

Network Effects and Learning in Crowdfunding

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Represent an increasing share of the global economy

Do not control transactions but simply enable them

Critical for digital platforms to overcome:

1. Coordination problems \Rightarrow **Network effects** ('payoff externalities')
2. Asymmetric information problems \Rightarrow **Learning** ('informational externalities')

Little systematic empirical evidence exists on their incidence

Goal

- We study how the interplay between network effects and learning shapes the performance of crowdfunding platforms (CFPs)

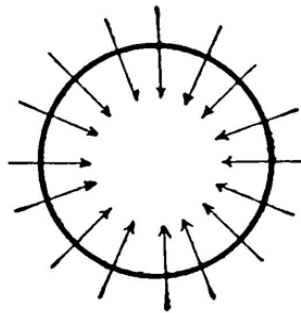
Findings

1. We confirm the existence of positive ‘within - project funding dynamics’
2. We show the existence of positive ‘*cross*- project funding dynamics’
3. Recurrent backers are the main transmission channel
 - They are better at spotting successful projects
 - They encourage future funding by other backers

Implications for CFP management

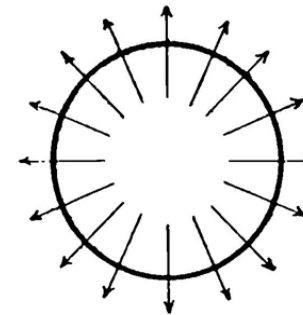
- Success of a CFP depends not only on the **quality** and **quantity** of projects but also on their **mix** (synergies between projects)
- Recurrent backers behave quite differently from new backers

Implications for CFP competition



Forces leading to **concentration**

Positive cross-project dynamics
Positive within-project dynamics

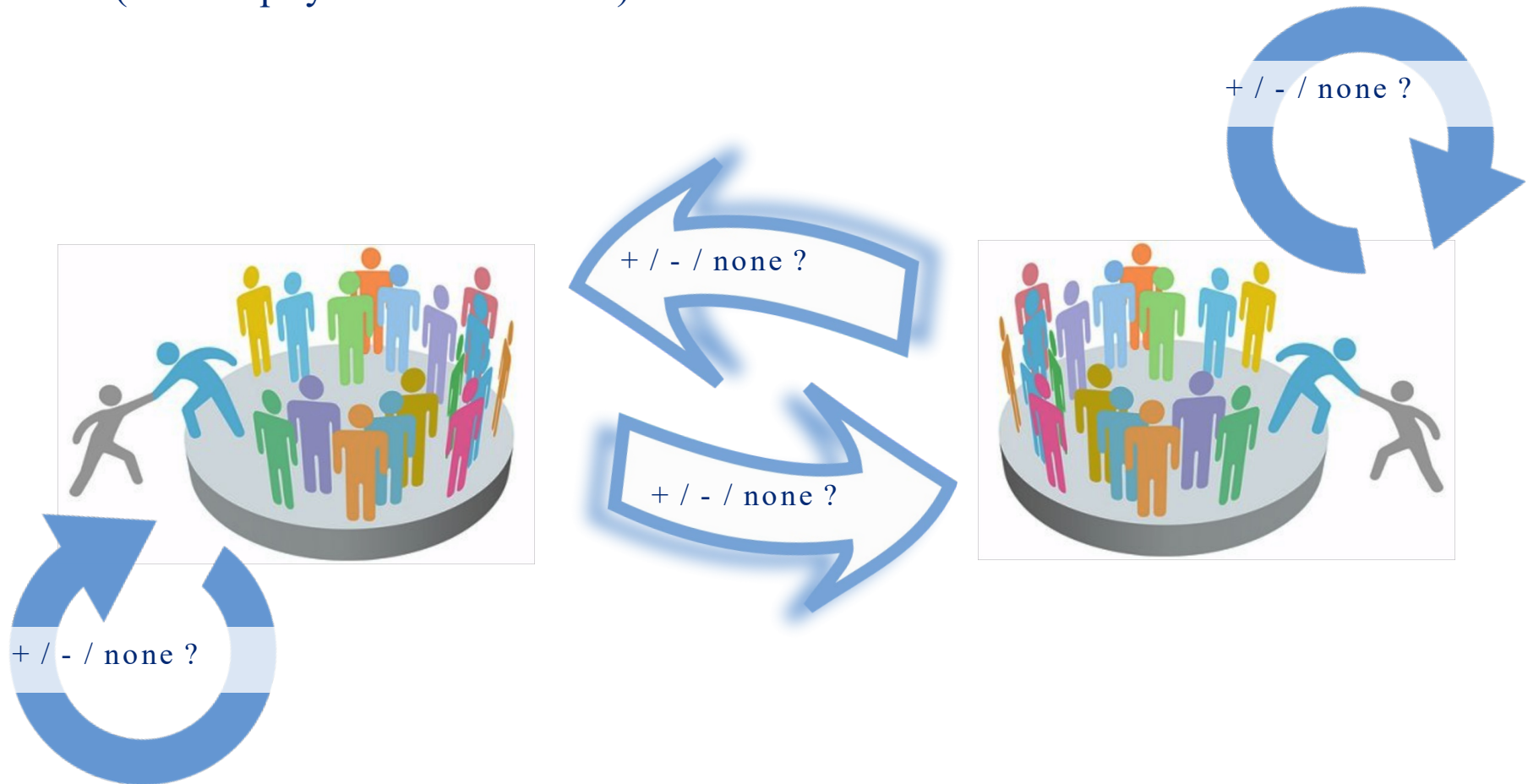


Forces leading to **coexistence of platforms**

Negative cross-project dynamics
Negative within-project dynamics

Network effects in crowdfunding

Payoffs that users derive depend on the adoption and usage decisions of other users (hence 'payoff externalities')



Individual learning

- Influence occurring independently of any social influences (e.g . trial and error, insight)

Social learning

- Influence resulting from rational processing of information gained by observing others (Bikhchandani, Hirshleifer, and Welch 1998)
- A.k.a 'informational externalities'

Interdependence is inherently dynamic

- Within *and* across crowdfunding campaigns

H1. Within - project funding dynamics?
Complement to existing studies

H2. Cross - project funding dynamics?
NEW ISSUE!

H3. Individual learning by recurrent backers ?

H4. Social learning by new backers ?

ULULE: Reward - based CFP

- Why a reward-based CFP and not an equity-based CFP?
 - Larger number of campaigns running simultaneously
- Why a (smaller) French CFP and not a (larger) U.S. CFP?
 - Deficit in size/notoriety compensated by richness of data



What we observe

- 23,971 campaigns posted on the platform from 05/07/2010 (opening day) to 29/11/2016, in 15 categories
- All 1.3 million of contributions to these campaigns + when (date/time), how much and by whom

What we can track

- Funding dynamics (within and across projects)
- Backers' behavior

Large variation of number of contributions across days and projects

- Average number of daily contributions per project: 1.6
- Significant dispersion: standard deviation of 9.5

Variation in the amounts contributed

- Average daily contribution for a specific project is €79.90
- Median of €5, standard deviation of €521
- Average daily total contribution (platform level) is almost €50,000 (from over 900 contributions)

Importance of recurrent backers

- Average proportion per project per day: 12.7%.
- Larger share for 'Games' (29.5%) and 'Comics' (25.4%)

Within- and cross-project dynamics

$$y_{ijt} = \alpha_i + \alpha_t + \beta_1 Y_{i,t-1} + \beta_2 Y_{-i,t-1} + \beta_3 Y_{-j,t-1} + \gamma X_{i,t-1} + \epsilon_{it}$$

Number of contributions received by project i of category j on date t

Project FE

Time FE

Number of contributions received by project i , by other projects in i 's category, by projects outside i 's category on date $t-1$

Error term

Vector of control variables (time-varying project characteristics: #projects, %goal, Popular, %recurrent backers)

Within - project dynamics

Cross - project dynamics

		# contributions _i			
		(1)	(2)	(3)	(4)
β_1	# contributions _{i,t-1}	0.185*** (0.002)			0.183*** (0.002)
β_2	# contributions _{-i,t-1}		0.027*** (0.002)		0.013*** (0.002)
β_3	# contributions _{-j,t-1}			0.075*** (0.003)	0.047*** (0.003)
	# projects _{i,t}	0.001 (0.007)	-0.030*** (0.009)	-0.024*** (0.008)	-0.029*** (0.007)
	% goal _t	0.286*** (0.006)	0.369*** (0.007)	0.368*** (0.007)	0.284*** (0.006)
	Popular _t	1.161*** (0.010)	1.252*** (0.012)	1.253*** (0.012)	1.163*** (0.010)
	% recurrent backers _t	0.662*** (0.002)	0.675*** (0.003)	0.674*** (0.003)	0.661*** (0.002)
	# observations	814,960	814,960	814,960	814,960
	# projects	23,022	23,022	23,022	23,022
	R ²	0.548	0.529	0.529	0.548

Fixed effects: Project, Month, Year, Day of the week, Funding cycle day

Evidence of positive within - and cross - project funding dynamics

- A 10% increase in # contributions to project i ($-i, -j$) yesterday leads to a:
 - 1.76% increase in # contributions to project i today
 - 0.12% increase in # contributions to project i today
 - 0.45% increase in # contributions to project i today

Novel results

Impacts of control variables

- Enhanced competition for pledges among entrepreneurs
- Goal-gradient effect: #contributions higher close to funding goal
- Projects featured on Ulule's first page generate more contributions
- Recurrent backers seem to generate larger within - group network effects

Categories

- Some categories generate relatively more cross-project dynamics than other categories
 - E.g. 'Music' or 'Art & Photos' > *Average* > 'Games'

Robustness

- Similar results when considering instead:
 - Volume of contributions (€ - amount)
 - Data from another platform (KissKissBankBank)



Identification strategy

- Faststarters = campaigns generating a very large number of contributions during their first day
- Largely unexpected by backers or platform managers
 - Plausibly exogenous in our campaign sample
 - Confirmed by absence of media coverage prior to campaign launch (Factiva search)

Main result

- The day a project attracts more than 200 contributions, this leads to a 3.87% increase in the number of contributions a particular project gets

	>200		>500	
	(1)	(2)	(3)	(4)
Fast start _t	0.013*** (0.004)		0.021*** (0.007)	
Fast start _{j,t} [1]		0.038** (0.015)		0.044** (0.022)
Fast start _{-j,t} [2]		0.011** (0.004)		0.019** (0.007)
<i>p</i> -value [1] = [2]		[0.0937]		[0.2803]
Controls	Yes	Yes	Yes	Yes
Project Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Day of week Fixed Effects	Yes	Yes	Yes	Yes
Funding cycle day Fixed Effects	Yes	Yes	Yes	Yes
# observations	813,983	813,983	814,585	814,585
# projects	22,995	22,995	23,011	23,011
R ²	0.518	0.518	0.523	0.523

New backers vs. recurrent backers

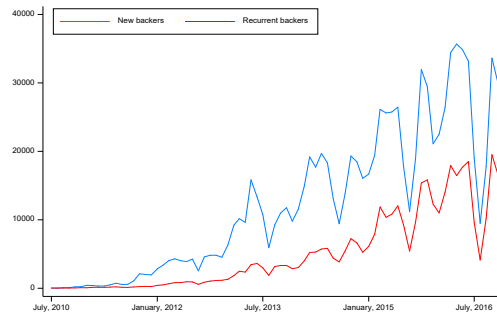
	>200		>500	
	(1)	(2)	(3)	(4)
'New' Fast start _t	-0.006 (0.007)		-0.013 (0.013)	
'New' Fast start _{j,t} [1]		-0.006 (0.026)		0.025 (0.043)
'New' Fast start _{j,t} [2]		-0.007 (0.007)		-0.018 (0.014)
<i>p</i> -value [1] = [2]		[0.9880]		[0.3423]
'Recurrent' Fast start _t	0.020*** (0.007)		0.043*** (0.012)	
'Recurrent' Fast start _{j,t} [3]		0.053* (0.030)		0.058 (0.041)
'Recurrent' Fast start _{j,t} [4]		0.018** (0.007)		0.042*** (0.012)
<i>p</i> -value [3] = [4]		[0.2472]		[0.7083]
Controls	Yes	Yes	Yes	Yes
Project Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Day of week Fixed Effects	Yes	Yes	Yes	Yes
Funding cycle day Fixed Effects	Yes	Yes	Yes	Yes
# observations	813,983	813,983	814,585	814,585
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Similar insight applies from the baseline fixed - effects estimations

	Success _i (Ulule)			Success ratio _i (Ulule)	
	(1)	(2)	(3)	(4)	(5)
Recurrent backer _i	0.028*** (0.002)			0.029*** (0.002)	0.020*** (0.004)
Recurrent backer _i		0.004*** (0.001)		0.003*** (0.001)	0.074*** (0.003)
Recurrent backer _j			0.007*** (0.001)	0.009*** (0.001)	0.079*** (0.002)
Age	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.004*** (0.000)
€-value first contribution	0.017*** (0.000)	0.017*** (0.000)	0.017*** (0.000)	0.017*** (0.000)	0.066*** (0.001)
Campaign duration	-0.053*** (0.001)	-0.053*** (0.001)	-0.053*** (0.001)	-0.053*** (0.001)	-0.185*** (0.002)
Cash contribution	0.063*** (0.001)	0.062*** (0.001)	0.062*** (0.001)	0.063*** (0.001)	0.135*** (0.002)
Country of residence Fixed Effects	Yes	Yes	Yes	Yes	Yes
Category Fixed Effects	Yes	Yes	Yes	Yes	Yes
Day Fixed Effects	Yes	Yes	Yes	Yes	Yes
# observations	1,303,197	1,303,197	1,303,197	1,303,197	1,303,197
R ²	0.080	0.080	0.080	0.081	0.273

	Timing _i (Ulule)			Timing _i (KKBB)	
	(1)	(2)	(3)	(4)	(5)
Recurrent backer _i	0.180*** (0.002)			0.179*** (0.002)	0.116*** (0.017)
Recurrent backer _i		-0.025*** (0.001)		-0.008*** (0.001)	-0.013*** (0.002)
Recurrent backer _j			0.002** (0.001)	0.008*** (0.001)	-0.012*** (0.001)
Age	-0.001*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
€-value first contribution	0.005*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.006*** (0.000)	-0.001*** (0.000)
Campaign duration	0.014*** (0.001)	0.016*** (0.001)	0.017*** (0.001)	0.014*** (0.001)	0.011*** (0.001)
Cash contribution	0.032*** (0.001)	0.030*** (0.001)	0.030*** (0.001)	0.032*** (0.001)	- -
Country of residence Fixed Effects	Yes	Yes	Yes	Yes	Yes
Category Fixed Effects	Yes	Yes	Yes	Yes	Yes
Day Fixed Effects	Yes	Yes	Yes	Yes	Yes
# observations	1,302,899	1,302,899	1,302,899	1,302,899	638,673
R ²	0.098	0.081	0.081	0.098	0.083

Evolution of number of backers (per month) on Ulule

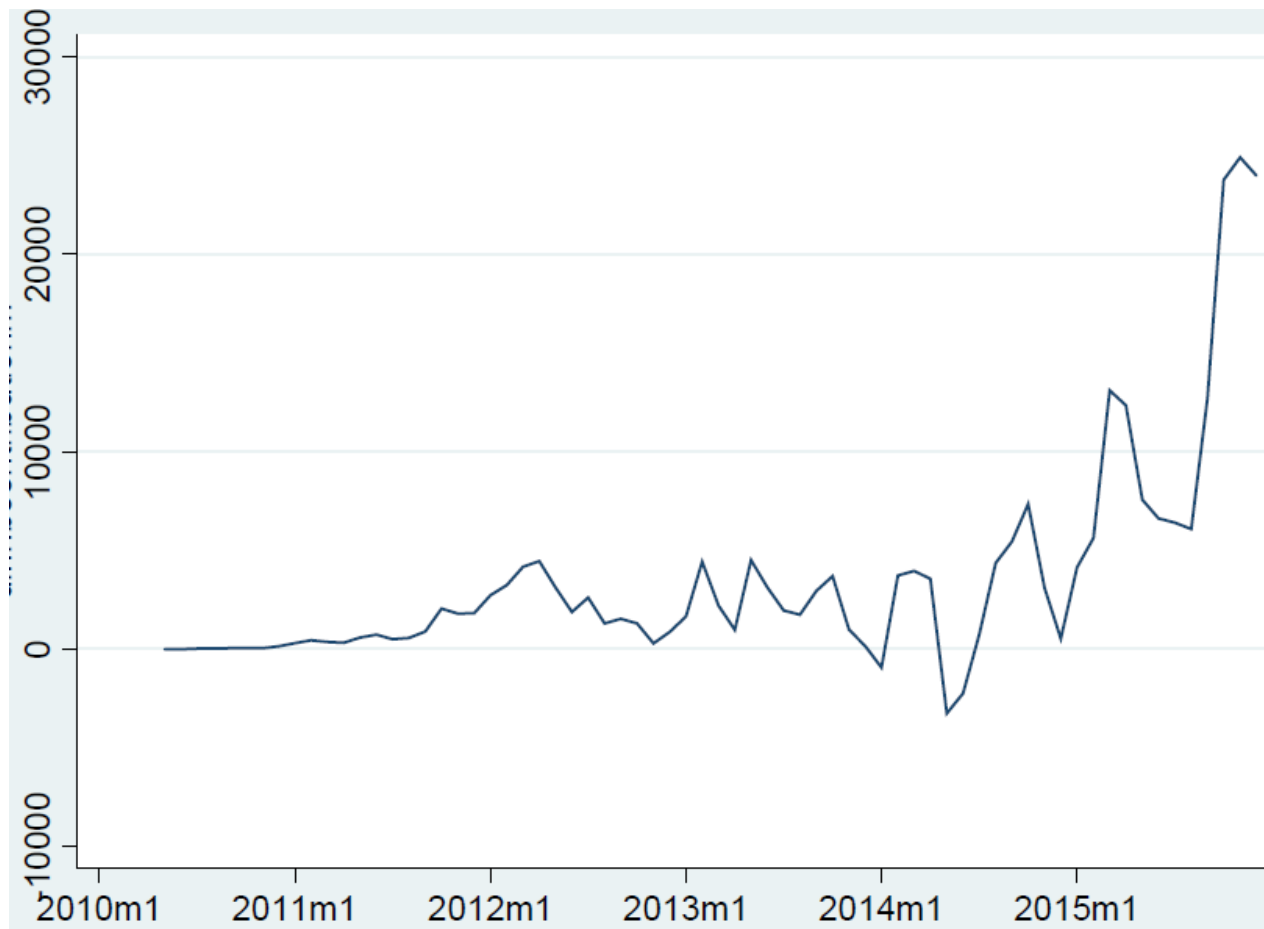


Growth rate of recurrent contributions

- Ulule: 33.5%
- KKBB: 6.5%

Ulule – KKBB gap over time

Higher share of recurrent backers on Ulule than KKBB (its main competitor)



Evidence of various forms of network effects and learning on CFPs

- Positive within - project funding dynamics (documented by prior work)
- Positive *cross*-project funding dynamics (novel result)

Evidence of the role of recurrent backers

- They are better at spotting successful projects ⇒ **individual learning**
- They back projects irrespective of the behaviors of others ⇒ **social learning**

Significant implications for CFP

- Management
- Competition

Thank You



Backup slides

TRADITIONAL FUNDING



Large amounts from one,
or a few, sources

CROWDFUNDING



Many small sums from
a large group of individuals

Business models

Crowdfunding

Donation - based
Reward - based
(pre-purchases)

Crowdlending

Lending - based

Crowdinvesting

Equity - based
Royalty - based

The crowd

Backers

Lenders

Investors

Examples

KICKSTARTER

PROSPER

 crowdcube

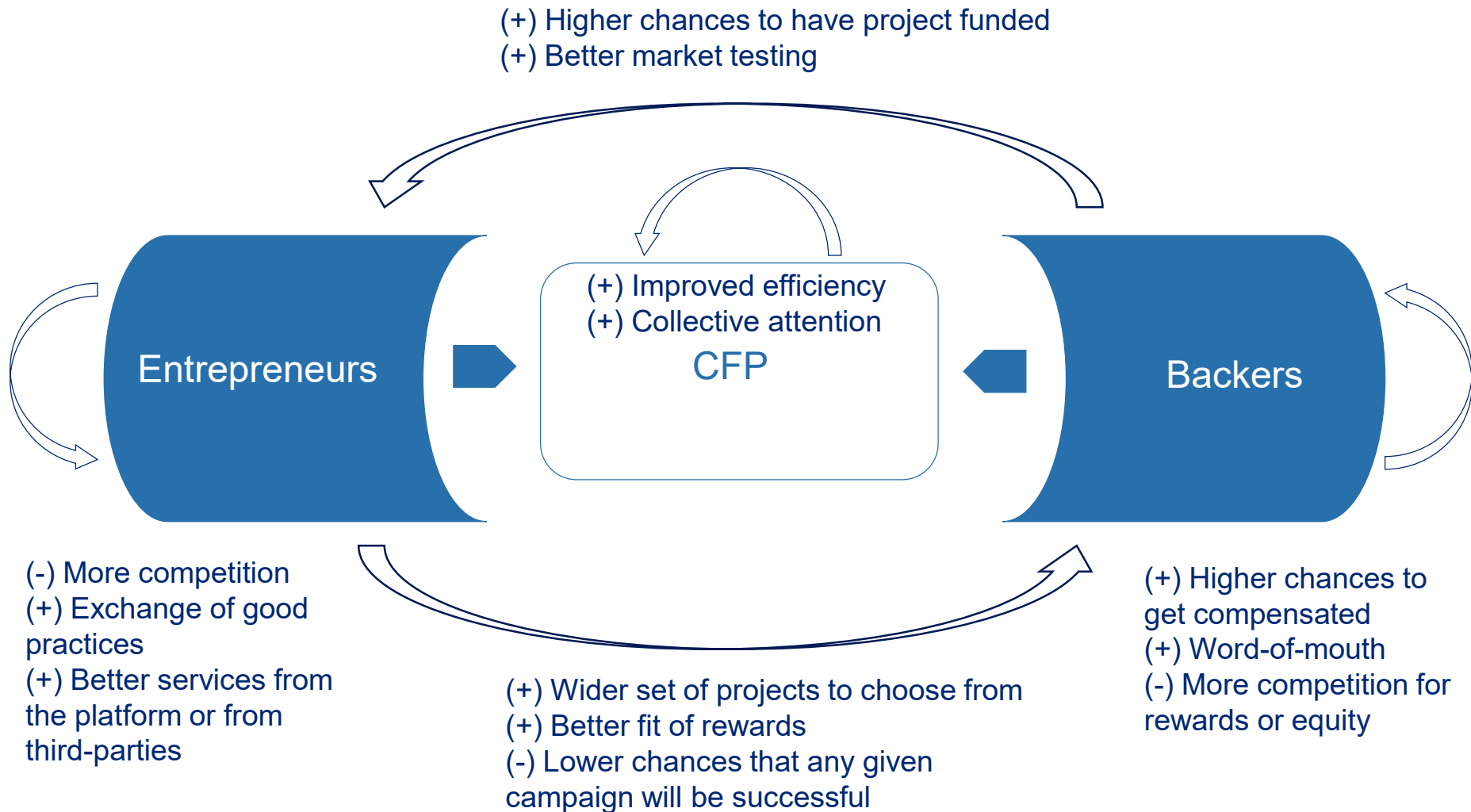
Platforms: Definition

- Entities that bring together economic agents, actively manages network effects among them and, thereby, generates economic value

Network Effects: 2 main categories

- One agent's decisions as to whether and how much to interact on the platform affect the well-being of other agents ...
- ...in her own group \Rightarrow **direct network effects**
 - Economic agents derive a utility not only (and sometimes not even primarily) from a product or service, but from the interaction with other agents
 - Utilities are interdependent: agents are part of a 'network'
- ...in another group \Rightarrow **indirect network effects**
 - In many economic environments, agents can be sorted according to their role in, or their benefit from, a transaction
 - Agents belong to distinct groups
 - Network effects arise across members of different groups

Direct and indirect network effects



Panel fixed - effects estimations

	(1)	(2)	(3)	(4)
# new contributions _{i,t-1} [1]	0.172*** (0.002)			0.171*** (0.002)
# recurrent contributions _{i,t-1} [2]	0.128*** (0.002)			0.127*** (0.002)
# new contributions _{.i,t-1} [1]		0.023*** (0.002)		0.011*** (0.002)
# recurrent contributions _{.i,t-1} [2]		0.006*** (0.001)		0.001 (0.001)
# new contributions _{.j,t-1} [1]			0.066*** (0.003)	0.042*** (0.003)
# recurrent contributions _{.j,t-1} [2]			0.012*** (0.003)	0.006** (0.002)
<i>p</i> -value [1] = [2]	[0.000]	[0.000]	[0.000]	-
Control variables	Yes	Yes	Yes	Yes
Project Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
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# observations	814,960	814,960	814,960	814,960
# projects	23,022	23,022	23,022	23,022
R ²	0.550	0.529	0.529	0.551

Monthly evolution of number of new (in red) and recurrent (in blue) backers

