

Measuring the online platform economy in Germany

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Working Paper 07/2021^{***)}

December 2021

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MEASURING THE ONLINE PLATFORM ECONOMY IN GERMANY

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22 December 2021

Online platforms have become one of the most important business models of the digital economy and likely counteracted some of the drop in economic activity during the COVID-19 pandemic. At the same time, platform markets are subject to controversial debates about market power and the need for pro-competitive policy reforms. Despite their rising importance in modern economies, however, a lack of data on platforms' activity complicates the evaluation of their impact on economies and societies. In this paper we aim to improve the understanding of patterns of platform diffusion and market dynamics among online platforms in Germany using proprietary data on website traffic between 2018 and 2021. Our analysis suggests that German platform markets experienced considerable growth over the past years, and especially since the onset of the COVID-19 pandemic. Results also show that the pandemic led to diverging growth patterns between sectors of the German platform economy, reflecting the sectoral heterogeneity of the COVID-19 shock. Finally, while German platforms are numerous, they often fail to reach a critical size to challenge the mostly foreign dominant platforms. We associate this finding with the observation that dominance in platform market typically persists over time, possibly reflecting a lack of market contestability.

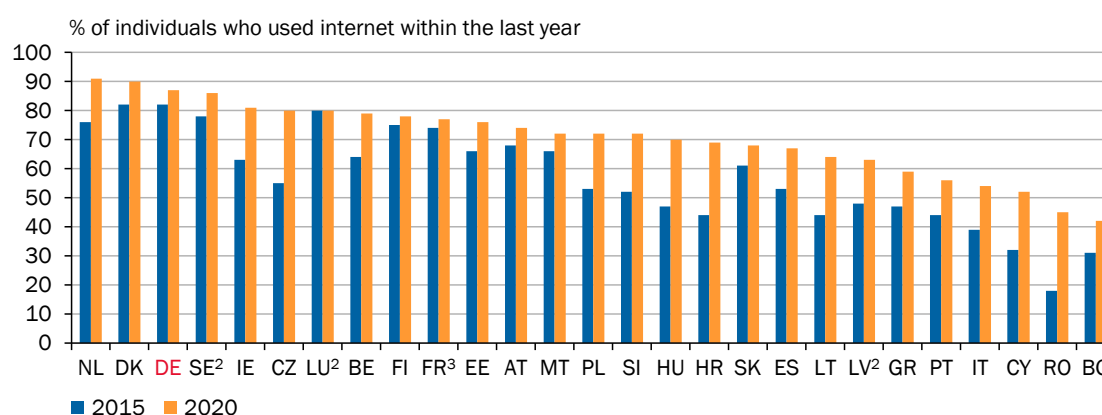
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1. Introduction

- Amidst the economic turmoil caused by the COVID-19 pandemic, online platforms have emerged as an important element in coping with the economic consequences of the pandemic. By allowing businesses to continue their operations and individual consumers to maintain activities despite distancing requirements, online platforms have likely helped sustain some of the economic activity during the economic downturn (e.g. through video-conferencing tools or online marketplaces). Whether or not the role of digital platforms will remain the same beyond the pandemic remains yet to be seen. However, in Germany, as in most EU economies, the share of internet users ordering goods and services online steadily increased over the past years, underlining the importance of the digital economy (Figure 1). Moreover, evidence is mounting, that the pandemic induced permanent changes in consumer behavior, hygiene standards, production technologies or the assessment of risk in supply chains, possibly translating into permanently higher platform activity in the future.

▸ FIGURE 1

Internet users who bought or ordered goods or services online for private use in the previous 12 months



1 – NL-Netherlands, DK-Denmark, DE-Germany, SE-Sweden, IE-Ireland, CZ-Czechia, LU-Luxembourg, BE-Belgium, FI-Finland, FR-France, EE-Estonia, AT-Austria, MT-Malta, PL-Poland, SI-Slovenia, HU-Hungary, HR-Croatia, SK-Slovakia, ES-Spain, LT-Lithuania, LV-Latvia, GR-Greece, PT-Portugal, IT-Italy, CY-Cyprus, RO-Romania, BG-Bulgaria. 2 – Break in time series. 3 – 2019 instead of 2020.

Source: Eurostat
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- Indeed, online platforms – defined as multi-sided markets, where distinct but interdependent actors, such as buyers and merchants, come together via the internet (Rochet and Tirole, 2003) – intermediate an ever-growing share of economic activity and rank among the most highly valued businesses worldwide. In 2021, for instance, four out of five of the most valuable US-based platform companies (Google (Alphabet), Amazon, Facebook, Apple and Microsoft) each had a higher market capitalization than the ten most valuable DAX companies taken together. Similarly, the majority of unicorns, i.e. unlisted startups with an enterprise value of more than USD 1 billion, used platform-based business models in 2017, highlighting their role for innovation (Cusumano et al., 2020).

3. The success of online platforms partly is driven by the benefits they offer to individual and business consumers. Online platforms can contribute to reducing transaction costs, information asymmetries and search costs, thus improving the matching and allocation of resources, and ensuring greater price transparency (OECD, 2019a; Belleflamme and Peitz, 2021). For SMEs in particular, online platforms can also facilitate the participation in global trade by providing easier access to new suppliers, distribution channels, customer groups and markets (González, 2017; Busch, 2019; OECD, 2019b). Finally, the increasingly widespread use of online platforms has been associated with positive productivity effects by increasing competitive pressures on non-digital providers (Bailin Rivares et al., 2019; Costa et al., 2021a).
4. At the same time, recent years have shown that platform markets are often dominated by a limited number of platform providers. This raises strong concerns about the lack of competition between online platforms, high degrees of market power and the misuse of gatekeeper positions by platforms that have become so large, they can effectively set the rules of their market. Wary of these concerns, numerous governments have opened antitrust investigations into possible anti-competitive practices of dominant platform companies and developed legislative proposals to adapt existing regulation to the digital age. In Germany, for instance, the 10th amendment of the “Act against Restraints of Competition” (GWB Digitalisation Act) in 2021 tightened provisions dealing with the anti-competitive abuse of dominant positions in the field of the digital economy. At the EU-level, the Digital Markets Act, which is still passing the ordinary legislative procedure of the EU, also aims at establishing contestability and fairness in digital markets.
5. Assessing the evolution of platform markets, however, remains a challenge absent comprehensive data measuring platform activity (OECD, 2019c). Anecdotal evidence, for instance, suggests that the rise in platform markets has been combined with rising concentration in these markets. Such observations and debates mostly rely on anecdotal evidence and hardly on quantitative measurements though, as platforms typically refuse to disclose data that would allow for an evaluation of their impact on the economy and society (Stigler committee on digital platforms, 2019). Moreover, traditional economic statistics, national accounts and market data are not geared towards observing online intermediaries, who do not produce goods or hold stocks (Lehdonvirta et al., 2021).
6. Existing empirical research on platforms and their impact on the economy thus mostly exploits proprietary or web scraped data and focuses on selected individual platforms.¹ This has sparked debates about the independence of research about digital platform markets in the past (Håring, 2017). In the absence of data on platform transactions, other research endeavors pursue an indirect way, relying on

¹ Examples include accommodation platforms, such as AirBnB, Booking.com or Expedia (e.g. Zervas et al., 2017; Hunold et al., 2020), attention markets, such as Facebook (e.g. Aral and Walker, 2012), B2C Markets, such as eBay (e.g. Blake et al., 2015), ride-hailing platforms, such as Uber (e.g. Chen et al., 2019; Angrist et al., 2021), or the Google Play Store and Apple App Store (e.g. Kummer und Schulte, 2019; Affeldt und Kesler, 2021).

surveys of households and firms such as the Eurostat Survey on ICT usage in enterprises. Survey data, however, offers only limited scope for analysis.

7. Against this background, we aim to improve the assessment of platform markets in Germany and contribute to a better understanding of their characteristics and evolution. It relies on proprietary data measuring platform websites' traffic, to proxy their diffusion between January 2018 and April 2021. With a view to gauging the differential effect of the COVID-19 pandemic on different types of platform services, we distinguish between seven sectors of interest, for which platform activity has likely been relevant (accommodation, delivery services, marketplace X2C, marketplace B2B, medical appointments, personal services, professional services).
8. In the following, section 2 defines platforms and describes the data collection procedure, section 3 provides first descriptive evidence of the platform economy, section 4 analyses the regional origins of platforms that are active in the German markets, while section 5 sheds light on market concentration trends. Section 6 concludes.

2. Measuring online platform activity: definitions and data collection procedures

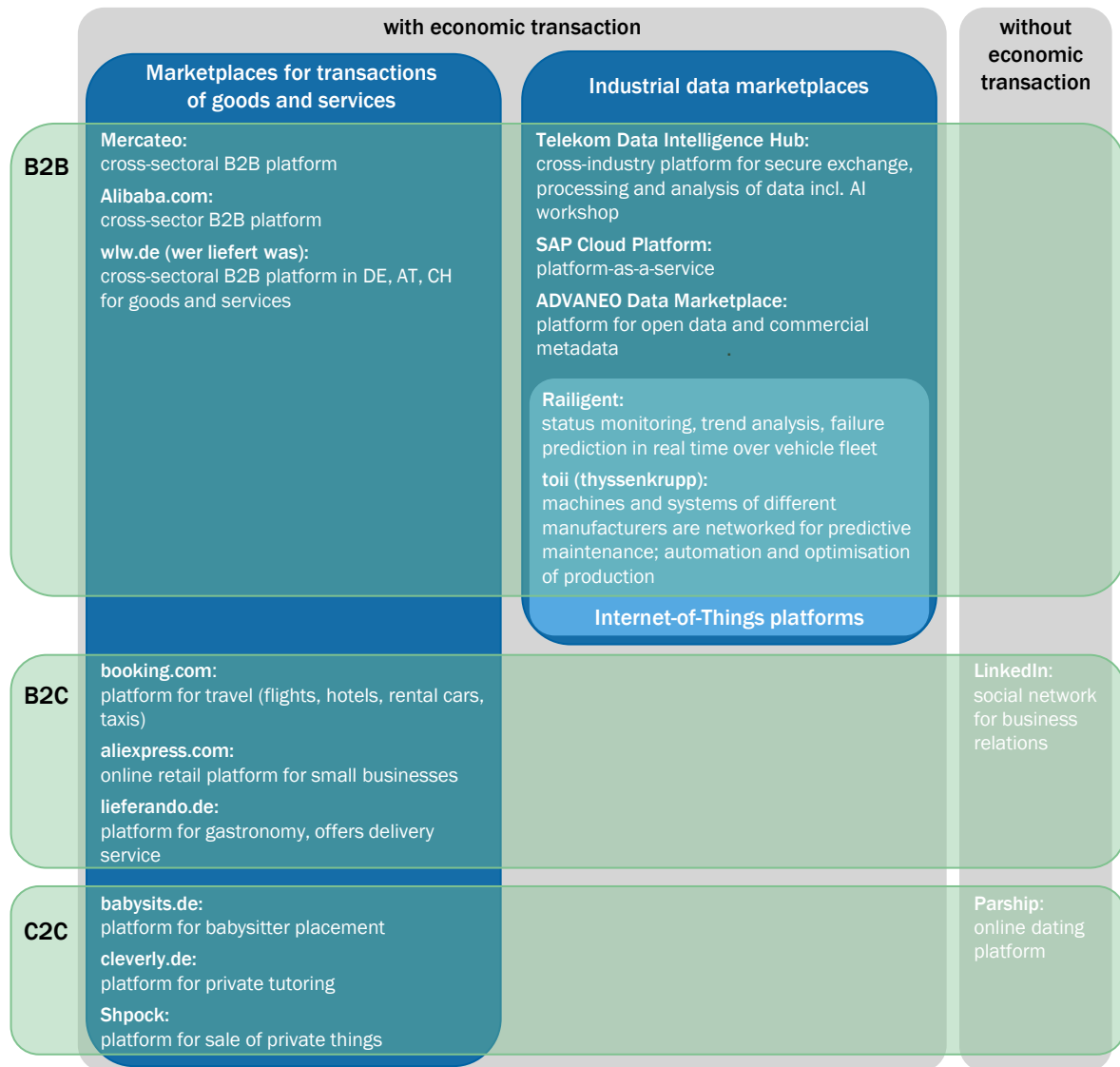
9. Based on their use, online platforms can broadly be distinguished along two dimensions (Figure 2).² The first dimension differentiates between platforms with and platforms without an explicit economic transaction. The former includes 'traditional' marketplaces for the transaction of goods and services as well as industrial data marketplaces, which also include Internet-of-Things platforms (i.e. the infrastructure for the networking also of physical objects and the collaborative use of industrial data; Koenen and Falck, 2020). The latter covers all platforms that do not directly mediate commercial transactions between market participants, but are still monetized by their operators, such as so called attention markets, i.e. marketplaces that do not directly mediate any commercial transactions with users and whose business model typically relies on advertisers paying for users' attention (Evans, 2020).
10. According to the second dimension, platforms also differ in their position in the value chain, i.e. the audience they target. Transactions between firms are settled by business-to-business (B2B) platforms, whereas business-to-consumer (B2C) platforms and consumer-to-consumer (C2C) platforms mediate transactions among consumers themselves or between businesses and consumers (Belleflamme and Peitz, 2021). All platforms, involving consumers on one side of the market, are frequently subsumed under the term 'X2C'. Due to data restrictions,

² While not accounted for by this study, Bailin Rivas et al. (2019) further distinguish between platforms that are in direct competition with incumbent firms (i.e. disruptor platforms, such as AirBnB) as well as platforms that connect existing service providers with consumers (i.e. aggregator platforms such as Booking.com).

this study exclusively focuses on marketplaces for the economic transaction of goods and services that are active in Germany, thus excluding industrial marketplaces as well as marketplace without an economic transaction (e.g. professional or social networking platforms).³ The exact selection criteria by sector can be found in Annex A.

▷ FIGURE 2

Matching Platforms



Sources: BDI, ifo, Institute for Innovation and Technology (iit), Shpock, Siemens, Telekom, Thyssenkrupp, Wer liefert was
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11. Relying on the above definition, we follow Costa et al. (2021b) in their data collection process and begin by retrieving information on the number of existing platforms by sector from Crunchbase. Crunchbase is a private company collecting data on private and public companies, which tags each company with relevant keywords (e.g. 'delivery service'). By means of the keywords associated with

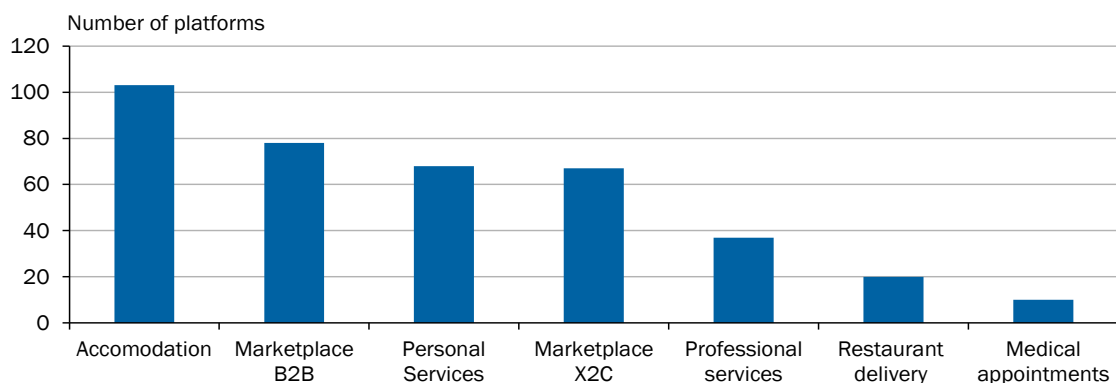
³ E-commerce websites run by individual vendors, which do not serve multiple groups of participants are also neglected, given that our interest lies in platforms, i.e. two- or multi-sided markets.

several dominant players within pre-defined areas of activity (e.g. “delivery” and “Food” for the platform Lieferando in the restaurant delivery sector), we then use a semi-automated process to create a list of the most popular platforms in Germany. Since not all businesses identified by this process adhere to the definition of platform used in this study, we manually eliminate mismatches and add to the list, whenever external sources (e.g. media or news articles) suggest that specific platforms are missing.

12. By design, the list of platforms only contains platforms active at the time of data collection (i.e. during May 2021), ignoring new entrants after that date. In a similar way, it also provides no systematic information with regards to market exit during the period assessed, as at the time of compiling the list of platforms, all platforms were active on the market.⁴ Given that our analysis only covers about 3.5 years, however, the number of market exits is likely limited. Following the above definition and methodology, we arrive at 383 online platforms that are active in Germany, with highly differing coverage across sectors (Figure 3). The sector comprising the most platforms in our sample is the accommodation sector with 103 platforms, whereas the market for medical appointments only includes 10 platforms. A list of the all the platforms considered in this analysis can be found in Annex B.

▾ FIGURE 3

Total number of platforms by sector ¹



1 – Covering the German platform market from January 2018 to April 2021.

Sources: Crunchbase, own calculations

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13. To measure platform activity, we rely on data from Semrush, a leading online visibility management software-as-a-service platform, that provides market research data on online activity and competition. More specifically, we use the count number of visits of online platforms from Semrush Traffic Analytics. Visits are estimated based on clickstream data, which likely represent a suitable proxy for market activity as online platforms exclusively mediate contacts online. Data on website visits are available on a monthly basis starting in January 2018 and include

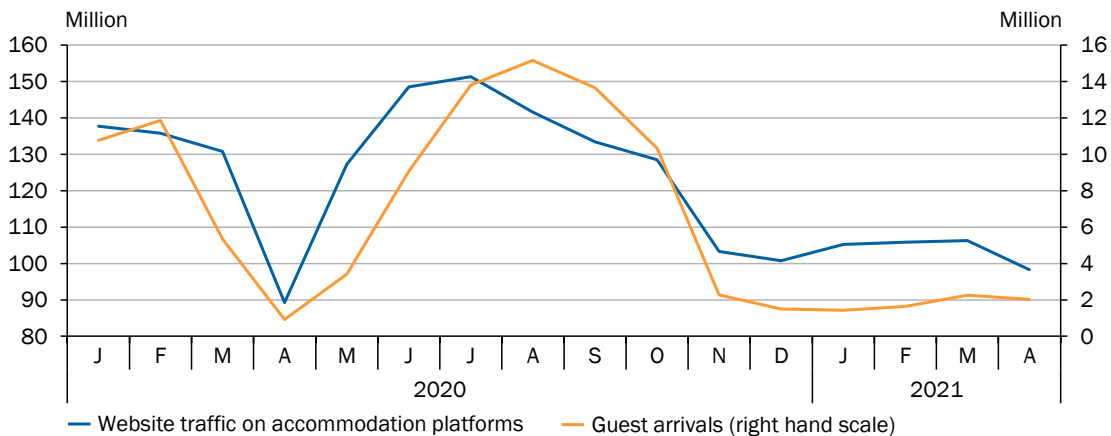
⁴ Market exits are captured only in some cases where mergers and acquisitions led to the disappearance of previously widely-used platforms, such as in the restaurant delivery sectors (see section 4).

direct, referral (from links on other web pages), search (from search results), social (from social media platforms), and paid (from ads) traffic for both mobile devices and desktop traffic from Germany.⁵ We note that besides the browser version many of the platforms also offer an app, through which one can enter the platform. While there is no data available for traffic from apps, we assume that user behavior evolves synchronously in the browser and app version of the platform. We are confident that the data provides a good indication of the relative activity over time, and between platforms within a given sector.

14. In an attempt to verify the underlying assumption that visits to the platforms' websites match the evolution of economic activity, we compare statistics on platform traffic obtained from our analysis to other sources of (off-line) activity. The sector best suited for such a comparison is the accommodation sector, where data on guest arrivals in Germany is available at a monthly basis. Confirming our priors, Figure 4 illustrates that platform traffic closely follows the pattern of activity in the German tourism and hospitality sector, as measured by official administrative statistics.

↳ FIGURE 4

Guest arrivals¹ vs. Semrush website traffic² on accommodation platforms



1 – Guest arrivals in Germany, businesses with 10 beds or more (incl. campsites). 2 – Traffic refers to the total number of website visits.

Sources: Semrush, Statistical Offices of the Federation and the Länder
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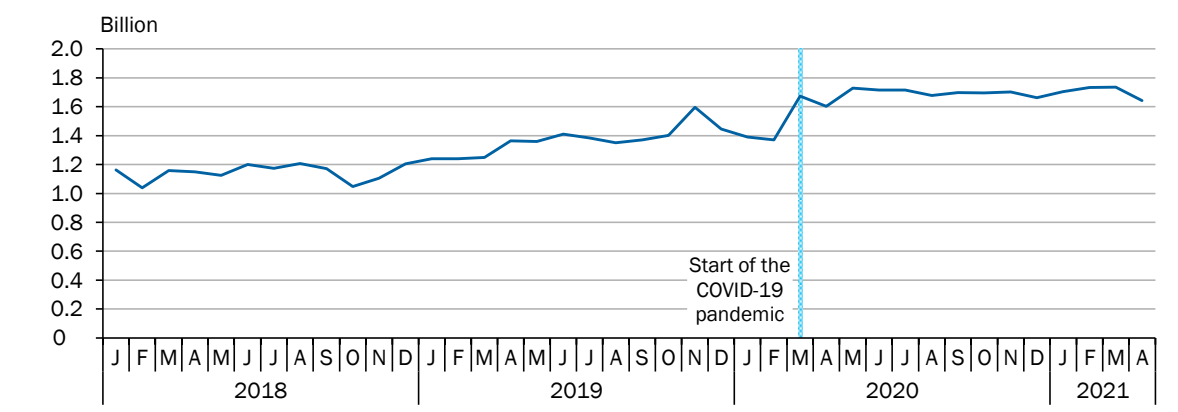
⁵ It should be noted that Semrush provides data prior to 2018, which however, were collected using a different methodology and are therefore difficult to compare with most recent data.

3. Descriptive evidence of platform diffusion in Germany

15. The German platform economy has been characterized by a continuous rise in overall traffic over the past years, with aggregate visits growing by 41 % between January 2018 and April 2021 (Figure 5). At the onset of the COVID-19 pandemic, platform activity shortly accelerated as traffic to platforms on the German market rose by about 22 % between February and March 2020, before stabilizing at a higher level during the pandemic.⁶

▾ FIGURE 5

Overall traffic¹ in all sectors



1 - Traffic refers to the total number of website visits.

Sources: Semrush, own calculations

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16. However, not all sectors have contributed equally to the overall rise in the German platform economy observed over the past years. The X2C marketplace sector, for instance, accounts for almost 87 % of the overall traffic to the German platform economy (Figure 6). This has strong implications for the interpretation of aggregate dynamics in Germany, which are therefore mostly driven by developments of this sector alone. Indeed, X2C marketplaces feature among the ‘oldest’ and most established sectors within the platform economy, as platforms including Amazon, Zalando or ebay have entered the German market in the early 2000s. While representing only a fraction of the traffic generated by X2C marketplace platforms, the second largest sector in terms of traffic is in our data the accommodation sector, accounting for 8.3 % of total visits.

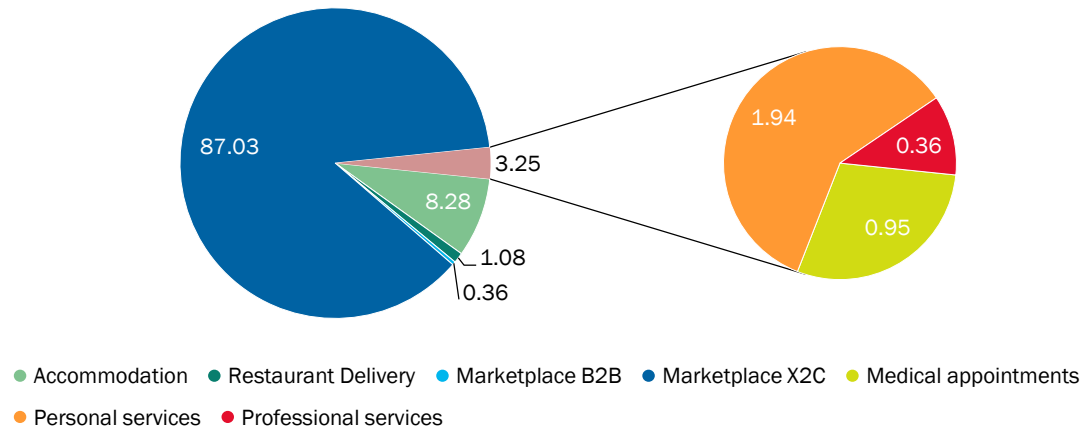
⁶ We note that the pronounced spike in platform visits we observe in November 2019 is driven by the X2C marketplace sector. While the spike coincides with Black Friday, which considerably affects online sales in Germany, we cannot rule out that this outlier constitutes a measurement error in the underlying traffic data.

↳ FIGURE 6

Share of traffic by sector

Time Period: January 2018 – April 2021

%



Sources: Semrush, own calculations
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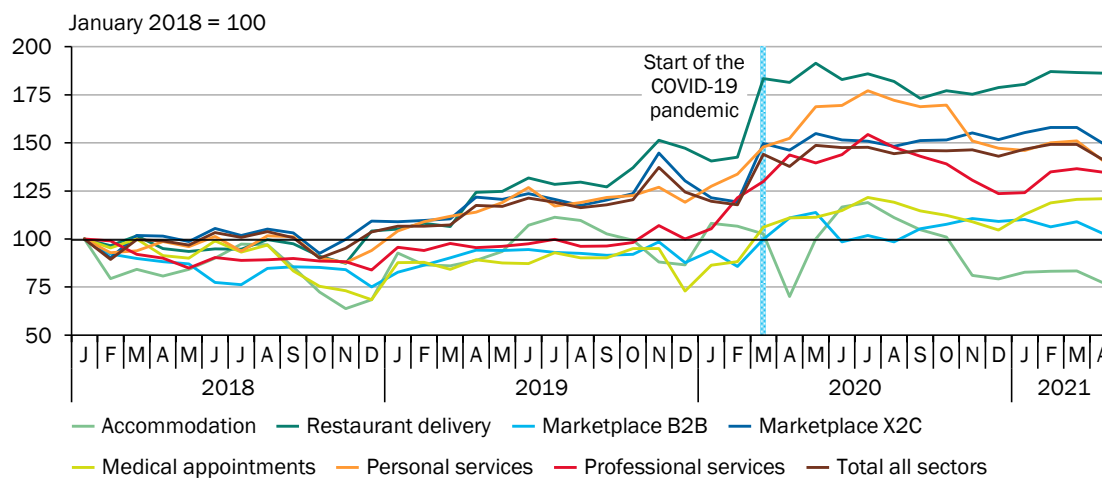
17. B2B marketplaces display a particularly interesting pattern insofar as they account for the second highest number of platforms, but only amount to 0.35 % of total visits.⁷ One potential explanation for this relatively low share of traffic might relate to the specificities of this sector: Compared with the other sectors under analysis, B2B platforms only target businesses, rather than individual users, often within narrowly-defined business sectors (e.g. the chemical industry). Related to this, they also tend to be based on in-depth sectoral expertise and might require specialist offerings that are tailored to the individual sectors and applications. In addition, users often have to conclude individually negotiated agreements with the platform provider, which increases the transaction costs compared with standardized contracts. This greater degree of differentiation and specialization limits the scalability and growth of individual B2B platforms compared with the B2C market (European Commission, 2020; Haucap et al., 2021). We also acknowledge that our analysis only reflects B2B marketplaces that are publicly available on the internet and does not cover proprietary marketplaces, which also play an important role in industrial applications of platforms (Lerch et al., 2019).
18. Looking closer at the dynamics of platform traffic across the different sectors under scrutiny mirrors the sectoral heterogeneity observed in terms of traffic shares. In particular, while most sectors show an increase in traffic since 2018, the increase has been more pronounced for the food delivery sector, X2C marketplaces and personal services (Figure 7). Only the accommodation sector displays strong fluctuations, with current website traffic averaging below 2018 levels, likely due to pandemic-induced lockdowns preventing travel. Figure 7 also graphically illustrates the sectoral divergence of website traffic across sectors since the onset of

⁷ It should be noted that the low share of overall visits might also partly result from data restrictions, as traffic to Amazon's B2B segment (amazon.de/b2b) cannot be separated from the consumer section (i.e. amazon.de) and is therefore not included in the B2B segment of this analysis.

the COVID-19 pandemic, reflecting once again the sectoral heterogeneity of the COVID-19 shock (Conseil National de Productivité, 2021; David, 2021).

↳ FIGURE 7

Growth of website traffic by sector



Sources: Semrush, own calculations
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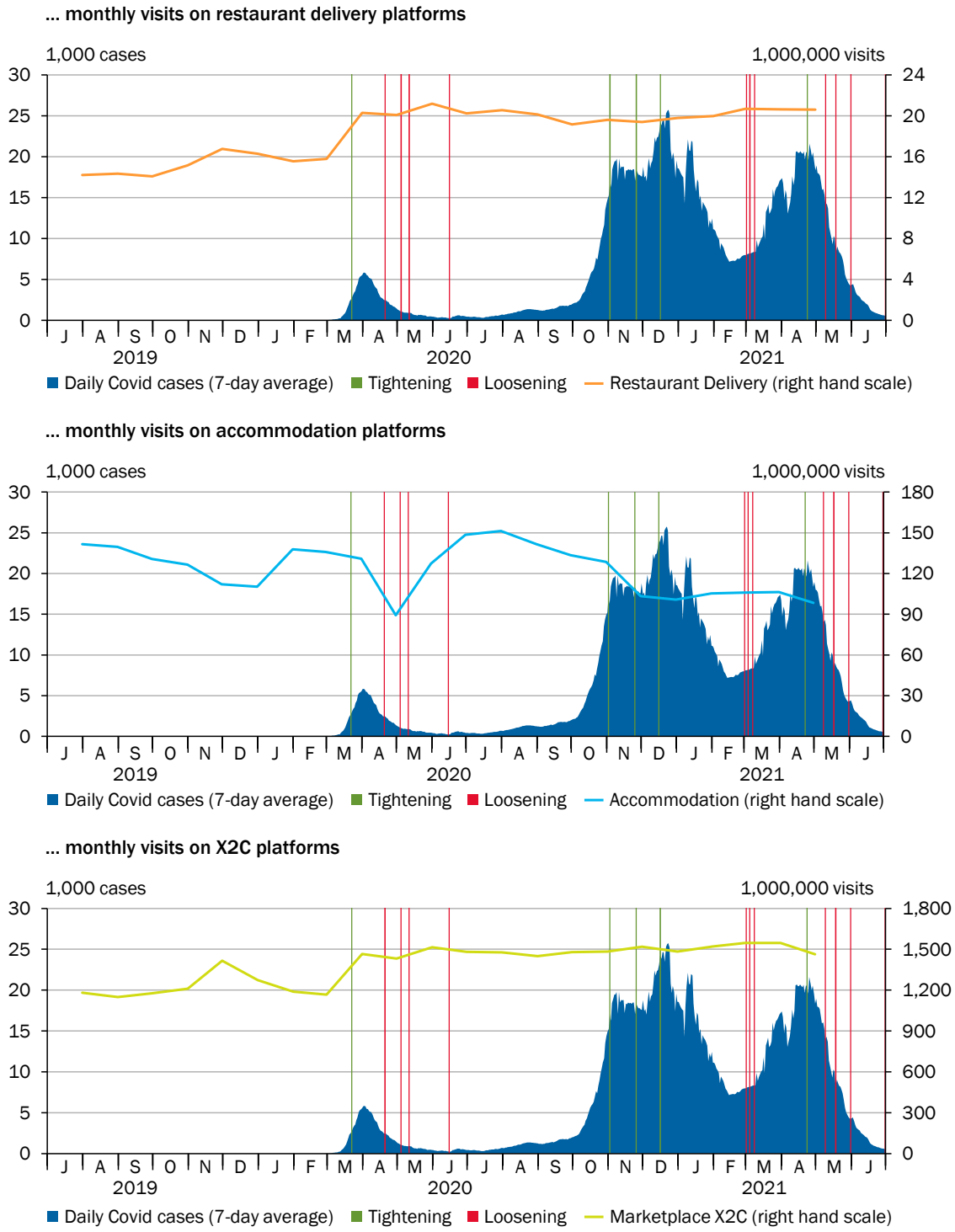
19. Next, we turn to the dynamics of individual sectors in light of the COVID-19 pandemic in more detail. The following graphs compare platform activity for selected sectors with the course of the COVID-19 pandemic. The course of the pandemic is tracked by means of daily new infections in Germany on a rolling 7-day average and the main federal decisions resulting in a tightening (or easing) of lockdown policies.⁸
20. Starting with the restaurant delivery sector, Figure 8 illustrates a steep increase in traffic as the pandemic begins. Between March and April 2020 alone, traffic increased by as much as 29 %, suggesting that some consumers in Germany quickly adjusted to the pandemic by shifting demand towards online platforms in the restaurant sector. Interestingly, the activity in the restaurant delivery sector remained at the new, higher level of activity throughout the pandemic, unaffected by the evolution of infection rates, or administrative lockdown policies. Similar patterns were observed for X2C marketplaces, which saw an instantaneous increase in activity by 26 % between March and April 2020 and remained at this new level of activity throughout the pandemic.
21. Especially the dynamics observed for restaurant delivery services and X2C marketplaces seem to reflect the notion that retail sales and restaurant services to a large extent shifted online due to government mandated lockdowns during the first half of 2020. By ensuring the continuation of at least a part of economic activities, especially of small businesses that would have otherwise shut down, platforms may have thus helped the German economy weathering the economic impact of the crisis (OECD, 2020). Restaurant services and the retail sectors, in

⁸ A timetable of individual tightening and loosening of lockdown measures is provided in Annex C.

particular, may also be prone to a permanent change in consumer behavior, as suggested by the shift towards higher level of traffic activity on platforms in the respective segments.

▾ FIGURE 8

Loosening and tightening of corona measures, daily COVID-19 cases in Germany and ...



Sources: Handelsblatt, MDR, Our world in data
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22. By contrast, markets for services which rely on the mobility of individuals and face-to-face interactions, experienced negative demand shocks during the pandemic. One vivid example of these dynamics is the accommodation sector. Figure 8 illustrates how closely visits to accommodation platforms followed lockdown restrictions. Over the course of the pandemic, the accommodation sector experiences a pronounced drop in activity by 32 % between March and April 2020, a recovery during summer 2020 and a repeated drop in activity during the second and third wave of the pandemic in Germany. Website traffic in markets for professional and personal services also took a hit during the second and third wave of the pandemic, likely due to introduction of lockdown policies impeding personal interactions and weighing on business activity. Finally, while not observable with our data, there are good reasons to believe that traffic in other platform markets relying on face-to-face services, such as ride-hailing services, were similarly affected by lockdown policies.

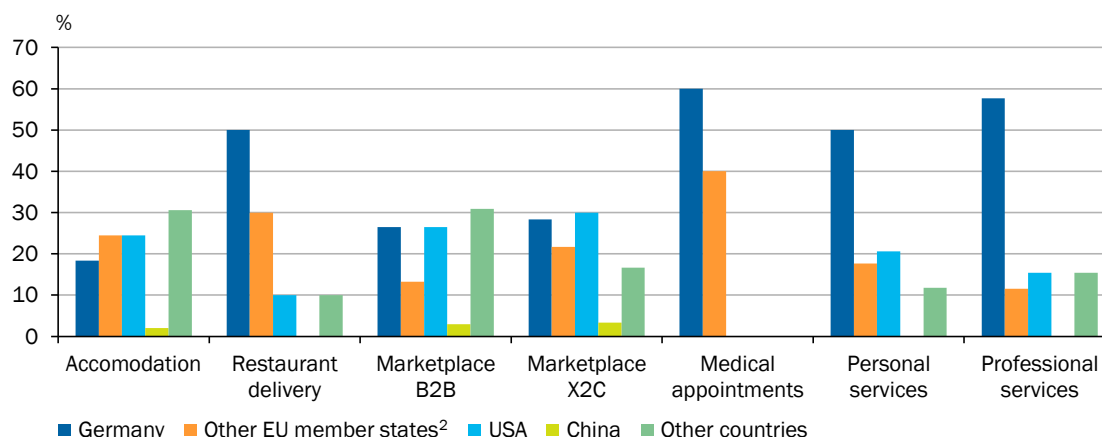
4. The role of domestic platforms in the German market

23. Much of the discourse on the platform economy revolves around the dominance of US-american and Chinese platform companies. However, little is known about the relevance of domestic platforms in the German market. We thus try to contribute to a better understanding of the regional distribution of platform companies' origin in the German platform economy using information about the location of companies' headquarters contained in the Crunchbase database as a proxy of platforms' origins.⁹
24. Looking at the share of platforms headquartered in Germany as a percentage of the total number of platforms active in the German market, it seems that German platforms are far more numerous than one might expect. They make up between 18 % and 60 % of all active platforms within each sector of the platform economy considered (Figure 9). In particular, in markets for personal- and professional services, medical appointments and restaurant delivery services, platforms headquartered in Germany play a seemingly important role, representing 50 % or more of the platforms active in this market.

⁹ Since information on the headquarter location is not available for all platforms, especially smaller ones, the number of platforms analysed here only represents a subset of the platforms analysed in the other sections of this paper.

↳ FIGURE 9

Transaction platforms used in Germany as a proportion of the total number broken down by location of headquarters¹

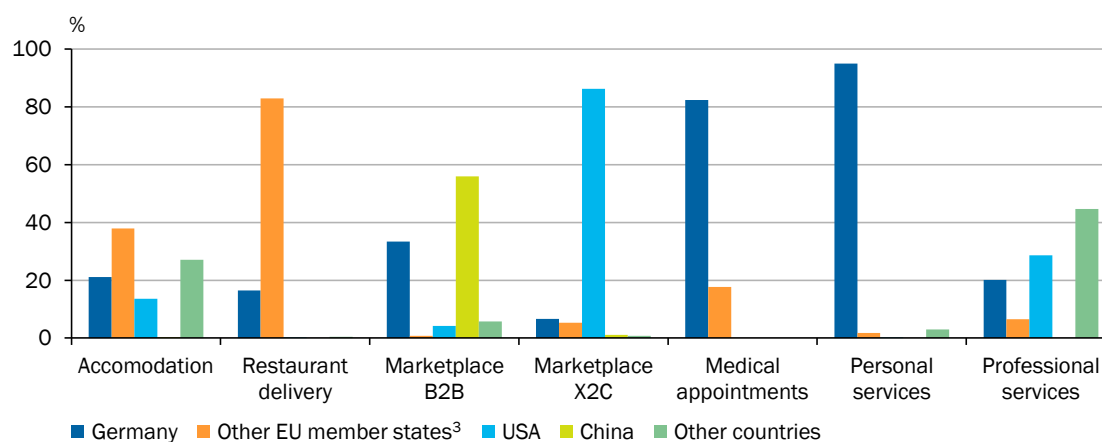


1 - Number of underlying transaction platforms per sector: accommodation 98, B2B marketplaces 68, B2C and C2C marketplaces 60, personal services 34, restaurant delivery services 10, professional services 26, medical appointments 5.
 2 - The composition of countries varies because data is not available für all EU member states.

Sources: Semrush, own calculations
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↳ FIGURE 10

Transaction platforms used in Germany as a proportion of total traffic broken down by location of headquarters^{1,2}



1 - Number of underlying transaction platforms per sector: accommodation 98, B2B marketplaces 68, B2C and C2C marketplaces 60, personal services 34, restaurant delivery services 10, professional services 26, medical appointments 5.
 2 - Average traffic per month measured in terms of monthly website visits; based on monthly data from January 2018 to May 2021.
 3 - The composition of countries varies because data is not available für all EU member states.

Sources: Semrush, own calculations
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25. While German platforms appear numerous, however, data on the website visits by region conveys a different message. Figure 10 supports the notion that the X2C platform market is in fact dominated by US platforms, which account for 86 % of the traffic in that sector. Potential drivers of this high share include widely used platforms such as Amazon or ebay. Given the relative importance of the

manufacturing sector in Germany, industrial B2B platforms are often discussed as an important sector of the platform economy for Germany with considerable growth potential (e.g. Lerch et al., 2019; BDI, 2020; BMWi, 2020; European Commission, 2020). Although Chinese platforms generate most of the traffic (56 %) in the B2B marketplace sector, German B2B platforms indeed rank second accounting for a share of 33 % of activity. In areas in which platforms have only been established for a few years, such as personal and business-related services, and in which language skills can play a key role, German platforms are faring much better by comparison. This presumably reflects the market-specific expertise required in these markets, making them less easy to scale across countries.

26. One important take-away from this analysis is that German platforms are numerous, but do not reach a significant market share in terms of website traffic. Instead, most sectors appear to be dominated by individual, mostly foreign, platforms, suggesting that market concentration is high in most platform markets. In the following, we aim to improve our understanding of market concentration trends within the German platform economy.

5. Trends in market concentration in the German platform economy

27. Compared with more traditional markets, the growth of online platform markets was strongly supported by the inherent characteristics of the digital economy, in turn fuelling higher concentration rates and winner-take-all dynamics (Costa et al., 2021a). In this context, the literature and policy makers emphasize the role of network effects, economies of scale and scope, positive feedback loops and lock-in effects.
28. Network effects, and in particular indirect network effects, are a defining feature of multi-sided markets, arising where the benefit for the participant depends on the number of participants on the other side of the platform. Operating systems and app markets, which bring app developers and users together, are one example. While users benefit from a large range of apps to choose from, the attractiveness of the platform for app developers increases with the number of users they can reach via the platform. New market entrants thus face a “chicken-and-egg” problem, as they have to attract a critical mass of initial users on one side of the market to become attractive for users on the other side (Caillaud and Jullien, 2003).
29. Due to a combination of high fixed costs required to set up the technological infrastructure and low variable costs for the reproduction of data and digitized information, online platforms also tend to enjoy strong economies of scale (Brynjolfsson et al., 2006). Moreover, online platforms often have the ability to capture and analyze huge amounts of data stemming from the transactions, enabling them to create additional value (Van Alstyne et al., 2016). By linking the different sources, online platforms might therefore enjoy economies of scope, provided they offer a variety of services collecting data (Bourreau and De Streel, 2019). Such economies of scope facilitate the expansion into new markets and

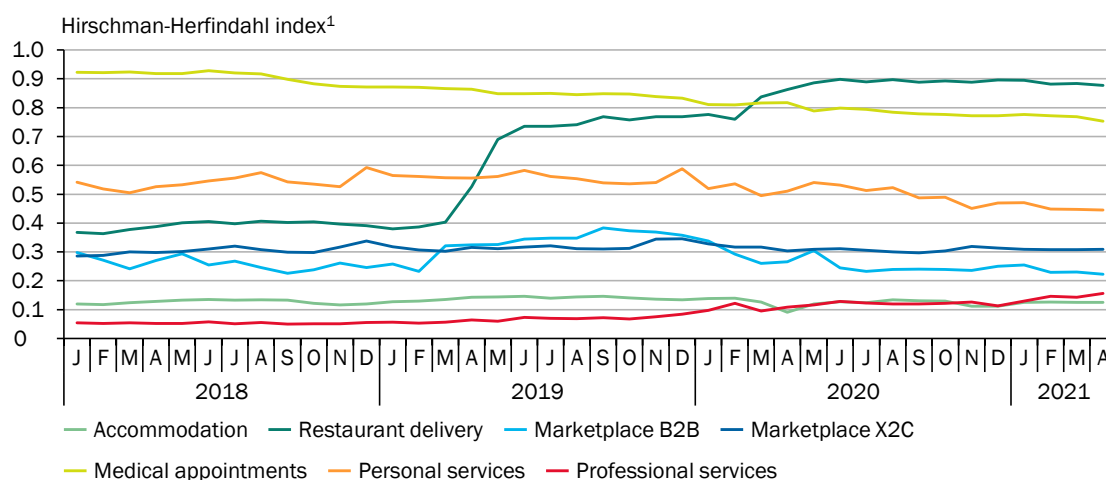
allow platform companies to build ecosystems consisting of different services, software and physical products around the platform, thus further strengthening the growth of already large platforms.

30. Another feature of platform markets is the emergence of positive feedback loops, whereby data-driven innovation enables the platform company to collect even more data that can be used as an input for further innovation processes (Schepp and Wambach, 2016). The data ownership, coupled with the ability to exclude competitors from their use, can thus serve as an important competitive advantage (Jones and Tonetti, 2020). Finally, the lack of data portability and interoperability between platforms can create strong lock-in effects and lead to the inability of participants to multihome, i.e. use several platforms simultaneously.
31. Taken together, the above-mentioned characteristics of online platforms have led respective markets to become subject to winner-takes-all situations and widespread market power. A priori, it is not clear whether more concentrated platform markets are more or less efficient (Jullien, 2005). While there could be efficiency gains to having very large platforms, higher concentration rates also limit the contestability of dominant platforms and could give rise to abusive behavior (Costa et al., 2021a).
32. Indeed, concerns are growing that dominant platforms abuse their position by setting the rules of the respective market (i.e. become a so-called “gatekeeper”) and, in the absence of adequate regulatory frameworks, distort competition. Such incentives are particularly strong for hybrid platforms, which manage the market, while also acting as a market participant on the platform (Crémer et al., 2019; Furman et al., 2019; Caffarra et al., 2020; Committee on the Judiciary, 2020). As a result, Europe and the US have initiated legal proceedings against all major platform companies over the past years. Most recently, for instance, the EU General Court ruled that Google had engaged in anti-competitive practices by favoring its own shopping service over competitors in its own search service, a practice referred to as ‘self-preferencing’ (Reuters, 2021).
33. In order to investigate the evolution of market concentration in our sectors of interest in Germany, we compute the Hirschman-Herfindahl-Index (HHI) for each sector. The HHI adds the squared market share of each platform in terms of traffic, and normalizes it by the number of platforms such that a value of one denotes a perfect monopoly.¹⁰ We do not suggest comparing the level of concentration rates between sectors of the platform economy, since the HHI crucially depends on the chosen delimitation of the respective sectors. Still, the analysis allows for an illustration of the development of market concentration over time within different sectors.

¹⁰ As an alternative we also used CR1, i.e. the market share of the top platform in each market, as a concentration measure. Both, the HHI and the CR1 yield qualitatively similar results.

▾ FIGURE 11

Sectoral concentration rates



1 – Hirschman-Herfindahl index measured in terms of traffic on the transaction platforms.

Sources: Semrush, own calculations

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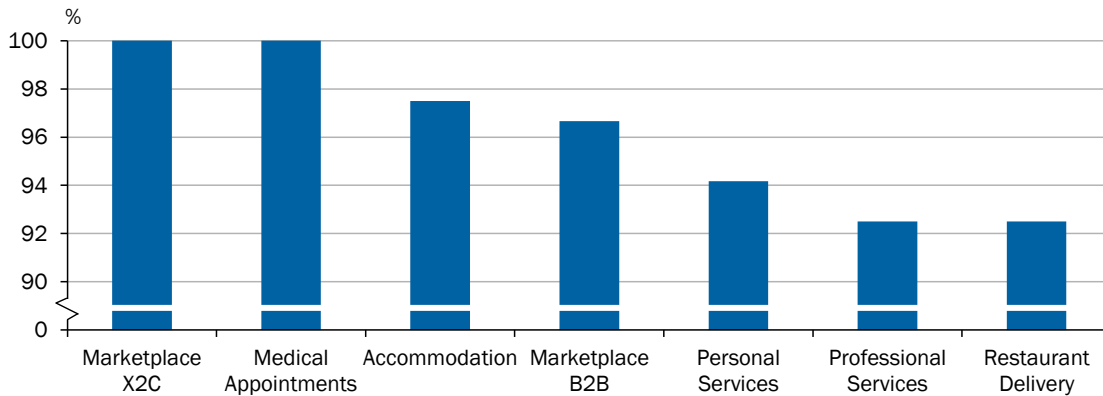
34. The results displayed in Figure 11 illustrate an overall stable evolution of concentration since 2018 in most sectors. While this might be due to the limited time span covered by the data, it should also be noted that concentration ratios might vary considerably at the global level. Concentration rates differ substantially across sectors, without any visible correlation with the number of providers within each sector.
35. The most notable concentration dynamic can be observed in the market for restaurant delivery services, illustrating the so-called “market tipping” phenomenon. Market tipping describes a situation in which a single platform suddenly becomes a monopolist, attracting almost all users, while competitors are unable to achieve a critical mass. In Germany, the market-tipping phenomenon emerged following a market consolidation process in the restaurant delivery sector in 2019, leading to a substantial increase in the market concentration rate.¹¹
36. Another way to analyze concentration dynamics is to investigate the persistence of platforms at the top. To that end, we measure the average share of the top three platforms in terms of visits, that were in the top three also in the previous period (i.e. in the previous month; Figure 12). A persistence of 100 % would thus imply that the top three platforms in terms of visits between 2018 and May 2021 remained the same. If, on the other hand, the top three platforms were to change every two months, the results would display a 50% persistence rate. Overall, we find the persistence to range between 94 % and 100 %, underlining the notion that once a dominant market position (i.e. among the top three) has been reached, it

¹¹ In particular, the platform Deliveroo withdrew from the German market in 2019, leaving Dutch delivery service Just Eat, with its Lieferando brand, as the last major competitor in the market.

becomes almost impossible for competitors, and especially new entrants, to challenge this position.

▸ FIGURE 12

Persistence at the top
Top 3 platforms, 2018 – 2021

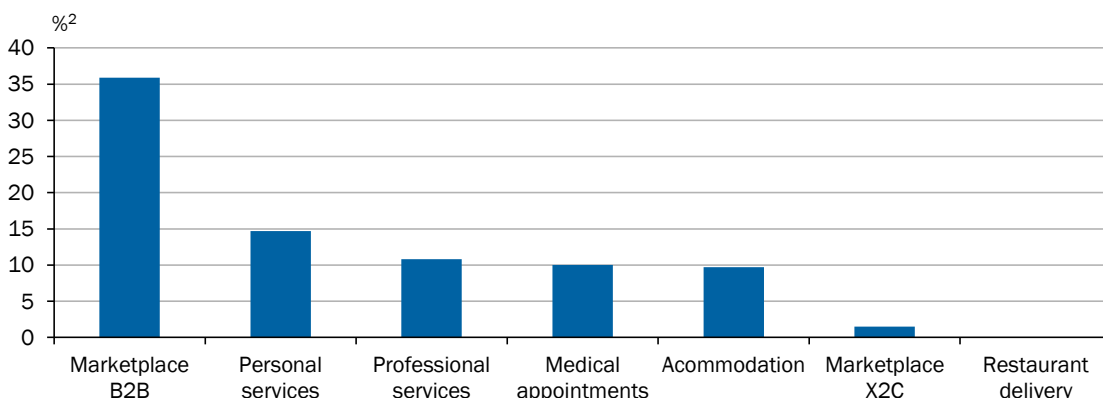


Sources: Semrush, own calculations
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- Finally, we look into market dynamics in terms of platform entry since 2018. In particular, based on the list of active platforms in Germany as of May 2021, we define the market entry date as the first appearance in the dataset where traffic takes a value greater than zero (Figure 13). While most sectors display low market entry rates, market entry in the B2B sectors appears to be very dynamic. This observation aligns with the idea that, in contrast to X2C markets, B2B platform markets are less mature, more contestable, and still associated with higher growth potential for platform providers.

▸ FIGURE 13

Share of market entries since 2018¹



1 – Share of platforms by sector that entered the market since 2018. 2 – As a percentage of total platforms analysed over the period January 2018 – April 2021.

Sources: Semrush, own calculations
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6. Conclusion

38. Over the past decade, and in particular during the COVID-19 crisis, online platforms have become a crucial element of economic activity. Private individuals and businesses alike are using platforms to buy and sell services and goods, get information, or find jobs. Despite their pervasive impact, however, data on platform activity remains scarce and is often limited to individual platforms. Building on proprietary data from Crunchbase and Semrush, this paper therefore aims to shed light at this underresearched market. We do so by collecting data on website traffic between 2018 and 2021 for a selection of the most relevant platforms in the German market, in seven sectors of interest.
39. Our results suggest that platform growth in the German market has been substantial over the past three years, with COVID-19 providing an important boost to their activity in many sectors. While the rise during the pandemic might only be temporary and recede as lockdown restrictions are relaxed for some sectors, tentative evidence suggests that others, including the retail sector and restaurant services, might see a permanently higher shift to online activities.
40. The analysis also reveals that, while many platforms are headquartered in Germany, they rarely manage to reach significant market shares in terms of website traffic within the German platform market. This observation is likely related to high concentration rates in the platform economy, emanating from a combination of market characteristics (e.g. network and lock-in effects) and the abusive behaviour of market-dominant platforms. Once platforms reach a dominant position, it indeed becomes extremely difficult for competitors to challenge the dominant incumbent, as suggested by the German restaurant delivery service market and the persistence of platforms at the top of the website traffic ranking.
41. In light of the ongoing shift of market activities towards online markets, however, greater efforts are needed to collect sector, country and cross-country data on online platform operations. Only with improved data, the evolution of platform markets and their economic and social impacts can be assessed comprehensively. Regulations aiming at the disclosure of platform data are therefore an important first step into this direction.

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ANNEX A. SELECTION CRITERIA FOR PLATFORMS BY SECTOR

The following selection criteria were applied within each sector to classify platforms operating for the German market.

- **Accommodation:** The platform must mediate accommodation services in Germany, be in German or English and should not be the online website of a hotel or hotel group. Examples include [airbnb.de](https://www.airbnb.de) or [booking.com](https://www.booking.com).
- **Food delivery:** The platform should offer delivery services and allow for transactions between restaurants and customers in Germany. Examples include [lieferando.de](https://www.lieferando.de) or [deliveroo.de](https://www.deliveroo.de).
- **B2B marketplaces:** The platform must clearly indicate that it allows for transactions between businesses. The website can be in English, but a delivery from/to Germany must be available. Examples include [alibaba.com](https://www.alibaba.com) or [wlw.de](https://www.wlw.de).
- **Marketplaces X2C:** The platforms must enable a registration for sellers. The website can be in English, but a delivery from/to Germany must be possible. Examples include [amazon.de](https://www.amazon.de) or [ebay.de](https://www.ebay.de).
- **Medical appointments:** The platform must match doctors and patients and allow the direct booking of a doctor's appointment in Germany. Examples include [docolib.de](https://www.docolib.de) or [jameda.de](https://www.jameda.de).
- **Personal services:** The platform must allow for transactions of services to private individuals and households, such as hairdressing, cleaning services, tutoring and alike. The platforms must be in German and should clearly indicate how to register as a service provider. Examples are [studienkreis.de](https://www.studienkreis.de) or [my-hammer.de](https://www.my-hammer.de).
- **Professional Services:** The platform must offer professional services, including by designers, lawyers, freelancers among others. The platforms must be in German and should clearly indicate how to register. Examples include [fiverr.com](https://www.fiverr.com) or [upwork.com](https://www.upwork.com).

ANNEX B: LIST OF PLATFORMS ANALYZED

- **Accommodation:** [9flats.com/de](https://www.9flats.com/de), [ab-in-den-urlaub.de/hotels](https://www.ab-in-den-urlaub.de/hotels), [acomodeo.com](https://www.acomodeo.com), [agoda.com](https://www.agoda.com), [airbnb.com](https://www.airbnb.com), [bedandbreakfast.com](https://www.bedandbreakfast.com), [belvilla.com](https://www.belvilla.com), [bestfewo.de](https://www.bestfewo.de), [bigbreaks.com](https://www.bigbreaks.com), [booked.net](https://www.booked.net), [booking.com](https://www.booking.com), [bookiply.de](https://www.bookiply.de), [bookitgreen.com](https://www.bookitgreen.com), [bookotrip.com](https://www.bookotrip.com), [bravofly.com](https://www.bravofly.com), [byhours.com](https://www.byhours.com), [casamundo.de](https://www.casamundo.de), [checkfelix.com](https://www.checkfelix.com), [ctrip.com](https://www.ctrip.com), [cuddlynest.com](https://www.cuddlynest.com), [daybreakhotels.com](https://www.daybreakhotels.com), [dayuse.com](https://www.dayuse.com), [destinia.com](https://www.destinia.com), [ebookers.com](https://www.ebookers.com), [ecobnb.com](https://www.ecobnb.com), [e-domizil.com](https://www.e-domizil.com), [edreams.com](https://www.edreams.com), [esky.com](https://www.esky.com), [expedia.com](https://www.expedia.com), [fairpoint.com](https://www.fairpoint.com), [ferienhausmiete.de](https://www.ferienhausmiete.de), [fewo-direkt.de](https://www.fewo-direkt.de), [flipkey.com](https://www.flipkey.com), [gayhomestays.com](https://www.gayhomestays.com),

goibibo.com, gowithoh.com, groupcorner.com, handiscover.com, holiday-check.com, holidayextras.com, homeaway.com, homestay.com, hometogo.com, hostelbookers.com, hostelworld.com, hostelworld.com, hotel.check24.de, hotel.de, hotel.de, hotel.info, hotel.info, hoteles.com, hoteles.com, hotelfriend.com, hotelfriend.com, hoteliers.com, hoteliers.com, hotelplanner.com, hotelplanner.com, hotels.com, hotels.com, hoteltonight.com, hoteltonight.com, hotwire.com, housetrip.com, hrs.com, ilovecohotels.com, jetsetz.com, kayak.com, kiwicollection.com, lastminute.com, luxstay.com, luxurybared.com, magicstay.com, makemytrip.com, misterbandb.com/de, mountvacation.de, niumba.com, nusatrip.com, nustay.com, opodo.com, ostrovok.de, otelz.com, prestigia.com, priceline.com, ratehawk.com, realadventures.com, reservations.com, secretescapes.com, skoosh.com, skylark.com, splendia.com, studentuniverse.com, swoodo.com, tablethotels.com, thewaylo.com, ticati.com, tourist-online.de, traum-ferienwohnungen.de, travala.com, travel.rakuten.com, travelbook.com, travelcircus.de, travelist.de, travelocity.com, travelstart.com, trip.com, tripvillas.com, trivago.com, vrbo.com, wimdu.de, wunderflats.com/de

- Food delivery: bringbutler.de, deliver24.de, deliveroo.de, deliveryhero.com, foodora.de, gopizzago.de, homedeliver.de, lieferando.de, lieferhase.de, lieferheld.de, lieferprofi.de, mjam.net, online-pizza.de, pizza.de, pizzaservice.de, pizza-taxi.de, pizzeria.de, restablo.de, ubereats.com, wolt.com
- Marketplace X2C: aboutyou.de, aliexpress.com, allyouneed.com, amazon.com, ao.de, artsper.com, asos.com/de, auctionet.com, auctions.yahoo.com, auto24.de, avocadostore.de, bidsquare.com, bonanza.com, bullionvault.com, caraworld.de, chrono24.com, conrad.de, dawanda.com, dhgate.com, discogs.com, ebay.de, ebay-kleinanzeigen.de, etsy.com, folkdays.de,groupon.com, gumtree.com, hey.car, hood.de, lauritz.com, limango.de, locally.de, maedchenflohmarkt.de, manomano.de, maschinensucher.de, micolet.de, mintysquare.com, mpb.com, notonthehighstreet.com, onbuy.com, otto.de, overstock.com, pamono.de, promofarma.com, qoo10.com, quoka.de, rakuten.com, rebuy.de, redbubble.com, reverb.com, shopping.yahoo.com, society6.com, spartoo.de, stockx.com, stubhub.de, ticketmaster.de, tise.com, tuvalum.com, vestiairecollective.com, viagogo.com, videdressing.de, voelkner.de, watchmaster.com, wayfair.de, wish.com, wuuff.dog, yatego.com, zalando.de
- Marketplace B2B: agrando.de, alibaba.com, all.biz, amazon.de/b2b, ariba.com, aseta.com, b2brazil.com, bamboorose.com, beautetrade.com, bevazar.com, bizongo.com, born.com, boxfox.co, brandsgateway.com, bsamply.com, carbanio.com, chemondis.com, crowdfox.biz, dial4trade.com, directindustry.com, doctorsbazaar.com, ec21.com, eporta.com, europages.com, eworldtrade.com, exportersindia.com, exporthub.com, fashion.cloud/de, fibre2fashion.com, gasgoo.com, globalsources.com, hubx.com, indiamart.com, industrystock.com/en, infobanc.com, klarpris.de, labscoop.com, lenewblack.com, lieferanten.de, liquidation.com, mangob2b.com, medikabazaar.com, mercateo.com, mfg.com, nexttrade.market, orangeshine.com, orderchamp.com, prisma-capacity.eu, quintet24.com, ralali.com, restposten.de, saltrex.com, schuetfflix.de, scoutbee.com/de, simplelots.com, simplesystem.com, solostocks.de, spanflug.de, spoileralert.com, superetage.com, suppliersplanet.com, svh24.de,

textileinfomedia.com, thomasnet.com, toolineo.de, toolots.com, tradeboss.com, tradeindia.com, tradekey.com, tradewheel.com, tradingtwins.com, twoosk.com, waystocap.com, wlw.de, wucato.de, yorso.com, zentrada.de, zoro.de

- Medical Appointments: arzttermine.de, clickdoc.de, doctena.de, doctolib.de, dr-flex.de, jameda.de, dr-flex.de, patient.samedi.de, pluspatient.de, zahnarzt-arztsuche.de
- Personal Services: babysits.com, babysitter.de, betreut.de, betreuung-gesucht.de, bidi.one, blauarbeit.de, bookatiger.com, booksy.com, cafetalk.com, care.com, careship.de, check24.de/profis, cleverly.de, deutschepflegeboerse.de, die-haushaltshelden.de, doozer.de, easy-tutor.eu, erstekinderbetreuung.de, erstenachhilfe.de, erstenachhilfe.de, extrasauber.com, fixando.de, frisuda.de, greataupair.com, hallobabysitter.de, handwerker-123.de, handwerksfinder24.de, haushaltsjob-boerse.de, haushelden.de, helpling.com, heytimi.de, italki.com, jim-bohilft.de, jobruf.de, jobruf.de, lernbude.de, lernigo.de, little-bird.de, maideasy.de, markt.de, mein-friseur.de, mentorium.de, my-hammer.de, nachhilfe1.de, nachhilfepartner.de, nachhilfe-team.net, nativenanny.de, optimal-nachhilfe.de, pflegefinden.eu, pflegeliste.de, pflegeplattform24.com, pflegix.de, prontopro.de, putzperle.de, sanier.de, schuelerhilfe.de, starofservice.de, studentering.de, studienkreis.de, studiwork.com, taskrabbit.com, treatwell.com, tutoria.de, wellnow.de, wonolo.com, work5.de, yoopies.com, zeel.com
- Professional Services: 4scotty.com, 99designs.com, agenturmatching.de, backinjob.de, clickworker.com, codecontrol.io, content.de, crowdguru.de, dassauge.de, de.yeeply.com, designcrowd.com, designenlassen.de, design-madeingermany.de, energieheld.de, fiverr.com, freelance.com, freelance-market.de, freelancer.com, freelancemap.com, freework.com, gigajob.com, gig-work.de, gulp.de, hallofreelancer.com, itportal24.de, jovoto.com, malt.com, mturk.com, onandoffer.com, peopleperhour.com, projektwerk.com, proz.com, testbirds.de, toptal.com, twago.com, uplink.tech, upwork.com

ANNEX C: TIGHTENING AND EASING OF LOCKDOWN MEASURES IN GERMANY

▾ TABLE 1

Timetable of lockdown measures in Germany (March 2020 – June 2021)

Date	Description
22.03.2020	Nationwide lockdown from 22 March 2020 (some businesses already closed); no exit but contact restrictions; home office.
20.04.2020	First loosening of measures (depending on the federal state); Berlin, Brandenburg and Saxony gradually resume school operations; the strict exit restriction in Bavaria and Saxony are being relaxed.
04.05.2020	Further relaxations; schools allowed to reopen; hairdressers open under strict hygiene measures.
11.05.2020	Restaurant and pubs reopen.
15.06.2020	Further relaxations, e.g. in contact sports; some measures are still in force.
02.11.2020	'Lockdown light'; renewed contact restrictions; more pleases than restrictions.
25.11.2020	New Corona resolutions are being decided.
16.12.2020	Hard lockdown; schools and day-care centres closed; only necessary businesses open (e.g. drugstore, supermarket, pharmacy); stricter contact restrictions.
11.01.2021	Further tightening of restrictions; restriction of the movement radius for districts with high incidence; schools/nurseries regulated depending on the federal state.
01.03.2021	Slight relaxations (e.g. hairdressers are allowed to open; garden centres open in some federal states).
04.03.2021	Lockdown extended, but nationwide opening plan linked to incidence is adopted.
08.03.2021	Openings despite rising COVID-19 infection rates.
23.04.2021	'Emergency brake' ("Bundesnotbremse") comes into force regulating curfews, schools, contact restrictions and retail trade.
09.05.2021	Relaxations for vaccinated and recovered persons.
18.05.2021	309 of 412 districts are below the incidence of 100, under which the federal emergency brake no longer applies.
31.05.2021	Only 3 districts with incidence above 100.
30.06.2021	'Emergency brake' expires.

Sources: Handelsblatt (2021), MDR (2021)

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