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ORIGINAL PAPER

Demanding proper payment in extremely vulnerable labor markets: gender differences in the prevalence of violence

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Abstract

The present study examines a unique database of 724 individuals that informally look after cars parked in the streets. The study enriches our knowledge on the relationship between gender and the aggression exerted by these irregular workers on citizens. Employing a multivariate analysis, we find that men tend to commit acts of physical aggression more frequently than women, while women show greater verbal aggressiveness than men, when drivers underpay in this voluntary payment market. The results provided by the present study have implications to understand the dynamics in these understudied sectors and may be a valuable input for social policies. The findings may be useful also for other sectors with significant similarities, that is, those that work in the street doing different tasks in exchange for tips such as cleaning the windshields of the cars or juggling at the traffic lights. These results may shed light to the research and policy design in contexts where vulnerable workers strive for the informal ownership of a physical public space.

Keywords Violence at workplace · Aggression · Poverty and informality · Gender differences

Introduction

Aggression is a social behavior with multiple manifestations (e.g., physical or verbal, elicited by anger or premeditated). Notwithstanding the many instantiations of aggressive behavior, all conform to the scholarly definition as behavior intended to

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cause harm to someone who is motivated to avoid that harm (Anderson and Bushman 2002).

Research into workplace aggression remains focused on employees (healthcare and social workers, correctional officers, bus drivers and ticket inspectors) that reported having been exposed to violence by citizens (e.g., Friis et al. 2020; Geoffrion et al. 2017). However, there are few investigations (e.g., Bensimon 2015) on citizens that have been exposed to violence by employees. In particular, there is no previous research on the violence that citizens suffered by people who, in an imperative way, demand a retribution of an unsolicited service (e.g., the squeegee men wiping the windshields of cars stopped at traffic lights; street hawkers selling bags, sunglasses or handicrafts; and rag-and-bone men collecting unwanted household items). In this research, we built and analyzed a novel and unique database to contribute to shed light on this understudied phenomenon of the violence exerted by irregular workers on citizens. Little is known about gender differences in these stressful situations: our study also makes a significant contribution in this line.

The analysis of these irregular markets in public spaces is of paramount importance for the understanding of contemporary violent phenomena. Such situations are found in many developing countries where vehicles are washed or looked after without any regulation, streets where garbage is picked up in exchange for a voluntary financial compensation or markets where goods are sold in informally assigned areas. This phenomenon is spread also in developed countries (Boels 2014).

In most Latin American countries, we find people who in an unsolicited way work on the street looking after parked cars in the hopes of getting a tip in return. Several attempts have been made to ban, regulate and legislate this practice, which can be known by different names in each country: from the *viene-viene* or *franeleros* in Mexico, the *cuidaautos* or *guardias* in Chile, the *franelinhas* in Brasil, the *celadores*, *vigilantes* or *guachimanes* in Colombia, the *cuidacarros* in Peru, the *trapitos* in Argentina, all the way to the *cuidacoches* in Uruguay, just to name a few.

Uruguay´s capital city—that has 1,400,000 inhabitants (Uruguayan National Institute of Statistics, Census 2011) and 540,000 cars (Municipality of Montevideo, Department of Transport 2015)—has experienced a boom in the number of *cuidacoches* in the last two decades, which is what makes it especially appealing to study the dynamics of the informal market of *cuidacoches*. Another aspect that makes Montevideo particularly interesting to study this market is that its local government—Intendencia Municipal de Montevideo (IMM)—has a long tradition of issuing regulations for this informal labor market. Some of these policies date back to 1933 (these regulations can be found in the *Digesto Municipal* [Municipality of Montevideo 2018]). Despite the municipality's aim to regulate this voluntary payment market specially since the early 1990s—the regulation has not experienced any significant change since then—nearly half of the *cuidacoches* remains out of the regulation nowadays.

Authors (2017) made a first approach to the *cuidacoches* labor market. For this purpose, they constructed a unique database of 520 *cuidacoches* from Montevideo. They focused on the mechanisms that led the *cuidacoches* to legalize their job. They found that those who legalize themselves, report that having the exclusive usufruct right to work at a certain block is the main benefit of having the work permit.

In this paper, we build on Authors (2017) by focusing on the *cuidacoches*' behavioral differences between women and men, and by expanding their database with more observations. Most studies, using varied methods such as laboratory experiments, observations, self-reported and peer-reported behavior, demonstrate that men are more aggressive than women in case of overall direct, physical and verbal aggression (Cross and Campbell 2011). This result holds across diverse cultures and the gender difference becomes larger as the risk associated with the aggression is higher (Archer 2004). In our study, based on the workers' self-reports, we find that in the hypothetical case that a *cuidacoches* has to demand the payment for their service, men tend to commit more acts of physical aggression than women. Interestingly, we find that female *cuidacoches* would react more aggressively than men (not physical, but verbal and minor direct aggressions), when drivers underpay them. This finding in a novel environment may show the existence of some kind of evolutionary process toward an equilibrium of few—there's a proportion of only one woman out of ten males in this market—and more aggressive women. This may shed light about the gender dynamics in deeply vulnerable environments.

Researchers increasingly seek to determine what motivate deviant behavior in the workplace. Of the many predictors of deviance, research has consistently found support for perceived unfairness or injustice (Michel and Hargis 2017). These processes may underlie the patterns of reported aggression that we found when *cuidacoches* feel that they were underpaid. Our study may foster further research on the motivation behind these aggressive behaviors in these stressed irregular environments.

The rest of the paper is organized as follows. "Literature review" section reviews the literature on gender differences in aggressiveness. "The *cuidacoches* labor market" section describes the *cuidacoches* labor market. "Methodology" section presents the data and "Results" section the main results. "Discussion" section discusses the implications of the evidence found.

Literature review

To the best of our knowledge, the present study is the first to date that provides an opportunity to enrich our insight on the gender differences in the aggressions that irregular workers exert on citizens in stressful situations.

Gender and aggression in the worker-citizen relationship

There has been a proliferating research on aggression within the relationship between employees and citizens (e.g., Friis et al. (2020) about ticket inspectors; Geoffrion et al. (2017) about the health care, law enforcement and public transportations sectors). However, literature that specifically compares aggression that men and women workers exert on citizens is scarce. One example is Bensimon (2015). He examined formal workers (security personnel) who completed an aggression questionnaire. Bensimon's findings revealed that in general, men security personnel reported much higher physical aggression than women, while women showed

slightly higher means of verbal aggression than men. Garner and Maxwell (2002), Bazley et al. (2007) and Schuck and Rabe-Hemp (2005) studied the prevalence of force used by the police. They found that male officers are more associated with increased use of force. Hoffman and Hickey (2005) examined the use of force by officers in a large, suburban police department during a seven-year period. No statistically significant difference between female and male officers was found in the overall rate of force or in the rate of unarmed physical force.

There is no previous research on the violence that citizens suffered by people who, in an imperative way, demand a retribution of an unsolicited service in irregular labor markets.

Theories of gender differences in aggression

Archer (2004) reports a comprehensive summary of sex differences in aggression, measured through self-reports, observations, peer reports, and teacher reports involving children and adults. Men seem to be more aggressive than women and this result holds across diverse cultures. Generally, the effect sizes for verbal aggression are smaller than those for direct and physical aggression (Archer 2004; Cross and Campbell 2011). In the case of indirect aggression, which refers to acts such as spreading stories, excluding and stigmatizing, the results vary depending on the measurement method. With some methods women show higher indirect aggression than men and in other cases there is no gender difference (Archer 2004; Cross and Campbell 2011; Hess and Hagen 2006). The difference in the female direction appears in childhood and adolescence and it reduces when adulthood (Archer 2009).

Rutter and Hine (2005) find that males reported engaging in workplace aggression more often than females. They offer a path analysis that revealed that "the relationship between sex and expressions of hostility was mediated by respondents' expectancies about the potential costs and benefits of engaging in this type of aggression" (Rutter and Hine 2005, p. 254).

The gender differences in aggression have been generally explained by diverse theoretical frameworks, which complement each other. A first theory relies on sexual selection. It explains the higher levels of competitiveness in males by their lower parental investment (fathers invest less than mothers in the care of his offspring). As females show higher parental investment, they became a scarce resource, and male have to compete against each other for reproductive access. The degree of risk an individual is prepared to take during a conflict is identified as the crucial difference between the sexes. The greater variation in male than female reproductive success leads to more intense male competition: it is typical of mammals (Archer 2004, 2009). "Therefore, sex differences in aggression are viewed as characteristic of humans, to be found across cultures. They arise at a particular point in development, either early in postnatal life or at puberty, and are maximal during the peak years of sexual activity. They are greater for risky forms of aggression, rather than involving a difference in arousal to anger" (Archer 2009).

Furthermore, from a biological approach, there are sexually dimorphic neuroendocrine mechanisms, underlying aggression. There is a prenatal different exposure to

sex hormones that is of great importance for personal traits such as empathy, altruism, cooperativeness and risk taking behavior (Staniloiu and Markowitsch 2012).

The social role theory (Eagly and Steffen 1986; Eagly and Wood 1991; Eagly et al. 2000; Eagly and Sczesny 2019) supports that behavioral gender differences are based on the historical division of labor between the sexes and the relating roles men and women assume in the society. "Boys but not girls learn that aggressive responding is appropriate as part of a set of instrumental behaviors that fit them better for the masculine role. Expectancies associated with the masculine role maintain aggression as part of an instrumental set of responses, and expectancies associated with the feminine role inhibit it as part of an expressive set of responses" (Archer 2004).

Following the literature on gender differences in aggressiveness, the present study aims to examine, in the field, the gender variations in different types of aggressiveness among the *cuidacoches* workers. Previous literature suggests that male *cuidacoches* would exert physical aggression to car riders, while female *cuidacoches* would exert verbal aggression. Notwithstanding the predictions of the literature, the market of *cuidacoches* is a particular one: each *cuidacoches* obtains and defends an informal right of usufruct over a place. Female *cuidacoches* would learn violent behaviors from constantly being exposed to a culture that is manifested by violence as a means of defending the workplace. The dynamics of this informal mechanism of acquisition suggest that the kind of woman who decides to work in the streets as *cuidacoches* is, on average, more violent (both physically and verbally) than the average. This selection bias may challenge the results of previous findings in formal settings (e.g., security personnel, police officers) that predict that women at work were found to be much less likely than men to exert physical violence on citizens.

Our research contributes with a unique database to the existing literature on gender differences in violent behavior, in a novel setting, with focus on underprivileged irregular workers that obtain their workplace by force. Does this stressful environment bias the type of violence exerted by women, against the predictions of previous literature?

The *cuidacoches* labor market

The people who work as *cuidacoches* are self-employed and are not constrained to a fixed schedule. They wear a reflective jacket so that people can identify them, stand in a visible spot on the street and take care of the parked cars. Usually, they also assist people finding a parking space and guide them during the parking maneuver. In some cases, there can be more than one *cuidacoches* in the same block, in which case they settle the issue of how to distribute the work themselves. The vast majority of *cuidacoches* work in the capital city of the country, where half of the country´s population is concentrated.

The *cuidacoches* market experienced a sudden growth after 2002, when the country suffered a severe economic crisis. The economic downturn pushed up the percentage of population under the poverty line from 19% after the crisis to 31% in 2003 (following the methodology applied by the *Instituto Nacional de Estadística*

in 2002, by Amarante and Vigorito 2006). In this context, the *cuidacoches*'s labor market absorbed in most cases unskilled workers who were willing to accept the precarious conditions of this informal job. In fact, the occupational category that includes the *cuidacoches* and other informal workers that work on the street, increased sharply from something more than 650 workers in 2001 to about 2.300 in 2003 (authors own calculations based on the *Encuesta Continua de Hogares* data published by the *Instituto Nacional de Estadística*; the occupational category considered includes: *cuidacoches,* shoeshine boy, billsticker and squeegee man).

After the economic recovery, instead of dismantling, the market has consolidated, in a context of sustained growth of car sales. In particular, the vehicle fleet of Montevideo more than doubled between 2002 and 2016, reaching more than 540,000 vehicles (according to the Observatorio de Tránsito of *Intendencia Municipal de Montevideo* and SUCIVE). In this context, the estimated number of *cuidacoche*'s stood at 2000, according to the latest data of the *Encuesta Continua de Hogares* (2014).

For its part, the government has promoted the regulation of the *cuidacoches* under an active policy. To register themselves, the *cuidacoches* has to present their identity card, health card, criminal records and passport photo. The registered *cuidacoches* have the usufruct right in her area, which means the police will provide protection in the case that another *cuidacoches* wants to work in that area. Besides, with the payment of an additional tax, the *cuidacoches* have the possibility of accessing to health assistance (which is extended to their family as well).

Furthermore, the government encouraged a program that consists of visiting the *cuidacoches* and giving them the proper information regarding how to get the working permit. Despite the government policy, about half of them remain as illegal workers (Authors 2017).

Methodology

Procedure

We designed a specific survey an implemented it in Montevideo in two waves in 2013. That year was particularly interesting because real GDP had been continuously growing since the severe economic crisis of year 2002. Thus, we studied this particular market of cuidacoches in an environment that showed a labor market in good health. The first wave was conducted in June–July 2013 with 520 observations (Authors 2017). The second wave of interviews took place in October–November 2013 with another 204 observations. Our final estimation sample included 724 observations.

In May 2013, an initial outline of the geographical distribution of the *cuidacoches* along the city was done. Based on this approach, we defined different zones with the same number of potential *cuidacoches.* The interviewers were hired and trained by members of the research team. They received a package with printed material and an identification card from the university. The package contained copies of the survey and a map. To avoid mistakes, each map identified the cells

for the specific part of the city where the interviewer would administer the survey. The interviewers were equally allocated among these zones. Each interviewer went over all of the blocks in their corresponding cells, and every time they found *cuidacoches* they carried out the survey. We made a pilot test of the survey that helped us improve the accuracy of some questions. To stimulate the person to answer the questionnaire, we emphasized the strict academic and research purpose of the survey. To encourage people to participate, we provided them with a lottery ticket number with small prizes. We determined that, in the case that at the time of the interview there were more than one *cuidacoches* in the street, the interviewer would conduct the interview to the one they considered the 'owner of the area'. The field supervisor closely monitored interviewers to help them in case they encountered any difficulty with the *cuidacoches* or with the procedure. Only one *cuidacoches* refused to be surveyed. Interviews were carried out between 10 a.m. and 6 p.m. from Monday to Friday.

Questionnaire

The forms were filled out by interviewers. The questionnaire included socioeconomic data on the *cuidacoches*, questions related to their work decisions and aspirations and to their behavior at work.

Among the most popular measures of aggression is the self-report Aggression Questionnaire (AQ; Buss and Perry 1992) that revealed four underlying factors: Physical Aggression, Verbal Aggression, Anger, and Hostility. One attractive feature of AQ is that this instrument does not only allow assess the overall aggression but also its individual factors. We omitted items that do not apply for the purpose of our study, and adapted some questions of the Physical and Verbal Aggression dimensions to identify the violent behaviors that the *cuidacoches* may exert on car riders.

A limitation of our questions on aggressive behavior—that are inspired in AQ—is that AQ is a self-reported instrument and the surveyed people may bias their answers in socially desirable responding. Though we are not able to rule this out entirely, AQ remains a valid and reliable instrument, employed to measure gender differences in aggressive behavior (Buss and Perry 1992; Bryant and Smith 2001; Gerevich et al. 2007).

In a section reserved for the interviewer there were questions regarding the external appearance of the *cuidacoches*. These variables were four binary indicators: physical appearance of the person, poor denture condition, being under the influence of drugs or alcohol at the moment of the interview and having used poor language during the interview. With these variables we constructed the Type Index that indicates the physical appearance of the person, taking values from 0 to 4. The four dimensions of the Type Index indicate factors (stress, vulnerability, affective states, unthoughtful actions) that may be deeply correlated with the propensity for violent behavior. Since these factors may not be balanced by gender, it is key to control for the Type Index when estimating the relationship between gender and aggressive behavior.

Participants

In Table 1 we include the definition and description of the main outcomes considered in this work and the descriptive statistics of the *cuidacoches* population that we study.

There are 647 males and 76 females (one observation is missing in gender) in the sample, so that women represent only 11% of the total *cuidacoches* workforce. This fact is consistent with vast literature that argues that the social identity factor influences the decisions and behaviors of people (Akerlof and Kranton 2000, 2005; Goldin 2002). Akerlof and Kranton (2000) show that one's identity, defined as one's sense of belonging to a social category (which includes one's gender identity) could be an important determinant on economic outcomes. In particular, social norms regarding what is appropriate for each gender to do may influence women and men: deviating from the behavior that is expected for one's social category has a negative impact on the utility function. This fact could explain why women may avoid their participation in the market of cuidacoches.

The proportion of legalized workers is 48% and the *cuidacoches* have on average roughly 6.6 years of education (the average for Uruguay is 8.6)—both Primary Education (6 years) and Secondary Education (another 6 years) are mandatory. The 24% of the sample can save some money and 11% of the surveyed population is homeless. On average they have been working as *cuidacoches* for 8 years and a large proportion of them have been working in the same zone. About 76% of the sample has health insurance—public health is free for deeply poor people—and 30% of the population has dependent minor children. For the vast majority (85%) of the workers, the earnings as *cuidacoches* represent their main income source.

As it is shown in Table 2, there is no significant difference between women and man on main characteristics, except for work permit, savings and health insurance. Being a woman increases 19 percentage points the probability of having the work permit and rises slightly (1 percent) the probability of having health insurance. On the other hand, men save 10% more than women.

Concerning income, women earn on average $8520 (USD 284) and men $9102 (USD 303) monthly (see Table 2)—household income per capita in Uruguay is $15,954 (USD 531). Figure 1 displays the association between income and age by gender. Income is strongly and negatively correlated with age both for women and men. Figure 2 graphs kernel density of daily income.

Figure 3 shows the correlation between income and the time working as *cuidacoches*. It seems that income does not vary with the number of years working in the street.

Results

To test if men and women might behave differently, we study gender reactions in two different hypothetical situations: aggressive behaviors against drivers who don´t give sufficient money, and the use of physical violence against other *cuidacoches* in order to defend their place in the street.

Table 1 Definition and description of variables

Variable	Description of variables	Mean	S.D	Min	Max	# Obs
Age	Age in years	46.664	14.49	15	85	659
Female	=1 if the person is female and 0 otherwise	0.105	0.31	0	1	723
Work permit	=1 if the person has a work permit and 0 otherwise	0.478	0.50	0	1	724
Years of education	Years of completed education	6.564	2.62	0	16	590
Save	=1 if the person has a remaining from his earnings and 0 otherwise	0.240	0.43	0	1	567
Homeless	=1 if the person does not have house and 0 otherwise	0.105	0.31	0	1	724
Type index	Index composed of four dummy variables: physical appearance of the person, poor denture condition, being alcoholised or drugged at the moment of the interview, poor language used during the interview. The higher the index, the poorer condition	0.911	1.17	0	4	684
Time as *cuidacoches*	Number of months the person has worked as *cuidacoches*	100.355	89.44	0	480	714
Time as *cuidacoches* in this area	Number of months that the person has worked as *cuidacoches* in this area	74.502	78.55	0	456	717
Health insurance	=1 if the person has health insurance and 0 otherwise	0.757	0.43	0	1	724
Minor children	=1 if the person has children younger than 18 years and 0 otherwise	0.301	0.46	0	1	715
Cuidacoches main income	=1 if the income as *cuidacoches* is the principal income he perceive and 0 otherwise	0.854	0.35	0	1	604
Work more hours	=1 if the person would like to work more hours and 0 otherwise	0.315	0.46	0	1	724
Leave current job	=1 if the person would like to leave the current job and 0 otherwise	0.638	0.48	0	1	724
Searching for a job	=1 if the person is searching for a different job and 0 otherwise	0.315	0.46	0	1	724
Searching for a job to replace	=1 if the person is searching for a job to replace the current job and 0 otherwise	0.620	0.49	0	1	216
Time in last job	Number of months the person worked in his last job	99.664	110.35	1	552	515

Table 2 Mean comparison by gender of main characteristics

	Women	Men	Difference	*p* value	# Obs
Age	48.893	46.403	−2.490	0.177	659
	(12.748)	(14.670)	(1.843)		
Years of education	6.538	6.572	0.033	0.924	589
	(2.699)	(2.614)	(0.345)		
Work permit	0.645	0.459	−0.186***	0.002	723
	(0.482)	(0.499)	(0.060)		
Income	8519.87	9102.16	582.288	0.365	696
	(5168.74)	(5262.66)	(642.12)		
Cuidacoches main income	0.879	0.851	−0.028	0.547	603
	(0.33)	(0.36)	(0.046)		
Type index	0.760	0.929	0.169	0.237	684
	(1.011)	(1.188)	(0.143)		
Savings	0.150	0.251	0.101*	0.084	566
	(0.360)	(0.434)	(0.058)		
Homeless	0.066	0.108	0.042	0.252	723
	(0.250)	(0.311)	(0.037)		
Health insurance	0.842	0.747	−0.096*	0.066	723
	(0.367)	(0.435)	(0.052)		
Minor children	0.320	0.299	−0.021	0.707	714
	(0.470)	(0.458)	(0.056)		
Time as *cuidacoches*	105.787	99.780	−6.007	0.583	713
	(90.91)	(89.38)	(10.930)		
Time as *cuidacoches* in this area	80.400	73.834	−6.566	0.494	716
	(69.90)	(79.58)	(9.596)		
Time in last job	86.840	101.043	14.203	0.388	515
	(92.804)	(112.075)	(16.428)		

Standard errors in parentheses. The reported difference is the difference in means between women and men

***Significant at the 1% level; **significant at the 5% level; *significant at the 10% level

In the case of violence against drivers, we use the information of the following question: "What would you do if somebody parks several times and leaves you a small or non-existing tip?" Response choices were: (1) "I continue working normally", (2) "I do not greet him", (3) "I tell him there are no parking spaces", (4) "I look at them with a straight face", (5) "I insult him", (6) "I don't take care of his/her car if somebody else damages or steals it", and (7) "Next time I'll damage his car".

Our analysis is based on the following linear regression:

$$R_{ij} = \beta_{0j} + \beta_{1j} WP_i + \beta_{2j} F_i + \beta_{3j} A_i + \beta_{4j} TI_i + \varepsilon_{ij} \quad (1)$$

Were $R_{ij} = \{R_{i1}, R_{i2}, \ldots, R_{i7}\}$ are each of the response choices to the question above, the i subscripts refer to each i individual, WP is the variable work permit,

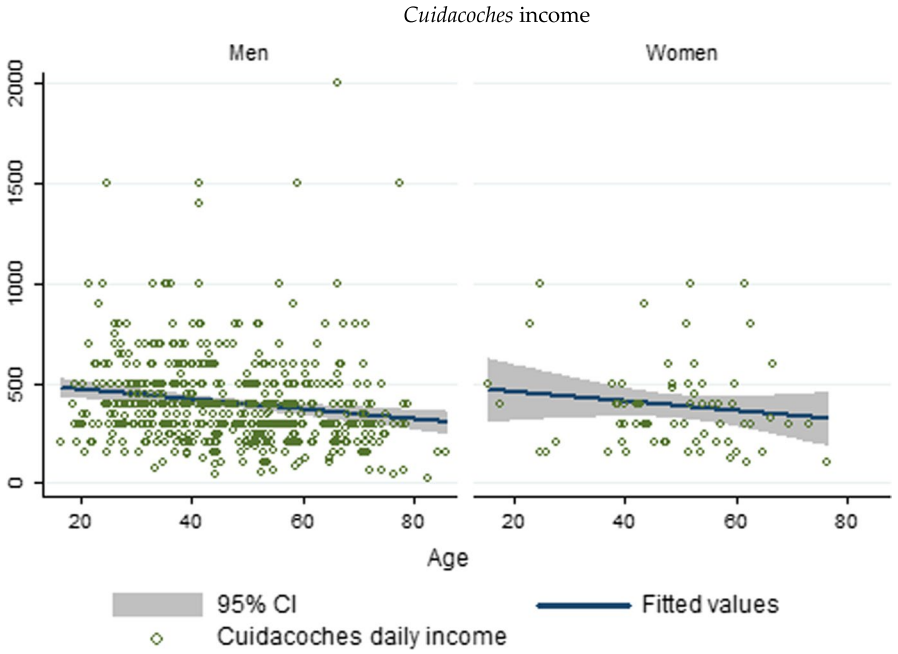

Fig. 1 *Cuidacoches* income. *Notes* The figure plots the *cuidacoches* daily income by age for men and women separately. Income measured in 2013 Uruguayan pesos

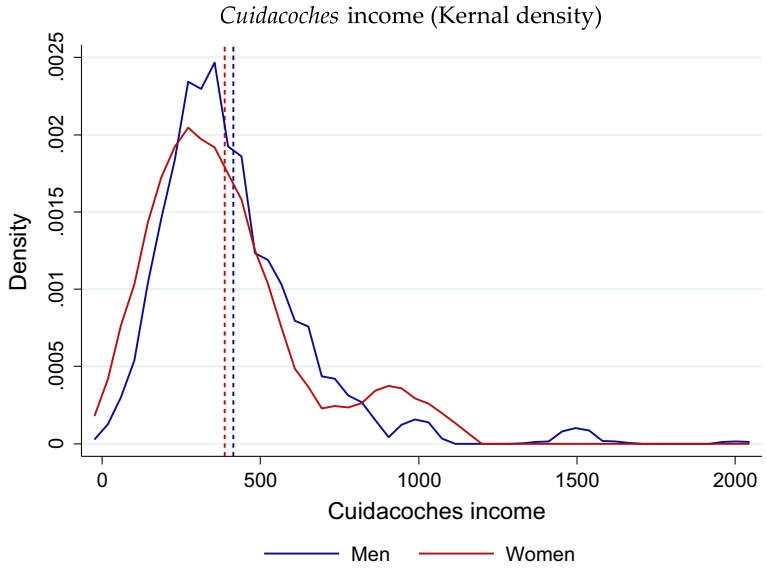

Fig. 2 *Cuidacoches* income (Kernel density). *Notes* Mean of *cuidacoches* daily income for men and women in dashed lines. Income measured in 2013 Uruguayan pesos

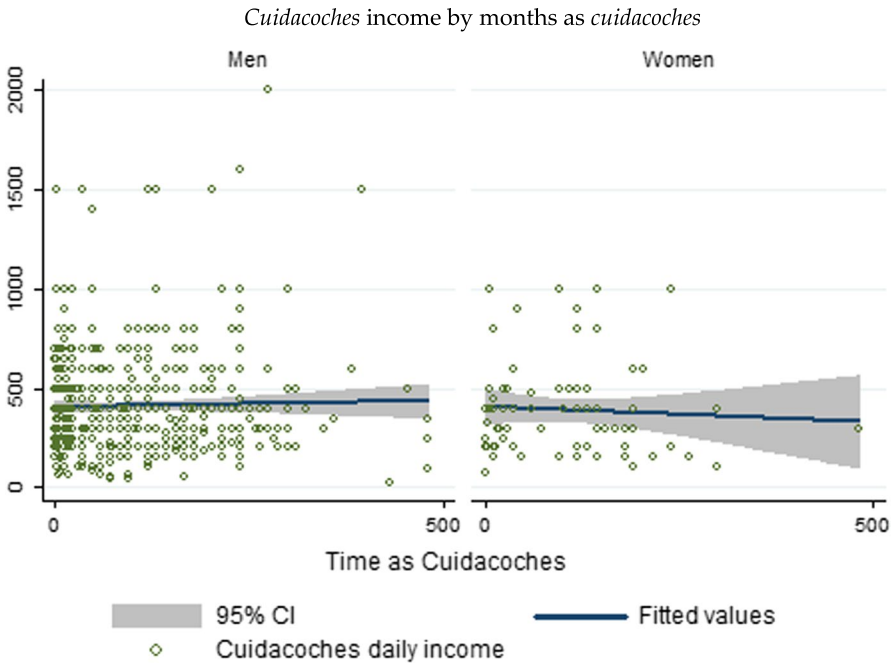

Fig. 3 *Cuidacoches* income by months as *cuidacoches*. *Notes* The figure plots the *cuidacoches* daily income by time as *cuidacoches*. The time as *cuidacoches* is measured in months and the income is measured in 2013 Uruguayan pesos

F is the variable female, *A* is the variable age, *TI* is the variable type index (the worse the type, the higher the index) and ϵ is a stochastic error term.

Table 3 shows that women might have more negative reactions than men: only with one exception ("I do not greet him"), women present a positive and significant coefficient along all the negative reactions. Besides, as expected, there is a positive and significant correlation between the type index and negative reactions, which means that the scruffier the person looks the higher tendency to have negative reactions.

To summarize the outcomes in a single measure, we create the Aggressive Behavior Index. This index is calculated as the simple average of three of the dichotomous variables obtained from the response choices presented in Table 3 that were considered as an aggressive reaction: "I insult him", "I don't take care of his/her car if somebody else damages or steals it" and "Next time I'll damage his car". Figure 4 depicts the cumulative density of the Aggressive Behavior Index for men and women.

In Table 4, we present the coefficients from OLS regression models predicting the Aggressive Behavior Index. We look at the stability of the female coefficient after adding different control variables. According to these models, being a female *cuidacoches* increases the probability of having aggressive behaviors. The

Table 3 Reaction when somebody parks several times and leaves you a small or non-existing tip

	Dependent variable						
	(1) I continue working normally	(2) I do not greet him	(3) I tell him there is no parking spaces	(4) I look at him with a straight face	(5) I insult him	(6) I do not take care of his car if somebody else damages or steals it	(7) Next time I will damage his car
Female	−0.058	0.070	0.046*	0.086**	0.069***	0.068*	0.014*
	(0.261)	(0.156)	(0.071)	(0.025)	(0.004)	(0.079)	(0.059)
Work permit	−0.062*	−0.024	0.003	0.001	0.003	−0.002	0.002
	(0.072)	(0.461)	(0.862)	(0.965)	(0.858)	(0.932)	(0.648)
Age	0.003**	0.000	0.000	−0.001	−0.001	−0.000	−0.000
	(0.016)	(0.662)	(0.947)	(0.292)	(0.172)	(0.691)	(0.503)
Type index	−0.030**	0.028**	0.031***	0.032***	0.033***	0.051***	0.005***
	(0.034)	(0.035)	(0.000)	(0.002)	(0.000)	(0.000)	(0.007)
r2	0.019	0.012	0.038	0.025	0.056	0.043	0.018
N	611	611	611	611	611	611	611

Following Eq. (1), each answer to the question 'What would you do if somebody parks several times and leaves you a little or none tip' are estimated. OLS estimations; *p*-values in parentheses

***Significant at the 1% level; **significant at the 5% level; *significant at the 10% level

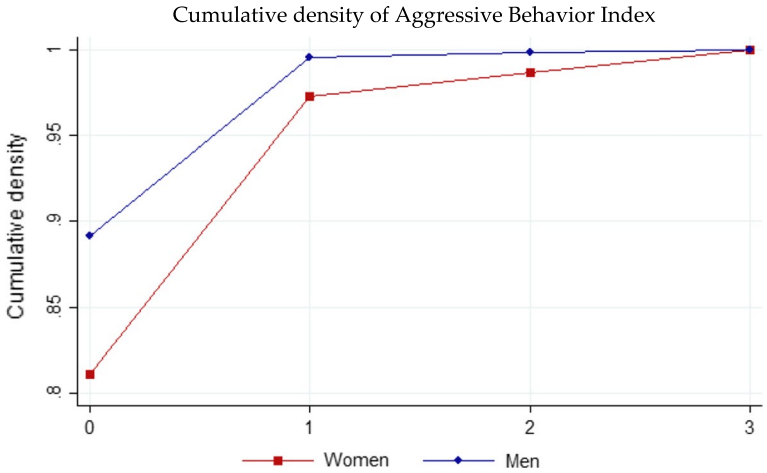

Fig. 4 Cumulative density of Aggressive Behavior Index

Table 4 Women effect on the Aggressive Behavior Index

	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.115**	0.138***	0.131**	0.141**	0.141**	0.142**
Age		−0.001	−0.002	−0.001	−0.001	−0.001
Years of education			−0.005	0.001	0.001	0.000
Type index				0.095***	0.095***	0.094***
Work permit					0.001	0.003
Homeless						0.026
# Observations	708	644	528	502	502	502

OLS estimation of the Aggressive Behavior Index. The aggressive behavior index is calculated as the simple average of three dichotomous variables obtained from the available answers to the question: 'What would you do if somebody parks several times and you a small or non-existing tip?'. The three answers averaged are: "I insult him", "I do not take care of his car if somebody else damages or steals it" and "Next time I will damage his car"

***Significant at the 1% level; **significant at the 5% level; *significant at the 10% level

coefficient for women increased and remains significant after controlling for age, years of education, type index, work permit and homeless.

Now we turn to interpersonal physical violence against other *cuidacoches*. We create a Physical Violence Index. *Cuidacoches* were asked about the method they would choose to kick out someone who was trying to work in their area if he/she had a work permit. The index is constructed as the simple average of two dummy variables obtained from the answers to that question: "I will forcibly remove them by myself" and "I will forcibly remove them with the help of others".

We run a linear OLS regression that explains the Physical Violence Index using the same variables as in the Aggressive Behavior Index model (Eq. 1). The results are shown in Table 5. Consistent with previous findings, women are not more likely

Table 5 Women effect on the physical violence index

	(1)	(2)	(3)	(4)	(5)	(6)
Female	−0.129*	−0.105	−0.121	−0.106	−0.085	−0.083
Age		−0.009***	−0.009***	−0.008***	−0.007***	−0.007***
Years of education			−0.004	0.003	0.002	0.003
Type index				0.099***	0.087***	0.082***
Work permit					−0.150***	−0.140**
Homeless						0.102

OLS estimation of the physical violence index. The Physical Violence Index is calculated as the simple average of two binary variables obtained from the available answers to the question: 'Imagine you have a work permit. What would you do to expel other illegal *cuidacoches* from your zone?'. The answers averaged are: "I will forcibly remove them by myself" and "I will forcibly remove them with the help of others"

***Significant at the 1% level; **significant at the 5% level; *significant at the 10% level

than men to employ physical violence against other *cuidacoches*. The correlation is negative and significant at the 10% level: being female decreases the likelihood of exerting physical violence. When we include controls, the correlation remains negative, but is no longer statistically significant at the conventional levels.

Other result is that legalized workers are less likely to be violent, since they can call the municipality or the police in case someone else wants to work in their zone.

Table 6 presents bivariate correlations between the components of the Aggressive Behavior Index and the type index. As expected, most are significant and positive. We analyze the coefficient differences by gender. Women have higher coefficients than men in most of the cases.

We calculated the correlations between the type index and the aggressive behavior by age, separately for women and men (Fig. 5). For women the correlation is greater than for men. The correlation strongly diminishes with age, which is more clearly for men.

It is important to note that the sample of women could be subject to a selection bias. Although there are no significant differences between women and men in all the observable variables (see Table 2)—with the exception of the likelihood of having the work permit and the health insurance-, we should go further on the analysis. To confront the existence of a selection bias we ought to compare female and male *cuidacoches* with women and men in the whole population. With adequate information we could determine if female *cuidacoches* are more violent than the average female population and the same comparison in the male case. Unfortunately, for the time being, we don't have enough information to do this study. However, it is interesting to note that the proportion of women *cuidacoches* in our sample is about 11%, while in the working population of the country that ratio is over 40%. Therefore, it seems to be that women choose to work as *cuidacoches* in a much lower proportion than men, and it is plausible that the kind of woman who decide to work in the streets as *cuidacoches* is, on average, more violent than the average man. This probable selection bias should be taken into account at analyzing the gender dynamics of

Table 6 Bivariate correlations

	Men and women				Men				Women			
	Insult	Do not take care	Damage	Type index	Insult	Do not take care	Damage	Type index	Insult	Do not take care	Damage	Type index
Insult	1				1				1			
Do not take care	0.0797**	1			0.0528	1			0.171	1		
Damage	0.290***	0.170***	1		0.239***	0.131***	1		0.394***	0.296**	1	
Type index	0.184***	0.176***	0.0985**	1	0.157***	0.191***	0.0722*	1	0.413***	0.0915	0.260**	1

Bivariate correlation coefficients for four variables. It is calculated for the entire sample and the subgroups of men and women. The first three variables are the answers included in the aggressive behavior index (see Table 3). The other variable included is the type index

***Significant at the 1% level; **significant at the 5% level; *significant at the 10% level

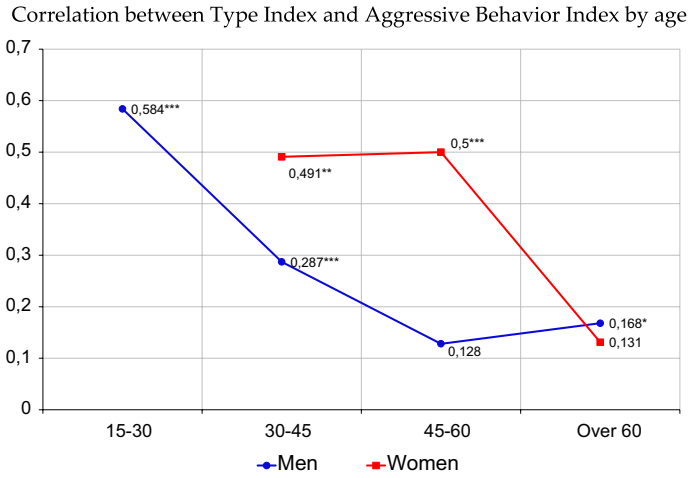

Fig. 5 Correlation between Type Index and Aggressive Behavior Index by age. *Note* The coefficients of bivariate correlations are calculated for four age cohorts: 15–30, 30–45, 45–60 and over 60 years old. ***significant at the 1% level; **significant at the 5% level; *significant at the 10% level

the market of *cuidacoches* and at evaluating the interesting result that women *cuidacoches* are more likely to react aggressively than men with the drivers. This finding may shed light to the research in similar labor markets, where vulnerable workers strive for the informal ownership of a physical public space.

Discussion

In this paper, we sought to address the gender differences in aggressiveness in the *cuidacoches* labor market, based on self-reported data. We found that women might react more aggressively than men, when they are not enough rewarded by the drivers. In addition, the type index also has a positive correlation with the aggressive behavior.

Following Campbell (2006), the main mediator of the sex difference in aggression is the fear, which is higher on women than men. Besides, the empathy and guilt are two domains that are highly correlated with aggression. As Campbell stands, there is a negative correlation between empathy and aggression and guilty and aggression, while women demonstrate greater empathetic concern than men and they are more likely to experience guilt than men. In the case of the c*uidacoches*, it is reasonable to think that drivers that leave a small or non-existing tip are not parking in that place regularly, but occasionally. In this context, it can be expected that women do not feel scared to the occasionally drivers, that probably, may not retaliate.

Most studies have shown that there are gender differences in social-preferences. Particularly, women usually are more pro-redistribution than men (Funk and Gathmann 2015; Alesina and Giuliano 2011). We consider that the higher redistributive

concern could be a possible explanation of the women strong reaction with cheap drivers.

Besides the economic precariousness that may have thrown women to this extremely vulnerable workplace, we offer another possible explanation behind our findings, in the vein of Bensimon (2015): Influenced by the gender stereotype associating anger with men (Plant et al. 2000), women may be drawn to the masculine occupation of looking after parked cars in the street to escape the societal expectations or norms for stereotypically feminine behaviors (Parsons and Jesilow 2001). Perhaps, the *cuidacoches* labor market provides an opportunity for women to express anger as a characteristic that is stereotypically associated with masculine behavior (Rabe-Hemp 2008).

It would be an interesting question to address in future research if there are other differences between women and men *cuidacoches* that have not been already measured and could be related to behavioral differences, such as mental health or self-esteem.

With respect to physical aggression, when comparing their behavior with other c*uidacoches*, we evidence that women appear to be less likely than men to use physical violence against other *cuidacoches*. In the absence of other controls, the correlation is significant and negative at 13%. Besides, having a worse aspect (higher type index) and not being legalized increases the probability of committing acts of physical aggression. As expected, the age has a negative correlation with the physical violence.

The aggression exerted by irregular workers on citizens when citizens underpay in this voluntary payment market may be motivated by injustice or unfairness. Is the perceived injustice reported by workers related to their tendency to engage in workplace aggression? There is some evidence in formal labor markets (Baron et al. 1999; Hershcovis 2007; Michel and Hargis 2017) but no research on injustice or unfairness within irregular workers that exploit the informal ownership of places in the street. This topic deserves more research. Further investigations may collect data from similar vulnerable populations in irregular markets to answer this question.

A limitation of this study is that we employed self-reported questions on aggressive behavior. Though we built our questionnaire inspired in valid and reliable instruments (AQ, the Aggressive Questionnaire, Buss and Perry 1992), we are not able to completely rule out the possible bias caused by socially desirable responding. Further research may try to build a database with observational data on aggressive behavior.

The present study provides valuable information about the *cuidacoches* and their heterogeneous behavior by gender, which should be taken into account in designing public-policies to prevent violence in similar extremely vulnerable settings. Several attempts have been made to ban, regulate and legislate the market of irregular street vendors in different parts of the world. Our study has implications for a wide range of welfare programs that require overcoming behavioral barriers within deeply vulnerable populations. This type of market is of paramount importance in the understanding of contemporary phenomena such as those found in blocks where vehicles are washed by informal workers, streets where garbage is picked up in exchange for voluntary financial compensation or in markets where goods are sold in squares and

at traffic lights. Knowledge of the sex differences in aggression exerted by workers on citizens could be an asset for policy makers and primary prevention strategists that wish to decrease the occurrence with occupation-specific efforts. "Tailoring strategies in accordance with the prevalence of specific types of workplace aggression may yield better results than generic strategies that address violence globally" (Geoffrion et al. 2017, p. 174). Any policy adopted is more likely to succeed if it is grounded in accurate factual assumptions. Our findings may shed light to the research and policy design in contexts where vulnerable workers strive for the informal ownership of a physical public space.

Declarations

Data availability Materials described in the manuscript, including all relevant raw data, will be freely available to any researcher wishing to use them for non-commercial purposes, without breaching participant confidentiality. All datasets on which the conclusions of the paper rely will be available upon reasonable request.

Conflict of interest The authors declare that there is no conflict of interest.

Ethical approval All the review was performed following the ethical standards.

Informed consent All individual participants provided informed consent.

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