The Systemic Risks and Regulation of BigTech – "Too Big(Tech) to Fail?"*

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When it comes to systemically important financial institutions, people usually think of banks, insurers or financial holding companies, but large technology firms (so-called BigTech) are increasingly part of this category. This paper examines regulatory approaches with which the systemic importance of BigTech firms in financial services could be addressed. According to the analysis, of the three regulatory frameworks identified in the literature ("restriction", "segregation", "inclusion"), when a balanced approach is used, the segregation of financial and non-financial activities seems to be the most promising regulatory solution, as this model works best for taking account of the practical aspects of operation, regulation and supervision.

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1. Introduction

When it comes to systemically important financial institutions, people usually think of banks, insurers or financial holding companies, but recent developments have increasingly pushed large technology firms (so-called BigTech) into this category. Technological innovation has brought about various new challenges in the past decade. Besides new products, services and access channels, new players have also appeared, and so-called FinTech and BigTech firms are more and more active in the financial services market (see *Arner et al. 2016; FSB 2017; Fáykiss et al. 2018; Frost et al. 2019*).

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Although the literature does not offer a single, widely accepted definition of FinTech (financial technology) services, in the interpretation of the Financial Stability Board (FSB),[1] FinTech solutions can include any technologically enabled innovation in financial services that could result in new business models, services or products with an associated significant effect on financial markets and institutions and the provision of financial services. FinTech firms are becoming increasingly important in the financial system, but from a policy perspective their case is somewhat different from BigTechs. Their customer base is currently much smaller than that of BigTechs, although it is expanding dynamically, along with their activities. On the other hand, the FinTech/neobank players with retail customers typically conduct their financial service activities in some kind of regulated framework within the EU (for example as e-money issuers or credit institutions), and thus if their activities become systemically important, the currently existing regulatory framework for other systemically important institutions (O-SIIs) would also be applicable to them.[2] Finally, it should also be noted that they currently rarely provide services to financial institutions related to some major technology infrastructure. Accordingly, this study mainly focuses on the systemic risks arising in financial services related to BigTech firms, and the systemic risk issues that may emerge in connection with FinTechs are not discussed in detail. Of course, from a regulatory perspective, if these businesses wish to provide financial services, they must comply with the applicable financial regulations, irrespective of whether they are FinTech or BigTech. If they do not offer financial services, their operation should be regulated by the rest of the legislative environment.

BigTech firms can be systemically important for various reasons. First, they are almost impossible to ignore in connection with their non-financial services: their huge customer base and database on user activities can give them a major competitive edge due to network effects. Moreover, BigTechs are increasingly active in offering technological services to financial institutions (e.g. cloud services, payment technology solutions), which can increase financial stability risks in the financial infrastructure. Finally, they also provide financial services or some kind of service directly related to finance or by incorporating the services of other financial institutions into their value chain, which can also raise the issue of systemic importance (see *ESMA 2020; Crisanto et al. 2021; Müller – Kerényi 2021; Ehrentraud et al. 2022*). It is important to note in the latter case that if they provide such services directly, the subsidiary offering the services in question is of course subject

[1] http://www.fsb.org/wp-content/uploads/R270617.pdf

[2] To paint a somewhat more nuanced picture, unlike credit institutions, e-money issuers are currently not subject to O-SII regulations and are not assessed for systemic importance. This is basically because the current regulatory framework and the established supervisory practice both consider the potential systemic risks arising from their operation to be much lower than in the case of credit institutions, because the range of services they can provide is highly limited; for example, they cannot collect deposits and may only extend credit under very strict conditions (therefore, liquidity and credit risk are not applicable in their case).

to the financial regulatory requirements and thus also, after reaching a specific size and complexity, the regulatory provisions on systemic risk.

Another important factor when it comes to the regulation of BigTech firms is that these institutions operate in complex structures, with a complicated ownership and governance system both in an institutional and a geographical sense. If a BigTech group has a subsidiary offering financial services, the group obviously has the necessary operating licence in the given country, but it only applies to that individual member firm, and there are typically no comprehensive regulatory requirements for the whole group, as the main activities of the group are usually outside financial services (*Frost et al. 2019; Ehrentraud et al. 2022*). This is often further complicated if these institutions provide financial services that do not require a licence, such as technological solutions related to payment services, solutions related to cryptoassets or even lending in some countries (for more details, see *EC 2021* or *EBA 2022*).

Most countries have no comprehensive, dedicated requirements in relation to the technology services that BigTech firms provide to financial institutions, and thus one might wonder whether the systemic risks are managed appropriately. Although critical services are subject to some indirect requirements (e.g. managing operational risk), both comprehensive and service-specific requirements are rare in these cases (but in connection with service-specific requirements one should mention the Hungarian[3] and EU[4] recommendations on cloud services or, in a winder context, the EU DMA regulation[5] and the DORA[6] regulation that entered into force on 16 January 2023 and becomes applicable from 17 January 2025, even though the latter will apply to financial services and not specifically to BigTech firms, similar to earlier practices). In connection with market-distorting practices, requirements can be identified that can pertain to technology services provided to financial institutions (e.g. in competition law), but this is still not a comprehensive regulation related to the systemic importance of BigTechs. As no comprehensive systemic risk requirements can be identified on a national, EU or global level that would apply to whole BigTech groups, the current framework is unable to address the major systemic risk factors, such as the interaction between financial and non-financial services as well as the related group-wide interdependencies (*ESMA 2020*; *Adrian 2021; Ehrentraud et al. 2022*).

[3] https://www.mnb.hu/letoltes/4-2019-felho.pdf
[4] https://www.eba.europa.eu/regulation-and-policy/internal-governance/recommendations-on-outsourcing-to-cloud-service-providers
[5] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32022R1925
[6] https://www.consilium.europa.eu/en/press/press-releases/2022/11/28/digital-finance-council-adopts-digital-operational-resilience-act/

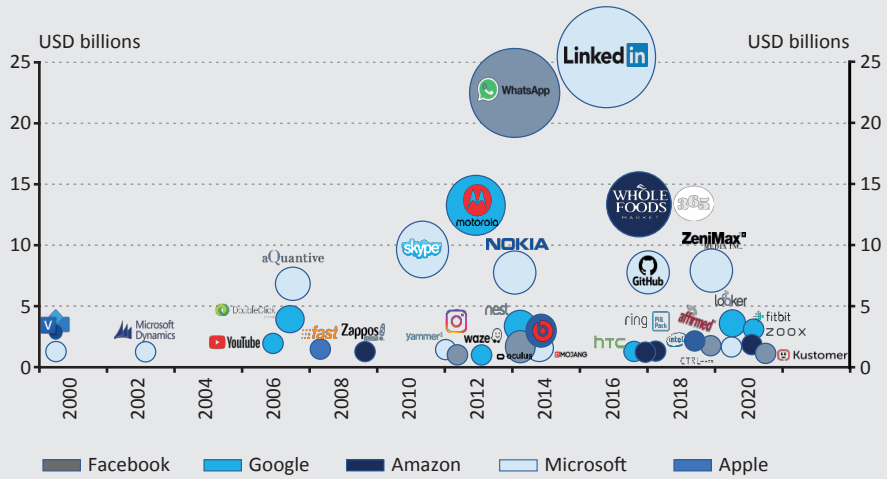
In the following, a brief overview is presented of the basic activities of BigTech firms in the financial services market. The analysis then turns to the interpretation of systemic importance in the case of BigTech and the areas where it can appear. After presenting the possible channels for systemic importance, the discussion focuses on potential regulatory approaches that are emerging in connection with BigTech firms active in financial services, mostly based on *Ehrentraud et al.* (*2022*), and the related advantages and disadvantages are summarised. In the final section, the authors draw the conclusions.

2. BigTech in the financial services market

Similar to FinTech, BigTech still has no single, widely accepted definition in the literature. In short, BigTech basically refers to large technology companies with huge customer networks (*FSB 2019*). According to a more detailed definition, BigTech means large technology conglomerates with extensive customer networks and core businesses in social media, telecommunications, internet search and e-commerce (*Adrian 2021*). Based on this, five technology corporations, the so-called Big Five, are usually identified as BigTech, namely Apple, Amazon, Google (Alphabet), Facebook (Meta) and Microsoft (for more information on the significant spread of these firms, see *Figure 1*). However, as in many other areas of the economy and business, emerging Asian companies such as Alibaba, Tencent and Baidu are also increasingly claiming their place on these lists. Interestingly, there are typically no European BigTech firms. A detailed discussion of the underlying reasons behind this is beyond the scope of the present paper, but the lack of strong technological and geographical concentration, the absence of a completely uniform market in many cases, linguistic heterogeneity and the underdeveloped venture capital ecosystem may all be part of the absence of a European technology player with a truly global reach. The European Innovation Council (EIC) launched the “EIC Scale-Up 100” initiative partly to encourage European technology firms to become global, and the main goal is to create genuine tech “champions” in the EU.[7]

[7] https://eic.ec.europa.eu/news/european-innovation-council-launches-scale-100-call-2022-05-16_en

Figure 1
Acquisitions by the "Big Five"



Note: Acquisitions of USD 1 billion or more until 2020.
Source: CB Insights (2021)

BigTechs operate in a fundamentally different manner than earlier corporations. To understand this, one needs to dig deeper and examine what makes BigTechs special and what the "BigTech DNA" consists of. According to *BIS* (*2019*), the BigTech business model has three key factors ("DNA"): (i) **d**ata analytics, (ii) **n**etwork externalities, and (iii) interwoven **a**ctivities. Network externalities attract more and more users to the platform, which leads to more and more data, and by analysing that data the platform can offer better and more services, which in turn leads to stronger network effects, further increasing the number of users.

Many new products, services, access channels and players have appeared in financial services, thanks to digitalisation and new technological solutions. In this context, BigTech players have increasingly started to provide solutions related to financial services. Novel solutions first appeared in relation to payment services: one need only think of Amazon Pay launched in 2007 or Google Wallet (currently Google Pay) that went live in 2011 or Apple Pay from 2014. This later grew into a wider range of services, now encompassing not only payment services but also retail and corporate lending and cryptoasset services.[8] It should be noted that not all of these services are provided directly by the BigTech groups, as they often offer them

[8] For a few relevant BigTech activities from recent years, see, for example, *Ehrentraud et al.* (*2022*).

through a third party, for example a bank (e.g. lending, bank card issuance). There are two major types of BigTech payment platforms. BigTechs may operate a system built on an existing external infrastructure (e.g. the platform of card companies). This is used by Apple Pay and Google Pay. In the second case, the transactions and settlements are conducted within the BigTech company's own system, such as in the case of Alipay (see *BIS 2019*). Even though BigTech firms often compete with banks, they still rely on them (directly in the first case mentioned, and when the payments go in and out of the system in the second case).

Interestingly, the rise of BigTech in finance may reverse a process launched with the appearance and growing popularity of FinTechs (*Adrian 2021*). In contrast to traditional banking, FinTech services typically focus on a small section of financial services, and this has started to unbundle financial services. In practice, this means that users do not turn to a single service provider (e.g. a commercial bank) for all of the financial services they use, but rather to several providers (e.g. FinTech firms) for different services. However, the entry of BigTech firms to the financial market may rebundle these services by allowing users to access and use more and more financial services within the BigTech ecosystem.

The current financial regulatory framework is not really suitable for managing the potential systemic risks related to BigTech, as there is no all-encompassing and dedicated regulation of large technology corporations when it comes to financial and infrastructure services. Of course, if they provide financial services directly, the financial regulations apply to them as well, but this cannot address the externalities arising from their network structure. Due to this regulatory problem, one recent idea is to move regulation away from focusing on institutions and sectors and towards an activity-based approach (see *ESMA 2020; Restoy 2021; Borio et al. 2022*). However, activity-based regulation is usually less comprehensive than the current framework covering financial institutions, which would be more effective from a financial stability perspective (e.g. restricting activities at the institution level, strict corporate governance requirements, potential dividend payment limits). Moreover, activity-based regulation would fail to address the main issue, namely that due to the special business model of BigTech firms, financial and non-financial services are often interconnected (*Ehrentraud et al. 2022*). Even if a BigTech company's financial service complies with activity-based regulation, the requirements are not applicable to the whole corporate family, and so this in itself does not create a level playing field for incumbent players and BigTech companies. There are promising initiatives in competition law (see *Crisanto et al. 2021*), but financial regulation does not address the systemic importance of technology giants in a manner consistent with their structural complexity.

Another difficulty related to activity-based regulation is that it is often hard to distinguish activities in the rapidly changing world of finance; one need only mention the difficulty when attempting to give a detailed definition of certain FinTech services. The job of regulators is further complicated by the fact that BigTechs typically provide cross-border services, creating an opportunity for regulatory arbitrage, in other words for exploiting the regulatory shortcomings and the differences in various jurisdictions (e.g. relocating certain services to a more favourable jurisdiction, tax issues, data protection and storage requirements). From a systemic risk perspective, this could lead to the build-up of cross-border systemic risks. This may necessitate the international harmonisation of regulations, which could significantly reduce such risks (*Adrian 2021*).

Due to the shortcomings of activity-based regulation, the IMF believes that a hybrid regulatory framework should be established, blending an activity-based system with an institution- or entity-based regulatory approach (*Adrian 2021*). This would create a regulatory framework with an entity-based core, but the requirements that institutions would need to meet would be activity-based. The activity-based requirements would be mixed with supervision at the institution level, allowing the risks building up at the corporate group level to be monitored and the business model to be understood by regulators (in connection with the hybrid regulatory framework of BigTechs, see, for example, *MNB 2022*).

3. Systemic risks and BigTech

The operation of tech giants may pose serious challenges for regulatory authorities. Their functions and special business model may give rise to risks in relation to competition law, privacy, consumer protection and financial stability (*BIS 2019*). In the context of financial services, the potential systemic importance of these institutions is high, both at the global and the regional level, as the current framework cannot manage these institutions in a manner consistent with their size and complexity. The financial stability risks arising from the operation of BigTechs are partly due to the huge amounts of data they handle, the interconnection between financial and non-financial services, the resulting network effects and the often unique technological solutions they offer.

Based on the relevant literature, there are two direct and two somewhat indirect interconnection channels related to the systemic importance of tech giants in the financial sector (see, for example, *BIS 2019; Borio et al. 2022; Ehrentraud et al. 2022*):

- *Directly provided financial services*: BigTech firms often provide financial services directly, usually through a subsidiary or a joint venture established with a financial institution. Transparency is reduced considerably because in the latter case responsibilities are difficult to distinguish, as these financial services are often provided embedded into value chains and customer processes, so the BigTech company itself is only responsible for a smaller section of the value chain in question. In connection with such services, dependence on other member firms of the BigTech group may cause operational risk, in terms of data management and storage and technology. Financial services established through this channel may be considered systemically important, simply due to the huge user base of BigTech firms[9] (e.g. their role in the financial system, difficult substitutability).

- *Provision of technology services to financial institutions*: Financial institutions often make strong use of BigTech technology infrastructure services, especially cloud services. The provision of such services creates a significant cybersecurity exposure for BigTech companies, and when the risks are realised it can create major privacy and reputation risks for financial institutions if they store their data at these firms. Another problem is that there are relatively few tech companies that offer these services at a suitable scale, and this increases concentration risk in this critical infrastructure. Finally, a further exposure is created if financial institutions run not only a subsystem but also their accounting system in this technology infrastructure. The systemic risk dimensions arising from this large concentration may be slightly reduced by hybrid solutions (a mix of so-called on-premise and cloud services), but these technology services always entail a level of systemic importance that should be addressed from a policy perspective. This is because most countries currently lack a comprehensive, dedicated regulatory framework for such services.

- *Risk of market concentration due to the interconnection between financial and non-financial services provided to users*: In order to exploit network effects, tech giants provide more and more services to more and more users, and the resulting data is used for cross-selling. While a BigTech company provides financial services, it can use the data collected from its non-financial services along with the related technology infrastructure, which could give it a competitive edge and distort market competition (see, for example, *Padilla – de la Mano 2019; Ehrentraud et al. 2022*). This could be relevant not only from a competition law perspective, but also from a systemic risk aspect, as high market concentration

[9] It should be noted here that BigTechs' asset tokenisation and stablecoin solutions may entail major risks in relation to financial stability, consumer protection, privacy, money laundering or even monetary policy and monetary sovereignty, if only because of the potential size of their customer base (see, for example, the Libra (Diem) initiative by Facebook (currently Meta)).

could produce systemically important institutions. It should be noted that this risk mostly captures the interconnection of financial and non-financial services, and it should mainly be treated separately from the risk channel in the first point.

- *Concentration risks arising due to the interconnection between financial services and technology infrastructure services:* As noted above, BigTechs are increasingly active in providing technology services to financial institutions. However, this could be systemically important not only because these firms operate a critical technology infrastructure (e.g. cloud services, payment technology solutions) for financial institutions, but also because these players offer their own financial services (see the first point above); thus, they are suppliers and competitors to the financial institutions at the same time. Moreover, cloud services may entail further problems, as the customer databases of the financial institutions concerned may be stored on the servers of the BigTech firm, even though they compete in certain financial services.[10] This interconnection may entail major risks, which should be addressed in a future regulatory framework. The risks are further heightened by the fact that certain BigTech companies have considerable market dominance on the supplier side in finance. For example, in cloud services, Amazon and Microsoft have a market share of over 50 per cent, and two thirds of the market is covered by the top five players (*Statista 2022*).

4. Potential regulatory approaches for technology corporations active in financial services

As shown above, there are several major, systemic risk factors related to large technology companies in the current regulatory framework, mostly due to their special operating model. However, any new, dedicated financial regulation framework focusing on tech giants may include several potential regulatory shortcomings arising from technological progress. First, it is often not straightforward which services are considered financial services and which are non-financial (this differentiation can sometimes be difficult due to technological solutions and their integration into the value chains). Many other affected areas may also be relevant during the establishment of the basic regulatory principles and the specific regulations (e.g. data protection, consumer protection, competition law), and the interactions among these areas should also be addressed. Moreover, the organisational structure of BigTech groups is also highly complex, so managing institutional and corporate governance issues may be challenging for regulation and

[10] It is worth mentioning that the cooperation between financial institutions and BigTech firms also includes situations where financial institutions provide financial services to or through a BigTech company. In such a scenario, the financial player partly creates its own competition.

monitoring as well. Finally, these institutions are global players, and they need to comply with numerous different local and regional provisions, which also increases the complexity of regulation.

In a paper addressing a longstanding problem, *Ehrentraud et al.* (*2022*) describe three main potential models for modifying the existing regulatory framework for tech giants which are active in financial services and for managing the identified shortcomings. The following sections build on this classification.

4.1. "Restriction"

In this approach, the principle of a "clear profile" would be applied, in the sense that institutions active in financial services would not be able to pursue certain other commercial activities. This is fairly strict, especially compared to the prevailing regulatory environment, but it is not completely unheard of: several countries have introduced legislation to prevent financial institutions from engaging in certain activities (e.g. those related to gambling).

Although the restrictive model promises relatively simple and quick implementation, and its introduction would practically prevent BigTech firms from engaging in financial activities and ultimately eliminate the above-mentioned financial stability risks, it would "throw the baby out with the bathwater": an outright ban may cause undesired disadvantages, for example a significant reduction in service diversity in the long run, or even the hampering of future innovation in the sector. The authors of the present paper believe that due to these disadvantages, regulation based on the restrictive model should be avoided.

4.2. "Segregation"

The segregation model would transform the internal group structure of BigTech companies to segregate financial and other commercial activities, so that the institution providing financial services is appropriately separated in its operation from the other entities in the group engaged in other commercial activities. For example, the Glass–Steagall Act that took effect in 1933 contained a similar requirement related to the separation of investment and commercial banking activities,[11] and comparable regulation has been outlined in China for financial holding corporations, which also applies to BigTech firms in certain cases.

The model assumes a financial entity or subgroup (a holding company of subsidiaries performing financial activities) separated from the other members of the BigTech group in a legal sense as well. This entity can provide financial services by complying with the regulatory provisions pertaining to it, or to the subgroup at the consolidated level, while ensuring that its relationship with the other members

[11] From a certain aspect, the Glass–Steagall Act can be construed as "restriction".

of the BigTech group and its dependencies are consistent with the regulatory framework, thereby shielding the financial subgroup from the risks associated with the other activities of the BigTech group.

The basic goal of this regulatory approach is to manage the internal dependencies within the BigTech group and thus eliminate and ban undesired dependencies while ensuring transparency in the group's operation, minimising the spillover of internal risks to the financial entity, ensuring operational resilience and regulating data management and data and technology sharing within the group.

The degree of separation is up to the legislators, and it may involve complete segregation. This means that in the strictest version of the segregation model, the part of the BigTech group providing financial services is completely isolated from the other commercial activities, financial transactions between the two parts are prohibited, and the financial subgroup is fully prevented from enjoying the benefits of the group-wide technology and data sharing platforms. *Ehrentraud et al.* (*2022*) therefore argue that this model has its drawbacks, too. As mentioned above, BigTech firms have secured a competitive edge due to the large customer base and by exploiting the network externalities attributable to the related huge amounts of data, and severely limiting or prohibiting the use of the common technology and data sharing platforms within the group, reducing these companies' competitive advantage and basically undermining their business model may be a disincentive for them to provide financial services. Therefore, an overly strict application of the segregation approach may ultimately yield drawbacks similar to the restriction model. The authors of the present paper believe that this may not necessarily be true, as with an appropriate framework the "segregation" model would not considerably hamper innovation. For example, in the case of BigTech payment solutions (e.g. Apple Pay, Google Pay), a framework segregated at the institutional and operational level and similar to what now applies to card companies could be established, which would not hinder the incorporation of innovative solutions. In the case of data sharing, the new data available at BigTech firms could also be used appropriately, but only in a much more regulated operating framework, modelled after that of "credit bureau" providers.

4.3. "Inclusion"

According to the third approach, a new, dedicated regulatory category taking into account the characteristics of tech giants' unique operating model should be established for the BigTechs active in financial services. This is because the existing regulatory framework is usually not suitable for regulating corporate groups that are active in financial services but have a business model which is not dominated by "traditional", regulated financial activities. BigTech firms are like that. As stated above, the current regulatory framework does offer partial solutions for mitigating

the risks entailed by certain financial conglomerates, but it has several shortcomings that prevent it from addressing all the risks created by BigTech, because it was not created to do so.

In contrast to the segregation model, the inclusion approach would create a comprehensive framework tailored to BigTech without making any radical intervention in their business models and thus hindering service diversity and innovation in the market. The framework takes a joint, group-wide approach to the parent company and all its subsidiaries, whether engaged in licensed financial activities or ones not requiring a permit, to understand and manage the intragroup interdependencies as well as the risks involved.

Similar to the segregation model, financial activities can be organised into separate entities (a subgroup or holding company) to ensure transparency under this approach as well. However, instead of completely ring-fencing these entities from the rest of the group, regulatory requirements applicable at the consolidated subgroup level are introduced, and instead of an outright ban on the interactions between financial and non-financial activities and intragroup interdependencies, these are monitored and managed with controls pertaining to the BigTech group as a whole and fine-tuned at the group level (with provisions for corporate governance, conduct of business, operational resilience and financial solvency requirements).

In this model, regulation is organised at three levels: first, it defines requirements for the whole BigTech group (parent company); second, it introduces rules at the individual subsidiaries engaged in financial activities; and third, it regulates the entity (holding company) merging the subsidiaries performing various (licensed) financial activities (*Ehrentraud et al. 2022*). Under the model, this would create a clearly defined boundary between the financial and non-financial activities within the BigTech group, and the appropriate detailed rules could help mitigate the risk of a spillover of undesired effects within the group.

It should be noted that the inclusion model does not wish to replace the existing rules pertaining to financial institutions but rather to complement them, as it would include additional provisions that go beyond traditional financial regulation.

This model undoubtedly involves a more complex approach than segregation, and thus its implementation could pose serious challenges due to the complex, global business model of BigTech firms, and it could require unprecedented international cooperation in regulation and supervision as well. With all its advantages, the inclusion model may create undue regulatory burden for certain companies if, for example, financial activities are not significant within the BigTech group as a whole. It is therefore especially important to carefully choose the regulatory criteria based on which the financial engagement of BigTech groups is considered significant, thus

allowing the planned framework to apply to them (such criteria could include the amount of assets or a predetermined level of revenue in the financial sector, or the combination of several similar indicators).

Table 1 gives a brief overview of the advantages and disadvantages of the three potential regulatory models. The European Union currently has no dedicated regulation for managing the systemic importance of large technology companies active in financial services, but a new regulation would probably be most promising if it was geared towards "segregation" or "inclusion".

Table 1
Potential regulatory models for large technology companies active in financial services

	"Restriction"	"Segregation"	"Inclusion"
Pros	• Relatively simple implementation • Risks clearly identified and managed	• Sheltering of financial activities from non-financial risks • Transparency	• Comprehensive, group-wide approach • Enables innovation and increased efficiency
Cons	• May impede innovation • May severely constrain provider and service diversity	• May lead to underestimation of group-wide risks • Requires limits on interdependencies that may discourage participation in finance, and if the limits are defined too strictly, the disadvantages presented in the "restriction" model may ultimately arise	• May lead to complex practical implementation and difficult monitoring • May lead to disproportionate regulatory burdens • Practical implementation of regulations may be difficult, due to large institutional heterogeneity

Source: Based on Ehrentraud et al. (2022)

5. Conclusion

The paper presents a quick overview of the typical activities of BigTech firms in financial services. The areas where larger systemic risk factors can arise were then examined, along with the emerging potential regulatory approaches. Finally, the main advantages and disadvantages of the three regulatory models ("restriction", "segregation", "inclusion") were presented.

In *Ehrentraud et al.* (*2022*), these benefits and drawbacks were mostly identified theoretically, even though the practical issues may be just as important in informing policy. In theory, the third option, "inclusion" seems to be the most promising regulatory approach, as it can manage most of the potential risks while supporting innovation at BigTech firms. However, there are numerous concerns regarding the implementation of the model.

First, the establishment of the necessary regulatory framework could be very difficult and costly. One need only consider the high degree of heterogeneity in BigTech firms in terms of business models, organisational structure and fields of activity. Consequently, a general framework taking into account vastly different business models would have to be established. Another factor making regulators' job difficult is that BigTechs typically include many business lines at the group level, and thus if balanced regulation is sought to be achieved, a deep understanding of business models and industries would be necessary to examine and accurately interpret internal interactions and interdependencies, which is usually outside financial supervisory authorities' fields of expertise, and they could hardly be expected to be intimately familiar with such matters.

Another potential problem faced by supervisors is that the members of the corporate family engaged in financial and non-financial activities are usually in different jurisdictions. This geographical and legal fragmentation (in data protection, financial activities, competition law, etc.) can make the job of supervisors very hard, and it would require a strong willingness for cooperation and heavy use of resources, far beyond what can currently be seen in the supervision of financial groups.

Finally, according to the authors of this paper, "inclusion" may not be the only approach that supports innovation and growing efficiency, as this can also be achieved with the "segregation" model in an appropriate framework. For example, in the case of BigTech payment solutions (e.g. Apple Pay, Google Pay), a framework segregated at the institutional and operation level could be established, similar to that of card companies, which would not hinder the incorporation of innovative solutions, but could increase the currently low level of regulation (e.g. while card companies face provisions capping so-called interchange fees in several countries, BigTech players can price their BigTech payment solutions completely freely, as these can currently be classified as technology services). Another example would be the issue of data sharing: the better risk assessment solutions of BigTech firms are usually attributable to the much larger amount of more granular data, which could be made available, at the institution level, to all financial service providers based on a regulatory framework (in a somewhat similar manner to how "credit bureau" providers currently operate).

Overall, when a balanced approach is used, the second regulatory model, the separation of financial and non-financial activities seems to be the most promising regulatory solution in the short run. With this approach, most truly innovative BigTech financial solutions could be incorporated into financial services through various channels, all while keeping the process easier to manage from a financial stability, data protection and competition law perspective.

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