Corp., 384 US at 571).

Second, improved information to assess product and platform market shares, and contestability of product markets. Financial metrics (such as sales or profit margins) are no longer the only — or even always the most relevant — indicators of a firm's market share. Similarly, a firm raising price above marginal cost, or a firm controlling price entirely, is often not the primary harm which large digital platforms can inflict on their ecosystems of supplier firms and consumers.⁵⁰ This makes a reporting framework that explicitly accounts for these non-monetary factors, through the compulsory reporting of operating metrics on monetisation (as we recommend), of growing importance to successful antitrust activities.

As detailed by the FTC head, Lina Khan, price is a less relevant marker of consumer and producer welfare in general, given the growing predominance of free products offered by Big Tech to advance platform adoption through network effects (Khan 2017, 2018b). These free products are (by definition) offered at a steep discount to consumers (and so are said to raise consumer welfare). However, innovation, fair treatment of suppliers and product quality degradation may follow in the wake of a firm gaining market power through its digital platform over its ecosystem of firms and consumers. Therefore, FTC cases are increasingly relying on non-price measures, such as monthly active users, user engagement and other user-centred metrics when assessing market shares, and even market power (through the ability of consumers to switch products). As a result, reporting requirements that work to increase the disclosure of relevant non-financial operating metrics are vital to advance future (and present) antitrust enquiries by the FTC and Department of Justice, as well as authorities abroad.

SEC filings should include information on the main financial and operating activities of firms, by product segment, without which the FTC is far more limited in its ability to evaluate and investigate issues of market power. For example, in the FTC's recently renewed and revised antitrust lawsuit filed against Facebook (Murphy and Fedor 2021; United States District Court 2021b), operating metrics on monthly active users and platform quality are central to the FTC's argument that Facebook is a 'monopoly'. Yet the monthly active users on Instagram is not publicly disclosed by Facebook in its annual 10-K filings with the SEC. For other operating metrics on Facebook's core social network platform, such as time spent by users each month on Facebook, the FTC had to draw on estimates from an external private company. Yet such information should already be made available to the investing public through Facebook's 10-K reports to the SEC.⁵¹

4.2 Monetisation disclosures: gatekeeper operating metrics

As outlined in section 2, the business model of a digital platform frequently relies on providing free or cross-subsidised products to users. User engagement is then monetised and sold to the 'other side' of the platform, as attention to advertisers or, using subscriptions or product bundles, to the same users. Yet free products currently have no explicit disclosure requirements placed on them

⁵⁰ This is famously encapsulated in the Herfindahl Index (also known as the Herfindahl—Hirschman Index) which uses revenue to measure the relative size of firms in relation to the industry they are in and provide an indicator of the amount of competition among them based on a firm's relative market share.

⁵¹ The benefits of requiring disclosures filed in 10-K reports is that it subjects companies to certain liability provisions under securities laws.

under segment reporting or in the 10-K report as a whole, even though they underpin growth in revenue generating products today and/or in the future.

In addition to financial measures, operating metrics are what Big Tech companies use internally today to assess product performance, from an early stage all the way through to maturation,⁵² since these operating metrics are increasingly the best predictors of revenue growth and the company's ability to retain, grow and monetise user attention and engagement within its broader ecosystem. Recognising that investors require these operating details, especially if they are asked to buy shares in a company that may focus on growth over profits, Big Tech already engages in the selective disclosure of user operating metrics in their 10-K reports. Such disclosures, however, are at the company's discretion, which means they can be difficult to interpret (e.g. releasing a growth rate instead of a monetary value); highly aggregated (instead of differentiated by product); and contain no clear narrative of how user data and free products are part of the monetisation process.

This discretion exists, even though such information is material to shareholders' ability to evaluate the company as a whole, because no clear regulations are in place to govern these monetisation disclosures. Not only are these metrics material to understanding the business prospects of tech companies, but they are important to regulators trying to assess market shares and market power in a digital world.

We recommend the following changes to reporting requirements:

Inclusion of a monetisation narrative in the 10-K report. In addition to the standard business description and risk factors contained in the 10-K report, we recommend inclusion of a detailed monetisation narrative, which explains how the company makes use of data from its users, and other internal and external sources, and monetises it in various parts of its business. All new external data acquisitions above a certain monetary threshold should be mentioned.

Current 10-K reporting requires that the firm includes discussion in Part 1 (Item 1 and Item 1A) of its 10-K filing on a range of factors, including a description of the business itself, the markets it operates in, risks facing the business and competition in the markets which it operates.

For digital platform operators, especially those reliant on monetising a free product (such as Facebook), monetisation disclosures are sometimes recognised in passing when discussing risks facing the business, including loss of users as a major risk factor. Yet no separate discussion is required by the dominant platform operators of their monetisation process, including which products are the major sources of user engagement, how internal data is used across platforms and with external data to assist in the monetisation process, or the role of machine learning and algorithmic ranking and reviews.

We recommend such a narrative be required for companies operating digital platforms, with specific requirements of what must be included in the narrative (even if differentiated by company type). This is in contrast to most 10-K narrative disclosures which adopts a 'may include' approach to much of its guidance.

⁵² Tim O Reilly interview with Jordi Ribas, VP for Bing (Microsoft), 1 September 2021.

The monetisation narrative may also be an appropriate place for the company to disclose the purchase of any external data above a required threshold. (The rationale for this is that data is an asset in the hands of a firm that can use it to enhance its monetisation capabilities. Just as mergers and acquisitions are subject to a reporting threshold, so too should such considerations be explored for data acquisitions.)

Mandatory inclusion of operating metrics for gatekeeper platforms. Required reporting of operating metrics on products that have a minimum number of monthly active end users and business users (revised gatekeeper provisions).

As this report has argued, with Apple's App Store as an example, part of Big Tech firms' business model is their role as aggregators of user and producer demand and supply through digital marketplaces and platforms (Thompson 2021). The European Union, in its draft Digital Markets Act (European Commission 2020), calls this a gatekeeper platform function.

One avenue through which to enhance operating disclosures of free products, and of firms who operate digital platforms in general, is to place operating reporting requirements on all platforms once they reach a certain scale.

Which platforms should be subject to mandatory reporting of operating metrics? The EU's proposed definition of a gatekeeper is used as a designation for the firm as a whole, based in part on operating a 'core platform service' (European Commission 2020). Here we suggest adjusting it to be applicable to the product level, including those products bundled together with core platforms and made global in scope:

- Any product (broadly defined) that assists with or is essential to the proper functioning of a core platform service (such as search engines, social networking services, certain messaging services, operating systems and online intermediation services);
- And with more than 45 million monthly active end users established or located in North America, or 100 million worldwide monthly active end users, whichever is reached first;
- And more than 10,000 yearly active business users established in North America, or 20,000 yearly active business users worldwide in the last year financial year, whichever is reached first. We would expand the definition of a business user to include advertisers, software developers, content creators, influencers and any channel or user who has monetised their activity within the last year.

Which metrics should be reported on? These will differ depending on the nature of the platform and the products which are involved in cross-subsidisation. Following the management approach to disclosures, products should have to release the operating metrics used internally by that product's head to assess performance and make operating decisions.

Unlike with the current management approach, we recommend such metrics do not have to be reviewed by the chief operating decision-maker (i.e. the CEO) in order to be considered as an operating metric used internally. This requirement is unnecessarily restrictive and in practice often amounts to nothing more than an arbitrary guideline which firms can circumvent, as we saw with Alphabet's non-disclosure of its Google products. Operating metrics to release might include monthly active users, daily active users, hours spent per user and advertising monetisation metrics (such as paid clicks and cost per click).

4.3 Enhanced segment reporting on diversified conglomerates

Mandatory product reporting of all products with \$5 billion or above in annual revenue or profits/losses to ensure managerial discretion does not hide major product segments. We recommend adding a simple quantitative product threshold on top of the existing segment reporting framework to ensure that management is not able to stop the release of financials of objectively large product segments, either by defining operating segments on a geographical basis or the use of creative accounting definitions to avoid meeting the 10% threshold tests.

While it might seem onerous to ask these Big Tech companies to report additional product segments, the reality is that they are so large that what amounts to a relatively small product to them may, within any given major product market, be the dominant offering (in revenue or profit terms).

Managerial discretion — or the management approach to segment reporting — has failed the investor community by keeping hidden essential product information material to the public evaluating the financial performance and prospects for firms as a whole. Managerial discretion disadvantages new firms looking to enter growing product segments by making the market structure and profit opportunities in such segments hidden. In doing so it prevents the market mechanism from operating effectively. Abuse of market power also remains hidden from regulators as the profitability of core product lines is not disclosed.

Several surveys indicate that the SEC, regulators, investors and practitioners find current segment disclosures inadequate and lacking detail, with excessive discretion provided to firms to limit the number and type of operating segments they report (CFA Institute 2018). Big Tech, despite being the five largest publicly listed (non-state-owned) companies in the world today, can choose to reveal few or no product segments at all. A related problem, we argue, is that Big Tech is big and their product segments are frequently globally significant, even when failing the 10% test. A 5% product segment of a Big Tech company is still potentially of global significance: 5% of Amazon's \$386 billion in 2020 net sales, for example, is more than the entire GDP of Rwanda, yet not considered disclosure-worthy.

What quantitative threshold should be used? For practical considerations, we recommend \$5 billion (or above) in annual revenue or profits/losses as an initial threshold.⁵³ \$5 billion is just above the 85th percentile of annual sales made by all non-financial publicly incorporated US firms in 2020 (Compustat database). This means that 85% of all public firms in the US have annual sales of less than \$5 billion, making any released product segment at least as big as the total annual sales of the vast majority of publicly listed US firms.

\$5 billion amounts to only 1.3% of Amazon's 2020 revenue (\$386 billion). However, 'smaller' companies with which it competes in the cloud storage market, like Dropbox and Box (which pioneered the category), only have \$3 billion-plus revenues between them, making what is a relatively small business for Amazon, the dominant player relative to its competitors. This is true of many of the markets in which Big Tech competes. With an estimated \$4 billion in revenue, Google Maps, for example, is as large as the Global Positioning System (GPS) market leader Garmin, yet

⁵³ With revenue defined using current SEC and GAAP guidelines on revenue recognition.

Google Maps is not reported by Alphabet as a standalone segment in its 10-K report, while Garmin releases five segments (fitness, outdoor, auto, aviation and marine).

If enacted today this rule would require exceptionally few additional disclosures within the universe of products and firms with 10-K filings. If a company only has geographical segments, however, such as Apple, then a number of additional financial disclosures would be required. The threshold would require review every five years or so.

What product financials should have to be disclosed? We suggest that product lines should be required to disclose core financials, which we define to include GAAP-consistent definitions of: total assets, revenue, capital expenditure, R&D expenditures, general and administrative expenses, cost of goods sold and profits (defined as operating income before depreciation or OIBD). This recommendation is based on professionals recently surveyed by the CFA Institute, where a majority of respondents (53.5%) agreed or strongly agreed that all balance sheet line items should be disclosed by segment regardless of whether they were allocated to the segment and reported to the CEO. In addition, the vast majority (80.4%) of respondents said segment disclosures could be improved by providing additional disclosures by segment related to capital expenditures, depreciation and amortisation, and goodwill (CFA Institute 2018).

One particular point of interest will be clearly defining product revenues capable of being allocated between different segments. This may be no small task given the increasingly bundled nature of Big Tech's product offerings, usually tied to platforms. Allocation of financials to distinct segments remains an issue recognised by present segment reporting, even if insufficiently so. Current guidelines, for example, permit assets to be shared between segments and concurrently to be uniquely tied to a single segment. Similar provisions will need to be explored with regards to product revenue allocations. This issue should be reviewed by the SEC's sub-committee on tech-related digital platform disclosures, which we suggest is established in our recommendation below.

Extending the managerial framework to operating metrics. Managerial discretion could be used as a basis to decide what operating metrics are reported for product segments disclosed, according to the \$5billion recommendation threshold above and the pre-existing segment reporting framework.

Philosophically, the management approach to segment reporting is based on the idea that external reporting of financial metrics should mirror internal management processes and reporting (Flood 2020).⁵⁴ We recommend extending this to operating metrics used internally, such that they should be reported externally to shareholders when used by a company's management for performance evaluation and resource allocation decisions.

4.4 A Big Tech disclosures framework

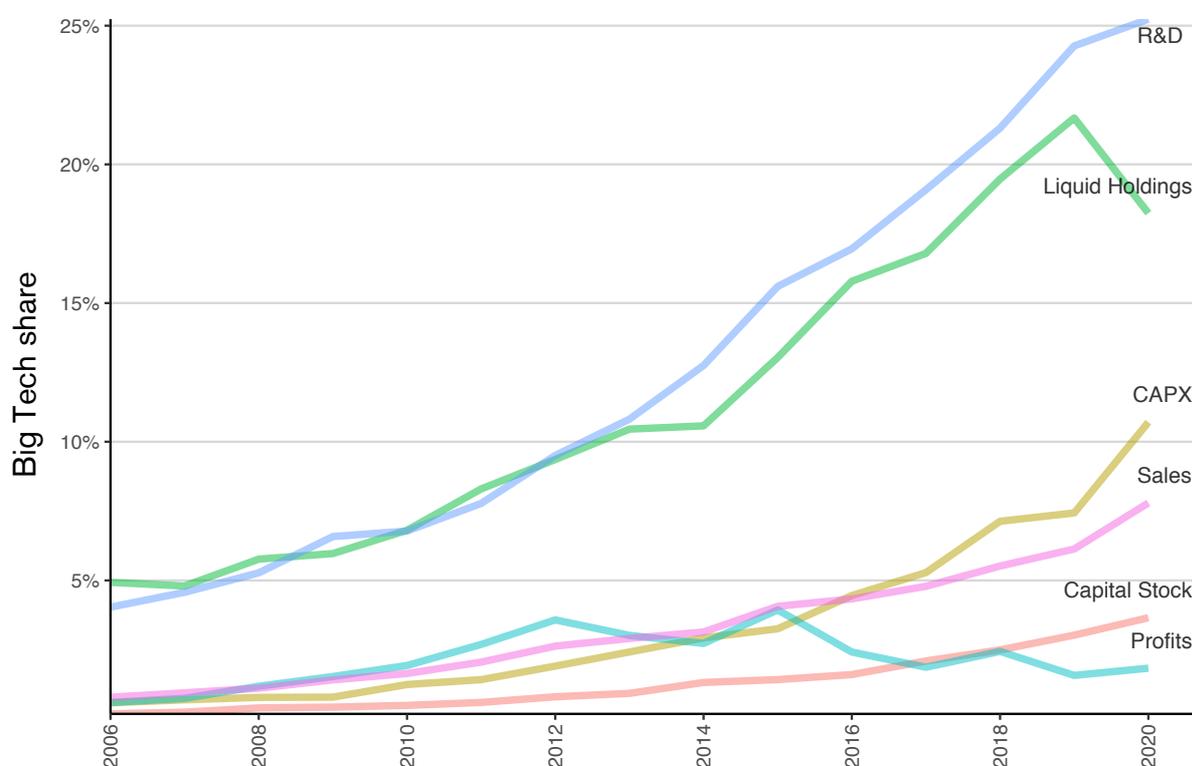
The SEC, and in particular its Division of Corporate Finance, plays a vital role in regulating business activities in the US economy. In theory, it should be well placed to enhance and update the product and platform disclosures large technology companies are required to undertake in their 10-K filings.

⁵⁴ Flood notes, 'The management approach, in general, provides that external financial reporting will closely conform to internal reporting.'

Investors and capital markets are urging enhanced mandatory disclosures on the issues identified in this report, brought together under the rubric of 'Big Tech'. This includes disclosures on digital marketplaces and platforms, the users and monetisation process which underpins the free products they provide, the ecosystems of suppliers and firms they manage and foster, their sheer size and the lack of enforcement power to extract disclosures from them in their 10-K filings.

A Big Tech-specific disclosures framework is warranted by virtue of the growing role of the five Big Tech companies in the economy and capital markets (see Figure 5). Big Tech's estimated contribution to US market capitalisation was 23% by mid-2021 (Bary 2021), while we estimate their share of R&D by US publicly listed firms at one-quarter and their share of CAPX to be above 10% (see Figure 5). This alone warrants particular dedicated attention from the SEC.

Figure 5. Big Tech's share of key financials of all US incorporated firms, 2006-2020



Source: Compustat North America. Excludes financial firms.

Notes: (1) Liquid holdings = cash + short-term investments (Compustat code CHE). (2) Capital stock = intangible assets (INTAN) + property, plant and equipment (gross) PPEGT. (3) Based on country of incorporation = USA. (4) NA values replaced by zero, including for R&D of which there are many in Compustat. (5) Removing firms with non-positive numbers for CAPX, PPEGT or assets. (6) Removing the following SIC sectors: 84 (gardens, zoos and museums); and 60-64 and 66-69 (financial companies but keeping real estate). Sales is not identical to revenue. We use sales here as a proxy.

More than Big Tech's growing role in capital markets and the wider economy, is the growing ubiquity and market dominance of their digital platform business model, which more firms are adopting as more of the economy moves to the digital sphere (Kenney and Zysman 2016; de Groen et al 2017; Henry-Nickie, Frimpong and Sun 2019). The platform business model warrants special attention from any future SEC task force to develop a tech-specific disclosures framework for such a business model.

Meanwhile, an industry-specific approach to SEC (or GAAP) disclosures is not without precedent. Industry-specific disclosure requirements, including in segment reporting, exist and should be looked to for inspiration in the establishment of specific disclosure obligations for Big Tech. SEC industry guides for industry-specific disclosures is one possibility, as has been done for oil and gas, mining and bank holding companies in the past (United States Securities and Exchange Commission 2007). One issue is that not all of these disclosure requirements are part of companies' 10-K reports. The latter has the benefit of placing a higher standard of accountability on firms.

Specific segment reporting exists for the airline industries through ASC 908-10, including determinations for industry-specific reporting of intangibles. For airline companies, rights to slots (i.e. gates) that airlines use at each airport to and from which they fly are recognised as an intangible asset on their balance sheet. These rights can be traded (Henry 2013). As a result, the SEC and GAAP require these rights to be recognised separately as intangible assets in their reporting. Yet many of the intangible assets which underpin Big Tech's market power and business model, including free products and users, are not at present given specific disclosure requirements and recognition on the balance sheet, including by segment.

Put differently, these intangible assets are themselves potentially sources of market power if they provide the firm with a sustained source of revenue and innovation. As a result, gates are recognised as intangible assets on the balance sheet, because the airline industry is — quite literally — performing a gatekeeper function in the same way that Big Tech does with its platforms. Yet Big Tech's sources of market power — its user base, human capital (engineering talent), proprietary algorithms and more — do not feature in its segment reporting, in part because they make no appearance on their balance sheets. Such omissions of intangible assets from the balance sheet and segments requires attention.

Enforcement of 10-K reporting is another issue warranting investigation and reform in the context of Big Tech. It appears that current guidelines provide the SEC and regulators with little ability to extract relevant information from firms when not disclosed. In part, this also reflects high managerial discretion afforded to firms under current segment reporting rules. Past exchanges between the SEC and Alphabet are indicative of how lack of enforcement has limited the SEC's ability to regulate in the public interest. More than two-thirds (72.7%) of CFA survey respondents agreed that regulators do not seem to enforce segment disclosure requirements effectively. One possibility would be statutory fines once a segment has been disclosed if, based on the now restated historical segmented financials, it is found that the firm should have disclosed the segment sooner.

The SEC has increasingly established subcommittees or task forces to investigate matters of importance to the investing public within its remit. For example, the SEC established the Climate and ESG Task Force to proactively identify misconduct involving ESG issues and it will require mandatory disclosures in 2022 in climate-related risks in its 10-K reports (Barbarino 2021). The initial focus of the task force has been to identify material gaps or misstatements in issuers' disclosure of climate risks under existing rules (United States Securities and Exchange Commission 2021b). It notes the importance of such ESG disclosures for the investing public and capital markets. It also notes the need to integrate and enhance enforcement through inclusion of the Division of Enforcement in the process and regulations.

The world has realised that without proper company-level climate-related disclosures, climate change cannot be successfully addressed. The same is true with the problems being faced around the tech industry. The objectives of creating a sector that operates transparently and does not abuse its power requires metrics that capture how value is actually created and how data is shared among different segments.

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