Gig-platforms do not discriminate on nationality, so why do foreign workers earn less?

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Motivation

The proliferation of self-employed working arrangements over the last two decades has led to a structural change in labour markets worldwide. One such arrangement that has stood out in particular is gig-work, with estimates suggesting solo self-employment accounts for between 4 and 22 per cent of total employment in the countries of the OECD area (Boeri et al., 2020). An individual is considered solo self-employed if they are independent contractors that do not employ others, for example gig-workers such as on-demand delivery riders or taxi drivers.

Between 2000 and 2017, solo self-employed fraction of self-employed workers increased from 47.06 to 72.34 per cent (Boeri et al., 2020). One industry that contributed to the emergence of this labour-market sector is on-demand delivery services, provided by multinationals such as Glovo, Deliveroo and UBEReats generating millions in revenue annually. Although precise figures regarding the total number of riders collaborating with these applications as autonomous workers are difficult to determine, all estimates point towards significant growth for this industry recently. For example, Assodelivery claimed the number of riders increased by 16% with respect to 2019[1]; Italian newspapers claimed instead that the number of riders has doubled during 2020[2]; eventually, the Public Prosecutor, in an investigation concerning food delivery companies in Italy, has claimed that the number of riders has grown from about 11'000 in 2019, to 60'000 in 2020[3]. Although on-demand service platforms have been studied in the United States (Garin et al., 2022; Cook et al., 2021; Chen et al., 2019), there has been little research into the European context where the demographic is different and more notably foreign. This is the foundation of our research agenda generously facilitated by the Fondazione Roberto Franceschi.

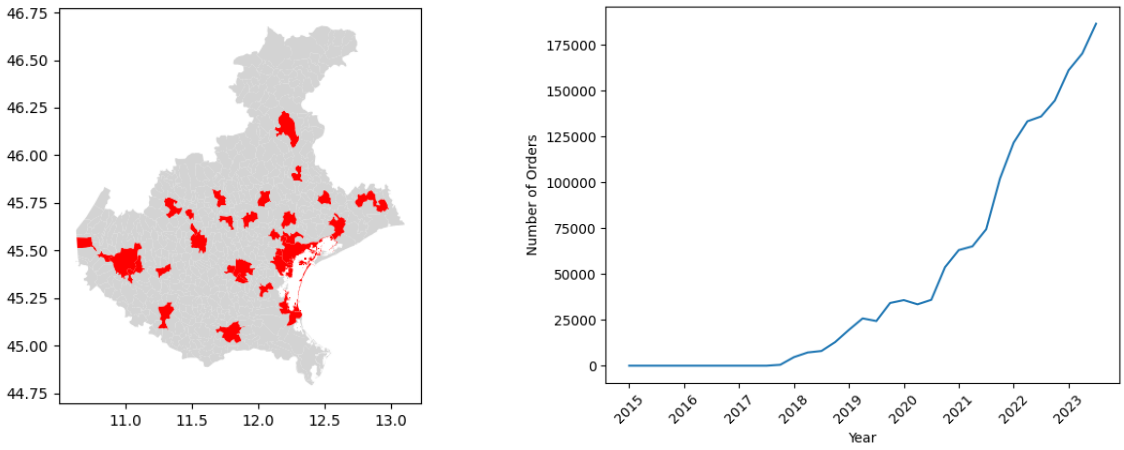
Context

In our research we collaborate with a market leading multinational on-demand delivery service operating in Europe that employs workers to complete deliveries. Since the company's launch in the Italian market in 2017, the platform has expanded into 154 cities that are each represented by a red point in Figure 1.

[1] Link to article
[2] Link to article
[3] Agenzia Giornalistica Italiana

Figure 1: Platform Operations in 2023

Figure 2 presents more granular details for the platform's operations in the Veneto region. Since beginning operations in the Veneto region at the beginning of 2018, the platform has expanded into 30 cities shown in 2a and grown sales from 499 deliveries in the first quarter of the year to 186,665 at the third quarter of 2023 shown in 2b. This represents an average growth rate of 28% per quarter.



(a) Completed order over time

(b) Area of operation

Figure 2: Orders and Operations in Veneto

Who works in the gig-economy?

To begin our analysis, we first explore the characteristics of those operating as gig-riders (columns 1 & 2) compared to the general population (columns 3 & 4). Riders are generally younger with 91.6% of them being between ages 15 and 30. 22.7% of riders have a history of seasonal work compared to 9.1% of the general population. Part-time work is also more common among riders, with 71.0% having engaged in part-time work compared to 38.2% in the general population. 89.4% of riders are male compared to 55.4% of the overall population and are more likely to have the highest level of education being a Diploma with 36.3% having a Diploma compared to 27.2% of the general population. Most strikingly, however, is that 34.2% of riders are from an Asia country compared to 4.6% of the overall population. This naturally means there is a lower share of Italian riders with less than 50% being from Italy compared to over 75% of the general population in Veneto being Italian.

Table 1: Comparison of characteristics of individuals selecting into gig-work on platform

Variable	Rider		Non-rider	
	Mean (%) (1)	SD (2)	Mean (%) (3)	SD (4)
Age: 15-30	53.2	49.9	12.4	33.0
Age: 30-45	38.4	48.6	28.8	45.3
Age: 45-60	7.3	26.0	34.5	47.5
Age: 60+	1.2	10.7	24.2	42.8
Seasonal Work	22.7	41.9	9.1	28.8
Part-time Work	71.0	45.4	38.2	48.6
Full-time Work	75.1	43.3	78.0	41.4
Never Work	6.1	24.0	10.6	30.8
Male	89.4	30.8	55.4	49.7
Italia	**46.5**	**49.9**	**76.3**	**42.5**
Unione europea	0.2	5.0	0.6	8.0
Nuovi paesi Ue	3.2	17.7	7.7	26.7
Paesi sv. avanzato	0.2	4.2	0.3	5.5
Est Europa non Ue	1.9	13.6	4.8	21.4
Africa del Nord e Medio Or.	4.4	20.5	2.6	15.9
Altro Africa	8.0	27.1	2.2	14.7
Asia	**34.2**	**47.4**	**4.6**	**20.8**
America c.merid. e Oceania	1.5	12.1	0.8	9.1
Nessun titolo	12.8	33.4	10.1	30.1
Lic. elem.	1.4	11.7	3.9	19.3
Lic. media	30.3	46.0	29.4	45.5
Qualifica	6.3	24.2	4.2	20.2
Diploma	36.3	48.1	27.2	44.5
Laurea	10.5	30.7	12.9	33.5

Italian vs. Foreign Workers

Given the foreign riders make up a disproportional share of the rider force, we were curious to understand whether their performances differ. Although earnings are determined as a function of distance covered, time waited and special circumstances for holiday, late or work during bad weather conditions, earnings differentials in autonomous labour markets have been documented across various groups. For example, Cook et al. (2021) found a 7% gender pay-gap for UBER drivers in the United States and Cook et al. (2019) estimated that drivers older than 60 earned almost 10% less per hour than drivers who are age 30 – the age that earnings per hour peak. These differentials were driven mostly by preferences for working in certain geographical locations during certain hours, driving speeds and returns to experience. We explore this on the dimension of Italian compared to foreign riders.

Despite earnings per delivery being pre-determined by a fixed formula, delivery riders born in Italy earn significantly more per hour than those born abroad. This earnings gap is illustrated in Figure 3 when considering all forms of transportation and Figure 4 when isolating only bicycle riders.

Figure 3: Earnings/hour (All Riders)

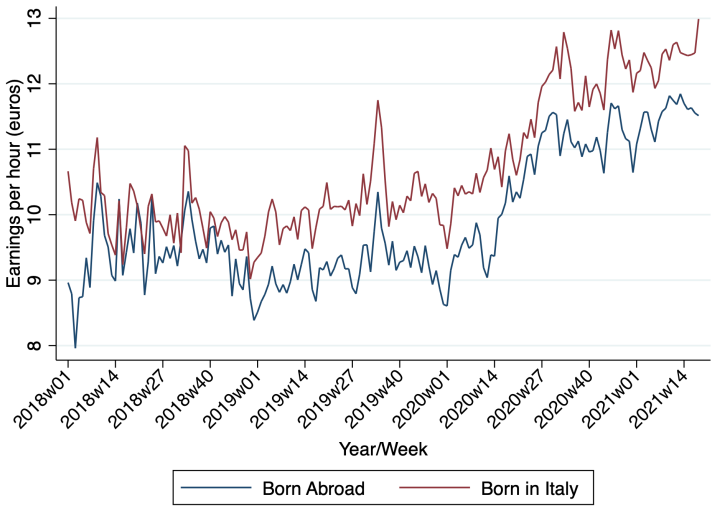


Figure 4: Earning/hour (Bicycle Riders)

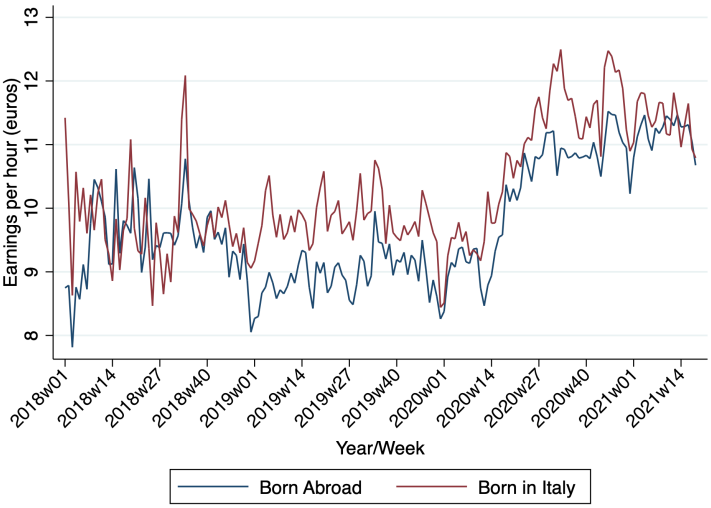


Table 2 quantifies the earnings per hour differential between these two groups. The first three columns indicate that, even at the delivery level, Italian born riders earn 5.6% more per hour than riders from abroad and the results persist, albeit with less significance, when considering only bicycle and motorcycle riders. At the shift[4] level the earnings differential is even starker: Italian-born riders earn nearly 10% more per hour than those born abroad. While the magnitude of the earnings differential when considering bicycle and motorcycle riders, at 4.9% and 9.4% respectively, the difference in earnings per hour between the two groups.

Table 2: Earnings per hour pay gap between riders born in Italy and those born abroad

	log earnings/hour	log earnings/hour	log earnings/hour	log earnings/hour	log earnings/hour	log earnings/hour
Italian dummy (1 if born in Italy, 0 otherwise)	0.056***	0.049*	0.042**	0.098***	0.049***	0.094***
	(0.01)	(0.03)	(0.02)	(0.01)	(0.02)	(0.02)
Transport	All	Bicycle	Motorcycle	All	Bicycle	Motorcycle
Level	Delivery	Delivery	Delivery	Shift	Shift	Shift
R^2	0.114	0.122	0.126	0.142	0.151	0.153
N	1631797	679527	583467	279766	124387	91406

Standard errors clustered by courier. Earnings per hour is defined by total earnings divided by time length of shift. A shift is defined as a delivery being accepted or delivered within one hour of the previous delivery being delivered. All regressions include week/year fixed effects and city controls. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Looking at delivery and shift level summary statistics in Table 3 and Table 4, respectively, the average earnings per hour is higher for riders born in Italy for all methods of transport as well as when isolating bicycle and motorcycle riders in both tables. When focusing on the table of deliveries, Italians drive longer distances on average for all methods of transport and bicycle riders which corresponds with longer delivery durations. There is no difference in the probability of a rider working during bad weather but Italians wait longer on average to receive a delivery from the partner. Bicycle riders born abroad drive at faster speeds than their Italian born counterparts but, on average, tips across all methods of transport are larger for the latter group.

[4]A shift is defined a consecutive chain of deliveries accepted or delivered within 1 hour of the previous delivery.

Table 3: Delivery level Summary Statistics

	Riders born abroad			Riders born in Italy			
	Mean	Std Dev.	N	Mean	Std Dev.	N	Difference
Panel A: All							
Order earnings/hour	13.464	5.255	907828	14.078	5.097	724505	-0.253
Total earned	4.952	1.917	907828	5.278	1.993	724505	-0.351
Order duration (hours)	0.409	0.195	907828	0.413	0.206	724505	-0.015
Distance driven	4.191	2.479	907626	4.881	2.763	724318	-0.786
Order bonus	0.896	0.975	907828	1.029	1.041	724505	-0.033
Order time compensation	0.090	0.229	907828	0.099	0.240	724505	-0.011
Order weather compensation	0.085	0.279	907818	0.085	0.278	724500	0.003
Tip	0.129	0.452	907828	0.148	0.482	724505	-0.003
Panel B: Bicycle							
Order earnings/hour	13.191	5.239	545525	13.302	5.086	134206	-0.234
Total earned	4.663	1.596	545525	4.766	1.588	134206	-0.032
Order duration (hours)	0.397	0.190	545525	0.403	0.195	134206	0.005
Distance driven by rider	3.602	1.818	545411	3.658	1.829	134183	0.085
Speed of delivery (km/hour)	9.944	5.617	545411	9.899	4.762	134183	0.141
Panel C: Motorcycle							
Order earnings/hour	13.958	5.181	277402	14.716	5.289	306266	-0.091
Total earned	5.341	2.202	277402	5.473	2.120	306266	-0.149
Order duration (hours)	0.418	0.196	277402	0.412	0.240	306266	-0.007
Distance driven by rider	5.065	2.896	277349	5.244	2.812	306178	-0.243
Speed of delivery (km/hour)	12.789	6.196	277349	13.757	6.375	306178	-0.486

At the shift level from Table 4, Italian born riders earn approximately 1 euro more per hour than non-Italian born riders. Regarding trip characteristics, Italian born riders' shifts are composed of fewer deliveries on average but average distances are longer due to higher average speeds. Noticeably, non-Italians spend 2.4 percentage points of their shifts waiting for a delivery. These higher average waiting times may be a consequence of working more during weekdays and during lunch and afternoon shifts than Italian born riders.

Table 4: Shift level Summary Statistics

	Riders born abroad			Riders born in Italy			
	Mean	Std Dev.	N	Mean	Std Dev.	N	Difference
Number of orders composing shift	4.612	3.474	157448	4.486	3.334	122330	-0.156
Shift earnings/hour	10.712	3.279	157448	11.746	3.273	122330	-0.845
Shift earnings	22.583	17.497	157448	23.486	17.586	122330	-2.863
Shift Duration (decimal)	2.196	1.639	157448	2.071	1.540	122330	-0.056
Distance driven by rider	19.586	17.894	157448	22.252	19.202	122330	-5.339
Speed of shift (km/h)	9.024	3.748	157448	10.851	4.125	122330	-1.801
Proportion of time spent waiting on shift	0.140	0.127	157448	0.116	0.114	122330	0.027
Sunday	0.165	0.371	157448	0.174	0.379	122330	0.000
Monday	0.096	0.295	157448	0.098	0.298	122330	-0.003
Tuesday	0.101	0.301	157448	0.097	0.297	122330	-0.001
Wednesday	0.118	0.323	157448	0.108	0.310	122330	0.003
Thursday	0.129	0.335	157448	0.128	0.334	122330	0.002
Friday	0.191	0.393	157448	0.193	0.395	122330	-0.001
Saturday	0.200	0.400	157448	0.201	0.401	122330	0.001
Morning shift	0.031	0.172	157448	0.044	0.206	122330	-0.029
Lunch shift	0.226	0.418	157448	0.168	0.374	122330	0.064
Afternoon shift	0.149	0.356	157448	0.109	0.312	122330	0.041
Dinner shift	0.576	0.494	157448	0.658	0.475	122330	-0.064

Decomposition

The aim of this analysis is to provide a decomposition of the earnings differential between Italian and non-Italian riders outlined in Table 2. Table 5 presents a sequence of equation (1) where y_{ist} is the total earnings

for individual i for shift s at time t, h_{ist} are the aggregate hours composing the shift, italian$_i$ is an indicator whether a rider was born in Italy and X_{ist} is a vector of controls.

$$\log(y_{ist}/h_{st}) = \alpha + \text{italian}_i + \Phi X_{ist} + \varepsilon_{ist} \tag{1}$$

Each column of 2 adds an additional group of variables added with the aim of explaining the initial earnings differential of 4.9% between Italian born riders and those born abroad. The first column presents the . Column two includes geographic and hour of the week controls, column three includes the number of deliveries and speed controls to account for fatigue, column four includes the logarithm of speed and column 5 includes the logarithm of the days since starting. Notice, from these results, a majority of the variation in the earnings differential is explained when adding the speed control with the earnings per hour differential being reduced to less than one percent.

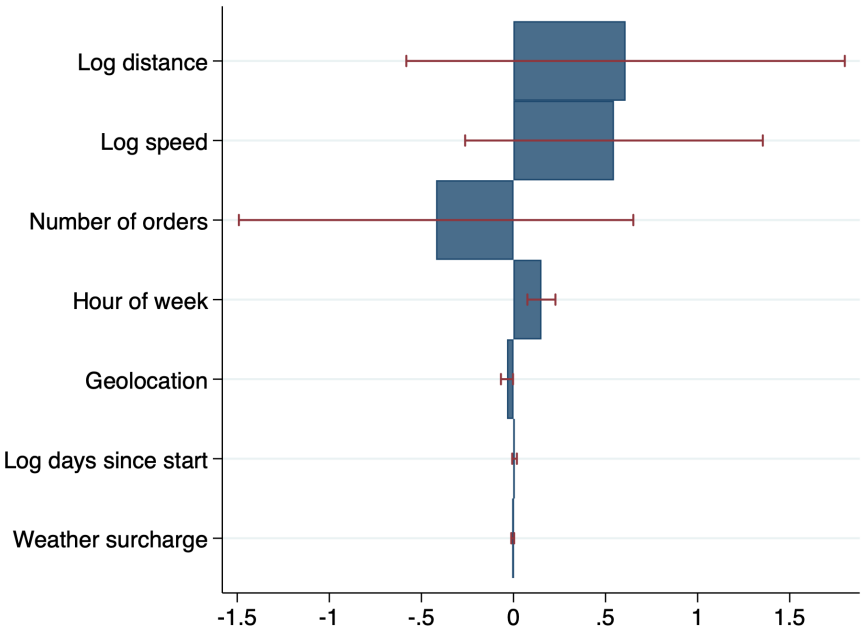
Table 5: Decomposition of earnings/hour differential by race

	log shift earnings/hour	log shift earnings/hour	log shift earnings/hour	log shift earnings/hour	log shift earnings/hour
Italian dummy (1 if born in Italy, 0 otherwise)	0.049***	0.053***	0.053***	0.008**	0.007**
	(0.02)	(0.02)	(0.01)	(0.00)	(0.00)
log distance			0.189***	-0.453***	-0.452***
			(0.01)	(0.01)	(0.01)
log speed				0.913***	0.913***
				(0.00)	(0.00)
log days since start					0.002*
					(0.00)
Hour of week	No	Yes	Yes	Yes	Yes
Location	No	Yes	Yes	Yes	Yes
Number of orders	No	No	Yes	Yes	Yes
R^2	0.150	0.194	0.261	0.878	0.878
N	123881	123881	123881	123881	123881

Standard errors clustered by courier. Earnings per hour is defined by total earnings divided by time length of shift. A shift is defined as a delivery being accepted or delivered within one hour of the previous delivery being delivered. All regressions include week/year fixed effects and city controls. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Since the order that variables are introduced can influence the standard decomposition, Figure 5 presents a decomposition that is order-invariant proposed by Gelbach (2016) with the 90% confidence interval in red. On the horizontal axis is the amount of variation each variable group explains of the originally estimated earnings difference of 4.9%. The only variable that significantly explains the positive omitted variable bias is geolocation, at approximately 14%, and hour of the week controls explains 3.5% of the differential estimated in column 1 of Table 5, it constitutes a negative omitted variable bias. While speed explains a large fraction of the bias, at around 26%, there is too much noise for its explanatory power to be classified as significant.

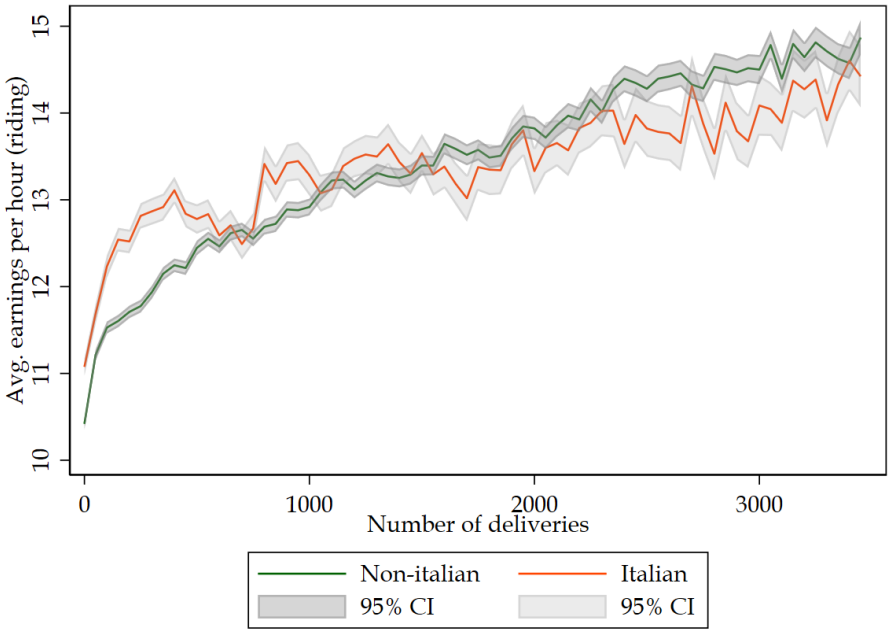
Figure 5: Factor decomposition of earnings per hour differential



Unpacking distance and speed

Figure 6 demonstrates the raw riders returns to experience as measured by the cumulative number of deliveries completed. There is a clear learning curve, which is especially steep early in a rider's tenure. Riders continue to learn valuable skills on the job through at least 2,500 deliveries with a fully experienced rider earning about 3 euros per hour (about 25%) more than a rider in their first 1000 deliveries. In principle, the rise in earnings shown in Figure 6 could be a selection effect if drivers' baseline productivity level is correlated with lasting longer on the platform.

Figure 6: Returns to experience



In Table 6 we return to our earnings regression and show that there are substantial returns to experience on the platform. Column 2 shows that drivers who have completed over 2,500 trips make nearly 15% more than those in their first 100 trips.

Table 6: Returns to experience

	(1)	(2)	(3)	(4)	(5)
	log earnings/hour	log earnings/hour	log earnings/hour	log earnings/hour	log earnings/hour
Italian dummy (1 if Italian)	0.041***	0.040***	0.039***	0.040***	0.039***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Deliveries: 100-500		0.064***	0.066***	0.064***	0.066***
		(0.00)	(0.00)	(0.00)	(0.00)
Deliveries: 500-1000		0.089***	0.093***	0.089***	0.093***
		(0.01)	(0.01)	(0.01)	(0.01)
Deliveries: 1000-2500		0.121***	0.126***	0.121***	0.126***
		(0.01)	(0.01)	(0.01)	(0.01)
Deliveries: > 2500		0.150***	0.159***	0.150***	0.159***
		(0.01)	(0.01)	(0.01)	(0.01)
Constant	2.560***	2.448***	2.443***	2.448***	2.443***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Transport	X	X	X	X	X
City	X	X	X	X	X
Week	X	X	X	X	X
Day/Hour			X		X
Geohash				X	X
R squared	0.122	0.134	0.146	0.135	0.146
Observations	1631797	1631797	1631796	1631797	1631796

Standard errors clustered by courier. Earnings per hour is defined by total earnings divided by time length of delivery. All regressions include transport, city and week/year fixed effects. Experience is measured as number of deliveries completed before a given delivery. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Conclusion

The research supported by the Fondazione Roberto Franceschi grant has enabled us to provide a first glimpse into the gig-work landscape in Europe. Our findings reveal a distinct demographic profile of gig-working delivery riders, which significantly diverges from the general population and most notably the high proportion of foreign riders

Our analysis indicates that these riders, on average, earn less than their Italian counterparts. This disparity in earnings is primarily attributed to a steeper learning curve faced by these individuals. Factors such as language barriers, unfamiliarity with the city, and the nuances of the gig-work environment contribute to this challenge. The economic and social marginalization of these individuals is a critical aspect and provides a clear indication of common struggles with integration of these groups.

The findings of this study have significant implications for policy development. They underscore the need for tailored strategies to address the unique challenges faced by marginalized groups, particularly non-native workers who may struggle with language and integration into the labour market and, more broadly, society.

Looking forward, our research aims to delve deeper into the role of the gig economy in labor market transitions, with a specific focus on these marginalized groups. Understanding their journey and the obstacles they face will be crucial in developing more inclusive and equitable labor policies, fostering a gig economy that benefits all participants.

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