The job of public transport, ride-hailing and delivery drivers: conditions during the COVID-19 pandemic and implications for a post-pandemic future

Andres Fielbaum*[1], Felipe Ruiz[2], Giorgio Boccardo[2], Daniela Rubio[3], Alejandro Tirachini[4,5], Jorge Rosales-Salas[6]

[1] Cognitive Robotics Department, Faculty of Mechanical, Maritime and Materials Engineering, Delft University of Technology, Delft, The Netherlands. *Corresponding author, a.s.fielbaumschnitzler@tudelft.nl

[2] Sociology Department, Faculty of Social Sciences, Universidad de Chile, Santiago, Chile

[3] Faculty of Architecture and Urbanism, Universidad de Chile, Santiago, Chile

[4] Transport Engineering Division, Civil Engineering Department, Universidad de Chile, Santiago, Chile

[5] Instituto Sistemas Complejos de Ingeniería, Santiago, Chile

[6] Centro de Economía y Políticas Sociales, Universidad Mayor, Santiago, Chile

SHORT SUMMARY

Transport workers were among the most affected by the COVID-19 crisis. In several countries, public transport and delivery drivers were considered essential workers, and the demand changed dramatically. In this paper, we analyse the impact of the pandemic on the daily jobs of public transport, ride-hailing, and delivery app drivers through a survey applied during the first peak of the pandemic in Santiago, Chile. Probit regressions on job satisfaction identify the main COVID-related experiences that explain variations in subjective perceptions. Our results show that the unstable characteristics of app-based jobs sharpened during the pandemic: Public transport drivers have kept their jobs and with a similar income, whereas ride-hailing and delivery app drivers do not as they lack social security. Several ride-hailing drivers lost their jobs without any compensation, while delivery drivers earn less money per hour and are more exhausted.

Keywords: COVID-19, delivery riders, public transport drivers, ride-hailing drivers, sharing economy, transport apps regulation.

1. INTRODUCTION

Drivers have been among those more affected by the COVID-19 crisis, as the nature of their working conditions changed. On the one hand, the demand changed dramatically,

with a significant decrease in people's mobility and a boost in the need to move goods (Gramsch et al., 2020). On the other hand, the working experience itself also became different, as transport drivers were deemed "essential" and were tied with the unavoidable interaction with other people, implying risks of contagion, particularly if sanitary measures for virus contention were not properly implemented.

In this article, we analyse the impact of the first peak of COVID-19 on the jobs of public transport drivers, ride-hailing (ridesourcing) drivers, and delivery drivers (app-based, i.e., riders) in Santiago, Chile, and study how that impact changed depending on the type of job. We applied a self-administered survey to them, asking a set of questions on their current working conditions, and comparing their situation to the pre-COVID era. We analyse working conditions (e.g. type of contract, working time, wage, risk situations faced, social security), job satisfaction, and subjective well-being at work.

We recognise two main distinctions to analyze the different impacts of the pandemic, as depicted in Table 1. On the one hand, standard and non-standard working conditions (i.e. regular and full-time versus part-time and temporary contracts) imply different levels of social security and labour rights (Kalleberg, 2001), that can even mask labour informality situations. On the other hand, the pandemic affected people and goods mobility in very different ways, as the former decreased while the latter faced a boom (Irawan et al., 2021), and the exposure to infection is expected to be higher in close contact with people. Note that the implementation of lockdowns sharpened this difference, as people can no longer move, so they might require someone else to do their regular shopping or to deliver goods.

	Standard Working Conditions	Non-Standard Working Conditions
Passenger travel	Public transport	Ride-hailing apps
Transport of goods	-	Delivery apps

Table 1: Relevant features of the three types of jobs studied in the paper.

2. METHODOLOGY

Our analysis of working conditions and pandemic impacts on the job of driving for ride-hailing apps, delivery apps, and public transport in Santiago, Chile, is based on a voluntary online and self-administered survey. It was distributed between May and August 2020, during the first wave pandemic peak in Santiago, when the first and strongest containment measures were implemented. The survey was applied to both current and former drivers, targeting public transport drivers, ride-hailing app drivers,

and delivery app drivers. The situation before and during the pandemic was surveyed for relevant topics. The survey contains five groups of questions:

1. Socio demographics characteristics: age, gender, nationality, education level, current and pre-pandemic occupation, and educational activities.
2. Transport workers' characteristics: transport sector before and during the pandemic.
3. Working conditions: type of contract, working time (specifically, the weekly average number of working hours), wage, additional job (if any), risky situations lived at work, social security, continuity of complementary employment during the pandemic, and circumstantial incentives to work.
4. Job satisfaction: subjective well-being at work and satisfaction level with the driving job in general and with specific elements of the job.
5. Impacts of the pandemic: self-declared health status, reasons for abandoning the transport sector, fears of the pandemic, sanitary (health) measures, and protocols implemented at work.

The universe of ride-hailing and delivery app drivers is unknown and unreachable. Therefore, it is not possible to make a random sampling strategy, meaning that all the results are only valid for the respondents of the survey.

3. RESULTS AND DISCUSSION

Working conditions

Descriptive statistics in relation to the working conditions of drivers, plus our estimation of wage rates before and during the pandemic, are shown in Table 2. First, we analyse standard and non-standard contracts. We distinguish three main categories:

(i) Work contracts, which provide the most stable working conditions, based on recognising drivers as workers employed by a company.

(ii) Service contracts, in which drivers have fewer labour rights and no compulsory social security contributions. These contracts suppose that the driver is providing a temporary service to a third company, with no long-term responsibilities.

(iii) Informal working arrangements, as those between app-based companies and several drivers that do not have any written contract (a kind of labour informality).

Only in the public transport sector work contracts prevail. In ride-hailing apps, informal mechanisms with no type of written contract predominate (69.0%). In delivery apps, there is a greater prevalence (55.6%) of service contracts, whereas 30.8% of the drivers from delivery apps have no contract whatsoever. These figures confirm the usefulness of the classification proposed in Table 1, i.e., that app-based jobs are non-standard.

Average working time decreased in all groups during the pandemic. Delivery drivers show the smallest drop in working time (7.7% drop), followed by the public transport group (31.1% drop). The group with the greatest variation is the ride-hailing apps (42.9% drop). The two main jobs' features are relevant to explain these figures: Those who work with passengers now work fewer hours, because fewer passengers travel. However, this effect is softened in public transport due to the existence of fixed contracts and the decision to keep bus service frequency at a high level. On the other hand, the non-standard job arrangements for delivery and ride-hailing allow for a closer match between demand and supply.

We estimated drivers' hourly wages before and during the pandemic, which could be directly calculated as the respondents reported their monthly income and the number of hours worked per week. Our estimation of hourly wage rates shows that wages did change because of the pandemic, and that the variation was different depending on the type of job: whereas wage rates in public transport increased, app workers slightly reduced their wages. In the case of public transport this can be explained because of an insufficient number of available drivers, which is covered with extra hours. The demand for ride-hailing dropped severely, which explains the decrease in those drivers' hourly wage. Delivery apps have faced a boom in their sales: why this yields lower hourly wages might relate to a higher number of riders, to the salary policies of the respective companies, or to the loss of nightly deliveries due to curfews.

Finally, the prevalence of extra jobs that are additional to those in the transport industry should be noted. Prior to the pandemic, the delivery sector had a greater relative concentration of cases with simultaneous employment in other sectors. In ride-hailing, 40% of cases had an additional job, distributed equally between full-time and part-time. As expected, the public transport sector is where the least prevalence of other employment was observed. During the pandemic, those extra jobs were largely lost: In the wake of a large economic shock such as the COVID-19 pandemic, these types of non-standard job arrangements become the single source of income for several drivers, significantly increasing their relevance as job generators compared to the pre-pandemic situation.

Variable	Category	Public transport	Ride-hailing apps	Delivery apps
Contract	Working contracts	100%	4.2%	2.5%
	Service Contracts	0%	14.1%	55.6%
	None	0%	69%	30.8%
	Doesn't know	0%	12.7%	11.1%
Weekly hours worked	Pre-pandemic: mean	48.5	44.5	37.8
	Pre-pandemic: variation coefficient	26%	45%	53%
	During pandemic: mean	33.3	25.4	34.9
	During pandemic: variation coefficient	36%	86%	59%
Hourly average wage in USD	Pre-pandemic	4.9	5.1	3.6
	During pandemic	5.3	4.9	3.4
	Change	0.4	-0.2	-0.2
Pre-pandemic: additional non-transport job	Yes. Full time	21.8%	20%	23.2%
	Yes. Part-time	13.8%	20%	32.6%
	No	64.4%	60%	44.2%
During pandemic: additional non-transport job continuity	Yes. From home	6.9%	21.4%	9.1%
	Yes. At workplace	79.3%	25%	15.9%
	No longer continues	13.8%	53.6%	75%

Table 2: Working conditions by type of work

Labour mobility due to the pandemic

Figure 1 shows a Sankey diagram of labour mobility due to the pandemic among the different groups. This mobility was very different depending on the group. The ride-hailing group was the largest before the pandemic, and it became the smallest during the pandemic (among those that still work in transport), mostly because ride-hailing drivers switched to delivery or they do not work in transport anymore. Most of the drivers that were doing deliveries before the pandemic remained in that job. Most of the new transport workers during the pandemic started to work in delivery. The public transport group remained mostly unchanged during the pandemic.

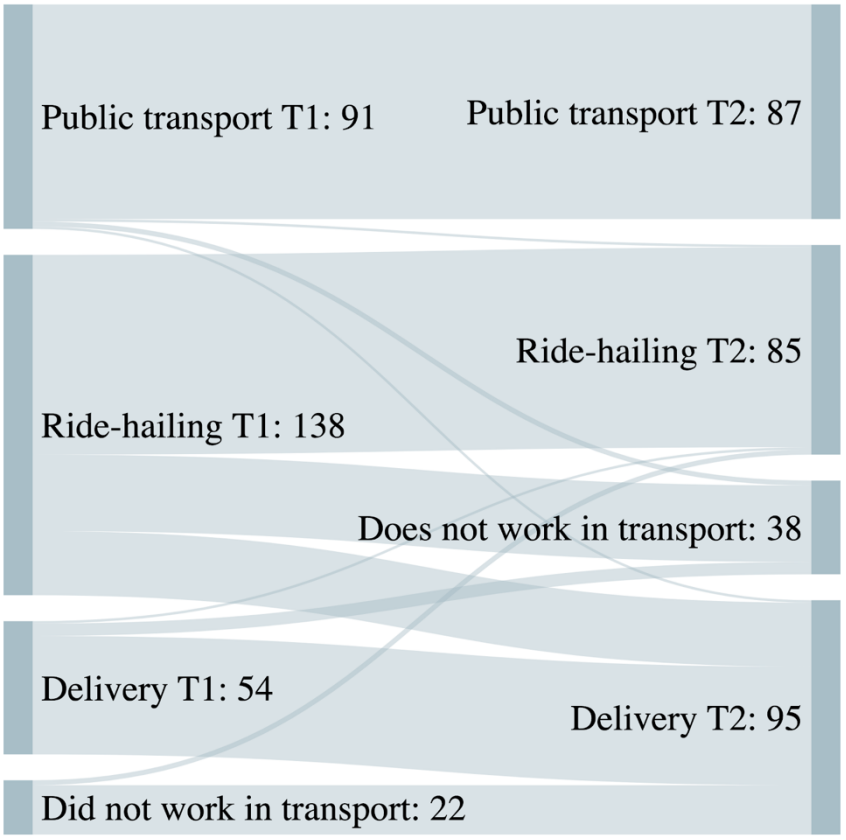

Figure 1: Labour mobility among different transport sectors, from T1 "before the pandemic" to T2 "during the pandemic".

Working in public transport is a standard working condition job, so it is less affected by this crisis. The other two jobs are non-standard, with the delivery sector gaining significant demand, and the opposite happening with mobility services. Working for the delivery apps became an alternative source of income for people whose regular jobs were lost or reduced.

Sanitary measures and employers role during the pandemic

We now analyse (Table 3) the health measures adopted in the transport industry during the pandemic. We can see that companies made different efforts depending on the sector. In the public transport sector, the implementation with company resources predominate; for the ride-hailing group, "implementation with own resources" is the most common response; and for the delivery group, mixed situations are observed. These differences have an effect on the level of implementation at all (last row for each measure). A relevant conclusion is that the existence of a regular employer, providing the necessary resources to implement these preventive measures, increases the chance that such measures do take place.

Group	Variable	Public transport	Ride-hailing apps	Delivery apps
Wear a mask	Implemented: company resources	91.8%	9.8%	52.5%
	Implemented: own resources	8.2%	68.9%	42.6%
	Not implemented	0%	8.2%	1.6%
Hand sanitisers usage	Implemented: company resources	88.5%	8.2%	55.7%
	Implemented: own resources	9.8%	70.5%	37.7%
	Not implemented	1.6%	8.2%	3.3%
Vehicle sanitisation	Implemented: company resources	70.5%	9.8%	3.3%
	Implemented: own resources	24.6%	68.9%	59.%
	Not implemented	4.9%	8.2%	34.4%

Table 3: Sanitary measures during the pandemic.

Changes in job satisfaction

As the pandemic impacted the whole daily working experience, the job satisfaction felt by transport workers is expected to change. To measure its changes, we replicated six questions regarding job satisfaction from the First National Survey on Job, Health and Quality of life (MINSAL, 2011): 1) Do you enjoy working? 2) Does your job leave you enough free time? 3) Do the concerns and problems from your job prevent you from enjoying your free time? 4) Do you finish your workday so exhausted that you only want to rest? 5) Does your job make you feel permanently stressed? 6) Have you thought about changing your job due to lousy labour conditions? In addition to these six questions, and considering the impact of the pandemic on wages, we also asked 7) Is your wage enough for your basic and regular needs? All these seven questions were answered in a Likert-type scale, and considering the pre-pandemic and the current situation. By these means, we can compare the answers to measure their change due to the COVID crisis.

Overall, there was a general decline in job satisfaction at the time of the pandemic (-19.3%), from a mean of 2.97 to 2.4. This is replicated for all groups, with the most significant variation occurring in the delivery drivers group (-21.7%). Only for the item "Enough free time", there is a positive but marginal variation during the pandemic (+4.5%).

In order to uncover how the different job types, as well as other working and sociodemographic characteristics, influence differences in job satisfaction before and during the pandemic, we specify ordinal probit regressions to identify the variables that

are statistically significant in increasing or reducing the different dimensions of job satisfaction under study. Probit and logit models are frequently used in transport analysis for the analysis of ordinal variables. For instance, Alemi et al., (2019) use an ordinal probit model to estimate the frequency of use of ride-hailing services in California, while Fielbaum and Tirachini (2020), use probit models to study the job satisfaction of ride-hailing drivers in Chile.

We estimated one probit model for each of the seven dimensions of job satisfaction. That is, each of the models is computed for only one of the explained variables. How to include the past and present situation in a probit model is not straightforward. Let X_{past} and $X_{current}$ be the dependent variables, and Z_1, ..., Z_n the independent variables. We are interested in the difference $X_{current}$-X_{past}, which cannot be directly used as the explained variable because the ordered models require the explained variable to be positive. To face this issue, we take X_{past} as another explanatory variable. By this means, if the pandemic has no effect, all the other variables will be not significant. We can look at it the other way around, i.e., the explanatory variables other than X_{past} will capture only the changes in the explained variable due to the pandemic, which is precisely our purpose. Results are shown in Table 4.

Global figures already revealed that the pandemic did have a strong effect on decreasing job satisfaction, and that such an effect depended on the job type. The results of the probit models in Table 4 detail the differences among job types, where it is not only relevant their current work, but also labour mobility during the pandemic. In all, the probit models prove plenty of meaningful relationships, such as the relevance of having served someone who looks like having COVID, or identifying that those that remain as delivery drivers report a stronger degradation in enjoying the work, stress, exhaustion, a desire of changing jobs, and receiving enough income.

Although the general effect is a clear deterioration in every index, the magnitude of such deterioration can vary significantly. Therefore, these findings are relevant to understand the impact of the pandemic situation in the transport job market at a detailed level.

	Enjoy working		Enough free time		Job concerns during free time		Exhaustion due to work		Stress due to work		Thinking of changing jobs		Wage in relation to needs	
	B	t	B	t	B	t	B	t	B	t	B	t	B	t
Explanatory variables														
Covid risk	1,23***	4,33	0,11	0,44	-0,76***	-2,86	-0,5*	-1,9	-1,06***	-3,87	-1,1***	-3,21	0,8***	3,02
Training	-0,23	-1	0,05	0,24	-0,29	-1,29	0,27	1,2	0,17	0,73	0,25	0,93	0,49**	2,18
Elderly care	-0,18	-0,63	-0,51*	-1,81	0,5*	1,77	0,34	1,22	0,69**	2,35	0,85***	2,59	-0,09	-0,33
Mask	-0,21	-0,26	-0,16	-0,19	0,77	0,9	0,78	0,91	-0,09	-0,09	-0,17	-0,18	-1,68*	-1,81
Hand sanitiser	0,06	0,1	-0,61	-1,02	0	0	0,14	0,23	0,32	0,5	0,16	0,26	0,82	1,29
Vehicles sanitisation	-0,13	-0,35	0,1	0,27	-0,08	-0,21	-0,31	-0,84	-0,72*	-1,9	0,17	0,41	-0,14	-0,36
Ridehailing-Ridehailing	-0,7*	-1,77	0,42	1,12	0,56	1,46	0	0,01	0,42	1,09	-0,23	-0,53	-0,05	-0,13
Delivery-Delivery	1,44***	3,29	0,22	0,51	-0,34	-0,8	-0,81*	-1,84	-0,89**	-1,98	-1,15**	-2,29	0,7*	1,66
Ridehailing-Delivery	0,12	0,29	0,05	0,12	-0,03	-0,06	-0,99**	-2,21	-0,39	-0,86	-0,98**	-2,06	0,27	0,63
PreCovid Satisfaction	-0,4***	-3,14	-0,68***	-6,02	-0,11	-1,22	-0,44***	-4,4	-0,56***	-5,41	-0,69***	-6,07	-0,31***	-3,07
Sociodemographic														
Age	0,97	1,43	0,82	1,2	-0,02	-0,03	-1	-1,47	-0,78	-1,12	-0,65	-0,84	0,24	0,36
Gender	-0,58**	-2,03	-0,42	-1,47	0,03	0,12	0,17	0,6	-0,06	-0,2	1,51***	3,89	-0,27	-0,96
Tertiary education	-0,5**	-1,98	-0,14	-0,56	0,07	0,28	0,17	0,72	0,19	0,75	0,19	0,66	-0,41*	-1,69
Working conditions														
Keeps full-time job	0,41	1,29	0,17	0,55	-0,64**	-1,99	0,27	0,84	-0,63*	-1,84	-0,3	-0,83	-0,46	-1,44
Keeps part-time job	0,09	0,23	0	0	-0,26	-0,75	-0,16	-0,46	-0,24	-0,67	0,18	0,41	-0,58	-1,58
Lost full-time job	0,09	0,21	0,34	0,83	-0,43	-1,05	-0,08	-0,19	-0,16	-0,38	-0,64	-1,38	0,22	0,52
Lost part-time job	0,42	1,1	0,68*	1,79	-0,73*	-1,91	-0,2	-0,54	-0,7*	-1,72	-1,32***	-2,96	0,34	0,88
Current working time	-1,12**	-1,97	1,09**	2,04	1,04*	1,89	-0,83	-1,56	0,82	1,48	0,49	0,83	-1,09*	-2,07
Current wage	-0,96	-1,18	0,1	0,13	-0,68	-0,87	-0,81	-1,04	0,16	0,2	1,08	1,24	-1,98**	-2,48
Past working time	0,14	0,23	-1,24**	-2,09	-1,83***	-3,1	0,67	1,14	-0,95	-1,52	-1,65**	-2,44	1,67***	2,81
Past wage	0,47	0,82	0,29	0,5	-0,14	-0,24	-0,24	-0,41	-0,57	-0,96	1,19*	1,86	1,35**	2,3
Intercepts														
1--2	-0,2	-0,19	0,37	0,35	-0,03	-0,03	0,44	0,42	1,28	1,14	1,14	0,93	-0,26	-0,25
2--3	0,36	0,34	1,54	1,48	0,54	0,53	1,24	1,18	2,03	1,82	1,55	1,27	0,53	0,52
3--4	1,46	1,37	2,49	2,36	1,39	1,35	2,11	1,99	3,01	2,67	3,47	2,75	1,62	1,57
4--5	2,41	2,23	3,53	3,29	2,24	2,17	2,89	2,71	3,94	3,45	4,39	3,42	2,65	2,53

Table 4: Value of the coefficients and t-test for each of the models. We mark with one, two or three asterisks when the respective variables are significant for $\alpha = 0.1,\ 0.05$, and 0.01, respectively.

4. CONCLUSIONS

The health and economic crisis provoked by the COVID-19 pandemic has had a strong impact on the transport sector, where its drivers have been particularly affected both because of the risks of catching the virus while working and by the changes in the demand for their services, with profound implications for job satisfaction and related concerns that go well beyond job-related matters. In this paper, we analyse these issues and compare the situations lived by different types of driving jobs, by studying a survey applied to drivers working in public transport, ride-hailing and delivery companies during the first wave peak of the pandemic in Chile (2020).

Our results confirm that the magnitude of the COVID-19 impact has been quite large for all these jobs, and that the negative effects are stronger for those that work (or used to) for app-based companies, many of whom have changed jobs (mostly leaving ride-hailing and/or joining delivery) and whose hourly wages have been reduced, a fact that is very relevant because many complementary jobs (other than transport) have also been lost. The reduction in people's mobility induced a decrease in working times for ride-hailing and public transport drivers.

App-based jobs have rapidly emerged in the past few years, and the consequences of their non-standard working conditions have been thoroughly discussed, expressing concerns about the lack of labour rights and protection. All these characteristics were sharpened by the pandemic. As such, a relevant implication of our study is the need to regulate these jobs to ensure that they count with the same social security provisions as regular jobs, i.e., to recognize that drivers are working for the respective companies.

The lack of regulation has other relevant effects on public health, as public transport drivers report the highest use of preventive measures (such as masks or hand sanitiser gel), which responds to the fact that those measures were mostly implemented by their employers, whereas app workers, deemed as "independent partners" by the companies, had to implement them mostly using their own resources.

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