

Can You Gig It? An Empirical Examination of the Gig-Economy and Entrepreneurship

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Boston University Platforms Symposium July 2016



What I Hope You Remember

- We investigate how the entry of gig-economy platforms (Uber X and Postmates) influences entrepreneurial activity in local areas.
- Results suggest
 - Marked decline in entrepreneurial activity after platform entry
 - Notably true for "low quality" entrepreneurs
- Economic translation of implications
 - Reduction of 1450 campaigns during the sample
 - ▶ \$7.5 mm in requests over a 21 month period
 - ▶ 14% decrease in requests one year out
 - Significantly reduces load on the platform by siphoning off low quality entrepreneurs



Platforms in the digital age



What do we know about platforms and the gig-economy?

- Roughly \$26 billion market (Malhotra and Van Alstyne 2014)
- Research has progressed on many fronts:
 - Platform design (Fradkin 2013, Fradkin et al. 2014)
 - Broader societal effects (Edelman and Luca 2014, Greenwood and Wattal 2015)
 - Effect on incumbent business models (Seamans and Zhu 2013; Zervas et al. 2015)
- Most research suggests that the service economy is price sensitive and displacing lower tier competitors
 - Hotels (Zervas et al, 2015)
 - Price sensitivity in drunk driving (Greenwood and Wattal, 2015)





Research Question

What is the effect of gig-economy platform introduction on the rate and characteristics of entrepreneurial activity in a given locale?

When we say entrepreneurial activity, we do not mean working on the platform.



Why might these platforms influence entrepreneurial activity?



- Existence of slack resources (Agrawal et al. 2015, Douglas and Shepherd 2000, Greve 2007, Kerr et al. 2014, Richtnér et al. 2014, Shah and Tripsas 2007)
- Opportunity COStS (Acs and Armington 2006, Armington and Acs 2002, Åstebro et al. 2011, Block and Koellinger 2009, Fairlie 2002, Storey 1991)
- These forces create a natural tension



Why might entrepreneurial activity rise?





Why might entrepreneurial activity fall?

There are Two Types of Entrepreneurs...



Why might entrepreneurial activity fall?

Bloomberg

Revisiting the Face of 'Necessity Entrepreneurship'



The rate of so-called "necessity entrepreneurship"—people starting businesses because other income opportunities are gone—increased sharply in the U.S. during the recession, according to the <u>Global Entrepreneurship Monitor</u>, a research project that tracks entrepreneurship. Necessity was a factor for 24.7% of new U.S. ventures in 2009, according to GEM surveys, up from 16.3% in 2007. For some of these entrepreneurs, getting laid off presented the opportunity to pursue business ideas they had long considered but didn't want to risk leaving a job for. "They really have everything to gain if there are no other good prospects for work," says Donna Kelley, professor of entrepreneurship at Babson College, who has worked on the GEM project. "You start to see a decline in necessity entrepreneurship when there is a healthier economy."

offering a higher than otherwise expected wage.





So what is going to happen?

Opportunity-Based

Necessity-Based





Context, Data, and Methods



The Setting

Two Natural Experiments

- ► The entry of the ridesharing platform Uber X
- The entry of the on-demand courier service Postmates
- We first focus on Uber X
- We then extend the investigation with Postmates
- Experimental Validity
 - Multi-site entry which is geographically and temporally dispersed





POSTMATES

Data

- Entrepreneurial Activity Kickstarter
 - World's largest crowdfunding platform (Burtch et al. 2013, 2015)
 - Significantly more reactive to changes
- Observation EA/Month
 - 3612 observations
 - 21-month period between 2013 and 2015
 - 172 Economic Activity Areas
- Data on platform entry is retrieved from:
 - blog.uber.com
 - Postmates.com





	(1)	(2)	(3)	(4)
DV	In(Campaigns)	In(Campaigns)	Campaigns	Campaigns
Rel Time _(t-6)	0.233***	0.220***	0.244***	0.221***
	(0.0764)	(0.0502)	(0.0581)	(0.0550)
Rel Time _(t-5)	-0.144	-0.0956	-0.0122	-0.0409
	(0.0953)	(0.100)	(0.0709)	(0.0643)
Rel Time _(t-4)	-0.0299	0.0392	-0.0447	0.00392
	(0.0488)	(0.0476)	(0.0520)	(0.0579)
Rel Time _(t-3)	0.0508	0.0349	0.0477	0.0147
	(0.0407)	(0.0389)	(0.0551)	(0.0519)
Rel Time _(t-2)	0.0154	0.00262	0.0522	0.0173
	(0.0344)	(0.0333)	(0.0376)	(0.0414)
Rel Time _(t-1)		Omitted		
Rel Time _(t0)	0.0354	0.00182	0.0394	-0.00524
	(0.0363)	(0.0345)	(0.0302)	(0.0263)
Rel Time _(t+1)	0.0499*	0.0633**	0.0352	-0.00369
	(0.0289)	(0.0294)	(0.0342)	(0.0355)
Rel Time _(t+2)	0.0466	0.0568	0.00376	-0.0358
	(0.0378)	(0.0362)	(0.0432)	(0.0489)
Rel Time _(t+3)	0.0306	0.0210	-0.0257	-0.0818
	(0.0451)	(0.0412)	(0.0571)	(0.0673)
Rel Time _(t+4)	-0.0234	0.00990	-0.143**	-0.168***
	(0.0449)	(0.0441)	(0.0581)	(0.0648)
Rel Time _(t+5)	-0.0314	-0.0249	-0.120*	-0.150**
	(0.0460)	(0.0462)	(0.0642)	(0.0645)
Rel Time _(t+6)	-0.0464	-0.0128	-0.196**	-0.216**
	(0.0590)	(0.0657)	(0.0764)	(0.0860)
Rel Time _(t+7)	-0.0938	-0.0838	-0.189**	-0.222**
	(0.0746)	(0.0740)	(0.0841)	(0.0879)
Rel Time _(t+8)	-0.160**	-0.219***	-0.315***	-0.398***
	(0.0648)	(0.0641)	(0.0773)	(0.0787)
Rel Time _(t+9)	-0.191***	-0.0935	-0.359***	-0.330***
	(0.0678)	(0.0703)	(0.0881)	(0.0949)
Rel Time _(t+10)	-0.356***	-0.364***	-0.408***	-0.450***
	(0.0782)	(0.0784)	(0.0965)	(0.0990)
Year Fixed Effects				N
Seasonal Effects	Yes	No	Yes	NO
	NO 2 (12	Yes	NO	Yes
		3,012	3,012	3,012

Robustness Checks



Selection Model

- The absence of a pre-treatment validates the parallel trends assumption
- Employment related factors, that are time-varying, may influence Uber's decision to enter the market
 They may also influence entrepreneurship
- Include Controls to control for employment dynamics:
 - Log number of employed people
 - Average Weekly Wage
 - Total quarterly wages

	(1)	(2)		
DV	Campaigns	Campaigns		_
Rel Time (1-6)	0.238***	0.219***		
	(0.0615)	(0.0568)	15	
Rel Time (1-5)	-0.0233	-0.0455		
	(0.0685)	(0.0644)		
Rel Time (1-4)	-0.0543	-0.000623		
	(0.0529)	(0.0592)		
Rel Time (t-3)	0.0421	0.0128		
	(0.0567)	(0.0528)		
Rel Time (1-2)	0.0498	0.0167		
	(0.0396)	(0.0422)		
Rel Time (t-1)	Omi	ttod		
Rel Time (10)	0.0311	-0.00832		
	(0.0308)	(0.0283)		
Rel Time (t+1)	0.0249	-0.00759		
	(0.0333)	(0.0360)		
Rel Time (t+2)	-0.00505	-0.0389		
	(0.0446)	(0.0501)		
Rel Time (t+3)	-0.0350	-0.0849		
	(0.0592)	(0.0686)		
Rel Time (t+4)	-0.162**	-0.175**		
	(0.0654)	(0.0707)		
Rel Time (†+5)	-0.150**	-0.162**		
	(0.0732)	(0.0714)		
Employment Controls	Yes	Yes		
Year Fixed Effects	Yes	No		
Seasonal Effects	Yes	No		
Quarter Effects	No	Yes		
N	3,612	3,612		
Number of Groups	172	172		



Coarsened Exact Match

- Is there significant heterogeneity between treated and untreated groups
 - Important to minimize these differences
- Coarsened Exact Match (CEM) (Blackwell et al. 2009, lacus et al. 2009, 2012)
 - Population to account for market size
 - Average weekly wage to account for the differences in average local opportunity costs
 - Current period

	(1)	(2)	
	Compolant	Compoigne	
Pol Timo	0 100***	0.021***	ייוףי
Ker nine (t-6)	(0.0752)	(0.231)	<u></u>
Del Time	0.0752)	(0.0039)	
	-0.0503	-0.0380	
	(0.0901)	(0.100)	
kernme (t-4)	-0.0877	-0.00782	
	(0.0730)	(0.0870)	
Rei lime _(t-3)	0.110	0.0442	
	(0.0753)	(0.0775)	
Rel lime _(t-2)	0.0118	-0.00894	
	(0.0392)	(0.0465)	
Rel Time _(t-1)		Ittod	
Rel Time (to)	-0.000814	-0.0374	
	(0.0298)	(0.0294)	
Rel Time _(t+1)	-0.000433	-0.0482	
	(0.0397)	(0.0469)	
Rel Time _(t+2)	-0.0113	-0.0651	
	(0.0406)	(0.0505)	
Rel Time (t+3)	-0.0481	-0.122*	
	(0.0509)	(0.0670)	
Rel Time (1+4)	-0.129**	-0.192***	
	(0.0547)	(0.0632)	
Rel Time (t. 5)	-0.139**	-0.205***	
	(0.0608)	(0.0704)	
Year Fixed Effects	Yes	No	
Seasonal Effects	Ves	No	
Ouarter Effects	No	Yes	
N	2 805	2 805	
	2,075	2,075	
Number of Groups	170	170	
Number of Groups	170	170	



Diagnosing Standard Errors

- Serial correlation is a consistent concern with DD estimations (Bertrand et al. 2002)
 - Inflates the probability of finding a significant result
- Random implementation Test
 - Randomly treat 1440 observations
 - Replicate the estimation and store the coefficient
 - Replicate 1,000 times

Benefits

- Assesses the probability of spurious results (Bertrand et al 2002)
- Reliable check against outliers



Random Implementation Test

Estimation	Campaigns with Seasonal and Year	Campaigns with
μ of Random β	-0.00007	0.00006
σ Random β	0.03482	0.03443
Estimated β (Rel Time t-4)	-0.143	-0.168
Replications	1000	1000
Z-Score	-4.105291	-4.881488
P-Value	p<0.001	p<0.001

Postmates

- The results for Uber X are compelling
 Startup costs for Uber X are still non-trivial
 Replicate these results with another platform
 - Postmates on demand courier service

Benefits

- Replication to rule out spurious correlation / scientific apophenia (Goldfarb and King, 2016)
- If opportunity costs are the driving factor, a larger effect should manifest for a lower cost platform
 - Postmates requires a bicycle
 - Uber X a car in good condition
- Rule out the argument that entrepreneurs are substituting the gig-economy platform for Kickstarter

	(1)	(2)	
DV	Campaigns	Campaigns	
Rel Time (t-6)	0.0784	0.0795	
	(0.0637)	(0.0545)	
Rel Time (t-5)	0.000571	0.00645	
	(0.0529)	(0.0452)	
Rel Time (t-4)	0.0155	0.0459	
	(0.0364)	(0.0362)	
Rel Time (t-3)	0.0311	0.0507*	
	(0.0313)	(0.0277)	
Rel Time (t-2)	0.0532	0.0618**	
	(0.0366)	(0.0248)	
Rel Time _(t-1)	Om	ιιιea	
Rel Time (10)	-0.0118	0.00244	
	(0.0344)	(0.0464)	
Rel Time (t+1)	-0.145***	-0.125**	
	(0.0411)	(0.0567)	
Rel Time (t+2)	-0.0965	-0.0937**	
	(0.0636)	(0.0399)	
Rel Time (t+3)	-0.171***	-0.160***	
	(0.0340)	(0.0415)	
	-0.112***	-0.0997**	
Significantly larger than uper X	(0.0408)	(0.0455)	
Confirmed with pairwise Wald Tests	-0.345***	-0.385***	
(2.35 and 2.42 p < 0.05)	(0.0706)	(0.0724)	
(2.00 and 2.12, p (0.00)	Yes	No	
Seasonal Effects	Yes	No	
Quarter Effects	No	Yes	
Ν		0 (10	
	3,612	3,612	

Campaign Quality

- Theory suggests entrepreneurs with low opportunity costs are the ones driving the decrease
 Lower opportunity costs would suggest a willingness
 - to take on projects of lower quality
- Evidence to the contrary would undermine this proposed mechanism
- Proxy campaign quality with fundraising outcomes
 Market should be able to sort based on quality
 Four Buckets:

 Unfunded, Partially Funded, Funded, Hyperfunded
 - 0% >0%-99% 100%-199% 200%+

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Unfunded	Unfunded	Partially Funde	ed Partially Funded	Funded	Funded	Hyperfunded	Hyperfunded
DV .	Campaigns	Campaigns	Campaigns	Campaigns	Campaigns	Campaigns	Campaigns	Campaigns
Rel Time _(t-6)	0.00465	-0.0334	0.280***	0.251***	0.133	0.125	0.0923	0.0915
	(0.220)	(0.238)	(0.0993)	(0.0889)	(0.0913)	(0.0937)	(0.193)	(0.195)
Rel Time _(t-5)	-0.0118	-0.0523	-0.0189	-0.0552	-0.151	-0.162	0.360	0.356
	(0.173)	(0.152)	(0.0700)	(0.0708)	(0.144)	(0.139)	(0.222)	(0.229)
Rel Time _(t-4)	-0.188	-0.0842	-0.0635	-0.00501	-0.0262	-0.00963	0.132	0.151
	(0.118)	(0.117)	(0.0569)	(0.0626)	(0.0721)	(0.0749)	(0.132)	(0.133)
Rel Time _(t-3)	0.0168	-0.0535	0.0581	0.0166	-0.00352	-0.0139	0.183	0.176
	(0.126)	(0.112)	(0.0657)	(0.0619)	(0.0548)	(0.0540)	(0.137)	(0.138)
Rel Time _(t-2)	0.0744	-0.00241	0.115***	0.0671	-0.0493	-0.0577	-0.0314	-0.0436
	(0.100)	(0.0907)	(0.0440)	(0.0481)	(0.0627)	(0.0639)	(0.105)	(0.108)
Rel Time _(t-1)				Omitte				
Rel Time (10)	0.0580	-0.0381	0.0819**	0.0215	-0.0411	-0.0531	-0.0718	-0.0846
	(0.0855)	(0.0671)	(0.0342)	(0.0318)	(0.0397)	(0.0367)	(0.0628)	(0.0666)
Rel Time _(t+1)	0.0743	-0.00370	0.0574	0.00987	-0.0343	-0.0478	0.0310	0.0192
	(0.0866)	(0.0773)	(0.0461)	(0.0460)	(0.0395)	(0.0410)	(0.0853)	(0.0889)
Rel Time (t+2)	-0.0296	-0.106	0.0262	-0.0209	-0.0191	-0.0336	-0.0996	-0.112
	(0.0849)	(0.0879)	(0.0482)	(0.0548)	(0.0512)	(0.0527)	(0.106)	(0.108)
Rel Time (t+3)	-0.0999	-0.204*	-0.00556	-0.0738	-0.0448	-0.0644	-0.0535	-0.0708
	(0.104)	(0.114)	(0.0677)	(0.0799)	(0.0574)	(0.0588)	(0.120)	(0.125)
Rel Time (t+4)	-0.261**	-0.315**	-0.112	-0.141*	-0.110*	-0.118*	-0.0455	-0.0515
	(0.126)	(0.139)	(0.0687)	(0.0753)	(0.0639)	(0.0659)	(0.145)	(0.145)
Rel Time (1+5)	-0.251*	-0.314**	-0.0664	-0.105	-0.0958	-0.104	-0.0695	-0.0804
	(0.142)	(0.143)	(0.0727)	(0.07	(0.0718)	(0.0720)	(0.177)	(0.178)
ear Fixed Effects	Sianif	icant	Yes			No	No Siar	nificant
	Door		\mathbb{N}	/liddling Dec	rease		Cho	ngo
Seasonal Effects	Deci	ease	Yes	Amona (Part	ially)	No	Cha	nge
Quarter Effects	Am	ong	No	Final and	liany)	Yes	Am	ong
N	Unfur	nded	3,612	Funded		3,549	Hyperf	unded
	oniu	laca		Campaig	ns		riypen	unded
Number of Groups	Camp	baigns	172			169	Camp	baigns

Pledged Dollars

- It is also plausible that the platforms are targeting downtrodden economic areas
 - Crowdfunding capital is often local (Agrawal et al 2010)
 - This would indicate an excess labor pool and steadily drying capital pool for Kickstarter
- Replicate our estimations with total dollars pledged as the DV
 - A change in dollars pledged suggests the capital available for investment is changing
 - If dollars remain constant it suggests a shift composition of campaigns that are launched

	(1)	(2)	
	Dollars Disclosed	Dollars Disclosed	
			i i i i i i i i i i i i i i i i i i i
Rei nime _(t-6)	0.0521	0.0569	쓰
Dol Timo	(0.175)	(0.174)	
Rei nime _(t-5)	-0.171	-0.104	
	(0.191)	(0.189)	
Ref fime _(t-4)	0.112	0.103	
	(0.124)	(0.123)	
Ref fime _(t-3)	0.108	0.114	
	(0.0946)	(0.0966)	
Rei lime _(t-2)	0.0208	0.0264	
	(0.101)	(0.102)	
Rel lime _(t-1)	()mi	tted	
Rel Time _(t0)	0.0782	0.0859	
	(0.0586)	(0.0630)	
Rel Time _(t+1)	-0.000292	0.00817	
	(0.0660)	(0.0695)	
Rel Time _(t+2)	-0.0822	-0.0731	
	(0.0728)	(0.0719)	
Rel Time _(t+3)	-0.0637	-0.0513	
	(0.0774)	(0.0811)	
Rel Time _(t+4)	-0.0163	-0.0112	
	(0.0918)	(0.0919)	
Rel Time _(t+5)	-0.0601	-0.0530	
	(0.109)	(0.108)	
Year Fixed Effects	Yes	No	
Seasonal Effects	Yes	No	
Quarter Effects	No	Yes	
Ν	3,612	3,612	
Number of Groups	172	172	



Self-Reported Profession

- Are individuals changing their self reported employment after entry of the platform?
 Do Uber drivers report themselves as drivers?
- Execute a difference in difference on iPUMS
 - Integrated Public Use Microdata Series Current Population Survey – largest publically available microdataset
 - DV Self report as a paid driver or chauffer
 - ► IVs
 - Dichotomous Uber treatment
 - ► Year, Month, and EA fixed effects
 - Estimators LPM and Logit



Self-Reported Profession

	(1)	(2)
DV	Driver	Driver
Estimator	Logit	
Uber X	0.217***	0.000684**
	(0.0693)	(0.000337)
Constant	-4.916^^^	0.00198^^^
	(0.0873)	(0.000219)
Year Fixed Effects	Yes	Yes
Month Effects	Yes	Yes
EA Fixed Effects	Yes	Yes
N	1,861,144	1,657,292

Summary

- In this work we examine how gig-economy platforms are influencing entrepreneurial activity
- Results suggest
 - The entry of Uber X and Postmates significantly reduces activity
 - The effect primarily accrues among low quality projects
 - These effects take between 9 and 15 months to manifest
- Economic translation of implications
 - Reduction of 1450 campaigns during the sample
 - \$7.5 mm in requests over a 21 month period
 - Significantly reduces the load on crowdfunding platforms by siphoning off low quality entrepreneurs

Contributions and Implications

- First glimpse into the supply side of gig-economy platforms
- Novel measure of entrepreneurial activity
- Implications for crowdfunding platforms
- Insights for policy makers who are currently debating the legality of services like Uber and Postmates
- Further contribution to the growing stream of literature discussing the broader societal implications of IS



Next Steps...

We got amazing feedback from the reviewers at Management Science

► Big things

- Why Uber/Postmates? Why not others?
- Replication with another DV
- ▶ Selection Models \rightarrow What's correlated with entry
- Asking Uber drivers directly

Thank You

Questions or Comments?

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