Online Appendix

Alternative Estimation of the Skill Variables

We conduct five additional robustness checks to alternatively estimate the two skill variables. These alternative calculations include: 1) assessing the entire nine months together, 2) evaluating the skills every week, 3) removing *PPA* and *AvgMealDuration* as control variables, respectively, 4) controlling for staffing in both models, and 5) using random effects models for estimation. In all the robustness checks, we treat only *TableLoad* as endogenous to be consistent with the main analysis done in the paper. In addition, since the two skill variables are time-invariant when estimated throughout the nine months, the waiter fixed effects are also dropped. We also estimate the two-way clustered errors in hosts and hours in all the models.

Table 1 shows the results. The coefficients of *TableLoad* are all significant and negative (-0.004, -0.0631, -0.0637, -0.0624, -0.0618). The magnitudes of *TableLoad* are different because the waiter fixed effects are excluded in the first model. The coefficients of *SpeedSkill* are significant and negative (-0.0091, -0.0048, -0.0032, -0.0059), while the coefficients of *SalesSkill* are not statistically significant. These results are all consistent with our original results with monthly skill variables. We decide to stick with monthly skill variables because they strike a balance between ability and flexibility. On the one hand, we need repeated observations of the same waiter to confidently extrapolate his/her skill level. On the other hand, we should allow a waiter's skill level to evolve over time because of learning or forgetting.

One Independent Variable a Time

We rerun with three separate specifications of Model 3 – one per independent variable, treating each variable as endogenous and estimating with its corresponding instrumental variable. The results are shown in Table 2. As can be seen, the coefficient of *TableLoad* is significant and negative (-0.0619), suggesting that waiters having high contemporaneous workload receive fewer tables than the RR rule states. The coefficient of *SpeedSkill* is also significant and negative (-0.0056), which implies that the waiters who are intrinsically prompter (low value of *SpeedSkill*) get assigned more tables than the RR rule suggests. Finally, the coefficient of *SalesSkill* is not statistically significant, which suggests that hosts may not use sales skill as a prioritization heuristics. These results are both qualitatively and quantitatively consistent with the original results of including all the variables together, which further alleviates the multicollinearity concern.

Coefficient of Variation as an Alternative for Dispersion of Table Assignments

We have replaced Gini coefficients with the coefficient of variation (CV) to reestimate the effect of deviation from the RR rule on performance. The coefficient of variation is the standard deviation of the table assignment numbers of each waiter during the hour divided by the average assignment number. A larger CV indicates a higher inequality. We mean-center this measure for interpretation purposes.

Table 3 shows the results. The results estimated by the coefficient of variation are qualitatively consistent with our main reports estimated by Gini coefficients. The quadratic terms are all significant and negative (-3.5808, -3.5233, -0.0618), and the linear terms are all significant and positive (1.8418, 1.7663, 0.0517),

Table 1: Hour-level Table Assignment, Alternative Skill Estimation Lengths

	(1) *HrTableDiff* Estimated by 2SLS	(2) *HrTableDiff* Estimated by 2SLS	3) *HrTableDiff* Estimated by 2SLS	4) *HrTableDiff* Estimated by 2SLS	5) *HrTableDiff* Estimated by 2SLS
TableLoad	-0.0040*	-0.0631***	-0.0637***	-0.0624***	-0.0618***
	(0.0019)	(0.0065)	(0.0065)	(0.0064)	(0.0064)
SpeedSkill (stable)	-0.0091***				
	(0.0008)				
SalesSkill (stable)	0.0170				
	(0.0105)				
SpeedSkill (weekly)		-0.0048***			
		(0.0004)			
SalesSkill (weekly)		-0.0043			
		(0.0378)			
SpeedSkill (removing PPA)			-0.0032***		
			(0.0006)		
SalesSkill (removing Meal Duration)			0.0501		
			(0.0319)		
SpeedSkill (controlling for staffing)				-0.0059***	
				(0.0006)	
SalesSkill (controlling for staffing)				-0.0075	
				(0.0045)	
SpeedSkill (random effects)					-0.0074***
					(0.0008)
SalesSkill (random effects)					0.0056
					(0.0062)
WaiterFE	No†	Yes	Yes	Yes	Yes
HostFE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	595,204	595,189	595,189	595,189	595,189
Prob>Chi-sq	<.001	<.001	<.001	<.001	<.001

1. Standard errors are shown in parentheses. 2. *p≤ .05, **p≤ .01, ***p≤ .001.

† :Dropped because of collinearity with two time-invariant skills (*SpeedSkill, SalesSkill*)

Table 2: Hour-level Table Assignment, One Variable a Time

	(1) *HrTableDiff* Estimated by 2SLS	(2) *HrTableDiff* Estimated by 2SLS	(3) *HrTableDiff* Estimated by 2SLS
TableLoad	-0.0619***		
	(0.0064)		
SpeedSkill		-0.0056***	
		(0.0016)	
SalesSkill			-0.0174
			(0.0338)
WaiterFE	Yes	Yes	Yes
HostFE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	595,189	436,803	436,803
Prob>Chi-sq	<.001	<.001	<.001

1. Standard errors are shown in parentheses. 2. *p≤ .05, **p≤ .01, ***p≤ .001.

Table 3: Implications of Dispersion of Table Assignments

	Column 1: DV = *HrTotalSales*	Column 2: DV = *TotalTables*	Column 3: DV = *AvgSales*
HrTableCV	1.8418***	1.7663***	0.0517*
	(0.1220)	(0.1143)	(0.0233)
HrTableCV^2	-3.5808***	-3.5233***	-0.0618*
	(0.1689)	(0.1582)	(0.0298)
AvgPartySize			0.3673***
			(0.0010)
Controls	Yes	Yes	Yes
Observations	131,682	131,682	131,360
Prob>Chi-sq	<.001	<.001	<.001

1. Standard errors are shown in parentheses. 2. **p*≤ .05, ***p*≤ .01, ****p*≤ .001.

suggesting inverted-U shaped relationships between the table assignment dispersion and hourly total sales, hourly total tables turned, and hourly average sales per check, respectively.

Splitting the Data into High and Low Sides of *HrTableGini*

We split the deviation into two ranges, high and low end of deviation, from the median (0.167). Table 4 shows the results. We find the slope to be positive in the lower ranges (11.72, 10.92, 0.51) and negative in the higher ranges (-8.94, -8.02, -0.55), which supports our inverted-U finding. These results are congruent with either the quadratic *HrTableGini* results or the Spline regression results in Table 6 of the paper, because the Spline regression essentially estimates the slopes below and below the median knot of *HrTableGini.*

Table 4: Performance Regressions After Evenly Dividing the Data into Two

	Sample with *HrTableGini* $\leq$ 0.167(median)			Sample with *HrTableGini* $>$ 0.167(median)		
	log(*HrTotalSales*)	log(*Tables*)	log(*AvgSales*)	log(*HrTotalSales*)	log(*Tables*)	log(*AvgSales*)
HrTableGini	11.7119***	10.9202***	0.5059***	-8.9446***	-8.0243***	-0.5555**
	(0.6817)	(0.6187)	(0.1378)	(0.8822)	(0.8042)	(0.1751)
AvgPartySize			0.3540***			0.3734***
			(0.0013)			(0.0021)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	69029	69029	68848	62653	62653	62512
Prob>Chi-sq	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

1. Standard errors are shown in parentheses. 2. *p$\leq$ .05, **p$\leq$ .01, ***p$\leq$ .001.

Mechanisms of Discretion Downsides

To demonstrate the proposed mechanisms of too much discretion leading to lower sales performance, we first replicate the inverted-U workload and performance curve (Tan and Netessine, 2014) in our data set (Columns 1 in Table 5). Specifically, we examine the effect of thenumber of tables a waiter opened in an hour (*HrTableLoad*) on his/her average sales per check during that hour (log(*HrAvgSales*)). We mean-center *HrTableLoad* for interpretation purposes. We also control for one hour lagged workload (*LagHrTableLoad*), average party size of the tables the waiter serves (*HrAvgPartySize*), linear daily trend (*Trend*), and the fixed effects of waiters, hour of the day, day of the week and stores. We further use the one-week lagged workload (the hourly average workload during the same hour the previous week) and its square term as instrumental variables for the two workload variables to address potential endogeneity. After that, we analyze the effect of table assignment inequality (measured in the Gini coefficient, *HrTableGini*), conditioned on workload, on individual waiter's performance to find support of the negative effect of unfairness on performance (Column 2 in Table 5). We also mean-center *HrTableGini* for interpretation purposes. The coefficients of $HrTableLoad^2$ are significant and negative (-0.0459 and -0.0391), while the coefficients of *HrTableLoad* are significant and positive. Interpreting the coefficients in Column 1, we find that when workload is less than $0.0694/(2\times0.0459) = 0.75$ tables or 0.53 standard deviation (1.43 tables) above the sample mean (2.77 tables), increasing workload will increase average sales per check. However, when workload exceeds the threshold, further increasing workload will reduce sales per check. This result replicates what is reported in Tan and Netessine (2014). Furthermore, the coefficient of $HrTableGini^2$ is significant and negative, while the coefficient of *HrTableGini* turns out to be insignificant. This results suggests that as the table assignment inequality increases, sales per check will eventually decrease, supporting that excessive unfairness may reduce work motivation.

After that, we show that ever increasing uneven table assignment concentrates workload on fewer and fewer waiters, who reach their capacity constraints and become the bottleneck of the system. In particular, Table 6 (a) shows the distribution of uncentered *HrTableGini,* while Table 6 (b) presents the average hourly number of tables assigned (*HrTableLoad*) to a waiter, who received more tables than average (i.e.,

Table 5: Hour-level Impact of Workload on Waiter's Sales Performance

	(1) log(*HrAvgSales*)	(2) log(*HrAvgSales*)
HrTableLoad	0.0694***	0.0534***
	(0.0052)	(0.0068)
HrTableLoad^2	-0.0459***	-0.0391***
	(0.0026)	(0.0032)
HrTableGini		-0.0672
		(0.0992)
HrTableGini^2		-9.2219***
		(1.6747)
LagHrTableLoad	-0.0039***	-0.0040***
	(0.0003)	(0.0003)
HrAvgPartySize	0.3252***	0.3226***
	(0.0006)	(0.0008)
Trend	0.0000***	0.0001***
	(0.0000)	(0.0000)
Controls	Yes	Yes
Observations	440,884	440,448
Prob>Chi-sq	<0.001	<0.001

1. Standard errors are shown in parentheses. 2. *p≤ .05, **p≤ .01, ***p≤ .001.

Table 6: Distribution of *HrTableGini* and the Corresponding *HrTableLoad*

	(a) *HrTableGini*	(b)	Average *HrTableLoad*
Mean	0.18		
P50	0.177	[0.18,0.24]	3.77
P75	0.24	[0.24,0.29]	3.83
P90	0.288	[0.29,0.31]	4.23
P95	0.31	[0.31,0.54(max)]	4.99

their *HrTableDiff*> 0). When *HrTableGini* is in the top 5% (i.e., between 0.31 and 0.54), the average *HrTableLoad* for those few overloaded waiters is approximately five tables. Given the mean *HrTableLoad* being equal to 2.77 and the standard deviation being 1.43, five tables is approximately 1.56 standard deviations above the sample mean. These summary statistics suggest that the few overloaded waiters may reach their capacity when table assignment inequality is very high. They become the bottleneck of the system, reducing both sales and table turns of the restaurant. Then restaurant should then consider to allocate their tables more evenly to use underutilized waiters.

References

Tan, T. F., S. Netessine. 2014. When does the devil make work? an empirical study of the impact of workload on worker productivity. *Management Science* .