(Partial) Exit and Voice in the Labor Market: Evidence from the Digital Water Cooler

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Abstract

Workers who are dissatisfied with an organization may express their discontent by exiting or by employing voice, options which are traditionally treated as substitutes. In this paper, we examine how technology-enabled platform work impacts the classic exit-voice framework, suggesting that the flexible nature of these work arrangements creates intermediate options for discontented workers: they can *partially* exit by shifting their allocation of work between platforms. We argue that under certain conditions, exit and voice may act as complements instead of substitutes: that is, both exit and voice will rise as alternative options improve. We empirically examine this question in the context of the ride-sharing market. Exploiting time variation in Lyft's market share gains on Uber in 59 U.S. cities between 2014-2018, we analyze posts from the largest online forum for ride-sharing drivers. Analyzing conversations at the "digital water cooler" allows us to quantify how drivers' discussions of the exercise of both exit and voice shift in response to market conditions. We show that as Lyft gained market share, drivers in those cities both increased their discussion of signing up and working for Lyft (partial exit), and increased their discussion of labor organizing (voice). Using topic modeling, we provide detailed evidence of the specific conversational topics that shifted in response to Lyft's market share gains.

1 Introduction

The question of how workers express their dissatisfaction with organizations – whether due to organizational decline, scandals or perceived exploitation – is an important one. In Hirschman's (1970) landmark theory, exit and voice are positioned as alternative responses to discontent. This original framework implies that exit and voice are substitutes – that is, when exit options become more feasible, exit increases and voice (i.e., actively expressing discontent) decreases. Indeed, a number of papers illustrate the substituting effect of exit and voice in both employees and consumers (e.g., see Gans et al., 2017; Adhvaryu et al., 2019). In this paper, we revisit this framework in light of the increasing prevalence of technology-enabled platform work, and provide empirical evidence on

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voice in organizations in the presence of alternative options. We argue that under the circumstances enabled by platform technology, exit and voice may function as complements instead of substitutes. In particular, we contend that when the possibility for organizational retribution is initially high, exit and voice are *both* likely to increase in response to alternative options.

Exploring the context of the gig economy, we introduce the concept of *partial* exit: the idea that workers need not leave a platform entirely when they are dissatisfied, but rather partially shift their labor allocation to alternative platforms. We suggest that new platform technology serves to remove the friction from the exit process and affords near-continuous adjustment of labor across platforms. We then formulate two key predictions for how the emergence of an alternative platform will affect worker behavior. First and most obviously, the gains to the alternative platform lead more workers to practice partial exit, by signing up for the newly attractive alternative and/or shifting some of their labor there. Second, the emergence of the alternative platform reduces the threat of impactful retribution, increasing workers' likelihood of exercising voice in the form of labor organizing.

In testing these predictions, we look to the ride-sharing market, analyzing over 600,000 posts from more than 15,000 drivers on uberpeople.net, the largest online forum for ride-sharing drivers. This highly active forum functions like a digital version of the proverbial water cooler, acting both as a space for socialization and knowledge-sharing. Studying posts on worker forums allows us to not only measure the extent of voice in a novel way, but to classify the content of the "conversations". Exploiting the uneven gains in market share made by Lyft – at the expense of the dominant platform, Uber – across 59 cities in the U.S. from 2014 to 2018, we examine how an increased Lyft presence in a given city affects the online behavior of the drivers based there. We show that drivers utilize the forum more as Lyft gains prominence in their city: a 10 percent increase in Lyft market share is associated with 3.6 more posts per driver in the subsequent month, an increase of more than 25 percent over the mean. We then show that the two specific areas that see greater activity as a result of Lyft market share gains are the subforums dedicated to discussing *Lyft* and *Advocacy*.

Using topic modeling, we provide descriptive evidence of the semantic subjects within subforums that see increased discussion as a result of higher Lyft share. We show that within the *Lyft* forum,

drivers increase their discussion of signing up for the platform, and their hours spent driving for the platform, following Lyft market share gains – evidence that drivers are responding to the emergence of the alternative platform by exercising partial exit. We also demonstrate that within the *Advocacy* forum, drivers increase their discussion of organizing, strikes, and employee status following Lyft market share gains – evidence that improved alternative options are also associated with greater voice. We then provide evidence for our proposed mechanism of the reduced threat of organizational retribution, showing that discussion of unceremonious firing (or "deactivation") falls as Lyft market share rises.

This paper makes contributions to several different literatures. First, it contributes to the literature on how workers express their dissatisfaction with organizations, particularly the exit-voice theory and its extensions. Our contribution suggests a theoretical framework for understanding when exit and voice will function as complements, rather than substitutes, in the presence of alternative options. This allows to us explain some of the mixed results regarding the effect of exit on voice. Second, we contribute to the burgeoning body of work on platform technology and the gig economy. This context is growing in relevance – it is estimated that about a third of U.S. workers have an alternative work arrangement as their primary job (Gallup, 2018; Bracha and Burke, 2018). While research on itinerant or contract work has a long history (e.g., Kunda et al., 2002; Barley and Kunda, 2006), the emergence of digital platform technology has enabled alternative forms of work on a new scale, and research interest in the setting is growing in tandem. However, as noted by Capelli and Keller (2013), most management and organization theories are still based on the presumption of full-time traditional employment. In response to that call, we revisit a classic theory of the organization in light of features of the new economy, with important implications for interfirm mobility and competition (Wezel et al., 2006).

Last but not least, we study the content of workers' expression of voice. Most previous empirical literature on the effect of voice in organizations investigates the effect of having the option of voice (either through labor unions or formal mechanisms in organizations) on exit or other individual- or organization-level outcomes (for a review, see Bashshur and Oc, 2015). Analyzing online communities allows researchers to gain a glimpse into users' conversations (Autio et al., 2013), and allows us, in particular, to document the precursors to collective action. With the help of text

analysis tools such as topic modeling (Hannigan et al., 2019), we are able to understand better how workers communicate with one another. Our results show that the "digital water cooler" can serve as a venue not only for knowledge sharing and socialization (Hwang et al., 2015; Faraj et al., 2011, 2016), but for labor organization and advocacy as well. Additionally, our analysis shows that the content of the conversation between workers dynamically changes with the condition of the labor market.

The paper will proceed as follows: in the subsequent section, we will review the literature on exit and voice, introducing in particular the idea of partial exit. We then further develop our theoretical framework and our hypotheses for how gains from the alternative platform will affect worker behavior. The "Data and Methods" section will describe the online forum we use to test our predictions and the construction of our measures. The "Results" section will summarize our findings in detail, and the "Discussion and Conclusion" section will examine the implications of our results and potential future research directions.

2   Background and Theory

In this section, we will outline our theoretical framework on how alternative options can influence the likelihood of exit and voice. We then discuss some particularities of the gig economy context, and introduce the idea of partial exit. We develop two primary hypotheses to test in the setting of the digital water cooler.

The Exit-Voice Framework

In Hirschman's (1970) classic framework, exit and voice are positioned as alternative responses to organizational decline, with loyalty being a third factor that influences the choice between these levers. This framework has been applied in a number of organizational settings, with implications for consumers as well as employees. Later adaptations of the framework extended the theory to other contexts – such as romantic relationships – and added a fourth response, neglect (Rusbult et al., 1982). Subsequent work examined how various contextual factors moderate the relationship between exit and voice. For example, Davis-Blake et al. (2003) showed how the use of nonstandard employees by organizations may reduce standard employees' loyalty and raise the likelihood of

both exit and voice. McClean et al. (2013) demonstrated how weaker managerial responsiveness increases the likelihood that voice will be followed by exit.

As shown through this work, the relationship between exit and voice is not perfectly straightforward, and they clearly do not always function as perfect substitutes. Indeed, Hirschman himself stressed in later work that exit and voice are not always alternatives in the manner of a classic seesaw relationship, but under certain circumstances might work in tandem. In discussing a political setting – the German Democratic Republic – he suggested that one of these circumstances might be the sudden availability of a new exit option:

> What happens here is that the newly won right to exit actually *changes* the human agents involved...Once men and women have won the right to move about as they please, they may well start behaving as adult and hence as *vocal* members of their community. (Hirschman, 1993)

What Hirschman seems to be suggesting here is that the presence of new alternative options increases the likelihood of voice as well as exit, making them complements. This contradicts the classical implication of the framework, which suggests that the presence of alternative options will increase the likelihood of exit and decrease the likelihood of voice. Evidence of this more standard seesaw pattern can be found, for example, in the paper by Gans et al. (2017), in which airlines with less market dominance were less likely to receive angry tweets when performance declined – presumably because consumers were electing to exit instead of complain.

The evidence on how the existence of alternative options changes the relationship between exit and voice is mixed, however. Rusbult et al. (1988), for example, found results suggesting that high quality alternatives increase the likelihood of both exit and voice, while Withey and Cooper (1989) found a positive relationship between alternatives and exit, but no relationship between alternatives and voice. We suggest that these seemingly contradictory patterns can be resolved when we consider the possibility of organizational retribution.

Retribution, Exit, and Voice

If we interpret the exit-voice framework through the lens of power, we can resolve the direction of the relationship between the quality of alternative options, exit, and voice. In particular, if we focus on the aspect of power that is potential for impactful retribution, then the predictions for voice in our two examples are clear. In the case of the GDR (Hirschman, 1993) where the potential for impactful retribution is close to its maximum (rights, freedom, and even life at stake), using voice is a risky option to exercise when there are no alternatives. Even if voice is the only option available, citizens may choose not to do so due to the costly risk involved. Then, when the number of alternatives increases – increasing the possibility for exit – the risk associated with retribution decreases, both because exit can be used to escape retribution, and because the organization (or the state, in this case) are less likely to exercise retribution for fear of mass exit. This shift empowers the possibility of voice, making exit and voice complementary. On the other hand, in many cases – for example, the case of airline consumers in Gans et al. (2017) – the potential for impactful retribution is close to its minimum. Using voice is a perfectly safe option even when the number of alternatives is low, so individuals are more likely to speak out when few alternatives are available. When the number of alternatives increases, individuals can choose between both exit and voice. In this case, as long as some prefer exit to voice when the choice is available, exit and voice will be substitutes.

For workers in organizations, retribution for speaking up can be quite high (e.g., Burris, 2012). Notably, the threat of retribution is reduced substantially when the possibility of *anonymous* voice is enabled; recent field experimental evidence has shown that the substitutable nature of exit and voice is upheld in an organizational context when workers are given the chance to express voice by completing an anonymous survey (Adhvaryu et al., 2019). Within the context of the ride-sharing market, however, there is not a clear opportunity for anonymous voice, and organizations have the ability to terminate drivers' platform usage at will and without explanation (Said, 2018). A driver's sudden "deactivation" means loss of livelihood, and the next best alternative to employ their vehicle asset is likely to be substantially worse. There is also evidence that some drivers believe Uber has retaliated by terminating drivers for speaking out, for example on Twitter or Reddit (Huet, 2014), contributing to the widespread belief that voice is risky. After Lyft gains

market share, the potential retribution of Uber termination changes in value. This makes voice a more appealing alternative after Lyft entry. We therefore hypothesize that in our setting, as the opportunity for exit to Lyft increases, voice should increase in tandem.

Specificities of the Gig Economy Context: Partial Exit

We next consider which features of the gig economy context affect the implications of this theoretical framework. One of the distinguishing implications of platform technology is not only that alternative options exist, but that the concept of *exit* itself takes on a new meaning. Rather than being a onetime decision to leave an employment relationship – one that involves some frictions – partial exit is a continuous process: once workers are registered with multiple platforms, they can continually adjust their allocation of work between them. In the ride-sharing context in particular, most prior work has considered the monopsonistic setting of Uber as sole platform in the ecosystem (e.g., Allon et al., 2018; Cachon et al., 2017; Kabra et al., 2017; Benjaafar et al., 2018). Under this setting, workers may substitute some portion of their hours driving for Uber for other part-time or contract work, or leisure. As another platform – Lyft – gains passengers, however, it becomes a clear high-quality alternative. Technology affords a near seamless transition of a worker's labor to the alternative platform, repurposing their vehicle, smartphone, and driving skills with little loss in value.

The nature of partial exit has one additional implication for its relationship to voice. In the classic exit-voice framework, once an individual has chosen to exit an organization, their motivation for exercising voice (within the context of that organization) falls dramatically: having departed, they naturally hold much lower stakes in the practices of the organization. At an individual level, this simple relationship is responsible for much of the intuition behind the classic seesaw pattern of exit and voice. With the possibility for partial exit, however, the relationship naturally weakens. If a driver shifts half her labor hours from Uber to Lyft, for example, her incentive to exercise voice with Uber might fall, but not disappear completely. Crucially, if Uber changes its policies and becomes comparatively more attractive to drivers, she can then shift her labor back from Lyft to Uber with little difficulty, meaning that raising voice with Uber might still be a useful exercise. This aspect of partial exit suggests that the departure of some drivers' labor hours to Lyft should not have the

same downward pressure on voice (with respect to Uber) as classic exit, adding strength to the prediction that the two responses may be complementary.

Under the framework of technological affordances, which are defined as the action possibilities in the context of some technology (Gibson, 1986; Zammuto et al., 2007; Faraj and Azad, 2012; Treem and Leonardi, 2013), partial exit is a novel affordance enabled by the constellation of technologies at play. Specifically, the combination of the competing platforms and the ease of switching between them, and the online community which makes it easy to find out about news, pricing, and promotions enables this new affordance of partial exit. Moreover, we believe that this affordance is novel even in the context of contingent employment, as drivers can and do switch employers at a within-hour time-scale. Importantly, because of the fast and cheap transfer of information and ease of switching platforms enabled by these technologies, partial exit is not only enabled but encouraged (Majchrzak et al., 2013; Davis and Chouinard, 2016). This distinguishes our setting from some other types of contingent employment where reputation and personal networks may be important avenues for sourcing work and which may discourage such rapid switching (Kunda et al., 2002).

Hypotheses

Our theoretical framework has two primary implications: first, that exit and voice are complementary when the threat of impactful retribution is initially high; second, that the partial nature of exit present in the gig economy enhances this relationship by reducing the downward pressure of exit on voice. Taken together, these implications suggest that *both* (partial) exit and voice should rise as the alternative option becomes more attractive – that is, as Lyft gains market share.

These predictions operate on the assumption that gains in market share in the ride-sharing market are driven primarily by rider, rather than driver demand – an assumption supported by statements from the companies themselves (Bosa, 2018). However, as it is a two-sided market, we are vulnerable to the possibility that driver choices are affecting the Lyft market share as well as their behavior. We will therefore look for evidence that drivers do indeed respond to the market share gains by choosing to partially exit – in particular discussion of *newly* signing up to drive for Lyft – to clarify the causal direction of the results. We hypothesize:

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Hypothesis 1. *Drivers will be more likely to exercise (partial) exit after Lyft market share increases.*

> **Hypothesis 1a.** *Drivers will increase discussion of Lyft, in particular discussion about signing up for the platform, after Lyft market share increases.*

The second prediction implied by our theoretical framework is that voice should increase along with (partial) exit as alternative options become more attractive. Our discussion thus far has conceptualized voice as an action aimed at pressuring management to enact change within an organization. In operationalizing voice, therefore, we focus on forum conversation that is clearly aimed at the organizational management in the hopes of compelling change: namely, labor organizing. While forum discussion of a strike, protest or lawsuit is clearly not equivalent to actually enacting one of these actions, it is a natural precursor to doing so, particularly because the internet is one of the only places drivers can gather to coordinate action. We therefore hypothesize:

Hypothesis 2. *Drivers will increase voice on the forum after Lyft market share increases.*

> **Hypothesis 2a.** *Drivers will increase discussion of advocacy, protests, and formal organizing after Lyft market share increases.*

In the following section, we will describe in more detail the specific data and methods we will use to test our predictions.

3 Data and Methods

Setting: Online Communities

Our primary research setting is a large online community specifically designed for ride-sharing drivers[1]. Online communities typically have an umbrella structure, in which there are subforums centered around specific subjects, and users can start new conversations ("threads"), or respond to existing ones. We describe the forum studied in this paper, uberpeople.net, as a type of "digital water cooler." The proverbial water coolers of the physical world are places where coworkers

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[1]While the community is named uberpeople.net, it has developed into a broad forum for drivers from all ride-sharing companies, not just Uber.

can gather for socialization and the dissemination of information. Platform gig workers, however, typically work independently and don't have the opportunity to interact with others who are performing similar job functions. Gig work may be isolating and is associated with increased occupational health issues (Lane, 2017; Tran and Sokas, 2017). Platform workers may also suffer anxiety around lack of purpose or identity (Petriglieri et al., 2018). Kunda et al. (2002) find that in their context of high-skill, technical contingent employment, workers are able to mitigate some of these downsides of contingent work arrangements via occupational communities and networks oriented around their professional orientation. Because drivers in our context do not have access to technical professional communities, the digital watercooler of the online community may perform a crucial social function for isolated workers, as well as providing a platform to share knowledge relevant to work activities.

Online communities like uberpeople.net, therefore, become some of the few places where gig workers can congregate and share information at any scale. This makes it a natural setting to study predictions about the impact of multiple platform use on worker behavior. The forum is highly active, with new comments appearing every several minutes. Our data comprise of all the posts made between January 2014 and January 2018 made by users identified as based in the 59 metro areas for which we have market share data: a total of 681,669 posts by 15,489 users. The posts are organized in conversation threads, each of which exists within subforums pertaining to particular topics. The largest subforums are *Advice*, a general forum for sharing tips and asking questions (24 percent of all posts); *Complaints*, a space dedicated to airing gripes about driver life (21 percent of all posts); and *Stories*, dedicated to recounting amusing or strange driving experiences (16 percent of all posts). More specific subforums exist that are geared towards narrower topics, such as *Pay*, *Insurance*, *Technology*, and *Ratings*. There are also a number of forums specific to particular geographies, in which drivers based in those areas can post about local issues.

Figure 1 displays the overall volume of posts over the time period studied in this paper, as well as the relative share of the twelve largest subforums over the same time. The overall number of posts varies between 10 and 20 thousand per month over the time period. We can observe what seems to be a spike in posts each January; this may be due to incentives and price cuts that are often introduced with the new year. The distribution of posts amongst the subforums remains relatively

consistent over time, though we do observe that the proportion of posts in the *Stories* forum seems to increase over the time period, and the proportion of posts devoted to *Pay* and *People* appears to shrink. The small surge of posts in the *Advocacy* forum in late 2015 is due to a flurry of activity following a San Francisco judge's decision to grant Uber drivers class action status (Levine, 2015).

———————————— INSERT FIGURE 1 ABOUT HERE ————————————

To assist in describing the nature of communication on the forum, we estimated a Latent Dirichlet Allocation (LDA) topic model (Blei et al., 2003) on the collection of posts. The LDA model is an unsupervised method of modeling the semantic subjects within a body of texts. In training this model, we treated each separate post as its own individual document. The final model has 175 topics [2], each of which is a probability distribution over the vocabulary of terms. The most probable words within topics provide an intuitive sense of the meaning of each topic, and viewing the body of topics is a useful way of understanding the content of the forum.

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Figure 2 displays the top five topics that are most uniquely associated with each of the main subforums. These were calculated by regressing an indicator for the subforum name on the proportions of all 175 topics. The five coefficients that were largest in magnitude are displayed in each panel, and each topic is represented by its top five most likely words. These topics provide us with a sense of what uniquely characterizes each subforum in particular. We can see, for example, that the topic most disproportionately associated with the *News* subforum is journalism-related (Topic 155: "story", "news", "read", "article", "stories"), and that the topic most associated with the *Complaints* subforum is a collection of curse words. The topic most uniquely associated with *Advocacy* has to do with strikes (Topic 175: "drivers", "uber", "strike", "union", "together"), while the *Stories* subforum seems most associated with topics about passengers (Topic 110: "women", "woman", "man", "female", "girl"; and Topic 93: "guy", "gave", "nice", "picked", "asked"). We can also observe some of the distinct vocabulary particular to the forum; the first word in Topic 53, "pax", is the widely used slang term for passengers employed throughout the forum.

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[2] In selecting the number of topics, we employed the *ldatuning* package, which visually compares several different fit metrics across different numbers of topics.

Independent Variables

Our primary independent variable is the lagged *Lyft Market Share* within each city-month pair. These data come from Second Measure[3], an analytics platform that tracks payment transactions for roughly four million U.S. consumers. The Second Measure data comprises the monthly ratio of raw sales in 59 U.S. metro areas belonging to Uber and Lyft. The Lyft market share ranges between zero and 56 percent, and is lagged by one month in all analyses. We then identified forum users based in these cities through one of two ways: 1) via text matching with the user-reported location on their profile, or 2) if they were active on the geographic subforum for that city. Any user who reported their location as "New York City", "NYC", or "Manhattan", for example, or who posted in the New York City geographic forum, would be identified as New York-based. If these data conflicted, the signature-reported location was given priority.

Dependent Variables

We compute one outcome at the level of month-city pairs (N=2,315), measuring the total number of *Active Users* based in each city who post to the forum in a given month. The remaining dependent variables are all computed at the user-month analysis level (N=48,730). We calculate the total *Number of Posts* per user in each month, as well as the number of posts made by the users in each subforum per month (*Advice*, *Complaints*, *Stories*, and so forth). We also analyze the proportions of the topics from the LDA model within each subforum at the user-month level.

Additional Measures and Controls

To account for any overarching movements over time, we include a monthly *Time Trend* variable that ranges from one to 48. We also include both month and city fixed effects in all models to aid in isolating the impact of changing Lyft share from general time- and location-based trends (the omitted month is the final one, January 2018). In the user-month analyses, we control for each user's *Months Active on Forum* – that is, the number of months since the user's first post on the forum. Finally, in the models where the outcome is the number of user posts within subforums or the proportion of topics within a subforum, we control for the overall *Total Number of Posts* per

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[3]https://secondmeasure.com/

user in that month. In each of the user-month level analyses, we cluster the standard errors by city, as the effective "treatment" (Lyft market share) occurs at the city level (Abadie et al., 2017).

4 Results

We present the results in several steps: first, as a descriptive measure, we will study the relationship between Lyft market share in a given city and the number of active users participating on the forum. This will help us to understand our results in light of whether increased Lyft market share is associated with either new drivers joining the ride-sharing market, or more active users participating on the forum. At the same time, we will examine whether individual users post more or less often following an increase in Lyft market share. Second, we will examine how the posting volume within the *Lyft* and *Advocacy* subforums changes with Lyft market share, allowing us to test Hypotheses 1 and 2. Finally, we will examine the changing composition of LDA topics within subforums, providing a clearer picture of how drivers' behavior changes as Lyft becomes a more attractive option in their city.

We first examine the relationship between Lyft market share in a given city and the number of active users participating on the forum. Estimated at the city-month level (it), we test this with an OLS regression with the specification:

$$ActiveUsers_{it} \quad = \quad \beta_0 \;+\; \beta_1 LyftShare_{i(t-1)} \;+\; \beta_2 TimeTrend_t \;+\; \alpha_i \;+\; \delta_t \;+\; \epsilon_{it} \quad (1)$$

in which the primary coefficient of interest, β_1, represents the effect of the one-month-lagged Lyft market share. We also include a *Time Trend* measure and city and month fixed effects, represented by α_i and δ_t, respectively. The estimation of this model can be viewed in Column 1 of Table 1. We observe a positive relationship – a 10 percent increase in Lyft market share is associated with approximately 4.5 more active users ($p < 0.001$).

We next examine whether drivers increase their overall level of posting on the forum as Lyft market share increased. To test this, the outcome of interest is the total *Number of Posts* made by each

user, estimated at the level of user-month pairs (ijt). We estimate this with the specification:

$$NumberofPosts_{ijt} = \beta_0 + \beta_1 LyftShare_{i(t-1)} + \beta_2 TimeTrend_t$$

$$+ \beta_3 MonthsActive_{ijt} + \alpha_i + \delta_t + \epsilon_{it} \quad (2)$$

which follows the specification above, but includes an additional control for each user's *Months Active on Forum*, in case newer users tend to post more or less in general. We also cluster the standard errors at the city level. This estimation can be viewed in Column 2 of Table 1. We can see that a ten percent increase in Lyft market share is associated with approximately 3.6 additional posts per user in the subsequent month ($p = 0.009$), irrespective of how long they had been active on the forum – an increase of more than 25 percent over the mean.

——————————— INSERT TABLE 1 ABOUT HERE ———————————

These results suggest that gains in Lyft's market share are associated with both *more users* actively posting on the forum, and more active posting *within* individual users. To test our hypotheses, however, we must examine in which parts of the forum this increased activity was concentrated. Hypotheses 1 and 2 suggested that Lyft market share would be followed by increased discussion of use of the Lyft platform, and labor organizing, respectively. We would therefore expect posting activity to rise in both the *Lyft* subforum and the *Advocacy* subforum. Table 2 displays regressions estimating the number of posts per user-month within each of these two subforums. The dependent variables are standardized for comparability. Using the *Advocacy* forum as an example, each model follows the specification:

$$Advocacy_{ijt} = \beta_0 + \beta_1 LyftShare_{i(t-1)} + \beta_2 TimeTrend_t$$

$$+ \beta_3 NumberofPosts_{ijt} + \beta_4 MonthsActive_{ijt} + \alpha_i + \delta_t + \epsilon_{it} \quad (3)$$

These models are identical to specification (2), but also include a control for the *overall* number of user posts made in a given month. As in all user-month level analyses, standard errors are clustered at the city level.

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Hypothesis 1 predicted that drivers would be more likely to exercise partial exit following an increase in Lyft market share, while Hypothesis 2 anticipated that drivers would increase their use of voice as Lyft market share increased. The increase in the use of the *Lyft* ($p = 0.033$) and *Advocacy* ($p = 0.016$) subforums provide support for these predictions. The effects are small but meaningful: roughly, a 30 percent increase in Lyft share is associated with about one-tenth of a standard deviation increase in posts per user within each forum. In terms of magnitude, a 30 percent increase in Lyft share is associated with approximately one additional monthly post for every three users in the *Lyft* forum, and one additional monthly post for every nine users in the *Advocacy* forum. Notably, these are the only two subforums which see statistically significant increases in posting activity associated with Lyft market share (see Table 4 for estimates of the effect of Lyft share on the other ten subforums).

Examining how the composition of specific semantic topics changes as a result of gains to Lyft share provides a clearer picture of what specific subjects of conversation are rising within the *Lyft* and *Advocacy* subforums. To do so, we use the topic proportions estimated by the LDA model. Examining each of the two subforums in turn, we identified the specific topics that grew within these forums. Standardizing the outcomes for comparability, we estimated the topic proportions within each subforum, with specifications of the form:

$$Topic1_{ijt} = \beta_0 + \beta_1 LyftShare_{i(t-1)} + \beta_2 TimeTrend_t + \beta_3 Number of Posts_{ijt}$$
$$+ \beta_4 Months Active_{ijt} + \alpha_i + \delta_t + \epsilon_{it} \quad (4)$$

We then identified any topic that had a substantial increase – at least one tenth of a standard

deviation – associated with a ten percent increase in Lyft market share. These topics, and the associated coefficients for the effect of Lyft market share in their respective models, can be seen in Figure 3.

—————————— INSERT FIGURE 3 ABOUT HERE ——————————

Within the *Lyft* subforum, the topics associated with Lyft market share are Topic 61 ("contract", "terms", "agreement", "services", "agree"; $p = 0.068$), Topic 127 ("name", "look", "picture", "real", "face"; $p < 0.001$), and Topic 135 ("hours", "work", "day", "work", "days"; $p < 0.001$). These first two topics relate to signing on with the platform – the first referring to completing the contract and signing the terms of service, and the second to creating a profile photo – and provide evidence for the fact that partial exit is actually occurring, in accordance with Hypothesis 1a. The last topic refers to work hours or days, and may reflect discussion of how much time to devote to driving for the Lyft platform.

Hypothesis 2a predicted that drivers would increase their discussion of advocacy, protests, and formal organizing when Lyft market share increased. Within the *Advocacy* subforum, the two topics that increase the most following Lyft market share reflect this prediction: Topic 92 ("independence", "employees", "employee", "contractor", "company"; $p = 0.021$) clearly refers to drivers' status as indepedent contractors versus employees, a common point of contention, while Topic 175 ("drivers", "uber", "strike", "union", "together"; $p = 0.073$) pertains to strikes and collective action. Two other topics that increase within the *Advocacy* subforum are about planning for the future (Topic 25: "looking", "move", "look", "next", "already"; $p < 0.001$) and sharing information (Topic 74: "information", "link", "find", "site", "info"; $p = 0.021$), indicating that the subforum may serve as a base for planning and knowledge sharing with respect to labor advocacy. The remaining two topics associated with greater Lyft share are less clear, but Topic 62 ("simply", "ability", "kind", "given", "however"; $p = 0.053$) seems to contain words used in expressing frustration, while Topic 80 ("city", "san", "chicago", "cities", "sf"; $p = 0.012$) may reflect that drivers are increasing their discussion of advocacy occurring in other cities.

Having established support for the two hypotheses, we next explore evidence for our proposed mechanism. We suggested that the gains to the Lyft platform would lessen the threat of impactful

retribution for drivers, making them more willing to express voice. The most meaningful form of retribution for ride-sharing drivers is to have one's platform access suddenly terminated, or "deactivated" (Said, 2018). We therefore perform a simple analysis to see if drivers are less likely to mention firings or deactivations following increases in Lyft market share in their city. At the city-month level, we estimate the effect of Lyft share on the total counts of the terms "fired" or "deactivated", controlling for the total number of active users in each city-month pair. The specification is therefore:

$$Retribution_{it} = \beta_0 + \beta_1 LyftShare_{i(t-1)} + \beta_2 TimeTrend_t + \beta_3 ActiveUsers_{it} + \alpha_i + \delta_t + \epsilon_{it} \quad (5)$$

The results of this model can be seen in Table 3. We observe that a twenty percent increase in Lyft market share is associated with approximately one fewer mention of firing or deactivation ($p = 0.011$), a decrease of approximately 27 percent from the mean. While we cannot capture actual levels of driver deactivation with this method, one of the benefit of measuring forum chatter is that we can capture not just discussions of retribution actually occurring, but also how salient the *threat* of retribution is in the minds of the users actively using the forum.

——————————— INSERT TABLE 3 ABOUT HERE ———————————

Finally, as an exploratory analysis, we examine the effect of Lyft market share on the number of posts in each of the other ten primary subforums, with specifications identical to those used with the *Lyft* and *Advocacy* subforums in Table 2. The results of this analysis can be seen in Table 4.

——————————— INSERT TABLE 4 ABOUT HERE ———————————

As previously mentioned, *Lyft* and *Advocacy* were the only two forums with a statistically significant increase in posting associated with Lyft market share. Two subforums, *Technology* and *Advice*, see substantial decreases in posting as Lyft share grows. The topic model analysis sheds some light on the former: within the *Technology* forum, the two topics that decrease significantly following an increase in Lyft share are Topic 104 ("google", "route", "gps", "maps", "waze"; $p = 0.043$) and

Topic 96 ("address", "location", "pin", "pickup", "wrong"; $p = 0.005$). Both these topics pertain to GPS and navigation. Lyft and Uber have different in-app navigation capabilities (Bindley, 2018), and examining some of the forum posts reveals that many drivers find the Lyft system easier to use[4]. The fall in the number of posts in the *Technology* forum, therefore, may reflect the fact that as more drivers spend more of their hours on the Lyft platform, they have fewer questions and complaints related to navigation technology.

The reason for the fall in posting seen in the *Advice* subforum is less clear: no single topic from the LDA model has a meaningful increase or decrease within this subforum. One possible explanation is that in response to Lyft entry, the information-sharing function of the platform shifts away from the general *Advice* subforum and towards more specific arenas of advice, such as *Insurance* or *Pay*. As drivers toggle between platforms, they may grapple with the fact that the competing platforms are constantly adding and adjusting pay incentive schemes (Bhuiyan, 2017), and that the two platforms have different requirements for driver and car standards (Hyrecar, 2017) and insurance coverage (Dehn, 2018). This may result in requests for advice being directed to these more specific subforums, as opposed to the more general *Advice* space. Another simple explanation is that as more drivers spend more of their hours driving for Lyft, they will direct their questions to the *Lyft* subforum rather than to *Advice*. We discuss some of the more generalized implications of the changes in conversation following partial exit, and potential future research directions, in the following section.

As previously mentioned, we effectively treat the changes in Lyft market share as exogenous, reflecting the fact that platform gains and losses are largely driven by passenger – rather than driver – demand (Bosa, 2018). The fact that our topic analysis reveals that drivers appear to be writing about *signing up* to drive for Lyft in the month following an increase in Lyft market share provides some reassurance that we are not merely observing the effects of reverse causality. We also find that our results are robust to using two- or three-month lags in Lyft market share.

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[4]In the elegant words of one uberpeople.net user: "The Uber navigation app totally sux. I never use it." https://uberpeople.net/threads/uber-app-navigation.316438/post-5176827

5 Discussion and Conclusion

This paper analyzes how the content of gig workers' conversations changes in response to the ascendance of an alternative labor platform, and what those conversations can tell us about their decisions to exercise exit and voice. We analyze posts on the largest online community for ride-sharing drivers, i.e. the workers' virtual water cooler. We observe in our results that as Lyft gains a greater foothold in a given city, drivers in that city post more actively. This increased activity is particularly concentrated in the *Lyft* subforum, with the topic analysis reflecting discussion of newly signing up for the platform. We also observe that Lyft market share is associated with more posting to the *Advocacy* subforum, particularly in topics related to employee status, strikes and unions, information sharing, and planning for the future.

The finding that "voice" increases with more "exit" options supports our conceptual framework suggesting that exit and voice can be complements in situations in which the threat of retribution is initially high. The findings also paint a broad picture that aligns with our characterization of the nature of partial exit: as an alternative labor platform – Lyft – gains market share, more drivers choose to exercise partial exit by signing up and devoting more time to work on the second platform (evidence of this is seen in discussion of signing up for Lyft in the topic analysis). The entry of the second platform reduces the threat of retribution, providing drivers with greater power and therefore a greater propensity to exercise voice (in this case characterized by discussing, and making plans for, labor advocacy). We document evidence of the reduced threat of retribution by analyzing mentions of drivers being "deactivated" or "fired," showing that instances of these terms drop as Lyft gains market share in a given city.

Though this analysis was conducted in the context of the ride-sharing market, the results are broadly applicable to other forms of platform gig work. This work can take both physical and digital forms. Platforms such as TaskRabbit and Handy, for example, are competing for dominance in the home-cleaning and repairs space, as many workers toggle between them. Meanwhile, a freelance software engineer can seek gigs on a variety of platforms, such as Upwork, Freelancer or Coding Ninjas. As in the ride-sharing example, these workers have the flexibility to allocate their labor across a number of platforms; perhaps unsurprisingly, robust online communities have emerged to discuss

these issues.[5] Similarly, there is growing evidence that firms exploit monopsony power in low-wage and online marketplaces, reflecting similar power dynamics and pressures as in the ride-sharing context (Dube et al., 2019; Benson et al., 2015).

While this paper focuses narrowly on the exit-voice framework as a means of exploring workers' responses to dissatisfaction with an organization, as our analysis on the other areas of the forum shows, there is potential for related work on how market shifts within a platform ecosystem affect workers' behavior. One of the key features of partial exit is that it is a continuous and ongoing process. While transitioning between applications is relatively easy, the decision of how to allocate labor hours between platforms must be consistently re-litigated. While our analysis shows that platform competition may increase workers' bargaining power, future work might focus on the search costs imposed on workers by this dynamic; that is, whether or not they spend more time comparing and monitoring platforms as a way of determining the optimal allocation of their labor. Because the information-diffusing application of online forums should be useful for transferring knowledge about changing incentive schemes, company news, and platform requirements, a context like the forum used in this paper could be a fruitful setting for this line of research.

There are a number of limitations to our study. First, while analyzing discussion in online communities opens up the possibility for researchers to "listen in" on the conversation of workers, it is a limited form of conversation at the water cooler for multiple reasons. First, there is likely to be selection in the type of drivers who participate in the online community; for example, casual, part-time, or less committed drivers are probably less likely to seek out the forum. Second, conversations on a public forum may differ from private (and in-person) conversations. We also conduct our analysis only in urban areas large enough to have sufficient forum activity, raising the question of how the dynamics shown in this paper might differ in rural or sparsely populated areas. Additionally, a number of questions remain about the stability of the relationships discussed in this paper. If increased voice results in the establishment of more formal structures, like unions, how will that affect workers' relationships with the platforms, as well as their modes of communication? Moreover, we did not address the third lever in Hirschman's framework – loyalty. Is there any way that labor platforms can win workers' loyalty when their business model relies on keeping them at

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[5]Interested readers might explore the active subreddit r/freelance and associated forums.

arm's length? We hope to take a closer look at these questions in future work.

Our work in this paper revisits a classic theoretical framework and explores how its constructs apply in light of emerging technologies and a changing economy. We suggest a framework for understanding when exit and voice will function as complements, rather than substitutes, in the presence of alternative options. This work also contributes to the growing stream of literature on the gig economy and alternative work arrangements, which continues to grow in relevance. Our hope is that this paper will add to the conversation on the nature of worker relationships to labor platforms – and how to characterize these relationships theoretically – and spur extensions and related work.

We also hope that our work provides an example of the opportunity afforded to researchers by new modes of work-related communication. As the share of workers with nontraditional employment arrangements grow – not merely platform workers, but independent contractors and traditional employees working remotely – work communication will increasingly have to occur through virtual methods. As more "water coolers" shift to the digital realm, researchers will be provided with an ability to observe casual work-related discussion in a way that was not previously possible.

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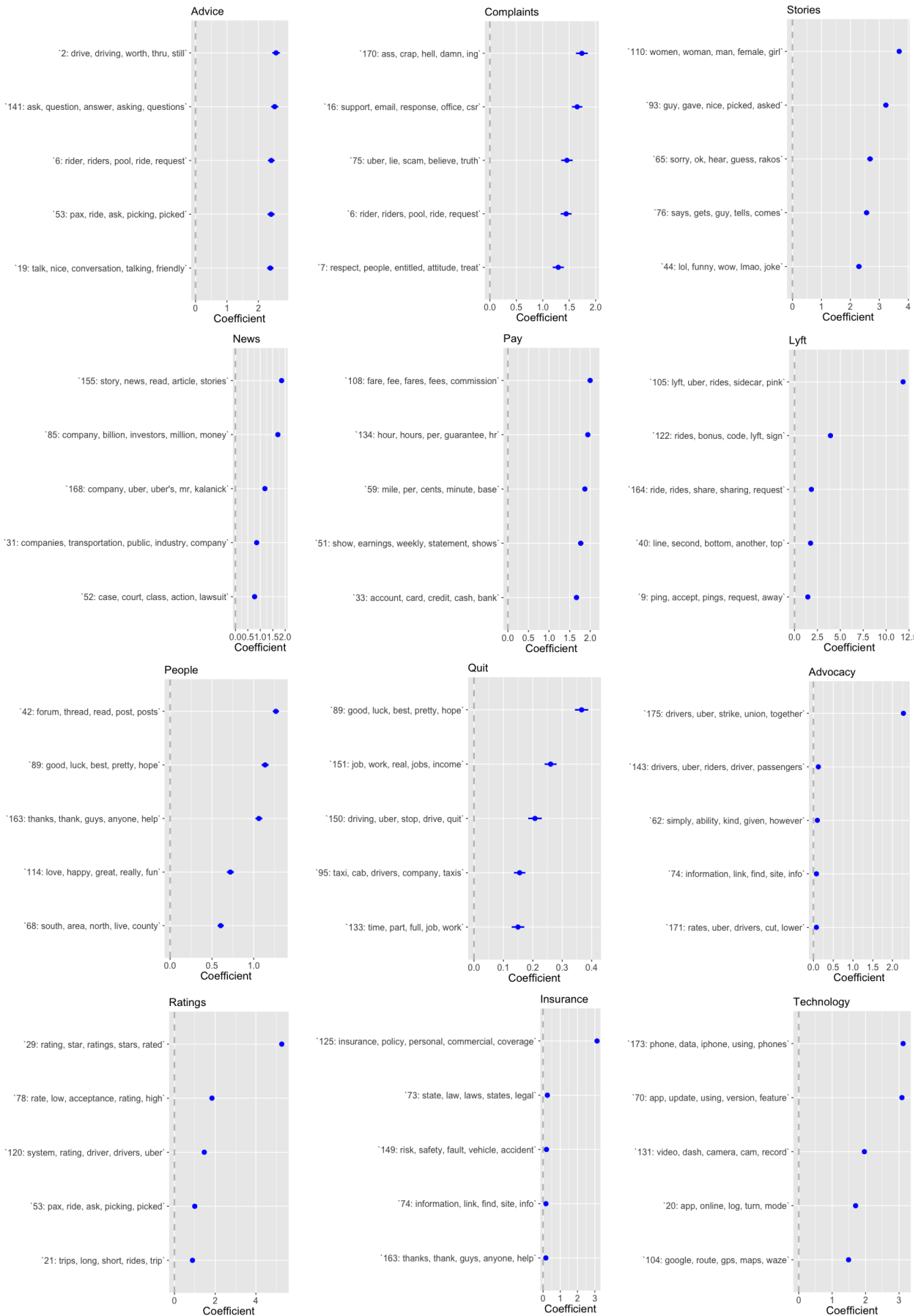
Tables and Figures

Figure 1: Subforum Post Composition Over Time
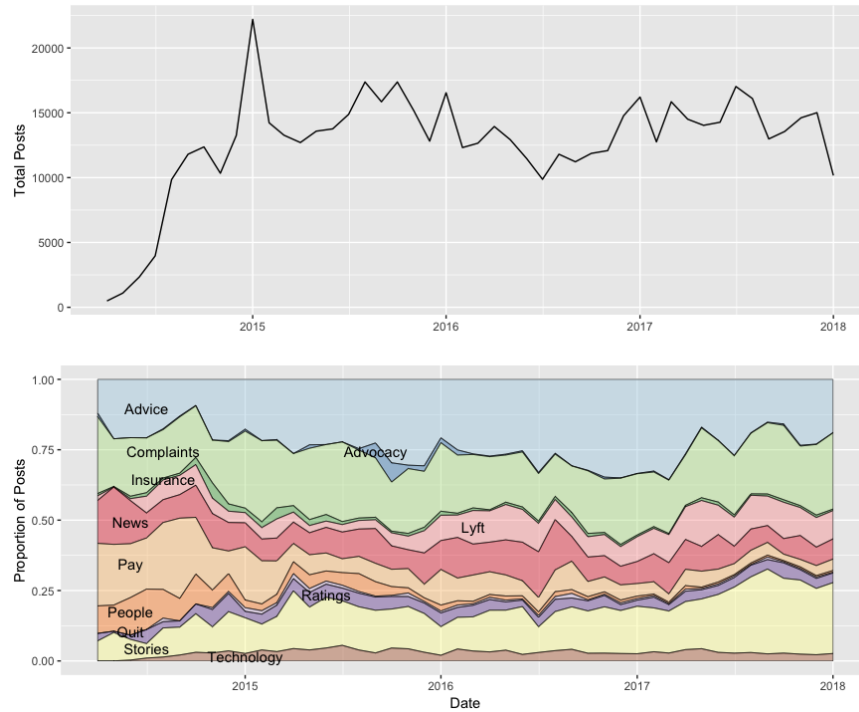
Notes: Top panel displays the overall number of monthly posts from January 2014 to January 2018, by drivers in the 59 cities studied in this analysis. Bottom panel displays the relative proportions of the 12 major subforums.

Figure 2: Topics Most Uniquely Associated with Various Subforums

Notes: Plots coefficients from OLS regressions of each subforum indicator on proportions of the 175 LDA topics. The top five topics most predictive of each subforum are displayed.

Table 1: Lyft Market Share Effects on Forum Activity

	Dependent variable:	
	Active Users	Posts per User
	(1)	(2)
Lyft Market Share (*t-1*)	45.62***	36.00***
	(7.79)	(13.71)
Time Trend	1.04**	−0.44***
	(0.41)	(0.10)
Months Active on Forum		−0.08
		(0.10)
Constant	−36.19*	58.95***
	(18.66)	(6.55)
City FE	Yes	Yes
Month FE	Yes	Yes
Analysis Level	*City-Month*	*User-Month*
Observations	2,315	48,730
R^2	0.86	0.09

*Note:* OLS regressions with SEs in parentheses (heteroskedasticity-robust in Column 1 and clustered by city in Column 2). *p<0.1; **p<0.05; ***p<0.01

Table 2: Lyft Market Share Effects on *Lyft* and *Advocacy* Subforums

	Dependent variable:	
	Lyft	Advocacy
	(1)	(2)
Lyft Market Share (*t-1*)	0.37**	0.34**
	(0.17)	(0.14)
City FE	Yes	Yes
Month FE	Yes	Yes
Observations	48,730	48,730
R^2	0.13	0.06

Note: OLS regressions with SEs clustered by city in parentheses. *p<0.1; **p<0.05; ***p<0.01

Figure 3: Topics Associated with Lyft Market Share within *Lyft* and *Advocacy* Subforums
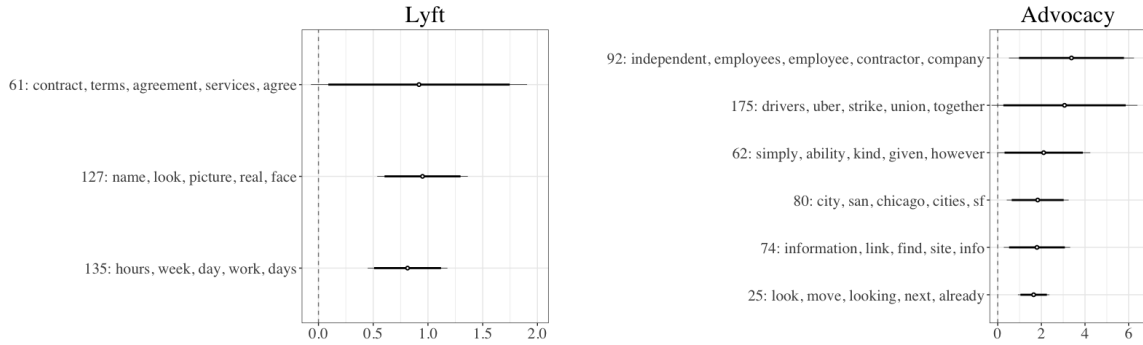
Notes: Plots point estimates and 95 percent confidence intervals of OLS estimations of the effect of Lyft market share in previous month on standardized topic proportions in each subforum, controlling for the users' overall posting activity and number of months active on forum. City and month fixed effects included; SEs clustered at city level.

Table 3: Lyft Market Share Effects on Mentions of Retribution

	Dependent variable:
	'Deactivated' or 'Fired'
Lyft Market Share (*t-1*)	−5.21**
	(2.05)
Time Trend	0.04
	(0.03)
Active Users	0.22
	(0.01)
Constant	6.77***
	(1.57)
City FE	Yes
Month FE	Yes
Observations	2,315
R^2	0.87

Note: OLS regressions with heteroskedasticity-robust SEs in parentheses. *p<0.1; **p<0.05; ***p<0.01

Table 4: Lyft Market Share Effects on Other Subforum Activity

	Dependent variable:									
	Insurance	People	News	Pay	Quit	Complaints	Stories	Ratings	Technology	Advice
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lyft Market Share (*t-1*)	0.90	0.77	0.45	0.38	0.20	−0.004	−0.08	−0.13	−0.40***	−0.67***
	(0.79)	(0.59)	(0.33)	(0.45)	(0.19)	(0.12)	(0.26)	(0.23)	(0.10)	(0.24)
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	48,730	48,730	48,730	48,730	48,730	48,730	48,730	48,730	48,730	48,730
R^2	0.13	0.26	0.37	0.39	0.11	0.66	0.57	0.28	0.20	0.64

Note: OLS regressions with SEs clustered by city in parentheses. *p<0.1; **p<0.05; ***p<0.01