

The effect of COVID-19 on long-distance transport services in France

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Effect of the COVID 19 on long distance transport services: case of France

Florent LAROCHE

In this paper we explore the effect of COVID 19 on the long-distance transport services in France. These services have been strongly impacted by the different lockdowns imposed. The research question has for objective to characterize the market before COVID 19 to understand its adaptation and the strategies of the stakeholders faced with sanitary regulations. The empirical research is based on a large panel of data collected on four routes in France from 2019 to 2021 for four modes. The first finding is the severe crisis in terms of supply during the first lockdown in March 2020. During the rest of the year 2020 and 2021, services increased slowly until recovering a similar level to that of 2019 for rail and carpooling. This is not yet the case for coach and air services. The second finding is the market concentration to the advantage of the dominant mode, train, especially in comparison to air, still subject to difficulty because of the reduction of the business market. The last finding highlights the persistence of conventional services during the different lockdowns and the high variability of low cost services. Finally, low-cost services were recovering services faster in autumn 2021 than conventional services, thereby increasing their market share.

Keywords: COVID-19; Public Transport; Interurban Mobility; Market organization

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EFFECT OF THE COVID 19 ON LONG DISTANCE TRANSPORT SERVICES: CASE OF FRANCE

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Abstract

In this paper we explore the effect of COVID 19 on the long-distance transport services in France. These services have been strongly impacted by the different lockdowns imposed. However, up to now, few papers have considered this topic. The research question has for objective to characterize the market before COVID 19 to understand its adaptation and the strategies of the stakeholders faced with sanitary regulations. The empirical research is based on a large panel of data collected on four routes in France from September 2019 to November 2021 for four modes (coach, carpooling, train and air). Prices and frequencies are discussed as main variables. The main results must be considered carefully as the pandemic is still ongoing at the end of 2021. The first finding is the severe crisis in terms of supply during the first lockdown in March 2020. During the rest of the year 2020 and 2021, services increased slowly until recovering a similar level to that of 2019 for rail and carpooling. This is not yet the case for coach and air services. The second finding is the market concentration to the advantage of the dominant mode, train, especially in comparison to air, still subject to difficulty because of the reduction of the business market. The last finding highlights the persistence of conventional services during the different lockdowns and the high variability of low cost services which disappeared during the crisis. However, mainly thanks to the public support, no operator went bankrupt or left the market. Finally, low-cost services were recovering services faster in autumn 2021 than conventional services, thereby increasing their market share. The crisis on the business market may explain the difficulty for conventional services faced with low-cost services better adapted to the leisure market.

Keywords: COVID-19; Public Transport; Interurban Mobility; Market organization

JEL Classification: L11; R4.

1. Introduction

In this paper we explore the effect of COVID 19 on the long-distance transport services in France. The interest of this topic is multifold. Firstly, never in contemporary history, have human activities been totally stopped for several long periods around the world during the years 2020 and 2021. Long-distance trips and services have been strongly impacted as the key principle of the different lockdowns was to get people to stay at home. Secondly, the literature, both academic and non-academic, on the effect of the COVID 19 is still rare, especially regarding long distance mobility. Most of the latest papers are focused on urban mobility. Nevertheless, a few papers have considered long distance transport as the sector has been strongly impacted, as mentioned by Taczanowski (2020). In Poland and Italy, train services were reduced by -40% and -90%, respectively, during the first lockdown (Taczanowski, 2020). The topic can be investigated more in-depth as academics assume that the COVID 19 effect could lead to a "new normal" (Vickerman, 2021). According to Vickerman (2021), the development of teleworking and the fear of crowded spaces could lead the public transport services towards a severe crisis, calling into question the dominant model of a deregulated competitive scheme for public transport, especially for long distance services.

The research question has for objective to test the assumption of a "new normal" for long-distance services. The first challenge is to characterize the market before the COVID 19 pandemic to better understand its current evolution. The second challenge is to identify the main stakeholders and their strategies faced with the different sanitary regulations.

The empirical research is based on a large panel of data. As the COVID 19 crisis was not initially expected, the data collection started on four routes in France where competition was expected for train services by 2020 in line with market liberalization. Also, the initial purpose of the data collection was to assess the effect of train liberalization on the current train market as well as on the other modes in terms of price and frequency. Consequently, the data collection started in September 2019 and was still active in December 2021 for four modes: coach, carpooling[1], train and air. The analysis is based on time series from September 2019 to October 2021. Prices and frequencies are discussed as main variables on an aggregated scale for all modes then mode per mode. Finally, the intensity of the competition is analysed on two scales: intramodal and intermodal. The Herfindhal Hirschman Index is used to assess the level of competition through market concentration (Lypczynski et al., 2017).

The main results have to be considered carefully as the pandemic is still ongoing at the end of 2021. However, the progress of vaccination in Europe and France during the second part of the year 2021 suggests a return to a normal state of the market. The first finding was the severe crisis in terms of supply during the first lockdown in March 2020. The effect of the other sanitary regulations and lockdowns during the rest of the years 2020 and 2021 have been progressively reduced and services increased slowly until recovering a level similar to 2019 for rail and carpooling. However, this is not yet the case for coach and air services. The second finding is market concentration to the advantage of the dominant mode, train services, especially in comparison to air as the main challenger for long distance trips. Air services still have difficulties in recovering their activity, mainly because of the reduction of the business market. The last finding highlights the persistence of conventional services during the different lockdowns and the high variability of low cost services which disappeared during the crisis. However, no operator became bankrupt during the crisis or had to leave the market, mainly thanks to the public support. Also, the low-cost services were recovering faster in September-October 2021 than conventional services, thereby finally increasing their market. The crisis in the business market may explain the difficulty for conventional services confronted by low cost ones better adapted to the leisure market. Consequently, the effect is higher intramodal competition, mainly between the incumbent and

[1] Carpooling can be defined as an arrangement where two or more people, not belonging to the same household, share the use of a privately owned car for a trip, and the passengers contribute to the driver's expenses (Delhomme and Gheorgiu, 2016).

the challengers in each mode. Finally, the new normal may only confirm old trends with the development of low-cost services and more competitive markets.

The practical implications are several for policy-makers and operators. Firstly, the COVID 19 pandemic highlights the key role of the public national incumbents during the crisis in ensuring a minimum service when other operators were stopping their activities, and providing specific services like sanitary trains in France. Secondly, there is a risk with the end of public financial support to transform the long-distance business into "business for survival" as the sector is highly sensitive to sanitary regulations and has become more competitive mainly because of tension in demand. Finally, most of the market segments are in a situation of duopoly. The risk of reaching a situation of monopoly for an operator is high if the challenger goes bankrupt. The public regulators must certainly remain vigilant in the next month regarding the effect of sanitary regulations and public financial support to avoid higher market concentration.

The paper is structured around 6 sections. Section 2 presents the motivations underlying the French case and the context for long distance services. Section 3 describes the data collection and method. Section 4 gives the global results after which section 5 discusses them mode per mode. Finally, section 6 concludes the paper.

2. Context

The motivations underlying the French case study are several. First of all, the French market can be characterised by a wide variety of services for long distance from train to carpooling, as described in subsection 2.1. Subsection 2.2 shows that France, like other European countries, has imposed strict for sanitary regulations with three lockdowns and other restrictions especially on long-distance trips. Finally, subsection 2.3 highlights the severe effect of the crisis on demand and transport companies.

2.1. A large panel of transport services for long-distance travel

The French case is interesting due to the large choice of transport services available on long distance routes. Laroche and Lamatkhanova (2021) showed that the diversity of service in the French market is similar to those of Germany, Italy and the UK. The services are mainly train, coach, carpooling and air. Consequently, analysis of the French market can give insight into trends on other markets after considering certain specificities of the French market. Firstly, most services are in a situation of duopoly or monopoly. Secondly, some of them are quite new and were still in a consolidation phase before the COVID 19. Thirdly, the low-cost services are well developed on the market.

More specifically, train services are still in a monopoly with the national incumbent (SNCF). The first competitors were expected for 2020 but the first lockdown and other sanitary regulations delayed the projects until the end of 2021. However, the high-speed market can be characterized by an innovative service as the SNCF is the first European operator to develop the concept of low-cost high-speed services (called Ouigo) since 2013. It can be interesting to distinguish low-cost services (Ouigo) from traditional services (Inoui) and analyse the "home made" competition between both. Concerning air services, they are subject to a duopoly for long distance trips for which the travel time for rail is longer than 3 hours and to a monopoly for the shorter trips. The national incumbent is traditionally Air France which can compete with Easyjet. The coach market is quite new in France in so far as it has been opened to competition since 2014. One of the first players was Flixbus. There were several other competitors in the first years but confronted by the consolidation of the market, there were only two main competitors at the beginning of 2020 before the first lockdown: Flixbus and Blablabus. Blablabus can be considered as a challenger and its history is original. Launched by the national train company (SNCF) in 2014 (IDBUS), the company was bought by the French leader in carpooling services (Blablacar) in 2019 with the ambition to become a multimodal actor in the passenger transport market. Finally, Blablacar is a

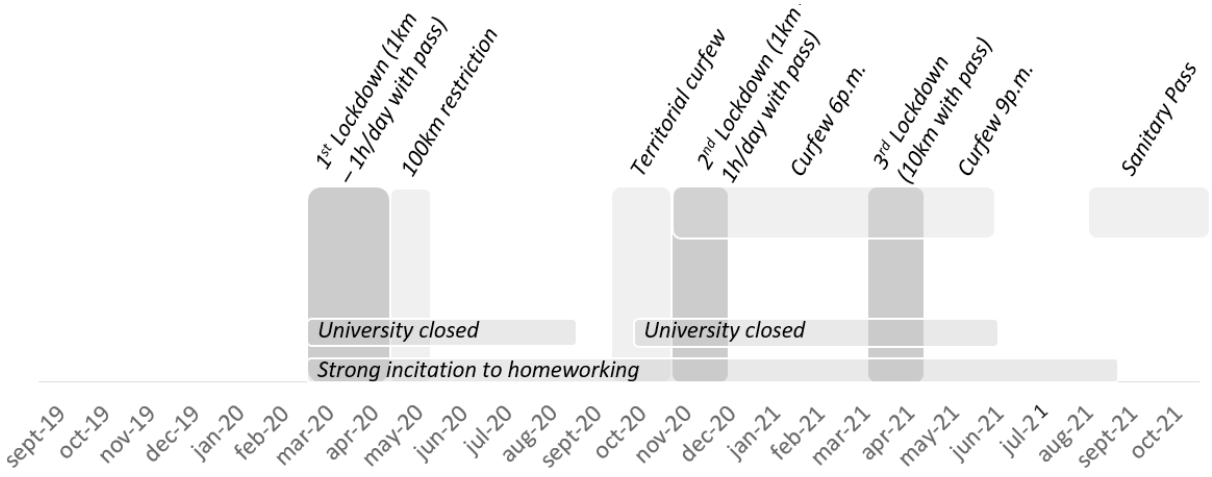
success story in France and in Europe for carpooling services. Established in 2006, it had 100 million of members in 2021 (Business Insider France, 2021).

To conclude, it will be interesting in the next sections to consider the effect of COVID 19 at both the global level and also mode per mode.

2.2. Sanitary regulation policy

The second motivation for the French case is the choice made by the French government to adopt a strict position against the COVID19 with a wide range of sanitary regulations. Figure 1 illustrates the chronology story of regulations from 2020 to 2021.

Figure 1: Timeline of the sanitary regulations in France.



Source: Author

The first lockdown was imposed in March 2020 some days after Italy but in line with the majority of the other European countries. From 17th March to 11th May, it lasted 8 weeks during which mobility was strongly limited to 1 hour per day within a perimeter of 1 kilometre with a pass. From 11th May to 28th May, the lockdown was loosened for local mobility but stayed restrictive for long-distance mobility with journeys limited to 100 kilometres for essential reasons. Long-distance transport services have been particularly impacted by these restrictions. Summer 2020 was particular for several reasons. In appearance, it was a "normal" summer. In detail, the obligation to wear a mask in public areas, transport included, had a potentially negative impact on long-distance services. Also, the limitation of international trips and the development of the "fear of social contact" changed certainly mobility behaviour and habits during summer, especially on long distances. The trend of summer 2020 continued at the beginning of September, with a lower level of restriction but permanent the sanitary regulations (mask, etc.). In this context, the universities opened their doors and invited students to travel long distance so they could be physically present in the classroom after 6 months of online courses. Unfortunately, the number of COVID 19 cases increased drastically during autumn, leading the French government to implement the second lockdown from 30th October to 15th December. The measure was postponed after a period of territorial curfews in the localities the most infected. The curfew lasted from 9 p.m. until 6 p.m. before the second lockdown. It was similar to the first one. Trips were limited to one kilometre for one hour per day with a pass. An additional measure was a global curfew throughout mainland France from 6 p.m. Here again, the long-distance services were strongly impacted. The universities again closed their doors until summer 2021 and teleworking became the norm for millions of workers. Although the second lockdown was lifted in December 2020, the restrictions remained very strict throughout winter 2021 with the national curfew imposed at 6 p.m., the closure of restaurants,

bars, ski stations, etc. The third lockdown was ordered from 3rd April to 3rd May. After that, the restrictions have been progressively alleviated with the end of the curfew on 30th June and the vaccination campaign. Finally, summer 2021 has been "normal", like summer 2020, with the permanence of restrictions the mask-wearing and the introduction of a sanitary pass for vaccinated people excluding the non-vaccinated from certain modes of transport (air, train), restaurants, etc. In October 2021, 70% of the French population was vaccinated against COVID 19, making it possible to return to a "normal" life with the end of the massive teleworking policy and usual work schedules in the universities. Here, the question of autumn 2021 by comparison to the period of September-October 2019 can be asked to assess the effect of one year and half of restrictions and verify if a "new normal" has emerged from this period.

To conclude, long-distance services have been particularly impacted by the different sanitary regulations. Long-distance trips have been forbidden for many months for the majority of the French population along with the closure of universities and massive teleworking, resulting in a withdrawal from the market of a large share of the usual demand for transport, if the student market and the business market are taken into account.

2.3. Effect on demand

This last subsection highlights the effect of COVID 19 on demand. It also compares the French trends to the European average. From a general point of view, the collapse in demand for long-distance transport services in France has been similar in terms of dynamics to the rest of the Europe. For the train market, demand decreased by -41% in 2020 by comparison to 2019 on the French market and by -48% on average in Europe (IRG-Rail, 2021). The situation was similar for air with a decrease of -67% for Air France and "only" -46% for Easyjet. The average in Europe was slightly higher with a decrease of -73% in 2020 by comparison to 2019 (Eurostat, 2021). For both modes, teleworking and the reduction of the number of business travellers certainly had a strong impact on the global dynamic.

For coach services, demand decreased by 65% over the period (ART, 2021). Considering carpooling services, they have the particularity of being less affected than other modes by the collapse in demand, with "only" -25% (Vérier, 2021). It is possible to assume that the user profile for carpooling is less sensitive to COVID 19 because of an age or other effect.

Finally, it is interesting to consider that road traffic on French high-speed roads increased by +7.6% during summer 2021 by comparison to summer 2019 according to Vinci Autoroute (Investir, 2021). This finding could highlight for long-distance trips a similar dynamic to urban mobility where an increase the car-use has been observed (Klein et al., 2021; Macharis, 2021).

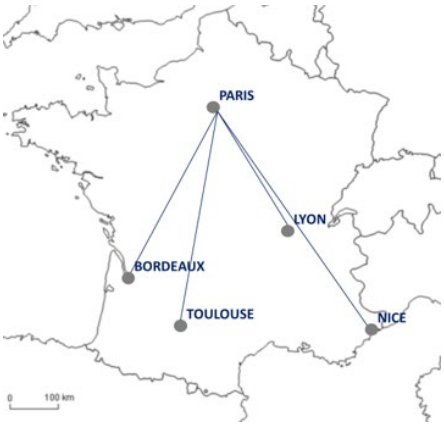
3. Data

This section presents the perimeter of the study in subsection 3.1. The data collection method is described in subsection 3.2. Subsection 3.3 details the method.

3.1. Study perimeter

The analysis is based on four main routes in France as shown in figure 2: Paris – Lyon, Paris – Bordeaux, Paris – Toulouse and Paris – Nice.

Figure 2: Study perimeter



Source: Author

The selection was motivated by the high probability of seeing a new train operator facing the incumbent in a context of market liberalization (2020), as the initial question of this research was about the effect of a new competitor for long-distance train travel. The effect of COVID 19 delayed this introduction and made it necessary to change the research question.

Consequently, the interest of the perimeter is to mix routes with different characteristics like travel time by train. Lyon and Bordeaux are less than 3 hours from Paris but more than 3 hours from Toulouse and Nice. The effect is a larger presence of air services for latter two destinations but fewer trains and other services like carpooling and coaches. Also, it is interesting to consider that the Paris – Lyon route is one of the most important high-speed lines in terms of traffic in Europe, with more than 44 million travellers in 2019.

3.2. Data collection and sources

Data were collected every Tuesday since September 2019 on each route and for four modes: train, air, coach carpooling. Tuesday was selected for its representativeness during the week. The collection was performed one week before except for carpooling because of the high variation of supply at the last minute. In this case, collection was performed one day before to consider more than 90% of the supply.

The collection concerned each mode and each service (only direct without connections) during the day with price, schedule, travel time, etc. In total, the database is composed of 87 days and more than 14 000 observations between September 2019 and October 2021.

The main sources are the websites dedicated to the different modes. Most of them are comparators because of the competition between operators. Two exceptions are for train and carpooling where the markets are monopolies. For rail, we used the commercial website of the SNCF where all the train offers are consigned. For carpooling, there are several operators but only one drives the market. Blablacar's website is the reference for carpooling. For the other modes, the comparators were used. For Air, Google flight gives a full overview of supply during a day while the European website Omio.fr was used for the coach services.

Table 1: Sources for the data collection

Mode of transport	Source
Train	www.oui.sncf
Air	www.google.com (flight)
Coach	www.omio.fr
Carpooling	www.blablacar.fr

Source: Author

3.3. Method

The method is based on time series and a descriptive analysis. The times series are given from September 2019 to October 2021. The variations between 2019 and 2021 are calculated on the basis of two reference months: September and October for 2019 and 2021.

The main variables used to give an overview of the market evolution are price, number of seats and number of services (frequency).

The price is given as an average price per kilometre for each mode or service. The number of seats is given per day for each mode and service. It is based on the number of seats per service and their frequency during a day. The number of seats can change from one service to another according to its characteristics. This is especially true for train services. For example, a low cost service proposes 634 seats versus 510 for a conventional HSR service. There is less heterogeneity for the other modes. The standard for a coach service is 50 seats, 150 seats on average for a standard Airbus A 320 and 4 seats at most per car for carpooling. Finally, the frequency is based on the number of services during a day.

The competition is assessed by the Herfindhal-Hirschman Index (HHI). It is a well-known index usually used to assess the concentration on the market (Lypczynski et al., 2017). It is based on the market share of each operator. In this study, the HHI is calculated on the basis of the number of seats for each mode or type of service per day. It is certainly the best indicator for giving a realistic view of the level of concentration on a market taking into account the capacity of each mode and the frequency of the services.

4. Results

The results are split into two sections. Subsection 4.1 gives an overview of the COVID 19 effects in terms of price and capacity. Subsection 4.2 focuses on the effects for each mode.

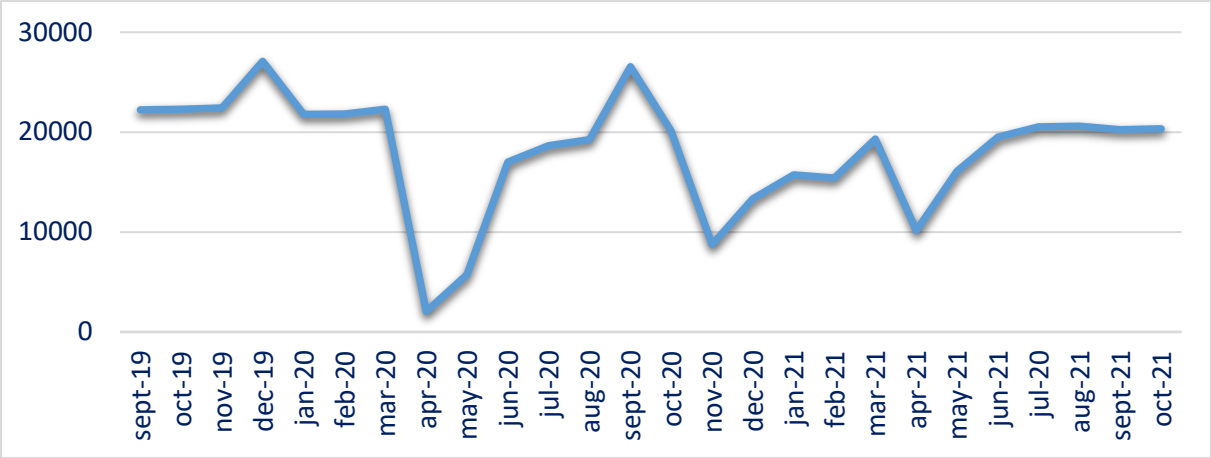
4.1. Market overview

The analysis of the effect of COVID 19 is based on several indicators. The first one gives a global overview of supply in terms of number of seats available on the market (figure 3). The second allocates the seats to the different modes to assess their modal share (figure 4). The analysis is detailed through the HHI to illustrate the level of intermodal competition on the market (figure 5) and the evolution of the supply mode per mode (figure 6). The last one focuses on the average price per kilometre for all modes (figure 7) and mode per mode (figure 8).

Regarding the number of seats, figure 3 shows a global decrease between the period September/October 2019 and September/October 2021 of -9%. From an average of 22 000 seats per day on the panel in 2019, there were no more than 20 000 seats in 2021. This drop is rather limited in comparison to the effect of the first lockdown on supply. Almost all the services stopped and there were only 2 000 seats in average per day during April 2020 (-91%). With a decrease of -56% and -47% respectively during

the two other lockdowns, the effect of sanitary regulation seemed to have had progressively less impact. Nevertheless, the supply is still below the initial stage and several assumptions can be made to explain this fact such as the development of new behaviours such as videoconference for business travellers or again the preference for private cars for leisure travellers.

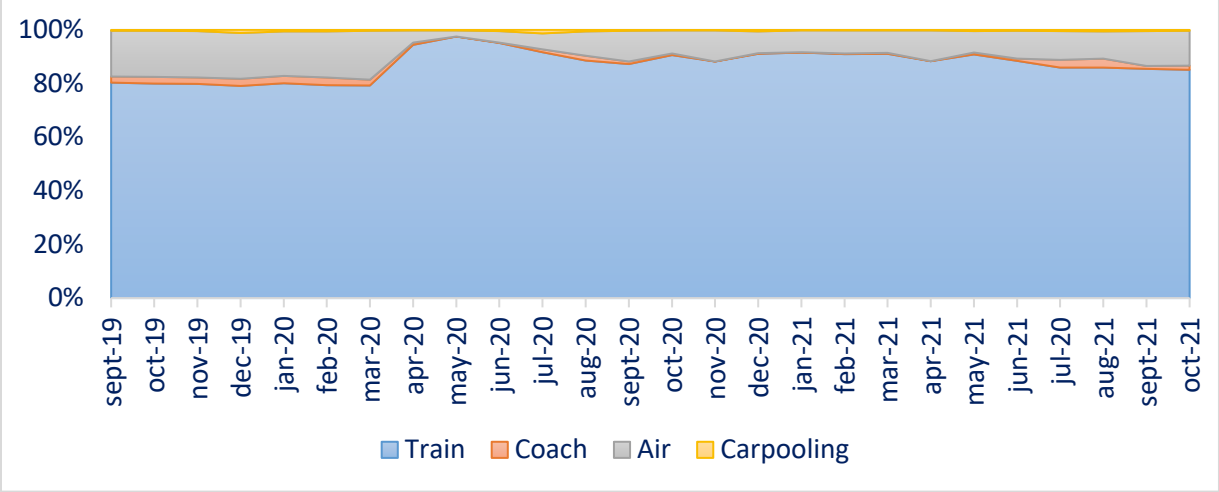
Figure 3: Global number of seats (average per route and day).



Source: Author

Figure 4 shows the main intermodal interactions. It highlights the strong market power of train services. They represented 80% of the market in 2019 versus 85% in 2021. Although coach and carpooling had a marginal share of the market (respectively 0.4% and 2.2% in 2019), rail increased its market power to the detriment of air services. The market share of the latter fell from 17% in 2019 to 13% in 2021. The first lockdown was very severe for the air services where the market share dropped to 4.6% before recovering to around 11% during the two other lockdowns. Nevertheless, the situation remains difficult for air services. For the other modes, it is interesting to consider that carpooling has been more constant than the other modes with a modal share between 0.4 and 0.2%. However, coach services have been strongly impacted with the stoppage of services during the second and third lockdowns. The result was an increase of the concentration of the market to the advantage of rail services.

Figure 4: Global market share of each mode (based on the number of seats)

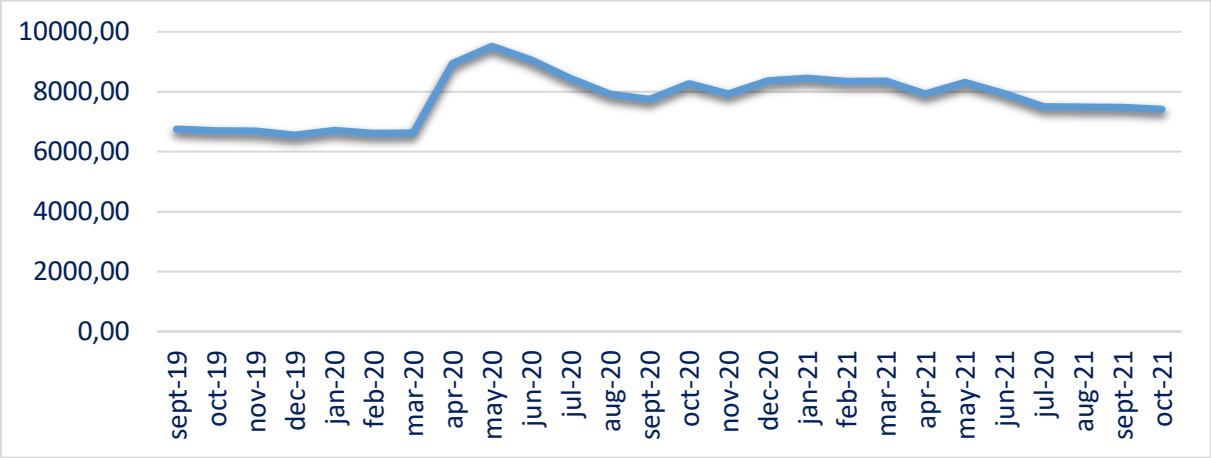


Source: Authors

According to figure 5, the HHI increased by 9.8% over the period with a peak during the first lockdown, placing the rail incumbent in a dominant position on the market. Figure 6 shows that rail services almost

returned to their initial level in 2021 by comparison to 2019 with an index of 96 (base 100: September/October 2019). This was far from the case for air and coach services with respectively 65 and 64. Carpooling services were in an intermediate situation.

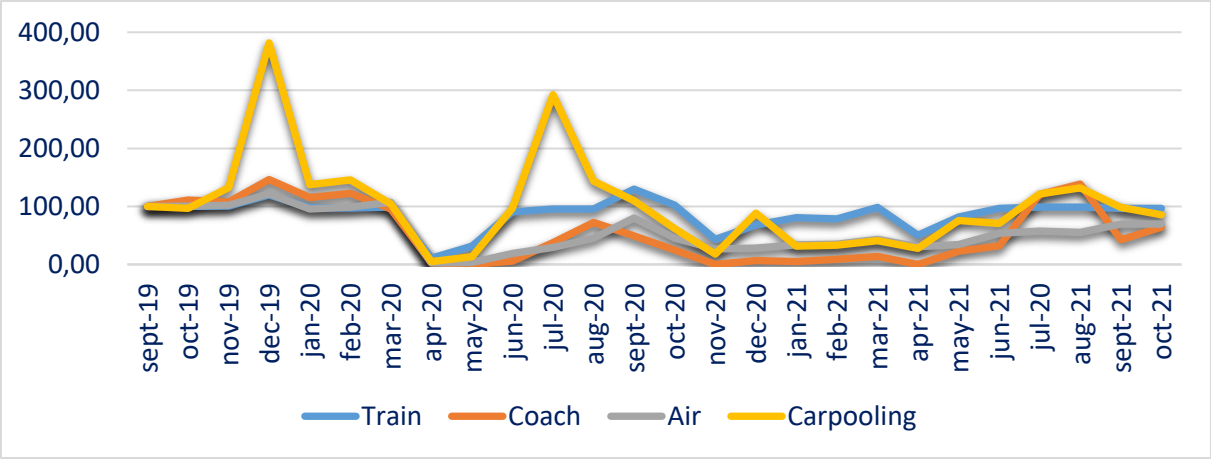
Figure 5: Global HHI (based on the number of seats)



Source: Authors

Also, figure 6 highlights a specific behaviour of carpooling services. They had the largest variations in terms of seats available, especially during peak period like Christmas or during the summer. This can be explained by the business model of carpooling as drivers are free to share their trips on the platform. Consequently, carpooling services are not a planned offer like other modes and can be considered as a direct expression of transport demand. Indeed, it is possible to assume that if the number of drivers increases then the demand for transport is certainly higher. The effect is a better utilization rate for the other modes although some variations can be observed, especially for coach services, well known for their flexibility, but also for rail and air. To conclude, the return of rail services to their initial capacity may hide a lower utilisation rate of rail than in 2019. This situation could limit the market power of rail services mainly in terms of prices.

Figure 6: Capacity evolution in terms of seats per mode (base 100: September 2019)

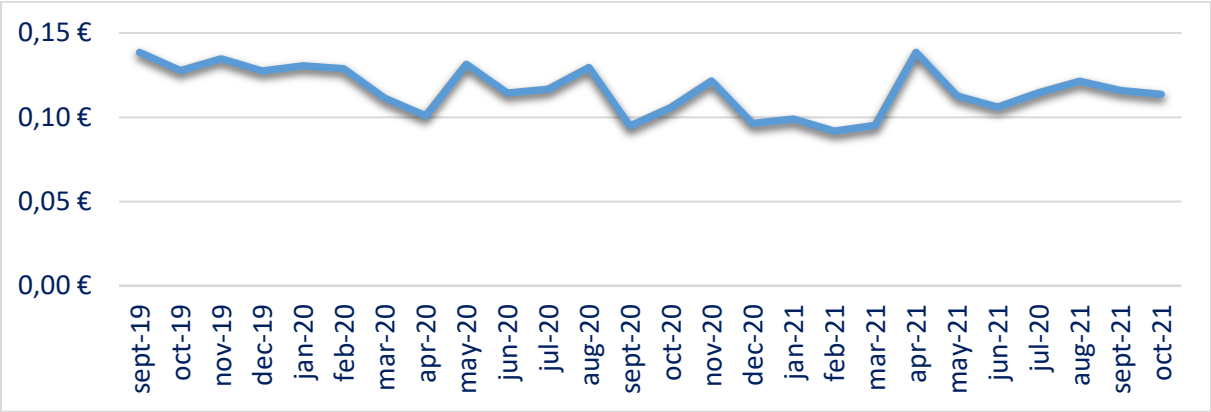


Source: Authors

About price, the effect of COVID 19 is unexpected. The figure 7 highlights a price decreasing during the period by -13.7%. The average price per kilometre was around 0.14€ in September 2019 against 0.11€ in October 2021. During the period two types of reaction can be observed face to the sanitary regulation. The first lockdown had a strong effect on price (-22%). It can be explained by the global

collapse of the offer. The two others lockdowns had an inverse effect by increasing prices. The main explanation will be to find in the composition of the services between low cost services and classic services (cf. section 5). The share of low cost services has been strongly reduced during the two last lockdowns inducing a price increase. Finally, the global price reduction on the period is questioning. This finding is at the opposite of the rest of the economy in France and around the world where the inflation makes its come back. In France, prices increased by almost 4% in October 2021 by comparison to October 2019 (the economist, 2021)[2]. Several assumptions can be made. Firstly, it can be the sign of a reduction of the demand. Lower prices can be strategic to stimulate demand in a situation where operators have overcapacity, especially for train services. Secondly, the ratio between low cost services and classic offer can be determinant for prices. Finally, the COVID 19 changed potentially strongly the business organisations with less physical meetings and more by videoconference. The reduction of this market, usually characterised by a higher purchase power, could impact the commercial strategy of operators and forced them to discount.

Figure 7 : Global price (average per route and day)

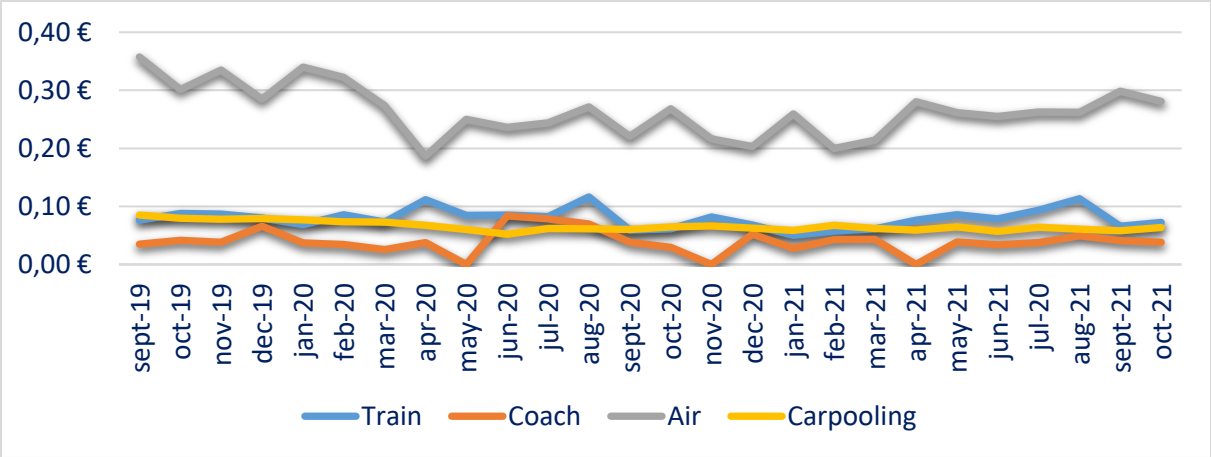


Source: Authors

For a better understanding it can be interesting to consider the price dynamic mode per mode in the figure 8. From a general standpoint, all price dropped excepted for the coach services. The biggest is for carpooling services (-26%) from a price average of 0.09€ per kilometre to 0.06€ in 2021. The second is for train services (-16%) from 0.08€ to 0.07€ and air services (-12%) from 0.36€ to 0.28€. Considering the lockdowns, prices reacted differently according to the modes of transportation. For air, prices are the higher by comparison to the other modes. They decreased during the first and second lockdown but increased during the third. It can be explained by the strong reduction of the offer and the financial public support to maintain a minimal offer during the two first lockdowns. Concerning the train services, it is interesting to consider that the average price per kilometre in not so far from the carpooling services. It can provide from the development of the low cost offer whose the extinction can have a positive effect of prices (increase) as during the three lockdowns. Nevertheless, it is interesting to observe that the train incumbent does not seem benefited from its dominant position on the market to increase prices. For the carpooling prices, the reduction is strongly correlated to the price oil during the year 2020. They should increase in next month face to the oil jump price. Finally, the coach services increased their prices after an extinction of their services during the lockdowns. The focus in the subsection 4.2 highlights the difficulties of the sector to find the economic equilibrium.

[2] https://www.economist.com/finance-and-economics/american-inflation-global-phenomenon-or-homegrown-headache/21806433

Figure 8: Detailed price per mode (average per route and day)



Source: Author

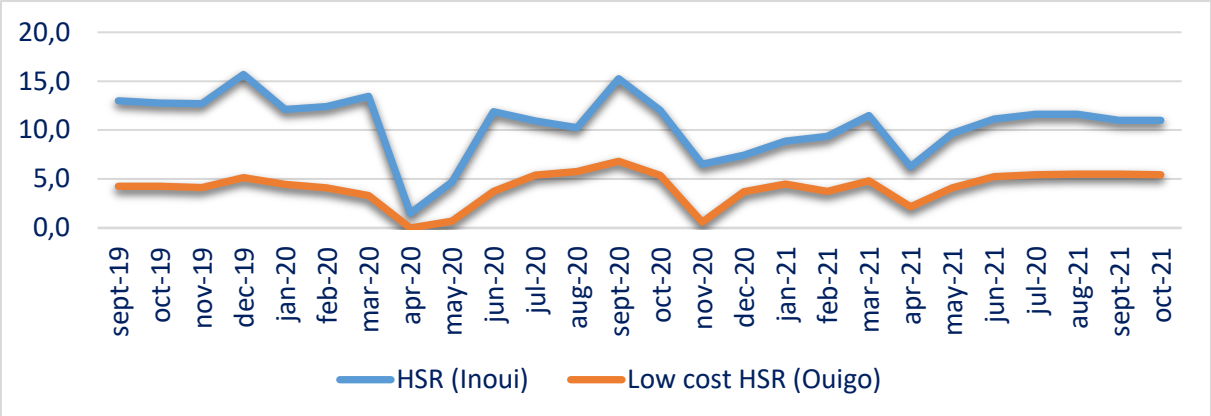
4.2. Mode focus

This subsection proposes to make a focus mode per mode on price and frequency dynamics.

4.2.1. Focus on rail services

The rail services can be split into two types: the conventional High Speed Rail (HSR) service (INOUI) and the low cost HSR service (OUIGO). From a general standpoint, figure 9 shows that the first lockdown was dramatic for both services. The conventional HSR almost stopped its services, reducing them from an average of 13 trains per day to 2 while the low-cost services stopped all traffic. The effect of the two other lockdowns was less severe although each time traffic was halved and the low cost services were more impacted than conventional HSR. However, the share of low-cost services increased significantly in the global rail offer from 2019 to 2021. The average number of trains per day decreased by almost -15% for the conventional HSR but increased by +30% for low cost HSR. The result was a substitution of conventional HSR by low cost HSR with a bigger market share of low cost HSR (from 22% in 2019 to 30% in 2021). The HHI decreased by 10% during the period pointing to greater competition between both services and a form of "homemade competition".

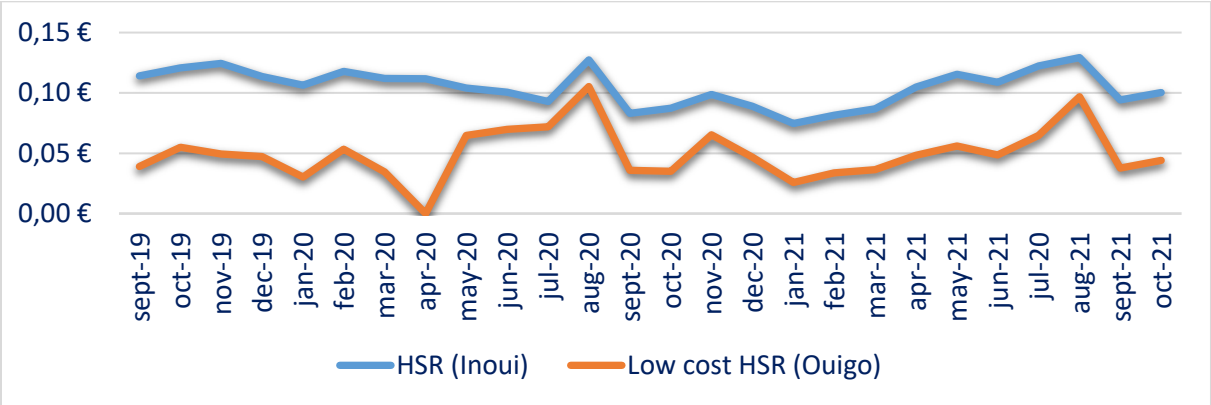
Figure 9: Train frequency (average number of trains per day and route).



Source: Author

Concerning prices for train services, the analysis is always more difficult because of yield management practices. Figure 10 shows that prices seemed to be more sensitive to the summer holidays than lockdowns. Nevertheless, it is interesting to observe that prices decreased by -17% and -16% respectively for conventional HSR and low cost HSR between 2019 and 2021. This result was unexpected in so far as the concentration of the market increased in favour of rail services during the period. At least two explanations can be given. Firstly, the global reduction of demand generated over-capacity and put pressure on prices. This is clear for the conventional HSR where the frequencies and prices were reduced during the period. The severe crisis on the business market linked to teleworking and videoconference can be an explanation. Secondly, the train market has been open to competition since 2020. With two years of delay, the first competitors should enter the market at the end of 2021. In this perspective, the incumbent has an interest in moderating prices on conventional HSR and improving its low-cost services to be competitive.

Figure 10: Average train price per kilometre (per day and route).

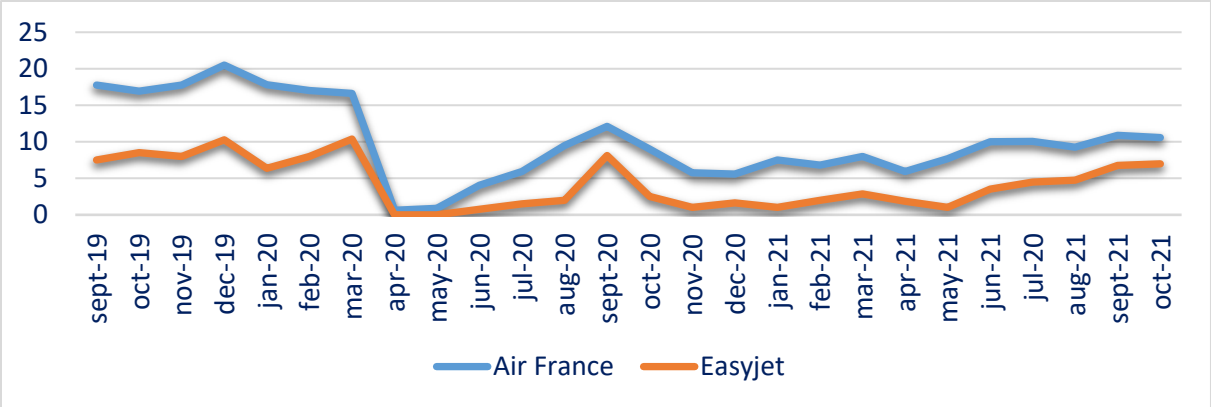


Source: Author

4.2.2. Focus on air services

The air services are split between two operators. The national company, Air France, traditionally runs conventional services in opposition to EasyJet, the well-known low cost company. As shown in figure 11, the first lockdown had dramatic effects on both companies with the shutdown of services. During the two other lockdowns, the market share of EasyJet remained lower than usually (around 20% versus 30% in 2019) with a market concentration to the advantage of Air France. However, the balance of power evolved quickly since summer 2021 with EasyJet almost catching up with Air France. Consequently, from 2019 to 2021, the frequencies ensured by Air France decreased by almost 40% whereas they dropped by "only" 14% for EasyJet. The market share for low-cost services increased from 30% in October 2019 to 40% in October 2021 and the HHI fell by -8% pointing to a higher level of competition on the market. As for the conventional rail services, the difficulties of Air France to return to its initial level may be the sign of a crisis on the business market where EasyJet is certainly in a better situation thanks to its strong position on the leisure market supported by its low price policy.

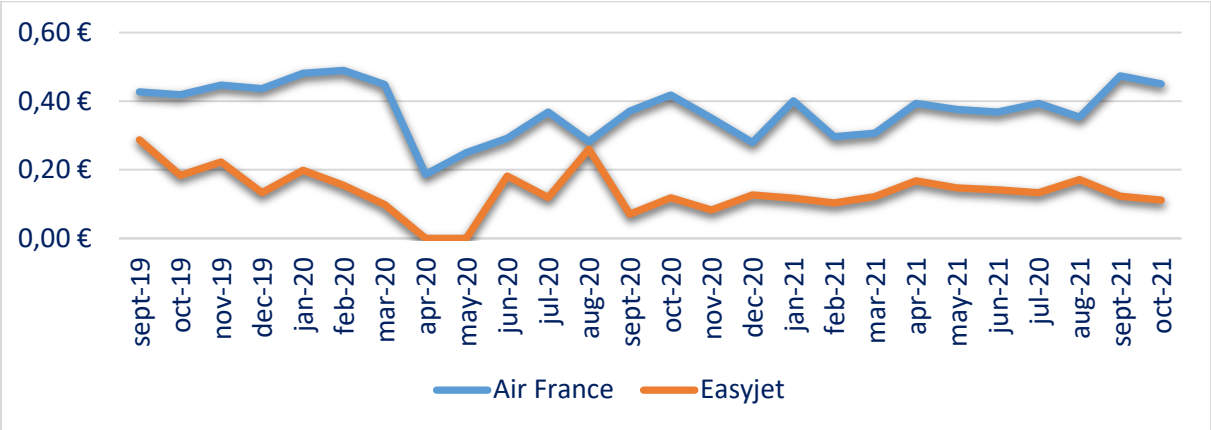
Figure 11: Air frequency (average number of flights per day and routes).



Source: Author

Regarding prices, as with rail, yield management practices limit the analysis, especially during the lockdowns. However, figure 11 highlights a strong divergence between the strategy of Air France and EasyJet. Air France increased its prices by +9% when EasyJet decreased its prices by -50% between 2019 and 2021. Reported in figure 11, EasyJet has an aggressive strategy of increasing supply and decreasing prices while Air France seems to have difficulties in maintaining its offer competitive. To conclude, the low-cost services seem to have increased their market share after two years of COVID 19. This last point will be discussed in section 5.

Figure 12: Average air price per kilometre (per day and route).



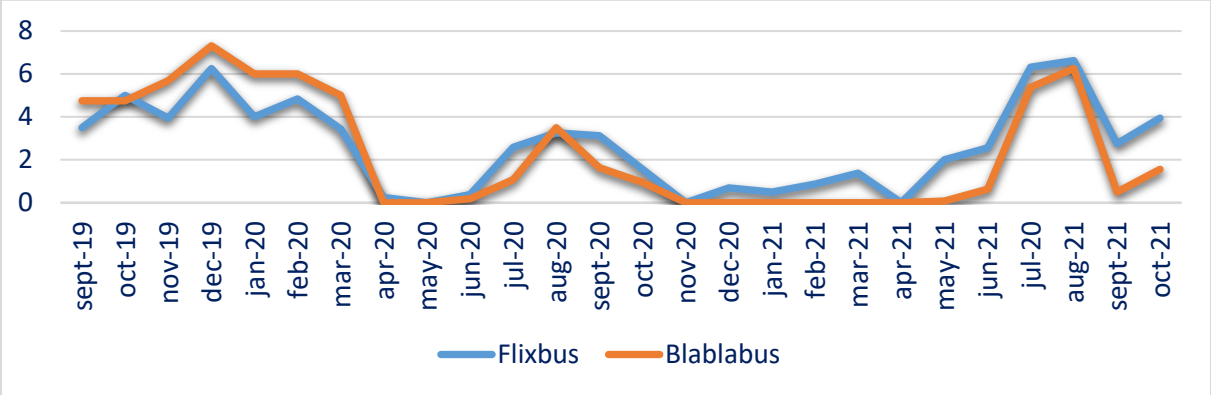
Source: Author

4.2.3. Focus on coach services

The coach market is characterised by a duopoly between two companies: Flixbus and Blablabus. Whereas for the rail and air services, it is possible to distinguish a conventional company from a low cost one, this is not the case for the coach market. Both operators are similar in their services and prices. They started their services recently, after 2014, and the market was still in a phase of consolidation in 2019 with direct competition for the market. Figure 13 exemplifies these characteristics. Both operators adopted a similar strategy during the three lockdowns with a shutdown of their services. Flixbus had a small advantage between the second and the third lockdown as it remained alone on the market. From a general standpoint, Flixbus seems to have performed better between 2019 and 2021 than Blablabus. In 2019, Blablabus was above Flixbus in terms of market share (49% versus 38% respectively). The

situation was the opposite in September/October 2021 with 62% of the market for Flixbus versus 18% for Blablabus. However, it is important to note that the frequencies are highly variable and sensitive to demand. In a conventional scheme, the situation of Blablabus could be interpreted as a difficult position. However, it is interesting to remember that Blablabus is part of Blablacar where demand is expressed by car drivers and car passengers. Consequently, Blablabus's excellent ability to adapt capacity to demand could be a competitive advantage over Flixbus whose business model is more conventional.

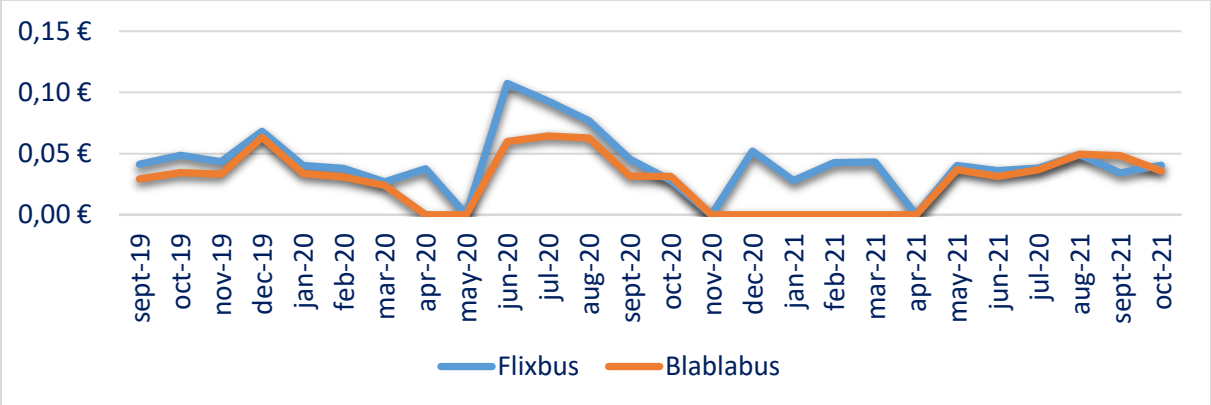
Figure 13: Coach frequency (average number of coach per day and route)



Source: Author

Figure 14 gives interesting findings on prices. Both operators are very close in terms of price strategy although Flixbus enjoyed its dominant position between the two lockdowns to maintain its prices. Considering the situation in 2019 and 2021, Blablabus was certainly in an aggressive position in 2019 with higher frequencies than Flixbus and lower prices. Unfortunately, COVID 19 has changed the game in favour of Flixbus which was in the lead in 2021 on the market with price convergence. Blablabus had to increase its prices by +32% between 2019 and 2021 while Flixbus decreased them by -17%. To conclude, the market is still in the process of consolidation and sanitary regulations had a strong effect on the dynamics of the operators. New sanitary restrictions could lead one of the operators to go bankrupt.

Figure 14: Average coach price per kilometre (per day and route).

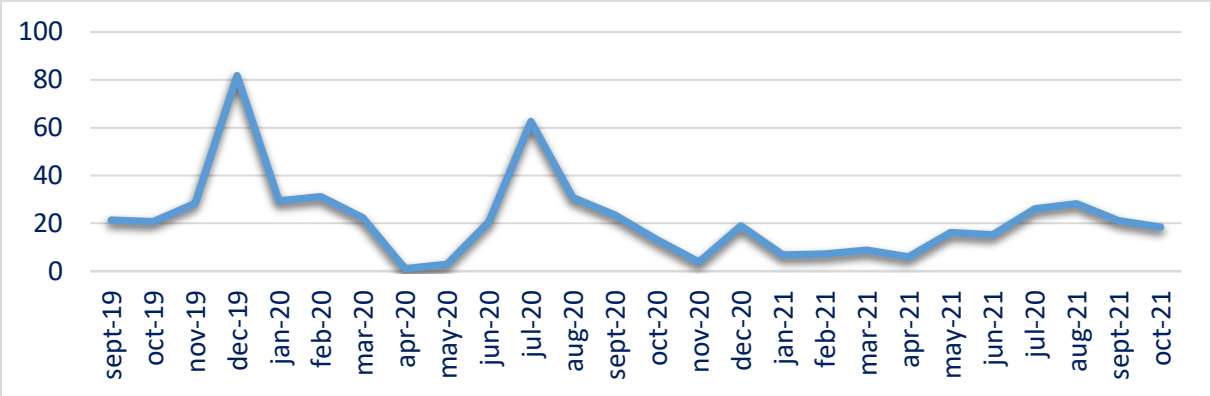


Source: Author

4.2.4. Focus on carpooling services

The carpooling market is specific for several reasons. First of all, there is mainly one operator for long distance trips, Blablacar. Some other platforms tried to develop alternative services without success until 2021. Secondly, Blablacar is a digital platform on which car drivers are free to share their trip and fix their price according to a limit fixed by the platform (calculated on the distance and based on the gasoline price and tolls). In economics, the business model of Blablacar can be defined as a two-sided market (Rochet & Tirole, 2003) with a strong position of the platform on the long-distance market. Consequently, figure 15 does not show a planned conventional offer but the results of an aggregate of drivers willing to share their trips. The variations in the offer are very high and the peaks are strongly dependant on the holiday periods during winter (Christmas time) and summer.

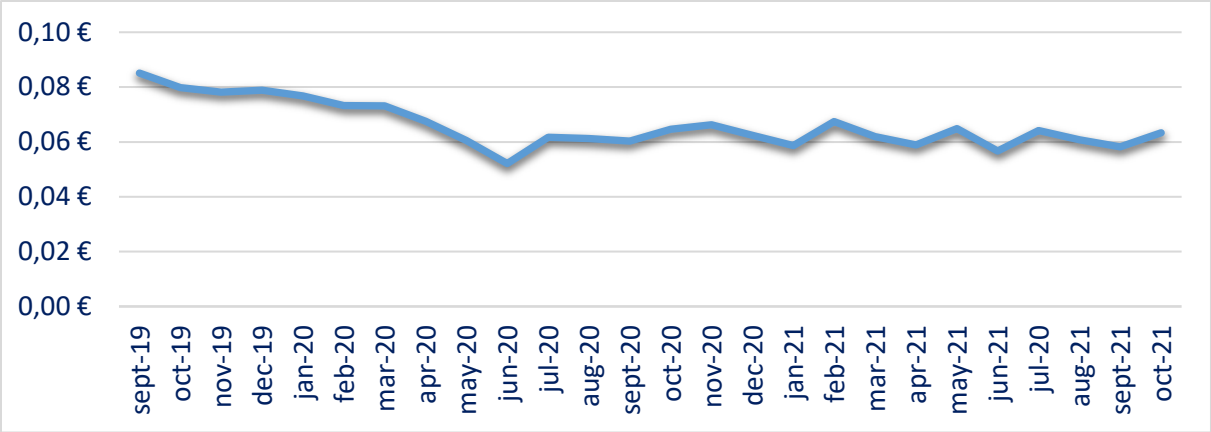
Figure 15: Carpooling frequency (average number of cars per day and routes).



Source: Author

The Covid 19 has had two interesting effects on supply. Firstly, traffic stopped during the first lockdown and were strongly reduced during the two others. Secondly, a change in drivers' behaviour seems to have occurred between 2020 and 2021. Although summer 2020 saw a classical peak, summer 2021 was below usual performance levels and the global supply fell by -6% between 2019 and 2021. The first explanation could be the simple evolution of the demand for transportation. Considering that the carpooling offer is dependent on the willingness of drivers to make trips, the carpooling supply is certainly the best indicator for assessing the level of demand for long-distance transport. Consequently, it is possible to assume that global demand decreased between 2019 and 2021, especially for the leisure market. This could also explain the reduction in supply for other modes. The second explanation can be linked to the "fear of social relationship". This psychological effect of Covid-19, depending on the fear of being infected, has been identified for other modes of transportation (Aaditya & Rahul, 2021). Finally, the last assumption is based on gasoline prices. They decreased during 2020 before increasing during summer 2021. As drivers' time value is very high because of the cost of organizing the services, it is possible to assume that the service has become less attractive for drivers. Figure 16 supports this hypothesis. Prices dropped by -26% throughout the period before increasing in October 2021. If they are linked to the gasoline price, they did not change significantly during the summer when oil prices were already increasing.

Figure 16: Average carpooling price per kilometre (per day and route).



Source: Author

5. Discussion

This last section has for objective to discuss two further aspects of the effect of the Covid 19 pandemic on long-distance services. Subsection 5.1. proposes a spatial approach based on the analysis of seat capacities route by route. Subsection 5.2. further questions the result on the increase of low-cost services.

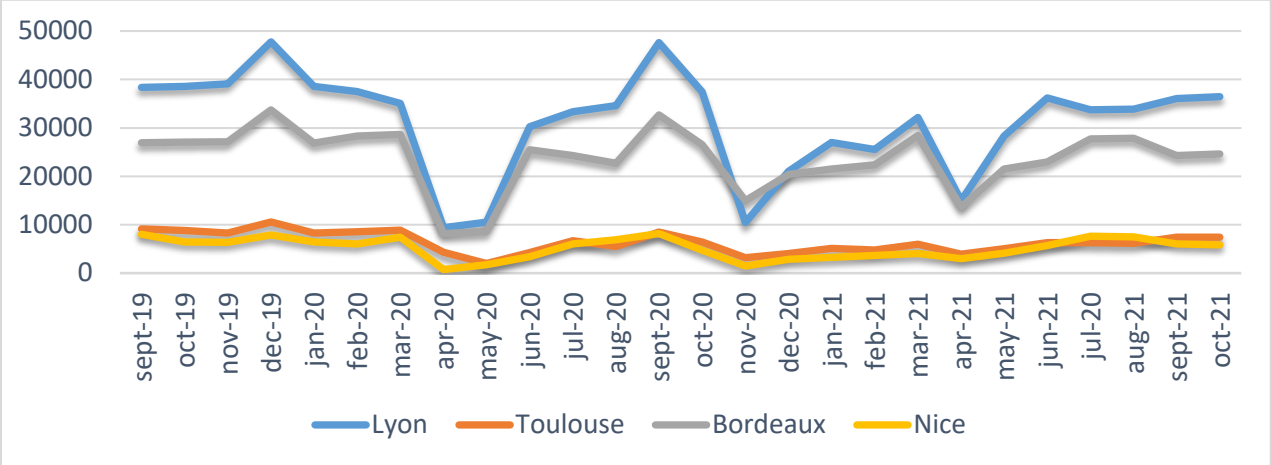
5.1. A spatial approach to the effects of Covid 19 on long-distance services

In section 4, the results were analysed by mode of transport. In this section, the objective is to provide an analysis per route to identify the potential spatial effect of sanitary regulations in France. We recall that the panel is based on the following four routes: Lyon – Paris, Bordeaux – Paris, Toulouse – Paris and Nice – Paris. It is interesting to consider that each of them has specific characteristics. Firstly, distance is a key parameter for distinguishing them. Lyon and Bordeaux are closer to Paris (466km and 586km, respectively) than Toulouse (677km) and Nice (933km). A second characteristic is the population size in the metropolitan area. Lyon is the biggest (1.3 million of inhabitants), Bordeaux and Toulouse are similar (749 595 and 783 353 inhabitants, respectively). Nice is the smallest with 550 000. Finally, their accessibility is heterogenic. Lyon and Bordeaux are directly linked to Paris by a High-Speed Line while Toulouse and Nice are still outside the HSR network. Consequently, the travel time by train to these destinations is longer and air services to them are more developed. Considering this, it is interesting to compare these routes and identify the potential effect of COVID 19 on seat capacities.

Figure 17 highlights the effect of COVID 19 on seat capacities for the four routes. The first comment is the effect of distance on seat capacities. The Lyon-Paris route is the shortest and offers the highest number of seats. The considerable difference in 2019 with Bordeaux can be also explained by the larger size of Lyon in comparison to Bordeaux. Otherwise, Toulouse and Nice are close in terms of supply. Toulouse has a small advantage due to its closer proximity to Paris and its bigger metropolitan area. The results are in line with the standard theory of the gravity model. Concerning the effect of COVID 19, the reduction in the number of seats was similar for Lyon and Bordeaux (-73% and -72%, respectively) but very different for Toulouse and Nice (-51% and -90%, respectively). In this case, it is difficult to draw a general law. The effect of the second lockdown was lower than the first one but highly heterogenic according to location. The effect of the latter was more unexpected with a stronger effect on short distances with respectively -54% for Lyon and -52% for Bordeaux and a lower effect on the longest distances with respectively -34% for Toulouse and -26% for Nice. Finally, all the destinations lost seat capacities in September/October 2021 in comparison to 2019. Nevertheless, the two shortest distances lost less capacity than the two others. Lyon and Bordeaux reduced their seat capacities by -

5.7% and -9.5%, respectively, while Toulouse and Nice reduced them by -17.5% and -18%, respectively. The higher reduction for the latter two can be attributed to the difficulties of the air services in returning to their initial level of service. Also, the better performance of Lyon and Bordeaux can be linked to the good performance of rail services, as seen in section 4. To conclude, the cities that are not linked to the HSR network or who are far from the main city (more than three hours) have certainly suffered more from the effect of COVID 19 than the others in terms of supply.

Figure 17: Distribution of seat capacities per route (average per day).



Source: Author

5.2. More low-cost services?

The results highlighted a possible increase in low-cost services for rail and air modes between 2019 and 2021. This last section proposes to test this finding.

Figure 18 compares the evolution of conventional and low cost supplies for air and rail in terms of frequency. In September and October 2019, there were on average 120 conventional trains and flights per day in the panel for 30 low-cost trains and flights. The modal share of low-cost services was around 25%. The effect of the first lockdown was dramatic for both services but stronger for the low-cost one. All the low-cost services stopped (rail and air) in comparison to the conventional one. The two other lockdowns had less impact on global traffic. However, the low-cost services were still more affected than the conventional one. During the second lockdown, the frequency decreased by -42% for the conventional services against -82% for the low cost. During the last lockdown, the decrease was -38% for the conventional versus -52% for the low-cost. This confirms the better flexibility of the low-cost service although in the case of serious crisis, the pursual of the full service offer is the guarantee of service continuity.

In September/October 2021, the average number of low-cost services during a day was around 34 versus 87 for the conventional offer. The lessons are several. Firstly, the number of low-cost services did not increase by much (+5.5%). They regained their dynamic before the COVID 19 pandemic. Secondly, the full service offer decreased by -28.5% over the period. They are far from the initial level with only 87 services per day against 120 in 2019. Consequently, the share of the low-cost offer increased in global traffic. Finally, the analysis confirms that the increase of the low-cost services is an illusion. There are more low-cost services because the conventional offer is still far below its initial level.

Figure 18: Average low-cost offer for rail and air per route and day versus the full service offer.



To conclude, figure 19 shows the ratio between low-cost services and conventional services for rail and air to control if the previous results are not driven by one or the other. For both air and rail, the ratio was higher in 2021 than in 2019, which confirms the previous results. If the ratio was higher in 2019 for air, signifying a larger share of the low-cost services, than for rail, it was the opposite in 2021. However, the ratio for air almost returned to the difference with rail in 2021, illustrating the aggressive strategy of EasyJet. It also confirms the severe crisis for the conventional offer traditionally driven by business trips. A survey and a demand analysis could be an interesting addition to this research to further explore the effect of COVID 19 on demand and the evolution of travel behaviours.

Figure 19: Ratio low cost services to classic services for train and air



Source: Author

6. Conclusion and practical implications

The COVID 19 pandemic is unprecedented in our modern society due to the strict regulations implemented all over the world in peacetime. These regulations have strongly impacted long-distance transportation by limiting the capacity of individuals to travel both between countries and within them. At the same time, some practices underwent strong development such as teleworking, the videoconference and others to find alternative solutions to physical mobility. The question in this study was about the effects of these shocks to long-distance transport services. The case study was France because of the difficulty to obtaining international data and the interesting position of this country thanks

to its large variety of services (rail, air, coach, carpooling) and its representativeness in terms of sanitary regulations (three lockdowns).

The main findings are several and have to be considered with caution because the pandemic at the time of writing in November 2021. The first finding is the severe crisis in terms of supply during the first lockdown in March 2020. The effect of the other sanitary regulations and lockdowns during the rest of the years 2020 and 2021 has been progressively reduced and services increased slowly until recovering a similar level to 2019 for rail and carpooling. However, this is not yet the case for coach and air services. The second finding is the market concentration to the advantage of the dominant mode, rail services, especially faced with the air service as the main challenger for long distance trips. Air services still have difficulties in recovering their activity mainly because of the reduction of the business market. The last finding highlights the persistence of conventional services during the different lockdowns and the high variability of low-cost services which disappeared during the crisis. However, it is interesting to consider two facts. Firstly, no operator went bankrupt during the crisis or withdrew from the different routes, mainly thanks to public support. Secondly, the low-cost services were recovering faster in September-October 2021 than conventional services, finally increasing their market share of the air, rail and coach markets. The crisis on the business market can explain the difficulty for conventional services confronted by low-cost ones better adapted to the leisure market. Also, the effect is higher intramodal competition mainly between the incumbent and the challengers in each mode. Finally, the spatial approach highlights the better resilience of cities connected to the High-Speed Rail Network that are close to the main cities. The cities that are not linked to the HSR network or that are far from the main city (more than three hours) have certainly suffered more from the effect of COVID 19 than the others in terms of supply. Consequently, the new normal appears only to confirm the old trends with the development of low-cost services and more competitive markets.

The practical implications are several for policy makers and operators. First of all, the COVID 19 crisis highlights the key role of the public national incumbents during a crisis to ensure a minimum level of service when other operators stop their activities. They also played a key role in provide specific services like sanitary trains in France. Secondly, there is a risk with the end of the financial public support to transform the long-distance business into “business for survival” as the sector is highly sensitive to sanitary regulations and is still weakened by the reduction of the business market. Also, most of the modes are in a situation of duopoly. The risk of reaching a situation of monopoly for an operator is high in the case of bankruptcy from the challenger. The public regulators will certainly have to remain vigilant in the next few months regarding the effect of sanitary regulations and public financial support to avoid higher concentration on the markets. Finally, the current market evolution with fewer air services could be an interesting trend for the future, considering the objective of carbon neutrality in France and Europe by 2050. The reduction of the business market can be a relevant lever for several reasons. Firstly, it may be easier to find alternatives to physical trips for business through the development of videoconference than for leisure or family trips. Secondly, business demand prefers frequency to low prices. A reduction of the business segment could favour fewer trains and flights per day but also a better utilization rate and commercial capacity thanks to the low-cost model. Finally, the benefit for society would not be only from an environmental viewpoint but also from a productive one, as the development of digital meetings is a strong driver of better productivity and planning organisation.

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