

# The Gender Gap in Small Business Performance: Evidence from a Food Ordering Platform

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# Introduction

- ▶ Gender pay gap among wage earners in different countries and job sectors (e.g., Blau and Kahn, 2017; Goldin et al., 2017; Bertrand et al., 2010; Gupta and Rothstein, 2005; Bayard et al., 2003)
- ▶ The gap persists among the self-employed / entrepreneurs:
  - Male-owned business have higher profitability (Kalleberg and Leicht, 1991; Bird and Sapp, 2004; Hardy and Kagy, 2018; Delecourt and Fitzpatrick, 2021);
  - And higher returns to capital (De Mel et al., 2008, 2009; Fafchamps et al., 2014).
- ▶ The gap persists in the gig economy (Cook et al., 2021; Adams-Prassl, 2020).
  - Gender gap → cost of flexibility (Goldin, 2014; Goldin and Katz, 2016; Cubas et al., 2019);
  - The flexibility of choosing working hours and locations.

# This Project

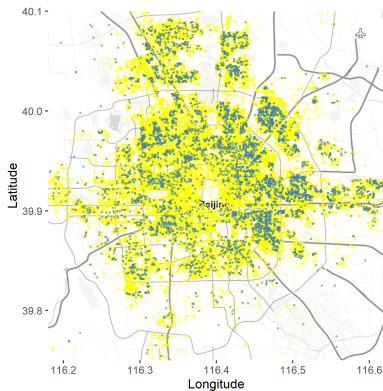
- ▶ Study the gender gap in business performances among freelancers selling home-cooked meals on a Chinese online food ordering platform.
- 1. Home-cooking is traditionally perceived as a female-typed task.
  - Mostly male-typed jobs in the literature, such as drivers (Cook et al., 2021), bus and train operators (Bolotnyy and Emanuel, 2022), and lawyers (Azmat and Ferrer, 2017).
  - Such stereotypes contribute to gender gaps in self-confidence, assessments of others, and behaviors (Coffman, 2014; Bordalo et al., 2019).
- 2. Freelancers set their own quantifiable business strategies.
- 3. Flexibility in working hours & working from home → balance household duties.

## Preview

- ▶ We document a 12.1% gender gap in daily revenues.
- ▶ Investigate how different factors help close the gap:
  - Time, location, and delivery options (25%); working hours (17%); experience (22%).
- ▶ Explore gender differences in business strategies:
  - Male sellers are more business sophisticated;
  - Shorter but more differentiated menus with higher prices;
  - Larger delivery radius and higher stock level.
- ▶ Fully close the gap after matching male and female sellers on their demographics, working hours, experience, and business strategies.

## Setting and Data

- ▶ We use proprietary data from a peer to peer online food ordering platform in China, which connects freelancers who provide home-cooked food with nearby consumers.



## Kitchen Information



### 胖轩私房馆

高女士

★★★★★ (5.0)

黑龙江 齐齐哈尔人

80后 2016年09月加入

Born in the 1980s

厨房地址 Kitchen Address

北京市海淀区北太平庄街道蓟门里北区

食安保障

了解详情



实名认证 Chef's Identification verified

家人身份信息通过平台验证备案



持有健康证 Food Safety Certificate verified

家人持有医疗机构办理的食品类健康证



267



## Kitchen List



128 orders per month  
Rating: 5

Deliver with a minimum order of 0 Yuan

Distance: 2.8 km

## Dish List



# Setting and Data

- ▶ Orders placed by customers in Beijing between Nov, 2014 and Dec, 2017:
  - The identity of the seller (freelancer) and the buyer (customer) for each order;
  - Detailed payment information, including prices, delivery fees, and coupons;
  - The list of dishes ordered, customer's rating and review, time of the order, etc.
- ▶ Freelancers: Demographic information from their profiles, including gender and age group.

TABLE: Summary Statistics

	Full	Male	Female
<i>A. Kitchen-level Characteristics</i>			
Male	0.29	1.00	0.00
Age	42.20	40.88	42.74
Rating	4.84	4.83	4.84
Num of Days Open	175.15	179.84	173.21
Share of Days Open	0.67	0.69	0.66
Daily Total Revenue	217	238	209
Daily Num of Orders	6.63	7.47	6.28
Hourly Total Revenue	36.49	38.54	35.65
Hourly Num of Orders	1.09	1.22	1.04
Num of Observations	5,529	1,618	3,911
<i>B. Order-level Characteristics</i>			
Total Payment	40.06	40.26	39.97
Delivery Fee	2.72	2.73	2.71
Coupon	6.55	6.69	6.48
Num of Observations	7,196,049	2,333,313	4,862,736



# Gender Earnings Gap

To examine the gender differences in business outcomes, we run the following regression:

$$R_{st} = \beta \text{male}_s + \alpha X_{st} + \gamma v_s + \pi_t + \varepsilon_{st},$$

- ▶  $R_{st}$  = business outcome of seller  $s$  at day  $t$ .
- ▶  $X_{st}$  = covariates that change over time, e.g., the seller's working hours.
- ▶  $v_s$  = time-invariant seller-level characteristics, e.g., age group, geographic location, delivery options, and customer ratings.
- ▶  $\pi_t$  = year fixed effect, week fixed effect, and day of week fixed effect.
- ▶ Standard error  $\varepsilon_{st}$  is clustered at the level of sellers.

TABLE: Gender Gap in Daily Revenues

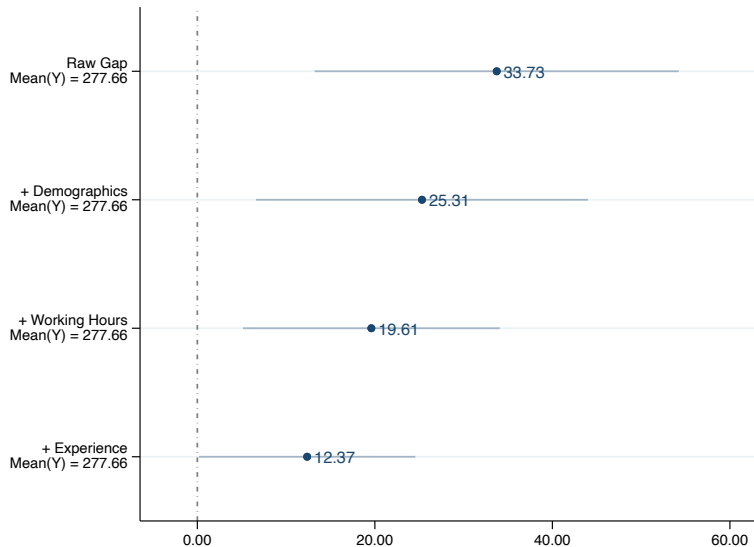
	(1)	(2)	(3)	(4)	(5)	(6)
Male	33.732*** (10.466)	31.098*** (10.378)	29.299*** (9.865)	25.311*** (9.537)	19.606*** (7.378)	19.871*** (7.391)
Working Hours					31.323*** (0.653)	31.282*** (0.658)
Rating						38.396* (22.458)
Time FEs		x	x	x	x	x
Demographics			x	x	x	x
Delivery				x	x	x
Mean(Y)	277.662	277.662	277.662	277.662	277.662	277.662
N	967,655	967,655	967,655	967,655	967,655	967,655

- ▶ The raw gap in daily revenues (conditional on being open for business) is  $33.7/278 = 12.1\%$ ;
- ▶ Year, week, dow, and geographic fixed effects, age groups, and delivery information explain 25% of the gap;
- ▶ After controlling for working hours and customer ratings, there remains a 7.2% gender earnings gap.

## Gender Gap in Daily Revenues: Additional Results

- ▶ Daily Revenues = Average Revenues Per Order  $\times$  Daily Number of Orders.
  - No meaningful gap in average revenue per order between male and female sellers;
  - The gap in daily revenues is entirely driven by the difference in number of orders.
- ▶ The gender earnings gap is concentrated among sellers below age 50. ▶ by age
- ▶ The results are robust to using hourly business outcomes.

FIGURE: Gender Gap in Daily Revenues, Controlling for Experience



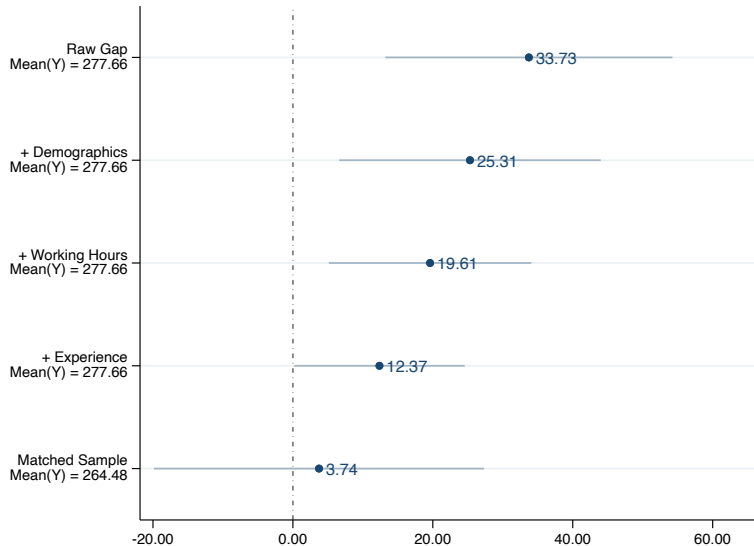
# Gender Gap in Business Strategies

- ▶ Men are more business sophisticated:
  - Offer smaller but more differentiated menus at higher prices and capacity; [▶ figure](#)
- ▶ Controlling for business strategies linearly does not help close the gap. [▶ table](#)
- ▶ Business strategies are irrelevant for the gender earnings gap?
  - Not necessarily.
  - The strategies affect business performances non-linearly;
  - There might exist complicated interactions across the business strategies.
- ▶ Match male and female sellers on their business strategies and other characteristics.

# Gender Gap in Business Revenues: Matching

- ▶ We use Exact Matching and Euclidean distance to match each male seller to the most similar female counterpart.
  1. Require exact matching on sellers' age groups and geographic locations;
  2. Coarsened exact matching on the date when they first started the business;
  3. Match each male seller to the closest female seller in terms of the Euclidean distance;
  4. The Euclidean distance measures the closeness in their hours and business strategies.
- ▶ Results are robust to alternative matching methods and specifications.

FIGURE: Gender Gap in Daily Revenues



## Discussion

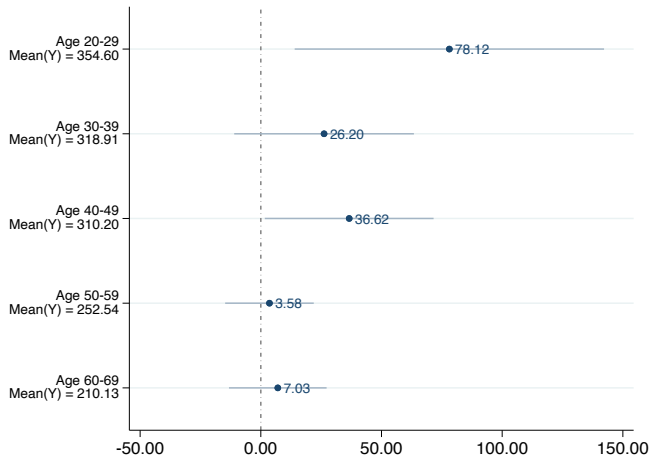
- ▶ We document a 12% gender gap in business performances among freelancers selling home-cooked meals online.
  - Traditionally female-typed & involves complicated business strategy-making.
- ▶ Factors in the literature (e.g., hours and experience) narrows the gap by 63%.
- ▶ Male sellers are more business sophisticated.
- ▶ The gap is fully closed when matched on demographics, experience, working hours, and business strategies.
  - Rule out customer-side constraints or discrimination in our context.
  - Unable to provide a functional form to describe how different strategies jointly determine the business success.



Thank you!

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FIGURE: Gender Gap in Daily Revenues, By Age Groups

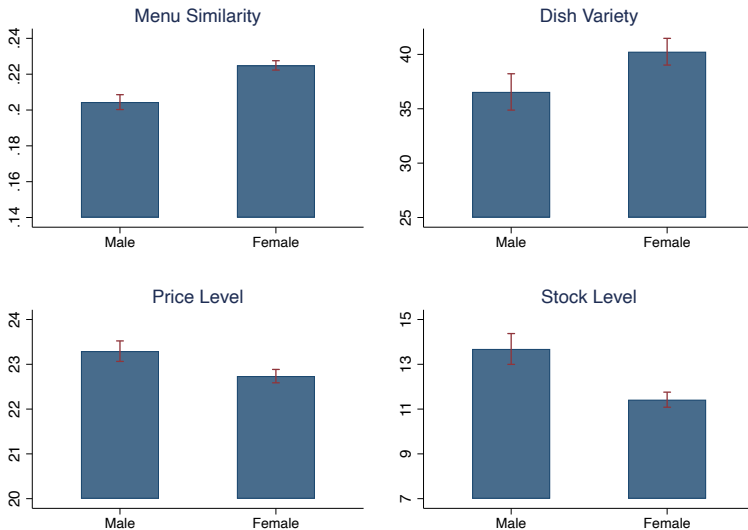


**TABLE:** The Effect of Experience on Gender Gap in Daily Revenues

	(1)	(2)	(3)	(4)	(5)	(6)
Male	19.871*** (7.391)	9.504** (4.748)	12.369** (6.217)			4.450*** (1.564)
Experience		0.056*** (0.004)				
Completed Orders: 150-400			31.466*** (1.358)	38.526*** (2.640)	28.127*** (1.561)	
Completed Orders: 400-1000			72.343*** (2.461)	86.526*** (4.934)	66.287*** (2.838)	
Completed Orders: 1000-2500			141.787*** (4.461)	157.453*** (8.713)	134.993*** (5.085)	
Completed Orders: >2500			332.059*** (12.208)	370.130*** (21.323)	312.858*** (14.681)	
Sample	Full Sample	Full Sample	Full Sample	Male Sellers	Female Sellers	Inexperienced
Mean(Y)	277.662	277.662	277.662	301.265	267.533	121.598
N	967,655	967,655	967,655	290,556	677,099	47,561

- ▶ Experience is measured using the total number of completed orders prior to that day.
- ▶ Experience can explain 22% of the gender earnings gap.
- ▶ Male sellers accumulated experience at a faster rate than female sellers.
- ▶ Even among the inexperienced sellers (the first 30 orders), there exists a 3.7% gender earnings gap.

FIGURE: Business Strategies, By Gender



## Cosine Similarity

- ▶ We define  $x_A$  as a vector of word frequencies for seller A's menu.
- ▶ The cosine similarity between menus of seller A and seller B is defined as  $\frac{x_A \cdot x_B}{|x_A||x_B|}$

**TABLE:** Gender Gap in Daily Revenues, Controlling for Business Strategies

	(1)	(2)	(3)	(4)	(5)	(6)
Male	19.871*** (7.391)	25.110*** (7.290)	26.259*** (7.241)	18.233** (7.418)	18.782** (7.355)	25.747*** (7.161)
Working Hours	31.282*** (0.658)	30.540*** (0.610)	30.280*** (0.610)	31.284*** (0.659)	31.195*** (0.653)	29.769*** (0.574)
Rating	38.396* (22.458)	70.403*** (22.099)	63.174*** (22.639)	19.061 (22.561)	58.844*** (22.084)	93.340*** (22.017)
Similarity		353.776*** (39.061)				272.341*** (39.209)
# of Dishes Available			0.909*** (0.133)			0.737*** (0.134)
Average Price of Dishes				4.259*** (0.613)		4.465*** (0.578)
Average Stock of Dishes					1.334*** (0.289)	1.989*** (0.297)
Time FEs	x	x	x	x	x	x
Demographics	x	x	x	x	x	x
Delivery	x	x	x	x	x	x
Mean(Y)	277.662	277.662	277.662	277.662	277.662	277.662
N	967,655	967,655	967,655	967,655	967,655	967,655