Dirk A. Zetzsche* and Linn Anker-Sørensen**

Taxing Data-Driven Business: Towards Data Point Pricing

Datafied business models avoid traditional taxation in many respects since data, being among the important value drivers of datafied business, are neither adequately priced nor accounted for in the firm's accounts. From a tax perspective, ignoring the value of data is inconsistent with the data economy paradigm, where it has been claimed that "data is the new oil". The stringent legislative response to datafied business models the authors propose herein is to assign a financial value (a "price") to each data point collected, herein referred to as "data point pricing". If the raw material (data) is thus priced, its use and transfer can be traced by applying traditional accounting methods. Certainly, data point pricing is no panacea; the inherently political question of who holds taxation rights in a cross-border context remains. Yet, data point pricing would make the locus of an important part of value creation transparent and facilitate the application of traditional tax assessment and transfer pricing methods to data-driven business models. As well as bringing about taxable measures, data point pricing yields beneficial side effects in the fields of antitrust law, financial regulation, data protection, anti-money laundering and criminal enforcement. Data point pricing thus has value even where taxation rights are allocated by way of a multilateral arrangement on the basis of the OECD statement of 1 July 2021.

Contents

1. **Introduction** 218
2. **The Issue: Arbitrary Value Allocation in Datafied Value Chains** 220
   - 2.1. Value generated through data collection 220
   - 2.2. Uncertain location and timing of value generation 221
   - 2.3. Failure of traditional tax concepts 223
3. **Proposed Solutions and Why They Fail** 223
   - 3.1. Transaction taxes (e.g., "bit tax") 224
   - 3.2. Transfer pricing 224
   - 3.3. The OECD's Pillar One and Two approach 226
     - 3.3.1. Denying deductions, minimum taxes 227
     - 3.3.2. Harmonized regional allocation of taxable substance 228
   - 3.4. Digital services tax based on gross revenue (GAFA tax) 229
   - 3.5. Virtual permanent establishment concepts 230
     - 3.5.1. Significant economic presence 230
     - 3.5.2. Significant digital presence (European Union) 231
     - 3.5.3. Activity test (OECD 2020 Report on Pillar One Blueprint) 232
4. **Data Point Pricing as a Remedy** 234
   - 4.1. Design and scope of data point pricing 236

* **Professor of Law, ADA Chair in Financial Law (Inclusive Finance), Faculty of Law, Economics and Finance, University of Luxembourg.**

** **PhD (University of Oslo), lecturer-in-law (University of Oslo); Ernst & Young Tax & Law Norway, Head of Decentralized Finance.**

The authors are grateful for comments and remarks on earlier drafts by Werner Haslehner, Juliane Kokott, Gjert Melsom, Pasquale Pistone, Julia Sinnig, Craig West and three anonymous peer referees, as well as diligent research assistance provided by Catherine Marie Diederich and Elisabeth Louise Kneip. All mistakes remain those of the authors.

4.1.1. Design 236
4.1.2. Scope: All datafied businesses 238
4.1.3. Delineation 238
4.1.4. Implementing data point pricing 239
4.2. Tax effects of data point pricing 239
4.2.1. Cross-border allocation of value creation 239
4.2.2. Enhancing data valuation through a market component 240
4.2.3. Data as intangibles 240
4.2.4. Limits 241
4.3. Counterarguments 242
4.3.1. Efficiency of the pricing mechanism? 242
4.3.2. Costs and technical feasibility? 243
4.3.3. Anti-innovation effect? 244
4.3.4. Technical tracking as a better alternative? 245
4.3.5. Data protection? 245
4.3.6. Enforcement? 246
4.3.7. WTO compliance 246
4.4. Beneficial side effects 247
4.4.1. Antitrust law 247
4.4.2. Data protection 247
4.4.3. Financial law 247
4.4.4. Anti-money laundering (AML) 248
4.5. Testing data point pricing: Distributed ledgers technologies 248
4.5.1. The technologies 248
4.5.2. Application of data point pricing to DLTs 249
5. Theses 250

1. Introduction

The taxation of data-intensive conglomerates has created significant unrest among policymakers around the globe.[1] The (apparently) advantageous tax deals enjoyed by firms like Apple, Google, Microsoft and others have made headline news in the world's leading newspapers. At the same time, parliaments,[2] governmental organizations such as the OECD[3]

1. M.P. Devereux & J. Vella, *Are we heading towards a corporate tax system fit for the 21st century?*, 35 Fiscal Studies 4, p. 449 (2014).
2. Without claiming completeness, the authors are aware of the British diverted profits tax (implemented by sec. 77 Finance Act 2015); *see* P. Baker, *The Diverted Profits: a partial response*, 2015 Brit. Tax Review, p. 167 (2015); D. Neidle, *The diverted profits tax: flawed by design?* 2015 Brit. Tax Review, p. 147 (2015); S. Piccioto, *The UK's Diverted Profits Tax: An Admission of Defeat or a Pre-emptive Strike*, 77 Tax Notes Intl. 3, p. 239 (2015); the various proposals for a digital services tax e.g. in France, Spain, Italy and the European Union (*see* sec. 3.4.); the Indian equalization levy (*see*, e.g., S. Wagh, *The Taxation of Digital Transactions in India: The New Equalization Levy*, 70 Bull. Intl. Taxn. 9, pp. 538-552 (2016), Journal Articles & Opinion Pieces IBFD), the Italian web tax (for a general overview, *see* N.A. Sarfo, *Finding Middle Ground over Unilateral Digital Taxation*, 72 Bull. Intl. Taxn. 4a (2018), Journal Articles & Opinion Pieces IBFD); as well as legislation or draft bills in Israel, Australia and various emerging and developing economies, *see* A.W. Oguttu, *A Critique from a Developing Country Perspective of the Proposals to Tax the Digital Economy*, 12 World Tax J. 4, sec. 3 (2020), Journal Articles & Opinion Pieces IBFD (citing initiatives e.g. in Nigeria, India, Indonesia, Pakistan, Thailand and various countries in Latin America).
3. *See*, in particular, OECD/G20, *Addressing the Tax Challenges of the Digital Economy – Action 1: Final Report* (OECD 2015), Primary Sources IBFD [hereinafter *Action 1 Final Report*]; OECD/G20, *Tax Challenges Arising from Digitalisation – Interim Report 2018* (OECD 2018), Primary Sources IBFD [hereinafter *Interim Report* (2018)]; OECD, Public Consultation Document, *Secretariat Proposal for a "Unified Approach" under Pillar One* (OECD 2019) [hereinafter Public Consultation Document, *Secretariat*

and academics[4] around the world have discussed a number of possible solutions to this controversial situation.

Adopting the view that value creation should guide taxation rights,[5] this article analyses the difficulties in taxing data-intensive firms and argues that a core issue in the taxation of data-intensive business models is the location and pricing of the characteristic service and assets, given that data flows and data processing are not adequately reflected in the financial accounting trails on which earnings – and turnover-based taxation – are founded (section 2.). Section 3. analyses proposed remedies such as the digital services tax introduced by France, transfer pricing, tax distribution schemes (like those proposed by the European Union to allocate taxes based on a digital presence) as well as the OECD's activity test, and automated digital services in particular, presented in October 2020, as well as the framework agreed on by way of the OECD statement of 1 July 2021. The analysis finds that these approaches will all fail, or be less effective than desirable, in the absence of a financial account being taken of the data trail itself, because as long as the data flow is not represented in the financial accounting, tax authorities lack the basis for sound and consistent application of tax laws.

Section 4. introduces "data point pricing" as a potential remedy: firms that collect data as part of their business model shall be obliged to offer their clients compensation for the contribution of their data to the firm. This compensation must be greater than zero at all times, and from the moment of the collection, the related transactions must be tracked in the firm's accounting.

Before addressing tax initiatives for data-driven businesses and examining how data point pricing may serve as part of a solution for identifying taxable events, the authors begin by exploring the actual issue of data as a basis for taxation.

Proposal (2019)]; OECD/G20, *Tax Challenges Arising from Digitalisation – Report on Pillar One Blueprint – Inclusive Framework on BEPS* (OECD 2020) [hereinafter *Report on Pillar One Blueprint*].

4. *See*, in particular, the contributions in P. Pistone & D. Weber (eds.), *Taxing the Digital Economy* (IBFD 2019), Books IBFD; W. Haslehner et al. (eds.), *Tax and the Digital Economy* (Wolters Kluwer 2019); W. Neuvel, S. de Jong & A. Uceda, *Profit Attribution Challenges in a Digital Economy – A Transfer Pricing Analysis of the EU Virtual Permanent Establishment Concept*, 25 Intl. Transfer Pricing J. 5, p. 343 (2018), Journal Articles & Opinion Pieces IBFD; M. Olbert & C. Spengel, *International Taxation in the Digital Economy: Challenge Accepted?*, 9 World Tax J. 1 (2017), Journal Articles & Opinion Pieces IBFD; M. Olbert & C. Spengel, *Taxation in the Digital Economy – Recent Policy Developments and the Question of Value Creation*, 2 Intl. Tax Stud. 3 (2019), Journal Articles & Opinion Pieces IBFD; W. Schön, *Ten Questions about Why and How to Tax the Digitalized Economy*, 72 Bull. Intl. Taxn. 4/5 (2018), Journal Articles & Opinion Pieces IBFD; W. Schön, *One Answer to Why and How to Tax the Digitalized Economy*, 47 Intertax 12, p. 1003 (2019); The special edition of Tax Notes International, *Navigating the Tax Challenges of the Digital Economy*, 90 Tax Notes Intl. 1 (2018).

5. While some regulators today seem to pursue other objectives, in particular easy enforceability, the assumption that value creation shall guide taxation rights was in line with the OECD's guiding rationale at least until very recently; *see* OECD (2018), *Interim Report* 2018, *supra* n. 3, at ch. 2 (with a full chapter devoted to value creation); OECD/G20, *Aligning Transfer Pricing Outcomes with Value Creation – Actions 8-10: 2015 Final Reports* (OECD 2015), Primary Sources IBFD. It is also supported in the literature, *see* e.g. M. Calabrese, *Taxation of the Digital Economy: A New Dawn for Multilateralism and Mutual Recognition*, in Pistone & Weber, *supra* n. 4, at pp. 77-82. For value creation as "gold standard" of taxation rules, *see also* Olbert & Spengel, *supra* n. 4, at secs. 1 and 3. *But see* Schön, *supra* n. 4 (collecting arguments against value creation) and Schön, *supra* n. 4 (arguing in favour of investment as guiding maxim).

2. The Issue: Arbitrary Value Allocation in Datafied Value Chains

2.1. Value generated through data collection

Data firms generate value by various means,[6] and datafied tech firms have the highest stock market valuations and profits of all listed firms.[7] The reasoning behind these high valuations stems from a combination of (i) traditional economies of scale; (ii) data-driven scale economies; and (iii) network effects:[8]

(1) Economies of scale refer to the reduction of per-unit production costs as a consequence of producing units in larger quantities. Digital platforms exhibit conventional economies of scale created by the primarily fixed costs of providing a service to an unlimited number of users and are based on applications and interfaces operating on high-frequency servers. Once the interfaces have been defined, the applications coded and the servers set up, connecting all additional clients comes at a very low marginal cost. Where additional users means additional marginal costs for energy and data warehousing, these additional costs per user are offset by the additional data these users create, allowing the platform provider to choose, more or less freely, which services the platform charges clients for and which services are provided to them apparently for free.

(2) The second type of scale economies results from the data collected and used for the application. In simple terms: "[m]ore information lets firms develop better services, which attracts more users, which in turn generate more data".[9] The following example is also illustrative: where, as is often the case in finance, risk management depends on data, we would expect better predictions if the risk management platform for hire can collect more and better structured data, and the distribution efforts are more likely to succeed when you know more about the targets of these efforts. For instance, the authors of this article are much more likely to acquire books on financial technology and regulation if the distributors were to actually bring new releases to their attention.

(3) Finally, digital platforms exhibit network effects. Network effects occur where an additional user of a service adds value to that product for other users. Essentially, the more users, the greater the benefit.[10] For instance, a telephone is of little use unless it can be used to call other people. The more people who can be called, the more valuable the

6. *See*, for a discussion of value drivers, S. de Jong, W. Neuvel & A. Uceda, *Dealing with Data in a Digital Economy*, 25 Intl. Transfer Pricing J. 2, pp. 4-7 (2018), Journal Articles & Opinion Pieces IBFD; S. Greil, R. Müller & M. Olbert, *Transfer Pricing for Digital Business Models: Early Evidence of Challenges and Options for Reform*, 11 World Tax J. 4, sec. 2.2. (2019), Journal Articles & Opinion Pieces IBFD.
7. *See* Bank of International Settlement, *BigTech Firms in Finance in Emerging Markets and Developing Countries*, p. 9 (2020); M. Fenwick, J.A. McCahery & E.P.M. Vermeulen, *The End of 'Corporate' Governance: Hello 'Platform' Governance*, 20 Eur. Bus. Org. L. Rev. 2018-5, pp. 191-97 (2019) (arguing that the most valuable firms in terms of stock price run datafied business models). *See also* H. Lee et al., *Does Implementation of Big Data Analytics Improve Firms' Market Value? Investors' Reaction in Stock Market,* 9 Sustainability 6, p. 978 (2017), (arguing that data-driven business models lead to stock price premiums).
8. *See*, for the following argument in the context of financial services, D.A. Zetzsche et al.*, Digital Finance Platforms: towards a New Regulatory Paradigm*, 23 U. Pa. J. Bus. L. 1 (2020). In general, *see* Francesco Ducci, *Natural Monopolies in Digital Platform Markets* (CUP 2020).
9. *A New School in Chicago*, *How regulators can prevent excessive concentration online*, The Economist (28 June 2018), available at https://www.economist.com/special-report/2018/06/28/how-regulators-can-prevent-excessive-concentration-online [https://perma.cc/SQL3-3F9D].
10. *See* A. Tiwana, *Platform Ecosystems: Aligning Architecture, Governance, and Strategy* pp. 33-48 (Elsevier 2014) (analysing the benefits to users of greater total users).

> phone becomes. The same mechanics work, albeit more explicitly, in digital platforms. On the one hand, the value of the software-based "network" grows in proportion to the number of copies installed on users' and firms' computers; the look and feel of software becomes embedded in human processes as users learn where to click, which shortcuts to use, and how to upload data or links to the Internet. The more a given software is used, the more its users expect its features to be embedded in their working environment. On the other hand, each additional user adds data to the existing pool. Taking the example of finance, where risk management can draw on more data from more firms, the predictive power of the platform's algorithms improves. For instance, with regard to risk management where data on operational risk events are scarce, all network participants benefit from pooling risk data. The same applies to social media networks where the advertising value increases in proportion to the number of users of the network. The platform effect of data collection may assist in calibrating existing services to clients/users. At the same time, a material amount of behavioural data from end-users may serve as a basis for new tailor-made products for platform users. This results in a data-gathering and calibration cycle: the "random" collection of data is followed by a calibration of services in light of the structured data, and continues with tailor-made services and dependencies based on shared data, which then enables the gathering of new data. This data collection cycle creates client retention as well as dependency and reliance. This retention factor is what creates the expansive multiples in corporate finance for tech companies, with structured data being the cornerstone of client relations.[11]

While the first scale economy, which concerns look and feel, is not unique to datafied economies, the second and third scale economies pressing for size and growth indeed are – with data gathering at the heart of value creation. For that purpose, it is of less importance which data are gathered since, in many instances, from an ex ante perspective it remains uncertain which data are useful. What is more important is that as many data as possible are compiled and that these data stand ready to be analysed by purpose-made algorithms.

2.2. Uncertain location and timing of value generation

Prior to assessing legal initiatives aimed at tackling various aspects of datafied business, three distinctions are essential.

First, there is the distinction between the entity that gathers data and the person that shares their data. The data-gathering entity uses data to create a potential economic value, while the person provides access to data when, for instance, using a website, buying goods or using a logistics service.

Second, there is the distinction between the entity that "owns" the collected data and entities that use the data pools; the latter most often will enter into a licensing contract whereby royalty income is created by the licensor and expenses are amassed on the side of the licensee.

Third, if the legal title of a database is transferred to another entity, the transaction results in a sale of intangible property, with income generated on the seller's side and expenses established on the acquirer's side.

11. Zetzsche et al., *supra* n. 8, at pp. 28 and 38-41.

A common quandary in all three distinctions here is the uncertainty related to arriving at the right price for the data involved, given that this depends on the value created, which is hard to determine.[12] To be precise, from a tax law perspective, the issue is often not *if* but *where, what and how* value is created.[13] The point at hand can be best explained by looking at a medium-sized technology value model, for example a robo-advertising platform that has passed the start-up stage. The same, albeit in larger dimensions, would be applicable to diversified big technology (Big Tech) firms, such as Google/Alphabet, Apple, Amazon, Alibaba/Ant Group and Facebook/Libra/Diem.

Let us assume a tech *idea* has been generated by three entrepreneurs in a tech incubator in Frankfurt (Germany).

Encouraged by other datafied business models being located in Luxembourg, the entrepreneurs decide to establish their *operational* headquarters in Luxembourg and create something of significant substance (e.g., headquarters, core functions, staff and office locations) in Luxembourg.

The *code* which drives the data engine was programmed in Bangalore, India. Accordingly, the firm establishes a joint venture on software programming together with a local partner in India.

The data-driven business *stores its operating data* as well as *client data on a distributed ledger/blockchain* with node functions provided in server farms located in countries where energy prices are relatively low compared to Germany and where tech infrastructure is stable (e.g., Australia, China, Denmark and Norway).

Their services are *distributed* to users worldwide, with core markets in Frankfurt, Hong Kong, London, New York City and Singapore. These clients use a data-gathering and analysing application running on a data engine designed in Frankfurt's tech hub, programmed in Bangalore and modified to meet legal requirements in the distribution countries by app experts in the relevant countries. The firm has also invested heavily in marketing and advertising in the distribution countries.

The artificial intelligence (machine learning) that draws conclusions from the client data and creates advertising *recommendations* was designed in Silicon Valley (United States), has

12. The insight that unique data sets are hard-to-value intangibles, dates back to the 1990s. The origin lies in the peculiar economics of datafied businesses, which are characterized by large constant fixed costs (through substantial investment in intangible assets such as data and services-specific software) and zero (or very low) marginal costs thereafter. In turn, with the quantity of the product increasing, the average (variable) cost of the product decreases, which renders valuation of the investment leading to scale (such as in data) a challenge once scale is achieved. Yet, without scale the datafied business will hardly be profitable. *See*, in particular, P.M. Romer, *Endogenous Technological Change*, 98 Journal of Political Economy 5(2), pp. 71-102 (1990); H. Varian, J. Farrell & C. Shapiro, *Economics of Information Technology* (CUP 2005).

13. *See* I. Cugusi, *Prospects for Taxation of the Digital Economy between "Tax Law and New Economy" and "Tax Law of the New Economy"*, 12 World Tax J. 4 (2020), Journal Articles & Opinion Pieces IBFD; De Jong, Neuvel & Uceda, *supra* n. 6, at p. 5 (stating that "it remains unclear whether current rules consistently attribute value to the large amounts of data collected and used in digital business operations"). *See also* Olbert & Spengel (2017), *supra* n. 4, at p. 44 (arguing that more research is needed to align taxation with value creation). *See also* N. Berndsen, *Profit Allocation Based on Scarcity Value: A New Factor for Taxing Intra-Group Services Where They Create Value*, 12 World Tax J. 4 (2020), Journal Articles & Opinion Pieces IBFD.

been tested by crowd testers all around the world and has been modified for country-specific services by the firm's R&D team in Frankfurt.

The service *hotline* for clients operates from call centres in Romania and India, while the firm's *accounting* is provided by its own accounting unit in Poland.

Finally, to perform its *operations*, the firm establishes subsidiaries in major commercial centres, including Dubai, Hong Kong, London, New York City and Singapore.

2.3. Failure of traditional tax concepts

In such a stereotypical datafied value chain, it becomes impossible to clearly identify where value has been generated, leaving established tax concepts ineffective.[14]

In terms of profit-based taxes (income or corporate tax) or turnover-based taxes (VAT), the profit and/or turnover could be adjudged to have been created in the following places:
(1) the place where the business idea was invented (Frankfurt);
(2) the place of the operational centre (Luxembourg);
(3) the places where the data are stored and processed (Australia, China, Denmark and Norway);
(4) the places where data are collected or where services are distributed (i.e., distribution countries);
(5) the places where users reside and/or where user-oriented subsidiaries have been established (important commercial centres);
(6) the places in which the core technology is developed (Silicon Valley, Frankfurt and Bangalore); and/or
(7) the places where valuable side services are located (Poland and Romania).

In such a setting, we usually do not know which entity creates which value since we face difficulties when establishing a market price for the gathering, transfer or analytics of data. Furthermore, different taxation regimes may apply depending on the role of the parties as well as on data-specific characteristics, such as whether the data are unstructured or structured for specific purposes.

3. Proposed Solutions and Why They Fail

While transaction tax approaches were considered (and rejected) early on, solutions adopted or proposed by regulators more recently include approaches relating to transfer pricing, denial of deductions based on minimum tax requirements, a harmonized regional allocation of taxable income, digital services taxes and virtual permanent establishment concepts. All of these solutions face practical barriers that render their application less effective than desirable.

14. *See* G. Bauer et al., *Corporate Income Tax Challenges Arising From Digitalized Business Models*, p. 8 (2019), available at www.ssrn.com/abstract=3348544 (identifying various modes of value creation).

3.1. Transaction taxes (e.g., "bit tax")

Building on the 1970s "Tobin tax" proposal for taxing currency trades to mitigate FX speculation,[15] the Canadian economist Arthur Cordell and others advocated in the late 1990s a "bit tax": a kind of turnover tax on digital traffic, similar to "gasoline tax or paying a toll on a bridge or toll road or having a license plate on a car".[16] Cordell proposed taxing each digital bit of information flowing in global networks, regardless of the form (e.g., data, voice and images). While distinguishing between local, long-distance and leased traffic, telecom carriers, satellite networks and cable systems should function as tax collectors and channel revenues directly to the national revenue service of the respective country.

If implemented, Cordell's bit tax of 1 cent per megabit of data would have prevented the information age as we know it, drawing on three important patterns in technological evolution: (i) Moore's law; (ii) Kryder's law; and (iii) one for which there is, to the authors' knowledge, no term yet established. Moore's law refers to the assumption that the amount of data processing power grows exponentially. Meanwhile, Kryder's law posits the same for data storage capacity. The combination of ever-increasing processing power and data storage capacity leads to ever-lower costs for both. The third pattern is the tremendous growth of communications bandwidth combined with decreasing costs. The underlying assumption of bandwidth growth at ever-lower expenses is supported by increasing network efficiencies, which lead to more bandwidth per euro or dollar invested. All in all, the three phenomena have led to exponential data growth over the last few decades.[17]

To allow for this technological development, any bit-based tax rate would require adjustment on an almost daily basis, and the same is true with regard to information carriers, which are also subject to rapid innovation. The bit tax proposal would also lead to double taxation in the case of fee-based services already subject to VAT, while distinguishing fee-based services from services with other types of compensation becomes increasingly difficult given the variety of payment models in the digital age. For these and many other reasons, the bit tax proposal did not find support among regulators in the early 2000s. However, as one of the first and most prominent transaction tax concepts, its benefits as well as the criticisms raised against the bit tax must be considered when dealing with taxing data-driven businesses.

3.2. Transfer pricing

Some of the above-mentioned value creation and transfer can be attributed to affiliated entities in a corporate group through established transfer pricing methods.[18] Accordingly, in order to establish arm's length pricing among affiliated entities, the price of services or

15. *See* J. Tobin, *The New Economics One Decade Older* (the Eliot Janeway Lectures in Honour of Joseph Schumpeter), p. 88 et seq. (PUP 1974); J. Tobin, *A Proposal for International Monetary Reform*, 4 East. Econ. J. 3-4, pp. 153-159 (1978).
16. The proposal was first put forward by A. Cordell & T. Ide, *The new wealth of nations* (Paper prepared for the annual meeting of The Club of Rome, Buenos Aires, 30 November-2 December) (1994). *See also* A. Cordell, *Taxing the Internet: the proposal for a bit tax*, 2 Journal of Internet Banking and Commerce 2 (1997) (summarizing the proposal).
17. For a discussion of these concepts with further references, *see* D.A. Zetzsche, R.P. Buckley & D.W. Arner, *Decentralized Finance*, 6 J. Fin. Reg. 2, pp. 174-182 (2020), available at https://ssrn.com/abstract=3539194.
18. *See* V. Chand & G. Lembo, *Intangible-Related Profit Allocation within MNEs based on Key DEMPE Functions: Selected Issues and Interaction with Pillar One and Pillar Two of the Digital Debate*, 3 Intl. Tax Stud. 6, pp. 2-38 (2020), Journal Articles & Opinion Pieces IBFD; *see also* Berndsen, *supra* n. 13, arguing

goods offered must be within an established interval of accepted market prices for similar transfers on the open market.[19] However, digital business models have put the current transfer pricing model under pressure.[20]

On the one hand, for *unique* services or goods (such as self-generated user data) there will be no market price. For many elements of the digital value chain, a market price is missing. This goes both for the individual sample of data based on specific data points or sensors and for structured data for a specific usage.[21] While there may be a market price for software development, server space and other standard services, there is no reference market price for the business idea itself, the underlying proprietary core technology (the AI), as well as the data that are collected and gathered from clients and then analysed. In particular, a comparison of prices charged by raw data vendors[22] will fail in many instances, since if these data were publicly available then advanced technologies would not be needed for their collection. There is some uniqueness in the data collected, be it their composition, time and location of gathering or their interaction with other data points. This uniqueness is highly user dependent; any effort made by outsiders to assess the correct market price suffers from externalities, information asymmetries and disregard for the option value of data, which is the potential (yet currently unknown) value of a data set in the future, in a new context. Using market prices for widely available raw data will thus most likely lead to an under-pricing of data collected by data-driven businesses.[23]

While market prices may be established by the emergence of consequent practice, if several *similar* transactions are pursued by several providers, another unique feature of data-driven business renders the application of transfer pricing difficult. Data-driven businesses may include a number of entities performing various functions, resulting in a potential split depending on where the components of these processes were performed.[24] In such a situation, applying transfer pricing would be at odds with the fact that user-driven benefits are

that the current taxation of value creation is unbalanced due to the lack of taking scarcity value into consideration.

19. *OECD Model Tax Convention on Income and on Capital* art. 9 (21 Nov. 2017), Treaties & Models IBFD [hereinafter *OECD Model* (2017)].
20. *See* Greil et al., *supra* n. 6, at pp. 3-5.
21. We experience similar difficulties to establish a market price for other unique assets or rights, e.g. intellectual property such as patents. *See also*, on the valuation of marketing intangibles, OECD/G20, *Addressing the Tax Challenges of the Digitalisation of the Economy – Public Consultation Document* sec. 2.2.2. (OECD 2019), [hereinafter *Addressing Tax Challenges of Digitalisation – Public Consultation Document* (2019)].
22. As suggested by C.A. Ludwig, M. Olbert & C. Spengel, *Transfer Pricing for Data Businesses: How to Apply the Arm's Length Principle to the Digital Economy* pp. 43-44, in Pistone & Weber (eds.), *supra* n. 4; Olbert & Spengel (2019), *supra* n. 4, at sec. 4.3.
23. In the meanwhile, this insight is common knowledge among data economists; *see*, e.g., D. Coyle & S. Diepveen, *Creating and governing value from data*, Working Paper 4-6 (University of Cambridge 2020) (on file with authors). W.C.Y. Li, M. Nirei & K. Yamana, *Value of Data: There's No Such Thing as a Free Lunch in the Digital Economy*, Discussion papers 19022 (RIETI 2019) (arguing that "unlike R&D that may depreciate due to obsolescence, data can produce new values through data fusion, a unique feature that creates unprecedented challenges in measurements", concluding that "data can have enormous value", and that data-driven businesses can capture the most benefit from the data because consumers lack knowledge regarding the value of their own data). *See also* R. Moro Visconti, *The Valuation of Digital Intangibles* pp. 345-360 (Palgrave Macmillan 2020).
24. *See* Ludwig, Olbert & Spengel, *supra* n. 22, at pp. 38-46.

external to the firm, even though transfer pricing is a method aimed at the fair taxation of intra-group transfers.[25]

The value of the transferred goods or services derives from individuals with key entrepreneurial risk-taking functions or those with decision-making power related to the development, enhancement, maintenance, protection, and exploitation of intangibles. For data collection, the gathering and exploitation of intangibles is particularly relevant. Whereas exploitation of intangibles would cover the function of structuring data sets, the question is to what extent transfer pricing principles would apply to the transfer of data as raw material. This depends on the extent to which data as raw material are accounted for as such in the first place, and as long as they are not, no transfer pricing rules apply to such transfers. Hence, data sets can be allocated and reallocated wherever "useful" from a tax perspective without a transfer pricing effect as long as a given value cannot be set on data as raw material.[26] Given the fact that data – even raw data – hold an inherent or potential value, one approach to address the transfer pricing conundrum thus lies in treating data similarly to other sources of business value, in particular raw material or intangibles. The authors will analyse this approach in section 4.

3.3. The OECD's Pillar One and Two approach

On 13 February 2020, OECD member countries agreed to pursue negotiations on two pillars.[27] Pillar One relates to new rules on where tax should be paid ("nexus" rules) and on what portion of profits should be taxed ("profit allocation" rules). The aim is to ensure that multinational enterprises (MNEs) conducting sustained and significant business in places where they may not have a physical presence can be taxed in such jurisdictions.[28] Pillar Two aims to address the persisting base erosion and profit shifting (BEPS) issues and to ensure that international businesses pay a minimum level of tax.[29] Before the authors discuss these

25. OECD/G20, Public Consultation Document, *Addressing the Tax Challenges of the Digitalization of the Economy: OECD/G20 Base Erosion and Profit Shifting Project*, p. 10 (OECD 2019); Thibaut Roques, *Transfer Pricing (TP) for Digital Platforms: How Should The International Tax Rules Be Revised To Align TP Outcomes With Value Creation* (Elsevier BV 2018); Schön (2019), *supra* n. 4, at sec. III.3.c.

26. *See* the discussion of such allocation in Olbert & Spengel (2019), *supra* n. 3, at sec. 2.2. (arguing that investment costs, depreciation rates for acquiring technology and hyper-deductions for high-tech investments are key drivers of these allocations).

27. *See* OECD/G20, Base Erosion and Profit Shifting Project, *Statement by the OECD/G20 Inclusive Framework on BEPS on the Two-Pillar Approach to Address the Tax Challenges Arising from the Digitalisation of the Economy*, pp. 6-7 and 28-29 (OECD 2020).

28. *See* on Pillar One in the version of OECD, id.: M.D. Astuti, *Three Approaches to Taxing Income from the Digital Economy – Which is the Best for Developing Countries?*, 74 Bull. Intl. Taxn. 12, pp. 16-18 (2020), Journal Articles & Opinion Pieces IBFD; and on OECD, Public Consultation Document, *Secretariat Proposal*, *supra* n. 3: P. Pistone et al., *The OECD Public Consultation Document "Secretariat Proposal for a 'Unified Approach' under Pillar One": An Assessment*, 74 Bull. Intl. Taxn. 1 (2020), Journal Articles & Opinion Pieces IBFD; V. Chand, A. Turina & L. Ballivet, *Profit Allocation within MNEs in Light of the Ongoing Digital Debate on Pillar I – A "2020 Compromise"?: From Using a Facts and Circumstances Analysis or Allocation Keys to Predetermined Allocation Approaches*, 12 World Tax J. 3 (2020), Journal Articles & Opinion Pieces IBFD; V. Chand, *Allocation of Taxing Rights in the Digitalized Economy: Assessment of Potential Policy Solutions and Recommendation for a Simplified Residual Profit Split Method*, 47 Intertax 12, pp. 1023-1041 (2019) (proposing to split taxation rights based on operating profit margins); I. Grinberg, *Stabilizing "Pillar One": Corporate Profit Reallocation in an Uncertain Environment*, 23 Fla. Tax Rev., pp. 130-192 (2019).

29. In its Pillar Two report that primarily defines the methodology for calculating taxable income, the examples use a minimum tax rate of 12%; *see* OECD/G20 Base Erosion and Profit Shifting Project, *Tax Challenges Arising from Digitalisation – Report on Pillar Two Blueprint*, at [182-82, 228-29] (OECD/G20 2020). On Pillar Two in the version of OECD/G20, *Addressing Tax Challenges of Digitalisation – Public*

concepts in the following section, a few comments on each of these pillars will provide the context necessary for the remainder of this article.

3.3.1. Denying deductions, minimum taxes

With respect to tax harmonization, the OECD has tried for years to establish an effective minimum tax level similar to approaches prevalent in the United States, such as GILTI[30] and BEAT,[31] by denying expense deductions, for instance, to jurisdictions that do not impose any (meaningful) income taxes.[32] Efforts in a similar direction but by different means have been made by the European Union and other jurisdictions to implement a minimum tax rate.[33]

These efforts eventually achieved some noticeable results: surprisingly, after statements from the US administration under former President Donald Trump rendered a political agreement with the OECD unlikely,[34] 131 states representing more than 90% of global GDP joined the OECD Statement of 1 July 2021 establishing a new framework for international tax reform that proposes some profit allocation rules (detailing OECD Pillar One) as well as a minimum corporate income tax of 15% (as part of OECD Pillar Two).[35]

Despite the agreement on the statement, two main difficulties remain. Firstly, an assessment on which tax rate is not meaningful, or the same question asked in a different guise when a minimum tax rate is proposed, comes with a judgement call that necessarily disregards the different ways in which countries finance their public activities: some countries finance public services by way of taxes while others finance these services through user fees or insurance premiums. For instance, the construction and maintenance of streets in Italy are

Consultation Document (2019), *supra* n. 21, *see* P. Pistone et al., *The OECD Public Consultation Document "Global Anti-Base Erosion (GloBE) Proposal – Pillar Two": An Assessment*, 74 Bull. Intl. Taxn. 2 (2020), Journal Articles & Opinion Pieces IBFD; J. Englisch & J. Becker, *International Effective Minimum Taxation – The GLOBE Proposal*, 11 World Tax J. 4 (2019), Journal Articles & Opinion Pieces IBFD, also available at https://ssrn.com/abstract=3370532.

On the OECD's Pillar Two compatibility with EU law *see* J.F. Pinto Nogueira, *GloBE and EU Law: Assessing the Compatibility of the OECD's Pillar II Initiative on a Minimum Effective Tax Rate with EU Law and Implementing It within the Internal Market*, 12 World Tax J. 3 (2020), Journal Articles & Opinion Pieces IBFD.

30. The Global Intangible Low-Taxed Income (GILTI) was introduced in 2018 by the IRS in the United States and is a taxation regime for US companies/citizens with foreign subsidiaries/legal entities with the aim of discouraging the shifting of profits out of the United States by means of intellectual property. *See* sec. 951(A) (including in gross income global intangible low-taxed income) and sec. 250(a)(1)(B) (providing a partial deduction for GILTI income) US Tax Act (2017); on details, *see* D.N. Shaviro, *The New Non-Territorial U.S. International Tax System, Part 2*, 160 Tax Notes Intl. 2 (2018).
31. The Base Erosion and Anti-abuse Tax (BEAT) is a minimum tax regime with three inherent features: (i) expands the tax base; (ii) imposes tax on that base at a rate below that for the regular tax; and (iii) makes the resulting liability payable only to the extent that it exceeds regular tax liability; *see* sec. 59A(a) and (c) US Tax Act (2017), and on details Shaviro, *supra* n. 30.
32. *See* Englisch & Becker, *supra* n. 29.
33. *See* arts. 97 and 99 Directive (2006/112/EC).
34. While US Treasury secretary Steven Mnuchin warned only against Pillar One rules affecting US firms with a digital business model, most observers believe an agreement on a global minimum tax rate (as part of Pillar Two) is unlikely when an agreement on the nexus and profit allocation rules is out of reach. *See* S. Fleming et al., *US upends global digital tax plans after pulling out of talks with Europe - Decision hits attempts to forge agreement on taxation of multinational technology companies*, Financial Times (17 June 2020), at https://www.ft.com/content/1ac26225-c5dc-48fa-84bd-b61e1f4a3d94.
35. *See* OECD, 130 countries and jurisdictions join bold new framework for international tax reform (1 July 2021), available at https://www.oecd.org/newsroom/130-countries-and-jurisdictions-join-bold-new-framework-for-international-tax-reform.htm.

financed by way of user fees, while Luxembourg finances this through taxes, and Germany mixes both concepts by imposing taxes on all cars and additional user fees on lorries. Any harmonized approach that sets the bar low would penalize countries that finance a greater proportion of their public services through taxes. Conversely, a high bar would penalise countries that finance a lower proportion of their public services through taxes and a greater proportion through service fees. In turn, the minimum tax rate of 15% is criticized by some as far too low.[36] Secondly, an assessment on which deductions are justified on business grounds is contrary to mere book-keeping exercises. Hence, it does not surprise that the OECD statement of 1 July 2021 lacks details. It has merely been established that "[r]evenue will be sourced to the end market jurisdictions where goods or services are used or consumed. To facilitate the application of this principle, detailed source rules for specific categories of transactions will be developed. In applying the sourcing rules, an MNE must use a reliable method based on the MNE's specific facts and circumstances". The decision that facts and circumstances are taken into account prompts the same difficulties as any transfer pricing approach, as discussed in section 3.2. Hence, a neutral model determining where value is created and in which way remains of the essence.

3.3.2. Harmonized regional allocation of taxable substance

A significant step forward for tax allocation across jurisdictions would include the development of a regional distribution model of income and turnover, as the OECD's Pillar One foresees, where legislators of the specified countries would have jurisdiction to set tax rates for income or turnover allocated to their own jurisdictions. However, developing such a model requires deep business insights and the investment of significant political capital. The authors argue that one key challenge is structural in nature and thus unlikely to go away: where one side loses from a tax agreement, the others tend to win, and in the absence of other bargaining tools, a political compromise is not feasible.

While the OECD statement represents a bargain reflecting the political will to act jointly after the standstill under the former US presidency, the model developed will require regular adjustments. A model in stasis would provide perverse incentives over time.

While closely interacting economies such as the Member States of the European Union may reach political compromises in the process of collective political bargaining within acceptable time frames, we can reasonably expect that it will not be possible to regularly adjust a standardized regional allocation in a multilateral setting. If the model is applied on a regional basis only, incentives to optimize the tax rate (including the allocation of services and value generation in countries not included in the model) would emerge and prevail.

Getting it right from the beginning is crucial. To do so, considering all relevant value drivers of digital business must be the starting point. For that purpose, two prominent models pursued by legislators[37] in assigning taxation rights on digital business warrant a closer look: (i) the digital services tax; and (ii) the virtual establishment concepts.

36. E.g. Trade Union Advisory Committee to the OECD, *Comments on the OECD/G20 tax agreement arising from digitalisation – Global Tax Reform Process Kept Alive* (2 July 2021), available at https://tuac.org/wp-content/uploads/2021/07/2107t_beps-1.pdf; Oxfam, as cited by D. Meyer & V. Walt, '*Far too low*': *Tax justice campaigners push back against the G7's 15% minimum tax-rate pact*, Fortune (7 June 2021), available at https://fortune.com/2021/06/07/global-minimum-corporate-tax-rate-g7-15-percent-pact/.

37. Many additional models have been developed by academia which the authors cannot discuss here in detail. Approaches proposed in the last year alone include, for instance, the digital investment concept

3.4. Digital services tax based on gross revenue (GAFA tax)

France's digital services tax, passed on 11 July 2019 by the Senate of the French Parliament (the so-called GAFA tax), taxes in principle the provision of both digital interfaces that enable users to enter into contracts and interact with others, and advertising services based on users' data. For both of these services, the legislation lists a number of exemptions such as the provision of digital content and certain payment services. The legislation sets the following size thresholds: EUR 750 million for taxable digital services supplied worldwide and EUR 25 million for taxable digital services supplied in France. A consolidated group account is used to determine whether a threshold has been surpassed.[38] The digital services tax is imposed at a rate of 3% on the gross revenues derived from intermediary and advertising services. For the digital services tax, the user's IP address is used to determine their location.

The digital services tax is a de facto VAT charged to a conglomerate based on a unilateral per-country estimate. Similar proposals have been discussed or implemented in other jurisdictions, including the United Kingdom,[39] Spain,[40] Italy[41] and – as an interim measure – the European Union.[42]

Disregarding questions as to whether the digital services tax has the characteristics of a prohibited tariff under the rules of the World Trade Organization (WTO),[43] the concept

by Schön (2019), *supra* n. 4; a destination-based apportionment formula (CCCTB 2.0) by M. de Wilde, *On the Future of Business Income Taxation in Europe*, 12 World Tax J. 1, p. 79 and 108-126 (2020), Journal Articles & Opinion Pieces IBFD; the sustained user relationship concept by J. Becker, J. Englisch & D. Schanz, *A SURE way of Taxing the Digital Economy*, 93 Tax Notes Intl. 3, 309 (2019); the withholding tax solution proposed by A.B. Moreno & Y. Brauner, *Taxing the Digital Economy Post BEPS ... Seriously*, 58 Colum. J. Trans'l L. 1, 121 (2019); the Quantitative Economic Presence test proposed by A.J. Cockfield, *Tax Wars: How to End the Conflict Over Taxing Global Digital Commerce*, 17 Berk. Bus. L. J. 2, p. 347 (2020); *see* J. Sinnig, *Taxation, Data and Destination – An Analysis of the Compatibility of a Digitalized Destination-Based Corporate Tax and a Destination-Based Cash-Flow Tax with International and EU Tax and Data Protection Law Frameworks* (PhD thesis, U. Luxembourg 2020).

See, for further arguments in favour of a fundamental tax reform, P. Hongler & P. Pistone, *Blueprints for a New PE Nexus to Tax Business Income in the Era of a Digital Economy* (2015), Journal Articles & Opinion Pieces IBFD; Y. Brauner & A. Baez Moreno, *Withholding Taxes in the Service of BEPS Action 1: Address the Tax Challenges of the Digital Economy* (2015), Journal Articles & Opinion Pieces IBFD; U. Schreiber & L.M. Fell, *International Profit Allocation, Intangibles and Sales-Based Transactional Profit Split*, 9 World Tax J. 1 (2017), Journal Articles & Opinion Pieces IBFD.

To the authors' knowledge, none of these models try to capture the economic value of data collection through data point pricing.

38. For an analysis of the possible limitations of consolidation as basis for group aggregation, *see* L. Anker-Sørensen, *Corporate Groups and Shadow Business Practices*, (CUP forthcoming 2021).
39. From April 2020, the British government will introduce a new 2% tax on the revenues of search engines, social media platforms and online marketplaces which derive value from UK users. *See* https://www.gov.uk/government/publications/introduction-of-the-new-digital-services-tax/introduction-of-the-new-digital-services-tax. For a critical discussion of the concept, *see* I. Grinberg, *User Participation in Value Creation*, 2018 Brit. Tax Review, p. 407 (2018).
40. *Spain risks US ire after approving digital services tax*, The Guardian (18 Feb. 2020), available at https://www.theguardian.com/world/2020/feb/18/spain-digital-services-tax.
41. G. Segreti, *Italy to introduce web tax on digital giants from 2020*, Reuters (16 Oct. 2019), available at https://www.reuters.com/article/us-italy-budget-web-tax-idUSKBN1WV138.
42. Proposal for a Council Directive on the common system of a digital services tax on revenues resulting from the provision of certain digital services, COM/2018/0148 final.
43. *See*, for a detailed analysis, W. Haslehner, *EU and WTO Law Limits on Digital Business Taxation*, in Haslehner et al., *supra* n. 4, at pp. 25 and 44-49; J.F. Pinto Nogueira, *The Compatibility of the EU Digital Services Tax with EU and WTO Law: Requiem Aeternam Donate Nascenti Tributo*, 2 Intl. Tax Stud. 1 (2019), Journal Articles & Opinion Pieces IBFD.

allocates a proportion of value generated to the users (and their data), rather than acknowledging that the benefits of data-driven industries emanate from many different sources, including the combination of data from many different origins and jurisdictions. The authors would further expect the French digital services tax to penalize innovation based on connecting data pools, given that it effectively assigns a penalty to big data conglomerates with multiple service offerings simultaneously. In turn, it is estimated that a mere 30 firms will be subject to France's digital services tax. In addition, the rate of 3% on gross turnover is arbitrarily set. Given the issues raised above in this section, a more balanced and more generally applicable tax model relying on established tax doctrines would be preferable.

3.5. Virtual permanent establishment concepts

One approach to taxing digital value creation draws on an analogy of the "permanent establishment"[44] as laid down in article 5 of the OECD Model Tax Convention on Income and on Capital (OECD Model). This approach, also referred to by the OECD in its 2015[45] and 2019 reports,[46] seeks to establish an equivalent to the permanent physical establishment of the firm as a nexus for taxation. It draws on the concept of "value co-creation" whereby providers and users together contribute to product development, as is often prevalent in digital industries;[47] where users are located somewhere other than where the provider is permanently established, taxation rights should also be allocated where the users have co-created some of the product's value, for instance by adding their data.

Based on this rationale, the authors consider two different concepts. The first concept, which is implemented in Israel and India for instance, sets minimum requirements for a significant economic presence, similar to the OECD's "significant presence" test. The second concept was adopted by the European Commission in its proposal for taxing data-driven business drawing on a "significant digital presence".

3.5.1. Significant economic presence

The significant economic presence test asks whether there is a "significant economic presence". While retaining some elements of physical presence, it seeks to reflect on the value

44. OECD/G20, *Action 1 Final Report*, *supra* n. 3, at para. 35 (stating that "[t]he PE concept effectively acts as a threshold which, by measuring the level of economic presence of a foreign enterprise in a given State through objective criteria, determines the circumstances in which the foreign enterprise can be considered sufficiently integrated into the economy of a state to justify taxation in that state […] The PE threshold 'has a long history and reflects the international consensus that, as a general rule, until an enterprise of one State has a permanent establishment in another State, it should not properly be regarded as participating in the economic life of that other State to such an extent that the other State should have taxing rights on its profits'. […] By requiring a sufficient level of economic presence, this threshold is also intended to ensure that a source country imposing tax has enforcement jurisdiction, the administrative capability to enforce its substantive jurisdiction rights over the non-resident enterprise"). On the OECD/G20, *Action 1 Final Report*, *see* Hongler & Pistone, *supra* n. 37. For a general critique of the OECD's permanent establishment concept, *see* R.S. Collier & J. Vella, *Five Core Problems in the Attribution of Profits to Permanent Establishments*, 11 World Tax J. 2 (2019), Journal Articles & Opinion Pieces IBFD.
45. OECD/G20, *Action 1 Final Report*, *supra* n. 3, at paras. 143-146 (proposing either a "significant digital presence" or "significant presence" in lieu of the permanent establishment test).
46. OECD/G20, *Public consultation document Secretariat Proposal*, *supra* n. 3, at paras. 3-5.
47. *See* M. Calabrese, *Taxation of the Digital Economy: A New Dawn for Multilateralism and Mutual Recognition*, in Pistone & Weber, *supra* n. 4, at pp. 77-82. For value creation as "gold standard" of taxation rules, *see also* Olbert & Spengel (2019), *supra* n. 4, at sec. 1.

created by relationships with customers or users extending over a period of six months, combined with some physical presence in the country, directly or via a dependent agent, as well as sales of goods or services (i) through a website in the local language; (ii) by offering delivery from suppliers in the jurisdiction; (iii) by using banking and other facilities from suppliers in the country; or (iv) by offering goods or services sourced from suppliers in the country. Moreover, the supply of goods or services to customers in the country resulting from or involving systematic data gathering or contributions of content from persons in the country could establish a significant economic presence.

For instance, since April 2018, Indian tax law asks whether there is a business connection in India. Significant and systematic distribution efforts directed at Indians (measured by downloads or data provision) as well as physical presence can establish such a business connection.[48] In a similar vein, where there is no double taxation treaty in place, Israeli tax law attaches tax levies to the place of income realization.[49] To determine this place, Israeli tax authorities look for a number of user-based and digital-based factors, such as the number of contracts concluded, the number of users, whether there is a website addressing Israeli customers, Internet activity in Israel and the correlation between Israeli customer activity and revenues generated.

These significant economic presence requirements have one telling disadvantage: they do not result in legal certainty. Furthermore, they lack a market-based pricing mechanism; in turn, the measurement of the taxation level is somewhat arbitrary and hardly predictable. Let us take an example where Israeli users are pure consumers, as is the case in fee-based models without any data being transferred from user to provider. In such a case, based on the idea of co-creation, the value is entirely created by the provider. However, India and Israel would ask for some share of taxation rights in these circumstances, which deviates from the concept of value creation.

3.5.2. Significant digital presence (European Union)

The European Union seeks to attach corporate taxation to a significant digital presence in lieu of the permanent physical establishment required to date.[50] Where a physical permanent establishment under article 5 of the OECD Model is missing, tax allocation should follow a *virtual* permanent establishment test establishing whether there is a significant taxable digital economic presence.

The European Union's proposal foresees that a significant taxable digital economic presence requires (i) net revenues from digital services to users in a Member State's jurisdiction exceeding EUR 7 million (revenue-based factor); (ii) more than 100,000 users of that service

48. *See* S. Gadzo, *Nexus Requirements for Taxation of Non-Residents' Business Income: A Normative Evaluation in the Context of the Global Economy* pp. 120-24 (IBFD 2018), Books IBFD.
49. *See* id., at pp. 114-25.
50. *See* Proposal for a Council Directive laying down rules relating to the corporate taxation of significant digital presence, COM(2018) 147 final (21 Mar. 2018), Primary Sources IBFD [hereinafter Significant Digital Presence Proposal (COM(2018) 147 final)]. *See* G. Kofler & J. Sinnig, *Equalization Taxes and the EU's 'Digital Services Tax'*, in Haslehner et al., *supra* n. 4, at p. 101; P. Bräumann, *Digital Permanent Establishments on Its Way to Becoming a Reality? The EU Commission's Proposal on Taxing 'Significant Digital Presence'*, in Haslehner et al., *supra* n. 4, at p. 147; Cugusi, *supra* n. 13, at pp. 10-14.

in a single Member State; *or* (iii) more than 3,000 contracts closed with users in a single Member State.[51]

While the idea of a permanent digital establishment has some merits,[52] and the European Union's quantitative thresholds provide legal certainty, there is scope for criticism with regard to three aspects. The first concerns the thresholds chosen. For instance, depending on how the users may be counted, the thresholds may be too high for smaller countries, like Luxembourg and Malta with their respective populations of 600,000 and 500,000, while at the same time being too low for large EU Member States like France, Germany and Italy; the proposal also excludes large-volume wholesale markets with few contracts and users. Thus, quantitative thresholds alone will be insufficient.[53] Second, the proposal raises the potential for double taxation and limits the openness of Member States to respond to technical innovations.[54] Third, as a more fundamental criticism, the authors observe a significant deviation from the OECD framework which rests on an extensive functional analysis of how the firm creates value as a precondition for allocating taxation rights, based on the staff and assets devoted and risks created in that jurisdiction.[55] Why users, revenue and contracts are best equipped to replace people, assets and risks requires some justification. Compared to that approach, a concept relying on assets – with the data used generated by others as the core concept – would be preferable.

3.5.3. Activity test (OECD 2020 Report on Pillar One Blueprint)

In its latest proposal issued on 12 October 2020, the OECD proposed as a nexus requirement an activity test that, paired with two thresholds, shall single out conglomerates that are able to "participate in a sustained and significant manner in the economic life of a market jurisdiction, without necessarily having a commensurate level of taxable presence in that market (as based on existing nexus rules)".[56]

From the outset, the OECD provides for sectorial exemptions that apply even if the activity test is met. These out-of-scope activities include certain natural resources, financial services, construction, sale and leasing of residential property, and international air and shipping business.[57] If an activity does not belong to any of these sectors, one of the following two activities may justify a deviation from the permanent establishment requirement: automatic digital services (ADS) and customer-facing businesses (CFBs).

Automated digital services (ADS) refer to revenue generation (including revenue from the monetization of data) on an automated and standardized basis from a large and global customer or user base that can be pursued remotely for customers in markets with little or no local infrastructure.[58] The word "automated" here refers to the equipment and systems in place to provide services to the users and stands in contrast to bespoke interaction, while

51. *See* Significant Digital Presence Proposal (COM(2018) 147 final), *supra* n. 50, at art. 4(3).
52. *See*, for a generally positive assessment of a digital permanent establishment test: Y. Brauner & P. Pistone, *Some Comments on the Attribution of Profits to the Digital Permanent Establishment*, 72 Bull. Intl. Taxn. 4a (2018), Journal Articles & Opinion Pieces IBFD.
53. *See* Neuvel et al., *supra* n. 4, at p. 348.
54. *See* Ludwig et al., *supra* n. 22, at pp. 31-34.
55. *See* Neuvel et al., *supra* n. 4, at p. 345.
56. *See* OECD/G20, *Report on Pillar One Blueprint*, *supra* n. 3, at para. 22.
57. *See* id., at para. 22.
58. *See* id., at para. 19.

"digital" refers to some type of remote provision. Typically, ADS businesses are characterized by high fixed costs for setting up the systems as such, but they can then scale up their services to many users at little marginal cost per additional user.[59]

Customer-facing businesses (CFBs) are defined as "businesses that generate revenue from the sale of goods and services of a type commonly sold to consumers, including those selling indirectly through intermediaries and by way of franchising and licensing".[60] From this broad language, it is hard to fathom which businesses are *excluded* – as any business will sell goods or services of some kind. Thus, the good or service must be:

(1) regularly, repeatedly, or ordinarily supplied to consumers, such as by engaging in consumer market research, marketing and promoting it to consumers, using consumer/user data, or providing consumer feedback or support services (irrespective of the location in which such activities take place);
(2) something fit for personal consumption, as opposed to bulk or raw materials accessible to wholesale traders or other businesses only; and/or
(3) transferred somehow to the consumer irrespective of the legal form (including any direct or indirect sale, lease, licence, rent or delivery) – an example would be the licensing of the right to consume or download music.

If the activities qualify as either ADS or CFB, they must surpass *two thresholds*: first, the consolidated revenue of the *conglomerate as a whole* offering a service should be above a certain threshold; and, secondly, its in-scope revenue earned from ADS or CFB *outside its domestic market* should also be above a certain threshold. In turn, only very large MNEs should be covered, and the administrative burden remains proportionate to the expected tax benefits. Threshold numbers in the size proposed by the European Commission's proposal for turnover (EUR 750 million) have been suggested, but the question is open and shall be adjusted as technical progress renders the administrative efforts less costly.

Given the broad language of both ADS and CFB (with CFB notably less certain than ADS), the OECD proposes looking first at the definitive lists of ADS and CFB activities, then at the general definitions, before – if a given activity meets the test – certain activities are excluded. The definitive list of ADS activities includes various standardized services,[61] while five types of services are excluded.[62] In the search for a common denominator, the authors find in some respects "customization" and in others the attachment of datafied services and datafication of physical goods.

For the CFB test, the authors lack such a list: the product or service may, under the view of the OECD, still be a consumer good or service even if the contracting party to the sale is not the final consumer (such as in a sale via a third-party distributor or where a franchisor has created a product, but the sale is contracted by the franchisee). More so than the contracting party, the "face" of the service is important. While the OECD provides for extensive guid-

59. *See* id., at paras. 19-20.
60. *See* id., at para. 38.
61. *See* id., at paras. 25-33 (online advertising services; sale or other alienation of user data; online search engines; social media platforms; online intermediation platforms; digital content services; online gaming; standardized online teaching services; and cloud computing services).
62. *See* id., at paras. 33-37 (customized professional services; customised online teaching services; online sale of goods and services other than ADS; revenue from the sale of a physical good, irrespective of network connectivity ("Internet of things"); and services providing access to the Internet or another electronic network).

ance using examples from pharmaceuticals (over-the-counter or all drugs?), franchising and licensing (Apple, iTunes and Netflix?),[63] the common denominator is far from obvious other than that a famous brand from a foreign country undertakes a business activity in another country. But if this is the core of CFB activities, what is the difference between digital brands on the one side and car brands, liquor brands, perfume brands, fast-food brands, and brands in financial services and airlines on the other?

Moreover, the ADS concept hardly serves its purpose in a world where more and more automated datafied services are being added to traditional services. Pertinently, what defines the boundary between ADS and traditional? The authors also lack an underlying rationale for deviating from the permanent establishment concept. Under the OECD's definition, a service that is only consumed by users in the distribution country could qualify as ADS even where there is not even the slightest amount of co-creation (i.e., in the absence of any value transfer as could be the case in user fee-driven models).

The OECD acknowledges that scope is a key pending political issue.[64] And with good cause: the ADS and CDB definitions are so broad and unintelligible that they are unfit to define the scope of exemptions from the permanent establishment requirement. The question of why certain activities are "in" and some others are "out" of the activity test matters, from a legal perspective. In some OECD member countries, the absence of a guiding rationale will lead to constitutional challenges under the legal principle of fair and equitable taxation.[65] Without a convincing rationale, national case law will piece by piece undermine the overarching rationale behind the globally harmonized taxation of certain cross-border situations.

In turn, the authors are still on the lookout for a method to insert market elements into taxation in an effort to achieve a better assessment of how datafied businesses should be taxed.

4. Data Point Pricing as a Remedy

In light of the obvious disadvantages of established models, this section introduces and examines an alternative concept, based on "data point pricing". This concept deviates from two common perceptions prevailing in the discussion so far: first, that the mere process of collecting data does not substantially add to value creation, and second, that considering the hardware and software elements together with related people functions in the functional analysis can serve as a proxy that captures the value of the data.[66]

Clients of datafied services apparently receive certain services "for free" when in fact they contribute their data, or give consent to data gathering by sensors, in lieu of a payment for the services they use. Even where commercial services are reimbursed, the service provider

63. *See* id., at paras. 40-48.
64. *See* id., at paras. 19-20.
65. For instance, Germany has a long-standing tradition of constitutional challenges drawing on article 3 of the *Grundgesetz* (the fundamental right to equal treatment).
66. *See*, for instance, Olbert & Spengel (2017), *supra* n. 4, at p. 36; Olbert & Spengel (2019), *supra* n. 4, at secs. 1 and 4; J. Lammers, *The OECD Concept of User Participation and a More Pragmatic Way to Tax Rent Seeking*, Tax Notes Intl., p. 614 (2019); T. Ehrke-Rabel, *Big Data in Tax Collection and Enforcement*, in Haslehner et al. *supra* n. 4, at pp. 283-285 (distinguishing between data, information and knowledge, data being defined as a raw piece of information, and stating that "pure data need to be processed and put into a specific context to be usable for tax purposes"). *But see* Bauer et al., *supra* n. 14, at pp. 14-21 (analysing various business models and concluding that for *some* business models collecting data has value, with or without nexus in a given country).

often relies on client data, and aggregates the data from multiple clients and combines them with data from external services to provide/enhance/develop new services. For the concept of data point pricing used in this article, the authors break down the services delivered and fees paid under the mixed contract users sign up to when using data-driven platforms.[67] Data point pricing focuses on what has been observed by the OECD, namely that services are often supplied with no direct charge to users while the users "pay" through granting access to their data. The idea of data point pricing treats user-created intangibles as "other currencies"[68] and is motivated by the "data is the new oil" paradigm proclaimed by proponents of the data economy. Both data and oil can function as value storage and, if rightly used, they can both move things forward.

Certainly, there are some differences between data and oil.[69] Data do not burn and cease to exist. They can be consumed multiple times and stored in multiple places at the same time, hence pricing data is tricky. Meanwhile, oil as a commodity can be more easily priced with the market clearing price equal to its cost of production. Further valuation differences may stem from the fact that the true value of oil is open to a clearer assessment ex ante, while the true value of data can be best assessed ex post. Yet, valuation risk is also inherent to oil, as the price of oil fluctuates in line with demand and supply. A further difference between the two may be seen in the fact that the returns of data for certain reiterative use cases such as training an algorithm are diminishing, while some believe the value of oil is stable (even though a car some 20 years ago needed much more oil per kilometre than today, indicating diminishing value in line with technological progress – similar to the learning curve of algorithms, but over a longer lifespan).[70]

Commentators argue that data only compound value if they are tied to a particular problem and when data need to be transformed by businesses aiming at value creation, concluding that (raw) data are not comparable to oil;[71] yet, the authors do not share their view. This is because we know today that oil serves a purpose only in the context of a combustion engine, while oil in water is mere pollution. Contextualization is crucial for any value driver.

Thus, the authors take a closer look at how to make use of the "data is the new oil" paradigm in five steps. The authors start with the design and scope of data point pricing (section 4.1.), delineating the concept from previously discussed and finally rejected concepts such as the "bit tax", before turning to its potential tax effects (section 4.2.). The authors go on to discuss potential counterarguments (section 4.3.), before stressing the beneficial side effects of data point pricing on other legal and economic areas of interest (section 4.4.). The authors

67. The authors believe that this approach is in line with the *OECD Model Tax Convention on Income and on Capital: Commentary on Article 12*, paras. 11.6 and 17 (21 Nov. 2017), Treaties & Models IBFD (requiring that considerations under mixed contracts shall, in principle, be broken down and taxation rules for each part shall be applied, unless one part constitutes "by far the principal purpose of the contract"). *See*, on the application of this principle for cloud computing, L. Fjord Kjærsgaard, *Allocation of the Taxing Right to Payments for Cloud Computing-as-a-Service*, 11 World Tax J. 3, sec. 3 (2019), Journal Articles & Opinion Pieces IBFD. Yet, cloud computing providers often charge user fees and use data-collecting consideration models only for entry offers.
68. *See* V. Allee, *Reconfiguring the Value Network*, 21 Journal of Business Strategy 4, pp. 36-39 (2000). On value creation focusing on user and community key roles, *see* Cugusi, *supra* n. 13, at pp. 14-16.
69. A. Stapp, *Why Data Is Not the New Oil*, Truth on the Market (8 Oct. 2019), available at https://truthonthemarket.com/2019/10/08/why-data-is-not-the-new-oil/.
70. The authors examine the last apparent difference that data are worthless within their argument below.
71. *See*, for instance, Ludwig et al., *supra* n. 22, at p. 41 ("this analogy is flawed").

conclude by testing the data point pricing concept against the background of a particularly often-discussed data storage mechanism, namely so-called distributed ledgers (section 4.5.).

4.1. Design and scope of data point pricing

4.1.1. Design

In a world where data analytics constitute a denominator for determining business development, strategic orientation for management and risk mitigation, access to and the collection of data is to many companies an important part of pursuing their business. The value of a data pool depends on the type of data collected. From the outset, two sources of data come to mind: self-generated and externally generated data. For instance, if the firm installs weather sensors on its own premises and movement trackers on its own vehicles, it could make use of the data generated, for instance, for forecasting weather or scheduling logistics. But if it installs weather sensors on someone else's premises or tracks some other individuals' movements, the authors would expect some reimbursement to the property owner and individual. While, in the first case, the generator and collector of data are identical, at the opposite end of the spectrum the data generator diverges from the data collector. Data collection then requires the data generator's contribution to and consent with respect to information sharing. This is most obvious where *personal data* (as defined by data protection legislation) are concerned; such data sets are specific to a person and are as such unique. Between the two extremes, we find nuances where data generators and collectors share information that does not qualify as personal data *strictu sensu*, with consent to various cookies being an example of the latter.

Whenever the data collector is not the same as the data generator, and a data transfer of some kind is necessary, the data generator's consent is valuable from the perspective of the data collector. The authors' data point pricing concept thus relies on the assumption that this value should be accounted for as an intangible asset in the corporate accounts. In this sense, data acquired from the data generators have value; the data point pricing concept presented herein then rests on the assumption that the transfer of data is equal to the transfer of other goods with value. This assumption does not require data to have a certain or even a high value. It suffices that data have *some* value – yet what this article's proposal aims at is that these data are accounted for in the company's books, and thus an accounting trail for raw data assembled from clients is established.

Data point pricing, as understood herein, requires each firm that relies on data collection and analysis to assign a value to each discrete unit of information (hereinafter data point) that it generates from or with the support of clients. Firms have to disclose the value of the data points collected to their clients and give them the choice of either having the data point price being allocated to their account with the firm to be used for acquisition of the firm's services or receiving a direct payment in cash. If a client chooses the former, then this amount can be used to pay for services offered by the same firm, essentially resulting in a "data for services" barter but with an accounting trail covering this transaction. If the client chooses the latter, since the digital services provide value to the client, the client must compensate the service provider by other means; for instance, the authors could imagine the transfer of non-cash assets including cryptocurrencies or any cession of rights to compensate the service provider.

The purpose of such data point pricing is twofold. First, the data point pricing shall lead to adequate pricing of data when collected from clients, and second, the value of data collected shall be adequately reflected in the firm's financial accounts. As such, data point pricing aims to create both a fair market price and a market pricing mechanism on which tax authorities can rely.[72]

Which price the firm offers for data collected from its clients is up to its own business strategy as long as the price is more than zero, so that a price for the data can be traced in the firm's accounts. In particular, the authors do not require a fixed price per bit or a certain pricing strategy for a certain data category. Rather, whatever the firm offers as a price for the data pool to its customers will eventually result in some sort of reasonable price for the data since the firm will seek to offset the data costs through its own services, as long as the transaction value for each data generation is traced and disclosed to the customer. For instance, if a client logs onto a service and provides data to the firm,[73] the authors can imagine the data price meter starting to run, and with each data point collected on the firm's servers the meter goes up (if only by a very small amount). This way, clients will be aware that they transfer value to the firm and may think more carefully about which firm they are willing to transfer value to and at what price.

Under efficient market mechanisms, the authors would expect the firm that offers the best price for the data to generate the most and best data. If the firm is interested in certain types of data, it could also offer a premium to clients that give these data away, such as their preferences for certain goods or tastes. At the same time, clients, if offered a monetarized value, become more aware of what they are giving away and thus more keenly compare data point pricing offered by various data-intensive firms (more precisely, the algorithms that will do the job for them).

Of course, data point pricing will reflect the fact that clients may give away their data at multiple points. This is, of course, intentional because both the pricing of data vendors and the provision of raw data by clients will determine the pricing mechanism.

Further attention must be devoted to the fact that data pools are processed by advanced algorithms to enhance value provided by the raw data. In principle, once the raw material (data) has been assigned a value, whatever happens afterwards with these data will be treated in accordance with accounting rules. Algorithms will analyse the data and generate insights more or less valuable for commercialization. But from an economic perspective, the algorithm does not stand alone, it is as contextual as the data it uses. It is embedded in a service model aimed at economic value generation. When providing the service, it would be against economic principles to use the raw material (data) without offering compensation for the use thereof. For instance, if the data pool used has been assigned "data acquisition

72. Note that the authors do not want to penalize data collection nor do they pursue any other Pigouvian purpose: as long as those who give away their data voluntarily, with full consent and information about the data generated (i.e. accepting the loss of privacy), are properly compensated, the authors are not aware of negative externalities generated by data collection as such beyond the usual means of production (energy consumption etc.); yet the authors are aware of positive externalities that these data transfers can generate, for instance through better or entirely new services for other users of the digital business.

73. The authors will consider that clients may seek to provide fake data, or competitors may seek to increase the tax base of their competitors by extensively using these platforms. Firms can protect themselves by building technical routines to identify useless data and immediately reduce the price they offer for the data received when certain patterns occur.

costs" of X (i.e., the sum of all compensation offered to users) plus Y (costs for data-collecting software, IT servers and energy), the authors would expect the entity that uses the data to provide some compensation for the use of data that stands in relation to the size of X + Y. In particular, if the algorithm is the sole user of the data pool, the costs of using the data should be equivalent to X + Y plus capital costs (C) of the data collection firm. Lesser costs may be justified if parts of the data pool are sold elsewhere at market terms (let us say for the sum of Z). Then, the minimum value is: X + Y + C – Z.

In turn, the type of users of data plus the established accounting methods could then provide the basis for better use of transfer pricing principles.

4.1.2. Scope: All datafied businesses

Defining the scope of rules for the digital economy has been a challenge for all tax concepts in relation to the datafied economy.

In principle, *all* firms collecting data systematically and automatically from their clients should do so within a clearly defined scope. Yet, until the pricing algorithms are in place and widely spread, the authors propose striking a balance between the administrative burden and data point pricing. The authors would thus suggest temporarily setting a threshold in terms of *terabyte of data collected from clients* as a precondition for data point pricing. As a proxy for data collected, we could look at the size of the server centres operated by the firm directly or indirectly (through assessing server space leased from cloud service providers).

The authors do not propose a distinction between traditional and IT-based firms, since one can turn into the other as technology advances. Indeed, as more and more parts of the production chain are datafied, the distinction between the two types will become increasingly difficult to justify. The authors also reject a distinction between platform-based and non-platform-based business, one- or two-sided markets and other digital business forms, for three reasons. First, the delineation among these concepts is in flux. Second, a distinction may be challenged under the principle of equal taxation. Third, data point pricing is at its core an accounting concept, making value creation transparent. This transparency supports fair taxation for *all* types of business.

4.1.3. Delineation

Data point pricing differs significantly from the bit tax discussed in section 3.1. While the bit tax asks external service providers to collect an additional new tax on information flows, data point pricing is at its core a mere disclosure rule, asking businesses to disclose to their clients and eventually tax authorities the price that the firm's management is willing to pay for a value set (even if, for the most part, it pays for these data through its services). Thus, we switch the valuation burden from the side of the clients (who have very little information on the value of their data) to the entity that is best informed and can thus apply a cost-effective pricing mechanism for the data. Implicitly, the business also provides information on the value of its services, given that they will not offer a service if the data they generate are less valuable from a business perspective than the service they offer. This way, data point pricing aims, for the most part, at reducing the information asymmetry with respect to (i) the value of the raw data used; and (ii) how that value is generated.

Note that data point pricing does not attach any immediate tax effects to the disclosure; contrary to bit tax, it does not come with an additional tax layer and avoids double transaction or income taxing. However, data point pricing triggers indirect tax effects, through increasing the effectiveness of well-established tax concepts, including transfer pricing and regional income allocation rules.

4.1.4. Implementing data point pricing

Data point pricing, as a mere disclosure rule as to which value is assigned to a data set, could be implemented by each country's legislator on a stand-alone basis. Yet, from a cost perspective, it is undesirable that each country has its own variants of data point pricing, as different details across countries will increase the firms' costs of implementing the concept. Implementation through a harmonized OECD framework is thus desirable.

Decisions necessary to be taken as a precondition for a well-functioning data point pricing concept include:

(1) how often the data point prices must be generated and updated, given that they will lead to a fluctuating book value of the firm's intangible assets (e.g., in a fully digitized environment, a daily or weekly update is desirable unless extraordinary events prompt a revaluation);
(2) how data point prices will be accounted for when data sets are combined or structured in new ways (with the expenses for the accumulated acquisitions defining the bottom price);
(3) which firms are subjected to data point pricing and are thereby required to account for the value of data sets, i.e., the minimum data threshold (section 4.1.2.);
(4) how data point prices will be documented and stored for later use by tax authorities, and how tax authorities can gain access to the data point prices disclosed to their clients (a predefined reporting framework based on ISO standards is necessary to allow for the technical analysis and processing of multiple tax authorities; to simplify analysis, certain client-specific data must be embedded in the stored and reported data set, including in particular a country identifier reflecting each customer's place of use and, in the case of personalized services, the client's country of residence); and
(5) which amounts generated through data provision must be paid out to clients and for which amounts the business may offer services only (balancing administrative costs with increasing counterparty risk on the side of clients collectively, the authors propose that data point equivalents exceeding USD/EUR 5 must be reimbursed to the clients).

4.2. Tax effects of data point pricing

4.2.1. Cross-border allocation of value creation

Analogous to the "unbundling" of services in competition law, data point pricing forces the datafied business to consider its bundle of services in two steps. First, the firm needs to determine what it provides as a service to its clients immediately, after which the corresponding price for the service is also determined. Second, the firm needs to determine what it wants to provide to clients as a service in the long term, as this will have a significant bearing on whether or not, and how much, the firm is willing to pay for client data. Thereby,

it needs to price the option of using certain data in the future,[74] in addition to the option of selling the data or licensing the data to third parties if desirable.

Once a value is assigned to the data collected from clients, the nexus relevant for attributing taxation rights in a cross-border situation becomes transparent from the fact that data are actually collected from these clients: data point pricing allows for a calculation of value created by data points provided from users in any given country. This calculation could provide market-based estimates that can then become the basis of any regionally allocated taxation, regardless of whether this is for VAT or income tax purposes.[75]

4.2.2. Enhancing data valuation through a market component

In response to the disclosure of data point pricing, the authors would expect clients to compare prices for their data offered by different service providers and to allocate their data to the highest-paying firm. To some extent, this would see clients serving as pricing mechanisms themselves. Furthermore, arbitrageurs may start to function on the relevant markets, enhancing market efficiency where similar services are available at better data prices. While this pricing may be inaccurate to begin with, and laden with information asymmetry regarding the option value and the valuation effects of externalities, these issues become less relevant as more datafied businesses compete for the same data.

For instance, let us assume that each shopping platform or streaming services provider asks for certain client data: algorithms comparing each provider's data compensation rates will finally steer most data streams to those who offer the best compensation, when viewed in correlation with user fees (if any) and the overall service level. Data collectors will thus approach their price limit more and more, close to the true value they assign to the data.

Data point pricing would eventually result in a market price being established for raw data previously unpriced and enhance through disclosure rules the efficiency of existing raw data markets (the authors discuss the limits of this mechanism in section 4.3. Both aspects increase the opportunities for tax authorities seeking to analyse and assess transfer pricing and support the enforcement of existing tax rules.

4.2.3. Data as intangibles

While not essential to support their main thesis, the authors' data point pricing model rests on the concept of intangibles under the OECD guidelines:[76] the firm collects data provided *by others* and in economic terms *pays for the right to use them* through the provision of services. In turn, the data points are only "self-collected" and not self-*generated*. In effect,

74. The option value of data can be assessed using option pricing models applying the Black-Scholes formula for pricing derivatives; *see* Coyle & Diepeveen, *supra* n. 23, at pp. 10-12.
75. Which model is most suitable to tax the value contribution of any given country is then up for negotiation. In principle, a flat tax combined with a low value exemption is most suitable for that purpose.
76. According to the revised *OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations*, ch. VI, A.1., para. 6.6 (at p. 249) (OECD 2017), Primary Sources IBFD [hereinafter *OECD Guidelines* 2017)] intangibles are: "[s]omething which is not a physical asset or a financial asset, which is capable of being owned or controlled for use in commercial activities, and whose use or transfer would be compensated had it occurred in a transaction between independent parties in comparable circumstances". While data is not listed as intangible by the *OECD Guidelines* (2017) (at pp. 252-257), the OECD mentions that the provided examples are not intended to be a comprehensive list.

the users grant the firm a right to use the data they provide, with compensation provided in kind rather than in cash.

Contractual rights and licences are one category explicitly listed by the OECD as intangible for transfer pricing purposes.[77] Similarly, the authors argue that raw data (data points) provided by users *are* intangibles under accounting law (where this is uncertain, regulators are encouraged to clarify that raw data are intangibles). Hence, unbundling the contract into which users of apparently free services enter leads directly to the data point pricing model the authors propose.

Pursuant to International Accounting Standards (IAS) 38, expenditure for an intangible item is recognized as an expense, unless the item meets the definition of an intangible asset, and (i) it is probable that there will be future economic benefits from the asset; and (ii) the cost of the asset can be reliably measured. The fact that the firm collects the data indicates that it wants to use these data somehow for an economic benefit, for instance for customized services, as otherwise it would not devote expenses in terms of energy and server structure to collect them. The fact that the firm conducts its own assessment as to which data to collect and as to which data to pay for shows that the firm sees economic benefit from collecting such data. Our proposal addresses the second and so far problematic[78] aspect under the accounting rules, namely the measurement of the asset's costs. The authors' data point pricing concept specifies a price for the data in the firm's offer to customers and through customers accepting the price, giving a methodologically sound estimate of the costs of data as intangible assets.

The authors further do not analogize data collection with "research" but rather with "development" costs. This is because the data pool collected has value; data pools can be sold at market prices > 0 even if the individual data point may have zero value as such, if segregated from other data points. The compensation for acquiring data is thus a part of the development expenditure in the course of generating data pools.

Once accounted for in this way, whether the data are to be amortized depends on the data collected. For instance, while social media data on human interaction may have a long lifespan and thus require annual testing for impairment, certain financial data on cash flows may have only limited use and may require amortization within that time span.

4.2.4. Limits

While their data point pricing model creates a pricing mechanism, as the authors discuss further in section 4.3., data point pricing is no panacea. In particular, the pricing efficiency would suffer under a monopolistic market structure. However, even where the price signal itself is not fully reliable, the data point pricing mechanism ensures that the data trail itself

77. *See OECD Guidelines* (2017), *supra* n. 76, at p. 255. *See also* M. Lagarden, *Intangibles in a Transfer Pricing Context: Where Does the Road Lead?*, 21 Intl. Transfer Pricing J. 5, pp. 331 and 333 (2014), Journal Articles & Opinion Pieces IBFD.

78. K. Birch, D.T. Cochrane & C. Ward, *Data as asset? The measurement, governance, and valuation of digital personal data by Big Tech*, 8 Big Data & Society 1, p. 3 (2021) (stating that "[w]hile it would seem logical to treat personal data as an intangible asset, it is not clear whether it can be measured and valued as a distinct resource, or if it is better thought of as a component of goodwill"). *See also* B. Lev, *Ending the accounting-for-intangibles status quo*, 28 European Accounting Review 4, pp. 713-736 (2019).

is reflected in the firm's financial accounts and thus becomes traceable for the tax authorities.

Further, the accounting trail provided by data point pricing enhances transparency with respect to *one* aspect of value creation: the value of data collected from the users in any given country. While it thus gives the authors a number for the *data-driven* network effects, it does not come with a price tag for the network effects created by *the business model itself*, nor the value generated through bundling data from various clients for a specific use. While challenges thus remain, the authors have limited the challenges to processes inside the firm, thus reducing the relevance of *external* contributions to value, which are particularly difficult to handle from a tax perspective.

Furthermore, data point pricing does not solve the inherently political question[79] of *how* data-related value creation is taxed. Even where data point pricing is adopted, Pillar Two of the BEPS Project remains important. Yet, data point pricing would add a neutral, market-based (instead of political) factor into the discussion and could thus help to break the deadlock in the OECD's negotiations.

4.3. Counterarguments

4.3.1. Efficiency of the pricing mechanism?

Data point pricing would be most effective if the prices disclosed are close to the value internally assigned by the firm. In markets where there is little competition for and a high degree of information asymmetry as to the potential use of a given data set, one would expect underpricing of data,[80] while in hotly contested markets the data point price would be close to the value internally assigned by the firm, or possibly even higher, where speculation in data prices is present. Such a phenomenon would be nothing new for tax law. Indeed, tax law needs to deal and has dealt with market volatility in relation to all types of assets, ranging from financial instruments related to commodities to real estate.

What is different, however, in this case is that clients may suffer from tie-in effects where the market is of an oligopolistic or even monopolistic structure. These concerns need to be taken particularly seriously given that data-driven business models suffer from tie-in and lock-in effects from the network effects and scale effects that the network and the data masses themselves generate (*see* section 2.1.). In other words, users of certain services not only contribute to the network effect with the provision of their own data, but also have no choice but to accept whatever price is offered by the service provider.[81] Nevertheless, a world with data point pricing is still better than one without compensation at all, as low prices being offered for data would signal that competition is limited, and this may inspire new firms to emerge and compete with the market leaders by offering higher prices. Furthermore, antitrust authorities could follow the signal sent by low data prices, in relative terms, and enhance antitrust enforcement action accordingly.

From a tax perspective, this would improve the current situation even if the price does not adequately reflect the true value of the data due to information asymmetry, network effects

79. A.M. Jiménez, *BEPS, the Digital(ized) Economy and the Taxation of Services and Royalties*, 46 Intertax 6/7, pp. 620-621 (2018).
80. *See* references cited *supra* n. 23.
81. Let us assume a user wants to be part of a large user group that is only available on Facebook. That client will accept any price for his data.

and scale economies. This is because the data trail would be documented in the financial accounts, *regardless of price*. In turn, tax authorities could discuss the proper data price using various types of market intelligence, similar to other areas in which the tax authorities challenge the price estimate given by a taxpayer.

To be sure, data point pricing has no effect on the pricing of a business idea as such. This is, however, a problem not unique to datafied business models, and is encountered in the taxation of all kinds of enterprises. But data point pricing assists in assessing the value of a business model since it makes the assets and cash flows underlying a business model more transparent. Based on this enhanced transparency, traditional estimation methods relating to enterprise valuation will lead to more accurate results. While the uncertainty regarding the value of the firm will persist, by applying data point pricing, the dimensions would be much less severe if *all* important raw materials (including data) other than the idea itself are priced and accounted for.

4.3.2. Costs and technical feasibility?

Data point pricing may be understood as a form of disclosure where the data firms disclose their internal calculations as to the value of data collected to their clients. Disclosure requirements, in principle, should only be imposed where the benefits of disclosure exceed its costs. Data firms would thus be burdened with programming routines that display the price for each data set. The pay-out mechanism may also prove costly at a time when payment services are priced per transaction. At the same time, the choice of a pay-out would prove more costly than account accrual, resulting in a lock-in effect for the client if the costs for pay-out were assigned to them.

A closer look reveals that the implementation of disclosure routines is a one-off cost and would be integrated within the costs of the next software update. One also needs to consider that the costs of payment have declined significantly in the last 15 years and are expected to decline even further in the next decade (close to zero), allowing for micropayments such as those suggested as part of the data point pricing model. In fact, many FinTech applications today already rely on micropayments and micro-valuations.[82]

The key lies in developing algorithms to assign value based on previously assigned priorities as to which data to look and compensate for. Once developed, the algorithms can function for all data collections and all countries. Such algorithms exist already, at least their essential parts: online marketing algorithms assign the advertising content according to expected users, based on what they know about users relying on their online history, based on cookies, etc., that is: user data. At the same time, the advertising *client* is charged an amount equal to the "value" of users: clients are charged more for access to focus groups than for access to non-focus groups, advertising on websites with more traffic generated by focus groups costs more than advertising on websites less often visited by that group, etc. These types of algorithms may be seen as a reverse model of data point pricing, which undermines both the costs and the feasibility counter argument. The authors expect similar algorithms

82. *See*, for instance, the blockchain-based platform for micropayments on royalties developed by Microsoft and EY; *see* L.J. Han, *EY and Microsoft launch blockchain solution for content rights and royalties management for media and entertainment industry*, Medium (16 Jan. 2019), available at https://medium.com/ktrade/microsoft-launch-blockchain-solution-for-content-rights-and-royalties-management-for-media-and-fce8d774b6aa.

adjusted to data point valuation and accounting purposes to take on the processes on which their data point pricing concept relies.

As in all technology, there will be transition costs and costs of initial investments. However, contemporary observers tend to overestimate the costs of technology in the long term. An example from tax may be insightful: the automated exchange of tax information across borders was seen as unfeasible two decades ago – and is the reality today, owing to technological progress.

This argument faces some potential objection given that the prices for data seem to be very low.[83] The low prices are attributed to the fact that data are not exclusionary and, once disclosed, the same data points could be used by many users simultaneously. Another factor assumed to account for the low data prices is limited demand. The authors' model – in line with data economists' insights[84] – assumes that there is a third reason: the fact that users are "tricked" into selling their data for little things (i.e., certain small services) too cheaply. There is an assumption here that the supply side of data is too passive, too uninformed, too unsophisticated and too uncoordinated to negotiate the optimal price for their data. Hence, by obliging that the services be unbundled from the data provision, the authors seek to activate a more vivid data market, by the same means as other (financial) markets suffering from information asymmetry: disclosure.[85]

4.3.3. Anti-innovation effect?

Another aspect to be considered is the potential impact of data point pricing on innovation. Datafied firms, so the argument goes, would be hindered in their development of data-driven business models that are not yet apparent, but which could become apparent simply by sifting through the data and looking for opportunities. In other words, firms that do not control vast data pools in the present will find it more difficult to boost or defend their existing position. In turn, under data point pricing, markets would rapidly reach a point where only a handful of providers remained.

Random-walk data analysis may run counter to the requirement of data protection law to set an objective for each data collection. However, putting that to one side for the moment, the authors would expect that the anti-innovation effect would depend on the price of the data being sought. Where there is high demand with respect to certain data points, the authors would expect higher prices than for data that are rarely sought. New business models will continue to focus on markets with low data point prices – similar to today's energy business models that focus on energy sources that are inexpensive in terms of carbon foot-

83. A. Stapp, *supra* n. 69 ("General information about a person, such as their age, gender and location is worth a mere $0.0005 per person, or $0.50 per 1,000 people […] A person who is shopping for a car, a financial product or a vacation is more valuable to companies eager to pitch those goods. Auto buyers, for instance, are worth about $0.0021 a pop, or $2.11 per 1,000 people […] Knowing that a woman is expecting a baby and is in her second trimester of pregnancy, for instance, sends the price tag for that information about her to $0.11 […] For $0.26 per person, buyers can access lists of people with specific health conditions or taking certain prescriptions").

84. *See* Coyle & Diepveen, *supra* n. 23; Li, Nirei & Yamana, *supra* n. 23.

85. Note that the do not claim that financial markets are comparable to data markets. While information asymmetry is prevalent in both markets, financial products are often standardized, while data is at least for now often unstandardized. But data point pricing could lead to enhanced standardization given the data governance structure necessary inside the datafied firm as a precondition for efficient pricing.

print and production costs, relatively speaking. That means potentially unexploited data pools will receive more innovative attention, which the authors find to be a sound result.

4.3.4. Technical tracking as a better alternative?

Some tech aficionados would argue that the more expertise is accumulated by tax authorities in data technologies, the easier it will become to track data trails by non-financial means. This argument is a variant of the tech nirvana fallacy[86] often reflected by tech enthusiasts in the literature. Under this fallacy, the current deficient state of the world is compared with a future optimal state of the world that is assumed to have better and more efficient resources that are either not yet available at all or are still to overcome legal or factual barriers (such as jurisdictional limits) before being implemented. The latter is particularly true for data trail tracking, which faces both jurisdictional and data protection hurdles. In contrast, cross-border cooperation on tax matters has gained momentum in the last decade, with exchange of information on tax matters becoming more and more prevalent among advanced jurisdictions. But to make the cross-border tax cooperation effective with regard to datafied business models, the respective transactions must have been documented in the entity's financial accounts. This is essentially what data point pricing is aimed at.

4.3.5. Data protection?

Another potential objection stems from data protection rules. As required by article 39 of the Treaty on European Union and article 16 of the Treaty on the Functioning of the European Union, data collection and processing in relation to natural persons is subject to strict rules set out by the General Data Protection Regulation (GDPR).[87]

Note that the authors' proposal does not address data collection and transfer as such. Rather, it only requires that the data collection be adequately reflected in the firm's books to allow for the application of transfer pricing principles.

If by violating GDPR the firm avoided taxation, the data point pricing model would clearly be inefficient. How would a violation of GDPR impact on taxation though? Data collection from non-natural persons is not governed by GDPR. Even with regard to natural persons' data collection, processing and transfer are not prohibited by GDPR as such; rather they are allowed if certain organizational and transparency requirements are met,[88] with the data subject's consent pursuant to article 6(1) lit. a and article 7 of the GDPR being of paramount importance. With regards to VAT, the European Court of Justice has

> […] consistently held that the principle of fiscal neutrality prevents any general distinction in the levying of VAT as between lawful and unlawful transactions. Consequently, the mere fact that conduct amounts to an offence is not sufficient to justify exemption from VAT. The exception applies only in specific situations where, owing to the special characteristics of certain products

86. *See* L. Enriques & D.A. Zetzsche, *Corporate Technologies and the Tech Nirvana Fallacy*, 72 Hast. L. J. 1, p. 101 (2020).
87. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC, OJ L119/1 (2016) [hereinafter General Data Protection Regulation (2016/679)].
88. *See*, in particular, the main principles set out in art. 5 General Data Protection Regulation (2016/679).

> or certain services, any competition between a lawful economic sector and an unlawful sector is precluded.[89]

Given that data collection is not illegal per se under all circumstances, the authors do not see a specific situation that precludes any competition between a lawful economic sector and an unlawful sector.[90] In turn, data law violations do not result in avoiding taxation. With regard to other types of taxation, the same rationale applies, mutatis mutandis.

4.3.6. Enforcement?

From an enforcement perspective, the data point pricing models would face certain barriers.

First, firms could outright refuse to offer data point pricing to their clients. Straightforward non-compliance could be addressed by fines, and legislators could elaborate an estimating procedure with penalty characteristics, similar to those applied in relation to other instances of non-accounting and non-reporting.

Second, tax authorities could lack the necessary resources to review whether the firm meets the data point pricing threshold or whether the firm offers compensation for all data collected from its users. Tax authorities in recent decades have become more and more effective in terms of enforcement, and any lingering limitations, particularly technical disadvantages, could be overcome by hiring data experts.

Third, some commentators argue that the object of value is not the data set itself but rather the combination and processing thereof.[91] Once repackaged and processed, the data set can be identified and tracked. Continuing with our data point pricing approach, if data are repackaged and processed, each relevant transaction will form an accounting trail, with the remaining data sitting in the data *and* financial inventories. From a tax perspective, if the data in the "data inventory" are at a price equal to that of the compensation paid to the client, while the firm generates high profits through some as yet unpriced data points, the proportioning of the data value is obviously wrong. This is not new per se – albeit the application of accounting principles to data sets is.

4.3.7. WTO compliance

Finally, as a supporting consideration, data point pricing will raise fewer issues from a WTO perspective than other concepts discussed in section 3. In principle, the WTO rules look critically at any rules that either penalize imports or subsidize exports.[92] As long as all firms are subject to the same set of disclosure and pricing rules, the authors do not see any discriminating effect. In particular, data point pricing does not ring-fence certain large (for the most part US-based) datafied businesses and thus provides the ground for de facto discrimination claims. It merely makes existing value flows transparent; the authors' data

89. *See* NL: ECJ, 29 June 1999, Case C-158/98, *Staatssecretaris van Financiën v. Coffeeshop "Siberië"*, [1999] ECR I-3995, at para. 21, Case Law IBFD.
90. For further details on these criteria, *see* NL: ECJ, 5 July 1988, Case C-289/86, *Vereniging Happy Family Rustenburgerstraat v. Inspecteur der Omzetbelasting*, [1988] ECR 3675, Case Law IBFD (arguing that the sale of narcotic drugs is not subject to VAT).
91. *See* Ludwig, Olbert & Spengel, *supra* n. 22, at pp. 41-46. *See also* the references *supra* n. 66.
92. Here is not the place for a complete review of WTO requirements for taxation. *See*, for a comprehensive discussion of WTO rules, W. Schön, *Destination-Based Income Taxation and WTO Law: A Note*, in *Practical Problems in European and International Tax Law – Essays in Honour of Manfred Mössner* pp. 429 and 432-449 (H. Jochum et al. eds, IBFD 2016), Books IBFD; Sinnig, *supra* n. 37, at pp. 234-251.

point pricing model is a mere accounting concept. The authors do not take a position on how to make use of this value transfer for tax purposes, nor do the authors believe that new rules need to be written. Rather, existing transfer pricing rules may work once the locus of value creation and the transfer itself is accounted for.

In order to avoid de facto discrimination of certain large (for the most part US-based) datafied businesses, the temporary threshold for the application of the data point pricing concept (section 4.1.2.) shall aim at including, in principle, all firms and sectors, as the authors expect the datafied firm to constitute the "new normal". The threshold shall exclusively aim at exempting small and medium firms where the administrative burden for applying data point pricing is obviously excessive, even when considering the digitization and automatization of the process.

4.4. Beneficial side effects

Data point pricing yields beneficial side effects in the fields of antitrust, data protection, financial and criminal law.

4.4.1. Antitrust law

As the authors pointed out in section 4.3.1., antitrust authorities could follow the signal sent by low data prices, in relative terms, and enhance antitrust enforcement. In fact, such a pricing signal would be highly valuable when it comes to monitoring market efficiency in markets rarely characterized by outright pricing of services provided. Indeed, many Internet businesses provide services appearing to be free, but these are not so as clients pay for them with their data.

4.4.2. Data protection

The EU GDPR assigns "control rights" (in contrast to ownership rights) to individuals whose data are processed by data controllers.[93] These control rights include, for instance, the "right to be forgotten" where the data are not needed anymore for legitimate purposes and the right to transfer one's data to any other data processing entity.[94] Yet, in practice, the principle of data scarcity (i.e. requiring the collection of data only where these data are needed for certain processing[95]) is rarely followed. Instead, by way of consent, users – faced with the alternative of being disbarred from an application altogether – tend to provide their consent for data collection more often than not. Data point pricing would render a "catch-as-much-as-you-can" data collection strategy more costly than collecting data from a particular data point. At the same time, commercial data pools would be better priced, facilitating the efficiency-*enhancing* transfer of data for commercial services.

4.4.3. Financial law

Financial law assigns a number of regulatory requirements according to a financial service firm's central location. These requirements include a minimum "substance" in terms of core

93. *See* art. 12 et seq. General Data Protection Regulation (2016/679).
94. *See* id., at art. 17.
95. Id., at art. 6(1) lists various objectives of why data may be stored. If under these standards data gathering, storage and processing is not necessary, it must not take place.

staff, the prohibition of letter-box entities as well as data location requirements where core processing data for the firm's operation must be stored at the place of licensing. In practice, similar to tax law, financial law loses its effectiveness in a datafied world: the more the firm's operations depend on data and data processing, the less important it becomes for the firm to have human resources located at its central location. At the same time, financial supervisors lack the necessary resources to identify the core of data activity. Indeed, it has become more and more difficult to supervise the operations of robo-advisers and financial ecosystems like those provided by Ant Financial, Blackrock, Charles Schwab, Vanguard and others that rely on heavily intertwined data exchanges among multiple applications and entities.[96] Ensuring compliance with financial law will be much easier once the raw material (data) has been priced and accounted for in the given entity's financial accounts. Data point pricing designed to ensure the data trail is reflected in the financial accounts could thus enhance the effectiveness of financial laws.

4.4.4. Anti-money laundering (AML)

From a public policy perspective, especially with respect to anti-money laundering (AML) and counter-terrorist financing, the authors can easily imagine a situation where any type of valuable asset changing hands would warrant attention. In the past, criminals, including terrorists, often transferred assets that were hard to price, such as antiques, pictures and other pieces of art, at prices that were unjustified from a market perspective to cover up the illicit sources of such money transfers.[97] It does not require a vivid imagination to assume that data could become an asset used for money laundering. Data point pricing would render such an endeavour much harder though since the data point is assigned a spot in the account journals once generated, and its transfer for return or write-off would require documentation.

4.5. Testing data point pricing: Distributed ledgers technologies

Certain data processing methods will trigger particular challenges. This is especially true with regard to distributed ledgers.[98]

4.5.1. The technologies

A distributed ledger is "a database that is consensually shared and synchronised across networks spread across multiple sites, institutions, or geographies, allowing transactions to have [multiple private or] public 'witnesses'".[99] The data sharing results in a sequential database distributed across a network of servers, which together function as a ledger.[100]

96. *See* Zetzsche et al., *supra* n. 8.
97. *See*, e.g., A. Marriage, *Secret structures, hidden crimes: Urgent steps to address hidden ownership, money laundering and tax evasion from developing countries,* European network on debt and development (Eurodad) (2013).
98. *See*, for the following, D.A. Zetzsche, R.P. Buckley & D.W. Arner, *The Distributed Liability of Distributed Ledgers: Legal Risks of Blockchain*, 2018 U. Ill. L. Rev. 4, pp. 1370-1374 (2018) (introducing the concept of distributed ledgers).
99. O. Wyman & World Economic Forum, *Innovation-Driven Cyber-Risk to Customer Data in Financial Services*, White Paper, p. 6 (2017), available at http://www3.weforum.org/docs/WEF_Cyber_Risk_to_Customer_Data.pdf.
100. D. Mills et al., *Distributed Ledger Technology in Payments, Clearing, and Settlement*, Fed. Rsrv. Bd., Finance and Economics Discussion Series 2016-095, pp. 10-11 (2016).

Distributed ledgers are characterized by the absence or minimal presence of a central administration and no centralized data storage. They are, hence, "distributed" in the sense that the authorization for the recording of a given piece of information results from the software-driven interaction of multiple participants. Coupled with cryptographic solutions, such features (decentralization and distribution across a network of computers) curtail the risk of data manipulation, thereby solving the problem of trusting third parties – specifically, data storage service providers.[101]

The modus operandi of distributed ledgers is best understood by contrasting them with traditional electronic ledgers where data are stored under the administration of a single entity. Such an approach entails a number of risks. First, if the hardware where the register is "located" is destroyed, the information content and the authority to ascertain that it is correct are lost. Second, an unfaithful administrator (or disloyal employee, as the case may be) may manipulate the information stored in the register. Third, a cyberattack may result in manipulation and data loss.[102]

Distributed ledgers address these problems by raising the barrier for manipulation. The underlying technology requires consensus of many data-storage points ("nodes"). If there are *n* nodes (instead of one concentrated ledger) and *e* describes the effort necessary to break into any single server, all other conditions being equal (safety per server, etc.), the effort necessary to manipulate all of the linked servers will be *n* x *e* rather than 1 x *e*.

Distributed ledgers are usually paired with a blockchain protocol.[103] Blockchain refers to the storage of all data parts as data bundles (the "blocks") in a strict time-related series that links each block, through a time stamp, to the previous and subsequent blocks. The blockchain renders data corruption even more challenging, because a successful cyberattack would require simultaneously corrupting not just one, but multiple sets of data (that is, the whole blockchain) as well as the time stamps.

4.5.2. Application of data point pricing to DLTs

The application of our data point pricing model to distributed ledger technologies (DLTs) presents a challenge since data points are stored at multiple points at the same time and data are also collected simultaneously on multiple ends of all those computers using essentially the same application.

This would imply a potential multiplication of data points and, in turn, render data point pricing difficult, given that many data transfers are not value enhancing in the commercial sense (yet they do enhance cybersecurity). Given that DLTs are pivotal emerging technolo-

101. *See* M. Finck, *Blockchain Regulation and Governance in Europe* pp. 12-14 (CUP 2019); *see also* S. Davidson, P. De Filippi & J. Potts, *Blockchains and the Economic Institutions of Capitalism*, 14 J. Institutional Econ. 4, pp. 639 and 641 (2018) (arguing that blockchain technology is a new governance institution that competes with other economic institutions of capitalism, namely firms, markets, networks and even governments); P. De Filippi & A. Wright, *Blockchain and the Law: The Rule of Code*, pp. 136-40 (HUP 2018) (arguing that widespread deployment of the blockchain will lead to tech-based business practices that could prompt a loss in importance of centralized authorities, such as government, and urging a more active regulatory approach).

102. Any server can be manipulated with sufficient computing power and time (even if no other weakness in an encryption system is known to the attackers). *See* J.-P. Aumasson, *Serious Cryptography: A Practical Introduction to Modern Encryption* pp. 10-18 and 40-48 (No Starch Press 2018).

103. *See*, for example, De Filippi & Wright, *supra* n. 101, at pp. 13-57 (describing blockchains).

gies, a data point pricing model that does not provide decent solutions to DLTs is unfit for long-term application.

The key in applying data point pricing to DLTs is to understand DLTs as mere data *storage* mechanisms. In this regard, the authors could use the analogy of other transfers that lack the economic purpose of value creation. For instance, if we transfer the possession of a valuable vintage car by handing the keys to the carport over to the guard, the purpose is to enhance the security of the car stored in the carport rather than to transfer the value of the car to the guard. DLTs are, in principle, no different, but use advanced IT-automated means.

Drawing on this analogy, the data point pricing mechanism the authors propose would still apply to the point at which data are collected from the users. While the data collection may be distributed over many servers (which renders enforcement more difficult), the principle as such is sound: whoever collects data provided by users must assign a value and disclose this to the user who provides the data, and follow up with that price in its accounting trail whenever the data are further used or transferred *for the economic purpose of value creation*. Yet, if data are merely stored to enhance cybersecurity, the data transfer does not carry the economic purpose of value creation and rather has the purpose of securing the existing value through better storage. The distinction between the purposes of data collection and storage as well as criteria for data point valuation can be coded into smart contracts (i.e., software routines applying "if-then" conditions with multiple variables). This way, smart contracts will facilitate real-time information on the data-gathering activity and "create an absolute auditable train of origination".[104]

Hence, in applying data point pricing, we need to distinguish between data flows and any entity *with an economic purpose of value creation* (for example, forwarding to an algorithm for further exploration) and data flows for other purposes. With this enhanced test, we will also be able to deal with other data storage techniques, such as keeping mirror copies at distant data centres.

5. Theses

Our analysis of taxing datafied business yielded five results:

First, digital business models are characterised by highly-intertwined data trails across many jurisdictions. The fact that data trails are not reflected in financial accounts renders taxation burdensome at present.

Secondly, transfer pricing with traditional means, a harmonised tax rate, and tax distribution schemes require a great degree of coordinated behaviour among tax authorities. Such coordinated behaviour is unlikely across multiple jurisdictions which compete fiercely for taxable income. While a digital services tax, focusing on a data firm's clients per country, could be imposed unilaterally, it may be understood to constitute a tariff in the WTO framework. Furthermore, it remains unclear why the tax rate is 3% of a country's gross turnover (and not, for instance, 1%, 2%, or 4%). All of these instruments do not change the underlying problem that data trails and data processing are not adequately reflected in firms' financial accounts used for tax purposes.

104. *See* M. Hamilton, *Blockchain Distributed Ledger Technology: An Introduction and Focus on Smart Contracts*, 31 Journal of Corporate Accounting & Finance 2, pp. 7 and 10 (2020).

Thirdly, the OECD's activity test and similar concepts drawing on significant economic presence come with a lesser degree of legal certainty and will keep courts busy for years; they may also trigger constitutional challenges in some countries following the principle of equal taxation, given the lack of consistency in the explanations as to why certain conduct triggers tax duties in some countries in deviation from the principle of physical establishment, while other types of conduct are excluded.

Fourthly, data point pricing, understood as a mandatory compensation that firms have to offer their clients to collect and use their data, could mandate price transparency *in lieu* of the existing data-for-service model, establish an accounting trail, and render the effective use of transfer pricing principles for the digital economy possible. Once a data point price is set, it will guide the pricing of any data transfer with the economic purpose of enhancing value related to the data (in contrast to other purposes such as enhancing cybersecurity). This way, value creation in any given country can be estimated, using the economic nexus that could justify taxation rights of the users' home countries. For reasons of cost, the data point pricing model should apply in the beginning only to firms whose data collection exceeds certain thresholds defined in terabytes. In the long run, once algorithms are in place, data point pricing can become the "new normal" for dealing with data-intensive businesses.

Fifthly, in line with the OECD's approach, data point pricing avoids ring-fencing the digital economy from the rest of the economy for tax purposes. Rather, it rests on two elements: (i) disclosure, and (ii) ensuring valuation of data and accounting as a raw material – similar to other intangibles. Importantly, data point pricing will not constitute a tariff under the WTO framework. Furthermore, data point pricing will lead to enhanced transparency on the data trail. Even if the pricing mechanism is not perfect, due to network effects and scale economies implicit to many data-driven businesses, with the data trail becoming obvious and clearly reflected in the accounting trail, the focus will shift from the question of where value is generated to the adequate pricing of such trails for tax purposes, which is a standard concern of tax laws.

Finally, data point pricing would yield a number of side advantages with respect to antitrust law, data protection, financial regulation, and criminal law, including the enforcement of AML/CTF rules. Data point pricing thus has value even where taxation rights are allocated by way of a multilateral arrangement based on the OECD statement of 1 July 2021.