

# The Value of “New” and “Old” Intermediation in Online Debt Crowdfunding

Fabio Braggion    Alberto Manconi    Nicola Pavanini    Haikun Zhu

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- ▷ ... To **marketplace**...  
Lenders invest in portfolios assembled by the platform
- ▷ ... Still not quite **bank-like**  
In the marketplace model lenders, not the platform, bear the cost of early liquidation (unlike bank depositors)

What are the effects of the new business model on lenders, the platform, and credit provision?  
(And how will the business model evolve?)

- ▷ 3 facts about online debt crowdfunding:
  1. Shift from peer-to-peer to marketplace
  2. Maturity mismatch in marketplace loan portfolios
  3. Changes in lender population
  
- ▷ Using a novel structural equilibrium model we find:
  - Moving from peer-to-peer to marketplace paradigm raises lender surplus, platform profits, and credit provision
  - Moving from marketplace to bank-like paradigm where platform bears early liquidation risk can be welfare increasing

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  - Adopting a new design unlikely random
- ▷ Need micro data
  - Measuring early liquidation risk and who bears it
- ▷ Need to assess lender preferences
  - Welfare impact depends on how lenders trade off return and liquidity risk
  - Preferences intrinsically unobservable & evolving with clientele

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  - Universe of loans & applications on leading Chinese platform Renrendai
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### 3. Data

Renrendai

5<sup>th</sup> largest Chinese platform

¥25bn (\$3.7bn) cumulative turnover

▷ 360,000+ borrowers

Median: 34 y.o., male, earns monthly  
¥12,520 (\$1,880), 50% college

▷ 350,000+ lenders/investors

Median: Invests ¥111,480 (\$16,740)

▷ 380,000+ loans

Median: ¥62,000 (\$9,000), 36 months,  
10.8% rate

▷ 5,000+ portfolio products

### 3. Data

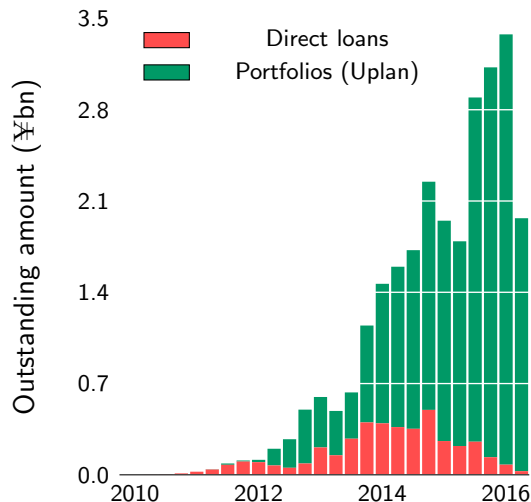
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### Fact #1: Shift to marketplace

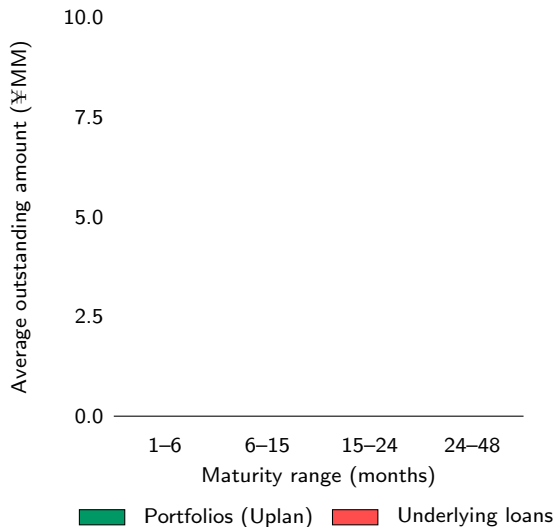


## 3. Data

### Fact #2: Maturity mismatch

- ▷ Median portfolio has size ¥3m (\$450,000), maturity 6 months, target return 8.5%, and attracts 115 lenders in 11 hours

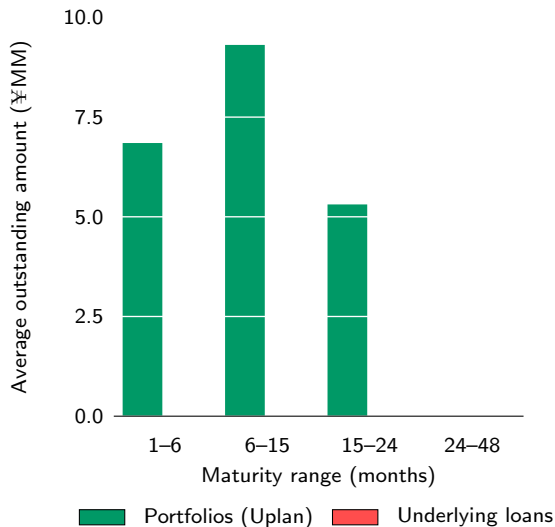
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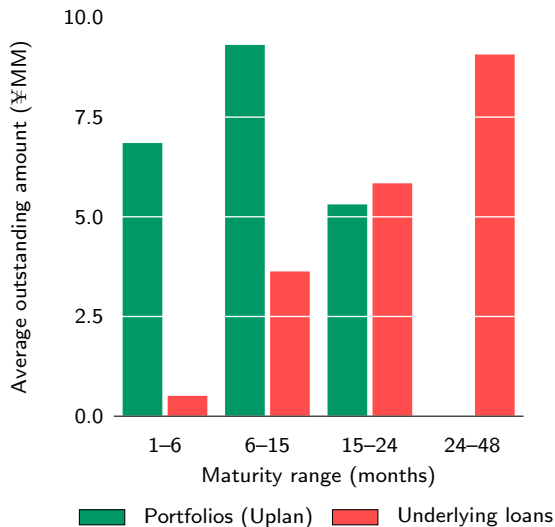
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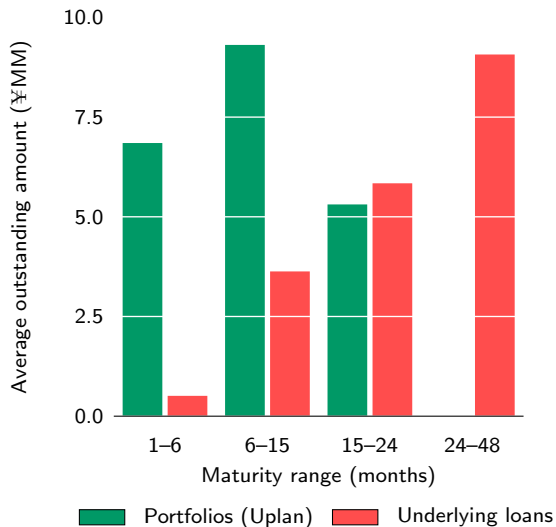
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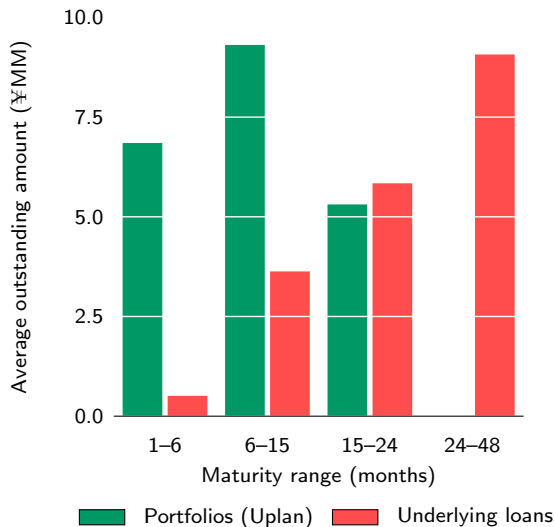
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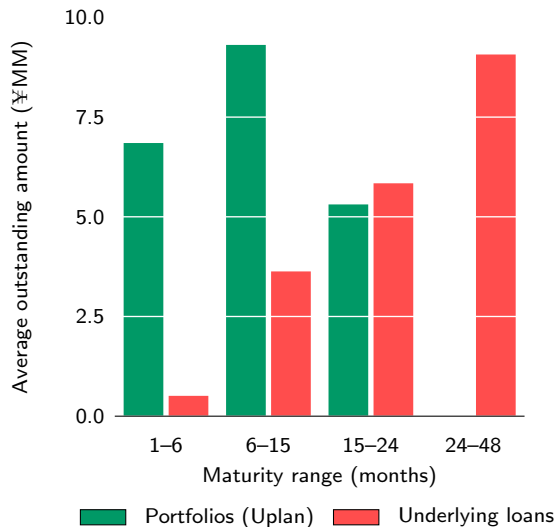


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  - On average: **22 months**  
U.S. banks: 19-25 months  
(Drechsler, Savov, Schnabl (2021))
  - Exposes lenders to **liquidity risk**  
(can only cash out once their loans have been resold)

- ▷ Marketplace investor portfolios  $\neq$  direct lender portfolios
  - More diversified (HHI 2% vs 12%)
  - Safer (default rate 0.3% vs 13%)
  
- ▷ Investor population becomes more risk averse
  - Downward trend in HHI (avg 4.3% in 2013, 2.2% in 2016)
  - Downward trend in defaults (avg 1.9% in 2013, 0.5% in 2016)

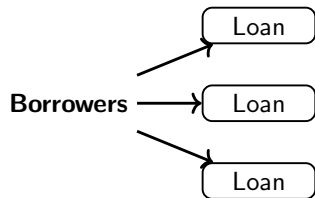
## 4. Model

**Lenders**

**Borrowers**

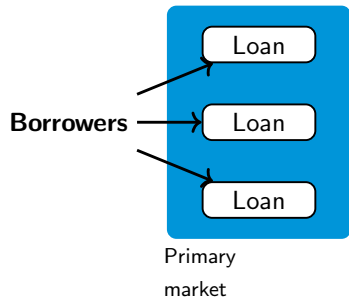
**Platform**

**Lenders**



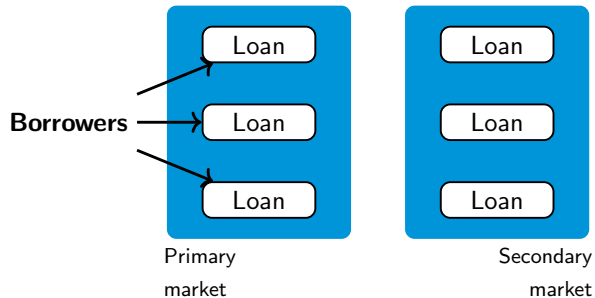
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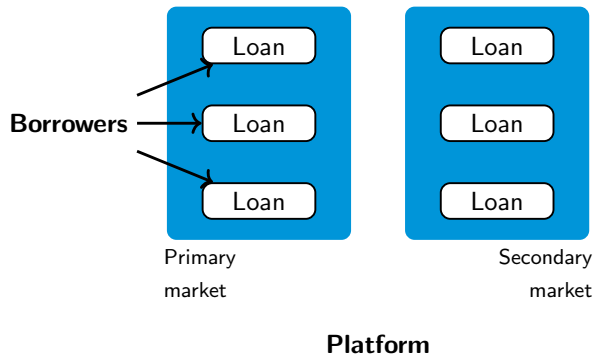


**Platform**

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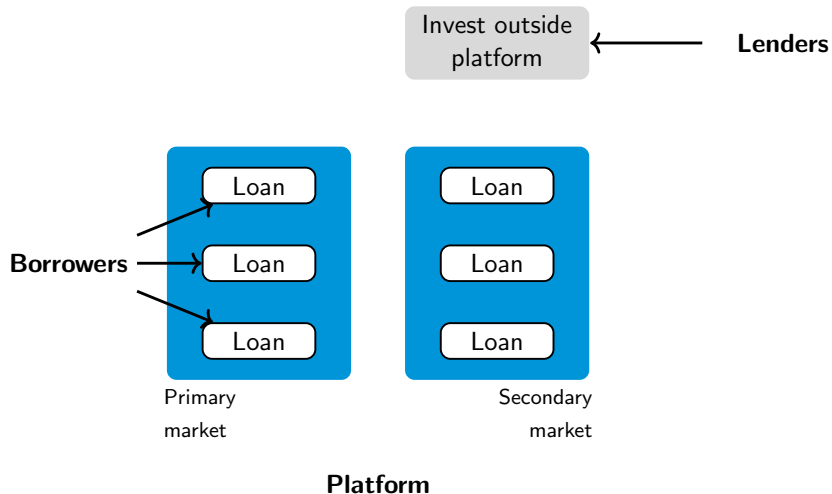
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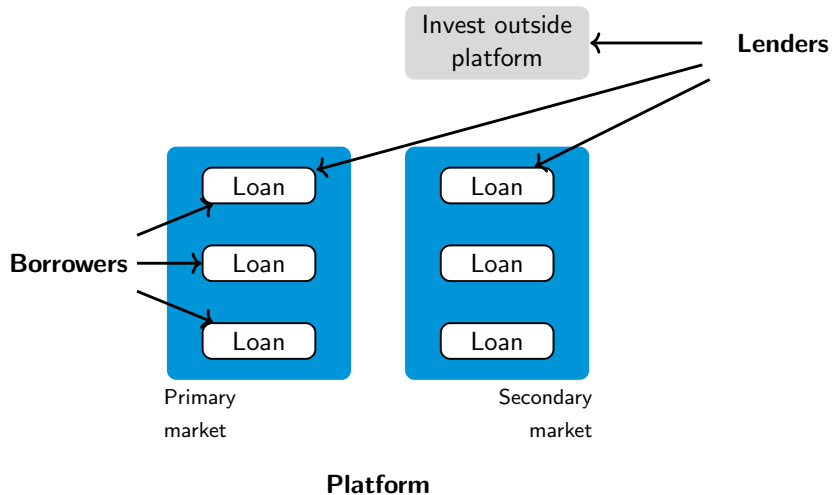
Lenders





## 4. Model

Lenders



## 4. Model

### Outside option

Utility normalized to zero

### Direct loans

$$U_{ict}^D = \underbrace{\gamma_{it}^r \ln(r_{ct}) + \gamma_{it}^m \ln(m_{ct}) + \gamma_{it}^z z_{ct}}_{\delta_{ict}^D} + \zeta_{ct} + \underbrace{\varepsilon_{ict}}_{\sim \text{T1EV}}$$

## Lenders: Indirect utilities

Invest in loan category  $c$   
based on indirect utility  $U^D$ :

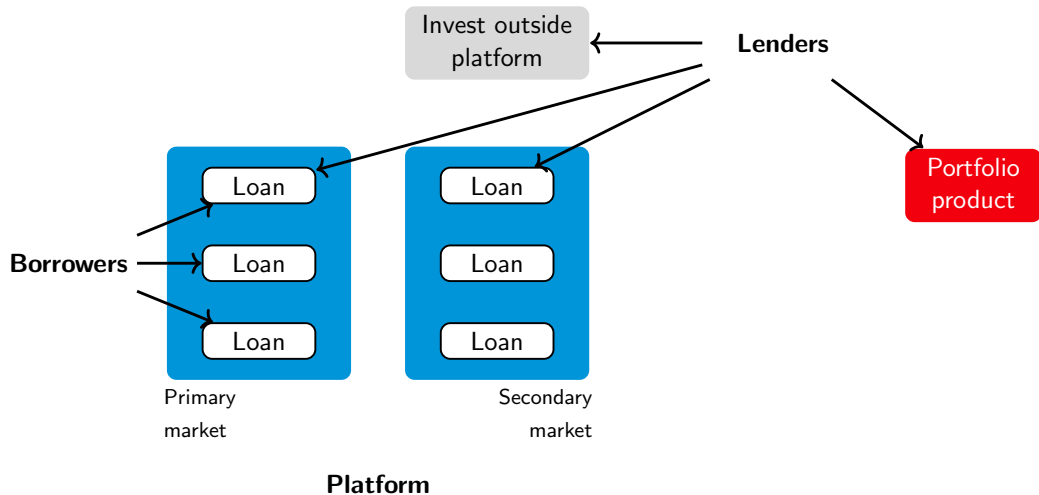
$r$  ( $m$ ) Promised return  
(maturity)

$z$  Other loan  
characteristics

$\gamma$  Preferences,  
heterogeneous based  
on lender **activity**

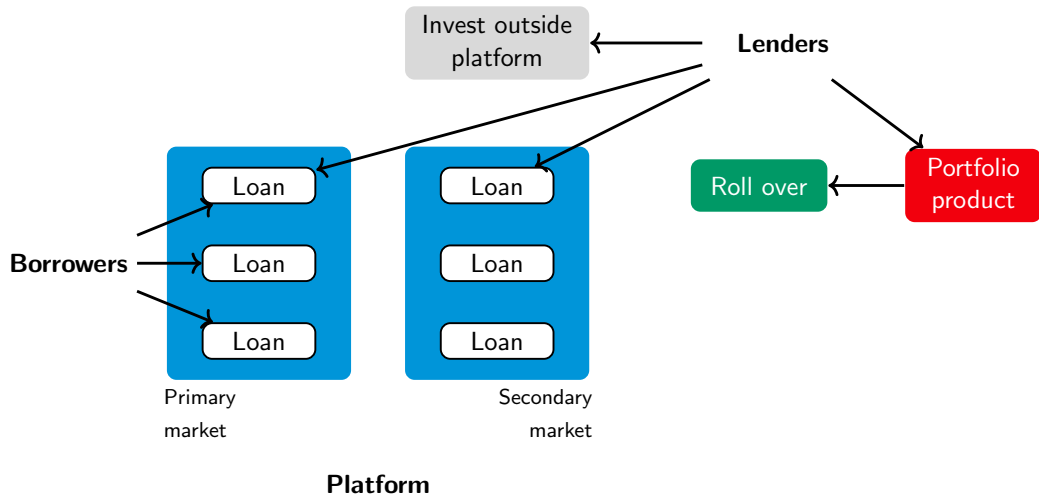
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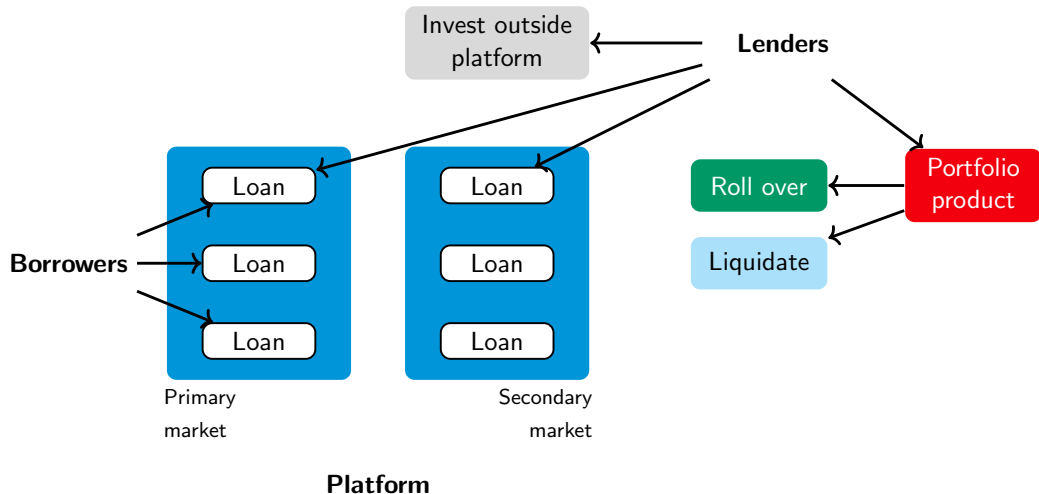
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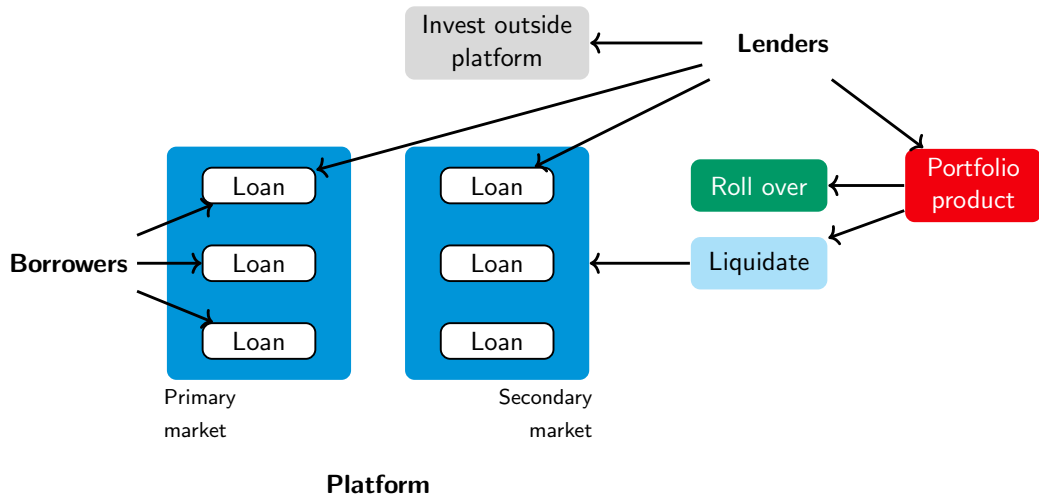
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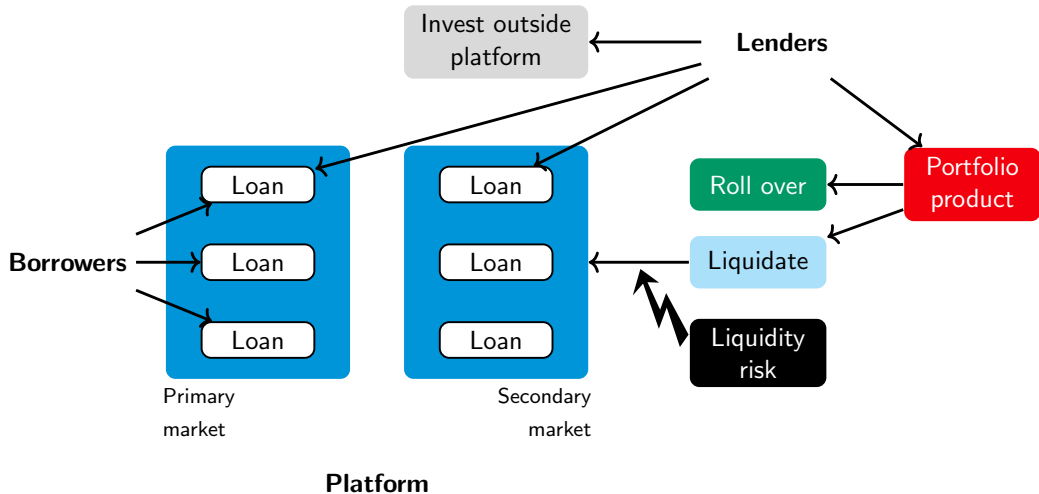
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### Portfolios

$$U_{ikt}^P = \underbrace{\alpha_{it}^{\mathcal{R}} \ln(\mathcal{R}_{kt}) + \alpha_{it}^{\mathcal{M}} \ln(\mathcal{M}_{kt}) + \alpha_{it}^{\mathcal{Z}} z_{kt} + \alpha_{it}^{\mathcal{L}} \mathcal{L}_{kt} + \xi_{kt}}_{\delta_{ikt}^P} + \underbrace{\eta_{ikt}}_{\sim \text{T1EV}}$$

### Rollover

$$U_{ikt}^{\text{Roll}} = \tau^{\mathcal{R}} \ln(\mathcal{R}_{kt}) + \tau^{\mathcal{M}} \ln(\mathcal{M}_{kt}) + \tau^{\mathcal{Z}} z_{kt} + \tau^{\mathcal{L}} \mathcal{L}_{kt} + \nu_{ikt}$$

## Lenders: Indirect utilities

Invest in portfolio product  $k$   
based on indirect utility  $U^P$ :

- $\mathcal{L}$  Resale time on the secondary market
- $\alpha$  ( $\tau$ ) Preferences, heterogeneous based on lender activity
- $\mathcal{R}$  ( $\mathcal{M}$ ) Target return (maturity)



Indirect utilities determine market shares/demand probabilities:

Loan categories

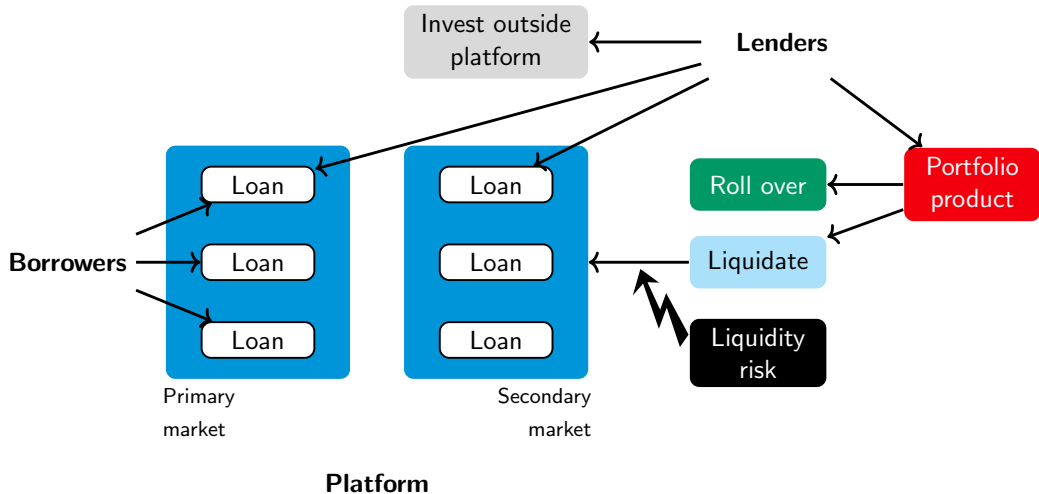
$$S_{ict}^D(x_{kt}, x_{ct} | \alpha, \gamma) = \frac{\exp(\delta_{ict}^D)}{1 + \sum_{k \in K_t} \exp(\delta_{ikt}^P) + \sum_{d \in C_t} \exp(\delta_{idt}^P)}$$

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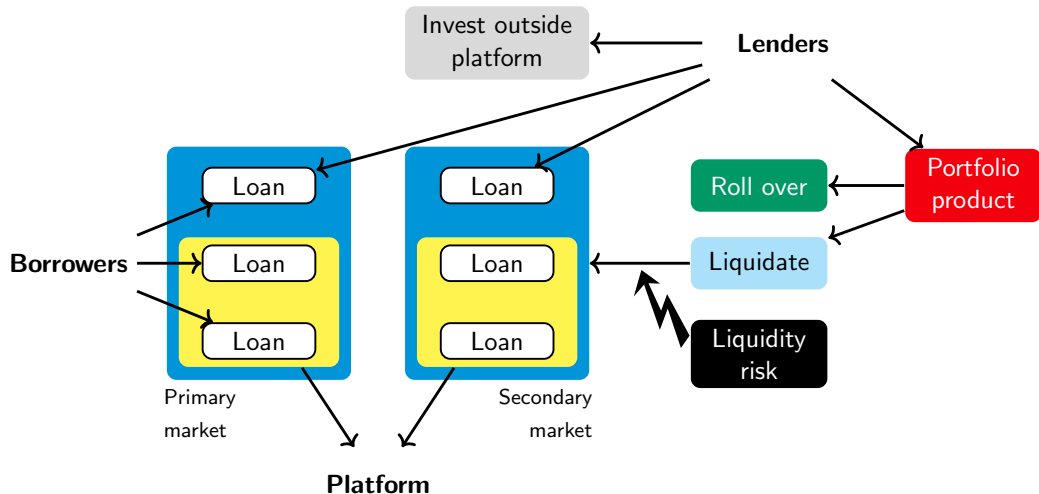
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## Platform



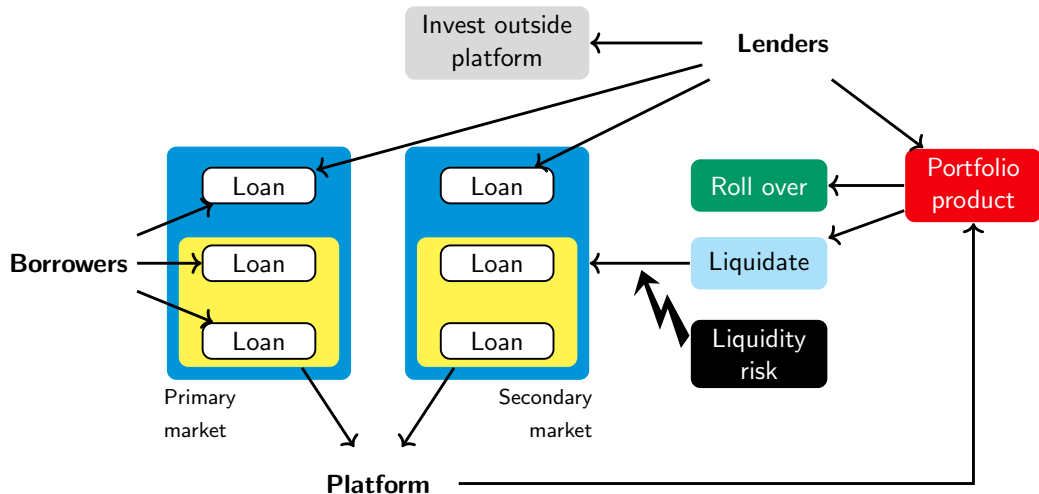
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## 4. Model

Platform



Following Kojien & Yogo (2019), portfolio weights:

$$w_{kct} = \frac{\exp(\delta_{kct})}{\sum_{g \in C_t^P} \exp(\delta_{kgt})}$$


$$\delta_{kct} = \beta_{kt}^r r_{ct} + \beta_{kt}^m m_{ct} + \beta^z z_{ct} + \omega_{kct}$$

where  $\beta_{kt}^r$ ,  $\beta_{kt}^m$  are “preferences” for loan return and maturity

$$\max_{\mathcal{R}_{kt}, \beta_{kt}^m} \sum_k \mathcal{S}_{kt}^P \mathcal{T}_t \left[ \sum_c w_{kct} (r_{ct} - \mathcal{C}_{1kct}) m_{ct} - \mathcal{R}_{kt} \mathcal{M}_{kt} - \mathcal{C}_{2kt} \right]$$

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Target return



## 4. Model

## Platform: Expected profit

$$\max_{\mathcal{R}_{kt}, \beta_{kt}^m} \sum_k S_{kt}^P \mathcal{T}_t \left[ \sum_c w_{kct} (r_{ct} - \mathcal{C}_{1kct}) m_{ct} - \mathcal{R}_{kt} \mathcal{M}_{kt} - \mathcal{C}_{2kt} \right]$$

Target return

Maturity mismatch



$$\max_{\mathcal{R}_{kt}, \beta_{kt}^m} \sum_k S_{kt}^P \mathcal{T}_t \left[ \sum_c w_{kct} (r_{ct} - \mathcal{C}_{1kct}) m_{ct} - \mathcal{R}_{kt} \mathcal{M}_{kt} - \mathcal{C}_{2kt} \right]$$

Total amount invested

Target return

Maturity mismatch

## 4. Model

Platform: Expected profit

Market share of product  $k$

Total amount invested

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Target return

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Portfolio weights

Market share of product  $k$  Total amount invested

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Loan cat.  $c$  return...

Maturity mismatch

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Loan cat.  $c$  return...      ... maturity

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## 5. Estimation

### Direct loans

$$\ln(\mathcal{S}_{ct}^D) - \ln(\mathcal{S}_{0t}) = \gamma_t^r \ln(r_{ct}) + \gamma_t^m \ln(m_{ct}) + \gamma_t^z z_{ct} + \mu_D + \mu_t + \zeta_{ct}$$

Logit approach for  
differentiated product  
demand ([Berry \(1994\)](#))

### Portfolio products

$$\ln(\mathcal{S}_{kt}^P) - \ln(\mathcal{S}_{0t}) = \alpha_t^{\mathcal{R}} \ln(\mathcal{R}_{kt}) + \alpha_t^{\mathcal{M}} \ln(\mathcal{M}_{kt}) + \alpha_t^{\mathcal{Z}} z_{kt} + \alpha_t^{\mathcal{L}} \mathcal{L}_{kt} + \mu_P + \mu_t + \xi_{kt}$$

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Heterogeneous lender preferences depend on [activity](#) on the platform (share of lenders in the top 5% of activity distribution)

## 5. Estimation

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Linear model for rollover decision by lenders  
(% that gets rolled over)

### Rollover

$$S_{kt}^{Roll} = \tau^R \mathcal{R}_{kt} + \tau^M \mathcal{M}_{kt} + \tau^Z z_{kt} + \tau^L \mathcal{L}_{kt} + \psi_t + \nu_{kt}$$

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Logit approach for the platform's portfolio weights

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$w_{k0t}$  is the share invested in one of the categories (normalization)

### Portfolio weights

$$\ln(w_{kct}) - \ln(w_{k0t}) = \beta_{kt}^r (r_{ct} - r_{0t}) + \beta_{kt}^m (m_{ct} - m_{0t}) + \beta^z (z_{ct} - z_{0t}) + \phi_t + \omega_{kct}$$

## 6. Results

## Lender preferences

	Direct	Portfolio	Rollover
(log) Return ( $\mathcal{R}_{kt}, r_{ct}$ )	0.30 (0.08)	0.23 (0.13)	0.93 (0.57)
(log) Return ( $\mathcal{R}_{kt}, r_{ct}$ ) $\times$ Active lenders %	2.94 (0.12)	2.31 (0.11)	
(log) Maturity ( $\mathcal{M}_{kt}, m_{ct}$ )	0.27 (0.02)	0.01 (0.03)	-0.01 (0.00)
(log) Maturity ( $\mathcal{M}_{kt}, m_{ct}$ ) $\times$ Active lenders %	0.22 (0.23)	-0.59 (0.25)	
Resale time ( $\mathcal{L}$ )		-5.41 (2.08)	-0.50 (0.49)
Resale time ( $\mathcal{L}$ ) $\times$ Active lenders %		53.72 (32.22)	
Portfolio product controls	✓		✓
Loan category controls	✓		
Channel (direct/portfolio investment) f.e.	✓		
Day f.e.	✓		✓
N. obs.	89,157		2,996
Adj. $R^2$	0.73		0.34

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(log) Return ( $\mathcal{R}_{kt}, r_{ct}$ ) $\times$ Active lenders %	2.94 (0.12)	2.31 (0.11)	
(log) Maturity ( $\mathcal{M}_{kt}, m_{ct}$ )	0.27 (0.02)	0.01 (0.03)	-0.01 (0.00)
(log) Maturity ( $\mathcal{M}_{kt}, m_{ct}$ ) $\times$ Active lenders %	0.22 (0.23)	-0.59 (0.25)	
Resale time ( $\mathcal{L}$ )		-5.41 (2.08)	-0.50 (0.49)
Resale time ( $\mathcal{L}$ ) $\times$ Active lenders %		53.72 (32.22)	
Portfolio product controls	✓		✓
Loan category controls	✓		
Channel (direct/portfolio investment) f.e.	✓		
Day f.e.	✓		✓
N. obs.	89,157		2,996
Adj. $R^2$	0.73		0.34

▷ Demand increasing in yields

## 6. Results

## Lender preferences

	Direct	Portfolio	Rollover
(log) Return ( $\mathcal{R}_{kt}, r_{ct}$ )	0.30 (0.08)	0.23 (0.13)	0.93 (0.57)
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- ▷ Demand increasing in **yields**
  - More so for investors in direct loans than in portfolios
  - More so for active investors
  
- ▷ Portfolio investors dislike **liquidity risk** (esp. if less active)

## 6. Results

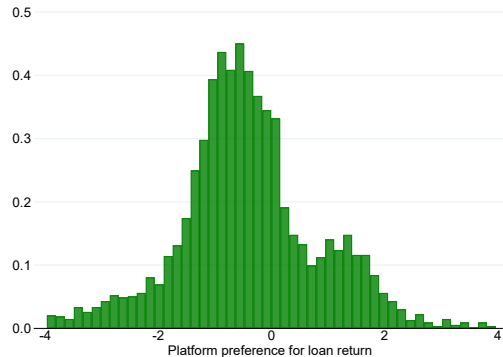
## Platform portfolio choice

	Mean	St. dev.
Return	-0.38	1.62
Maturity	0.11	0.53
Amount	0.97 (0.08)	
Default rate borrowers	-0.52 (0.08)	
Secondary market loan category	-2.70 (0.09)	
Loan category controls	✓	
Day f.e.	✓	
N. obs.	137,080	
Adj. $R^2$	0.652	

## 6. Results

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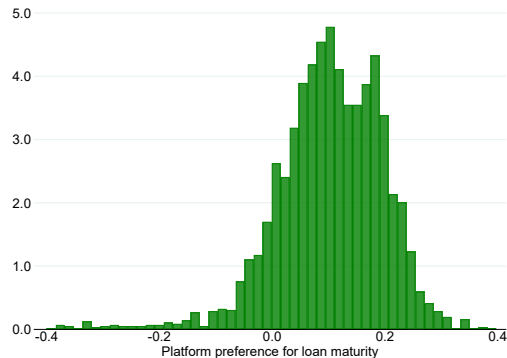
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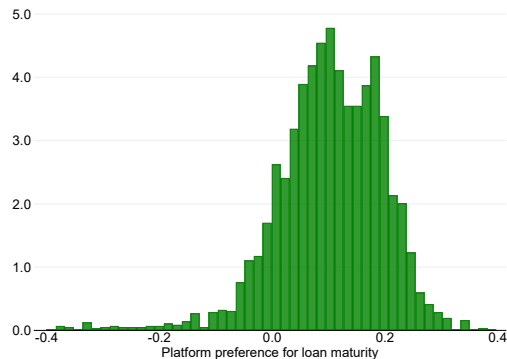
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## 7. Counterfactuals

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## 7. Counterfactuals

- ▷ How does the marketplace credit model compare to:
  - Peer-to-peer credit?
  - Bank-like credit? (more details...)
- ▷ How do **liquidity risk** and **lender risk aversion** affect the comparison?
- ▷ Use estimates and equilibrium model to find counterfactual
  - **Portfolio characteristics**: target return, maturity mismatch
  - **Welfare effects**: lender surplus, credit provision, platform profits



Outcome	Marketplace	Bank-like	Peer-to-peer
Average return (%)	8.13	8.10	
Average maturity mismatch (months)	22.30	22.30	
Amount lent (bn ¥)	19.91	19.93	6.18
Amount lent Uplan (bn ¥)	16.56	16.59	0.00
Average change in lender surplus (%)	0.00	0.20	-54.87
Average change in platform profit (%)	0.00	-0.17	

Changes in lender surplus and platform profit are relative to the “baseline” marketplace model.

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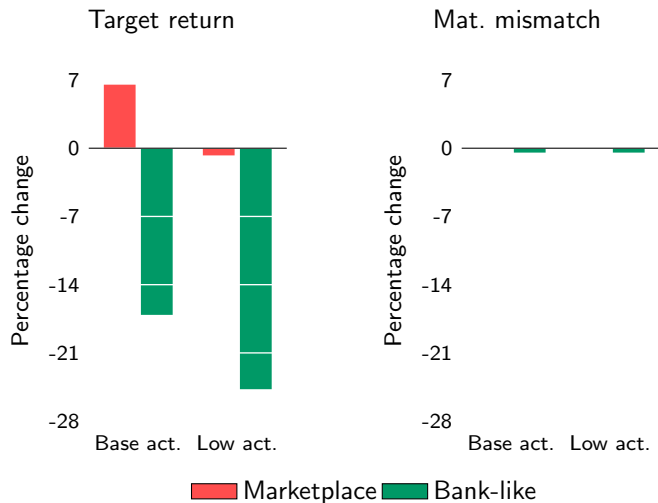
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- ▷ “Stress test” scenario
- ▷ Ramp up resale time  $\mathcal{L}$  from 0.5 days to 30 days
  - Max observed on Renrendai: 88 days
  - Max observed on Funding Circle: 120+ days
- ▷ Compare marketplace and bank-like models with high/low shares of active lenders on the market

## 7. Counterfactuals



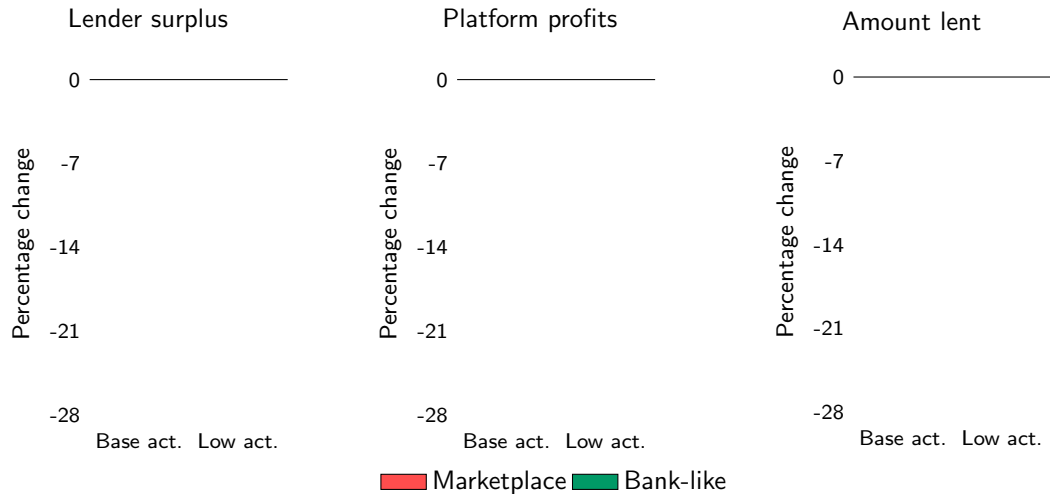
## Portfolio product changes

Compared to baseline scenario (marketplace, high liquidity):

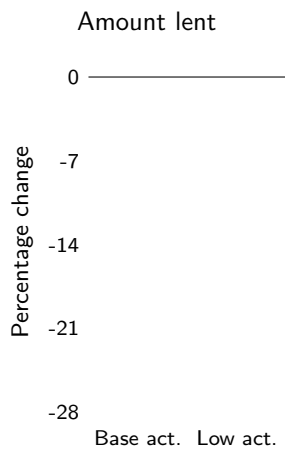
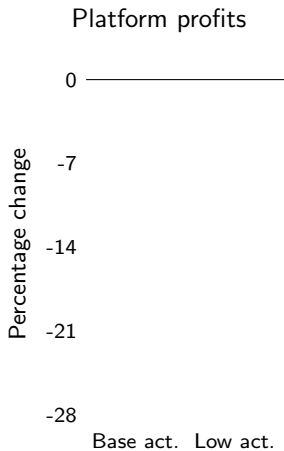
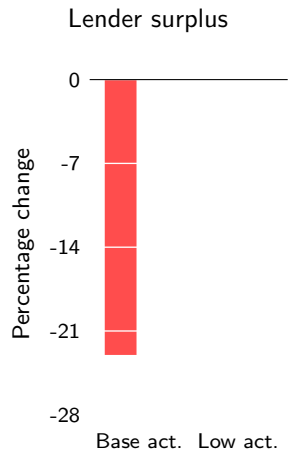
- ▷ **Marketplace model:** need to raise target return to attract active investors
- ▷ **Bank-like model:** platform passes liquidity risk through to the lenders, by offering lower target returns

## 7. Counterfactuals

## Welfare effects

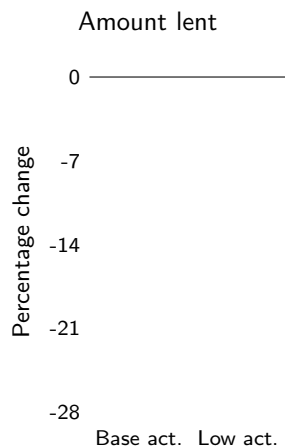
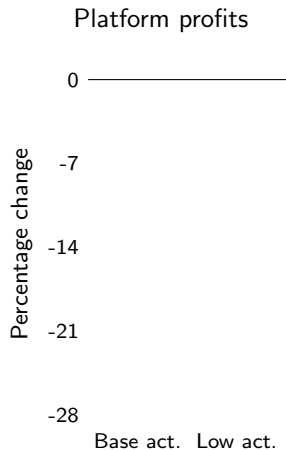
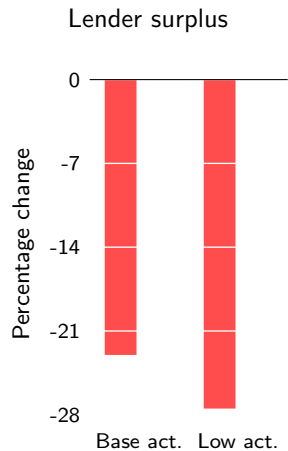


## 7. Counterfactuals



Marketplace Bank-like

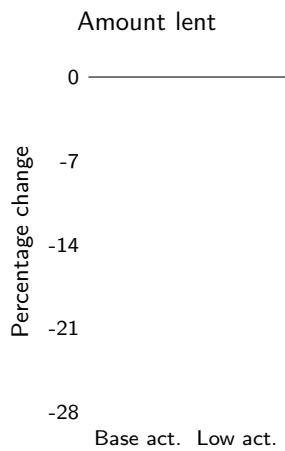
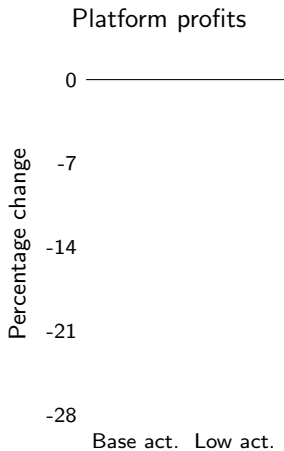
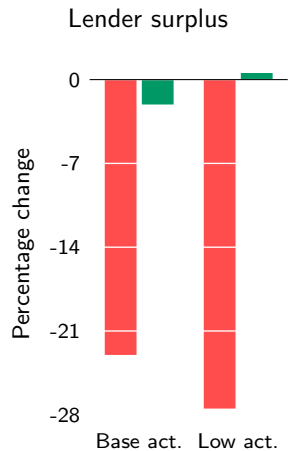
## 7. Counterfactuals



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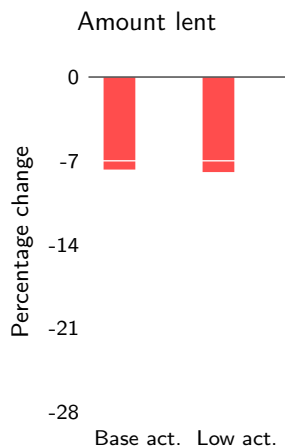
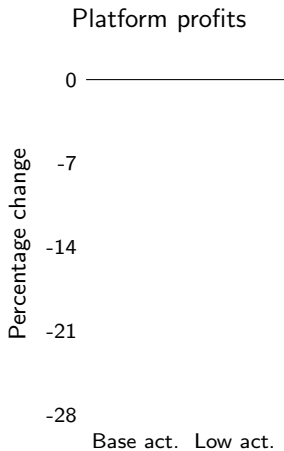
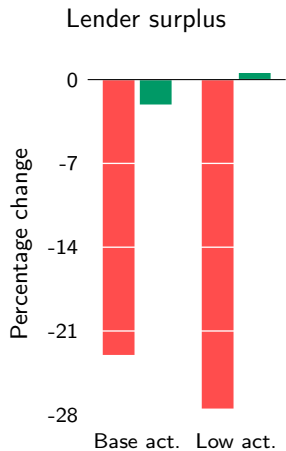
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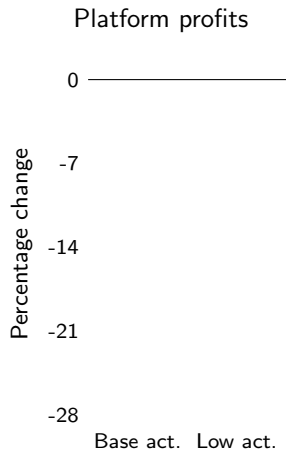
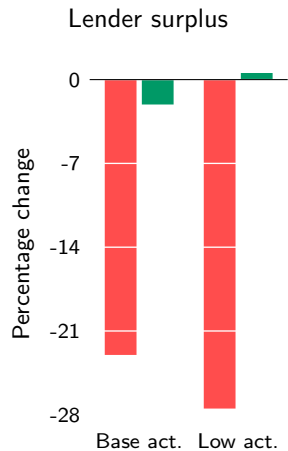
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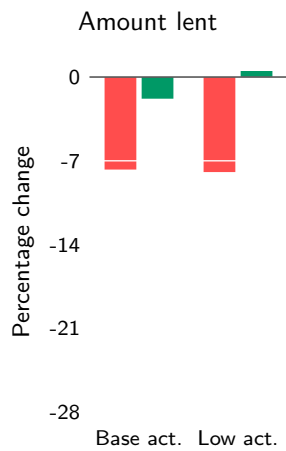


Marketplace Bank-like

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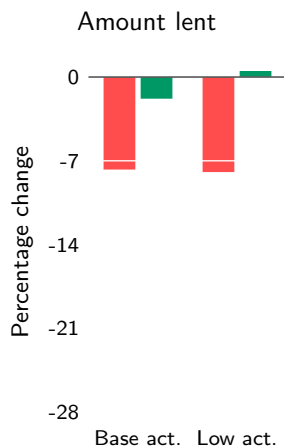
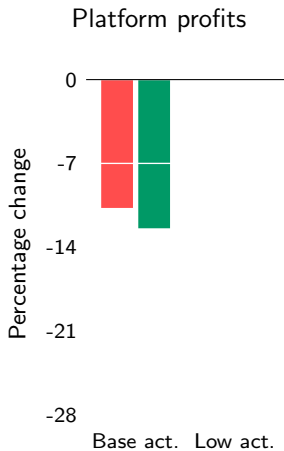
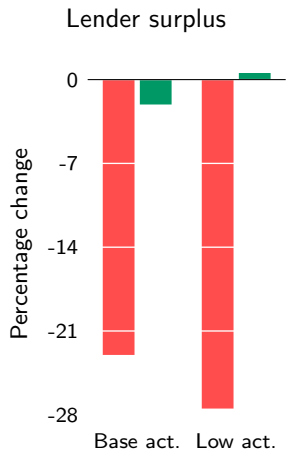


## Welfare effects



Marketplace Bank-like

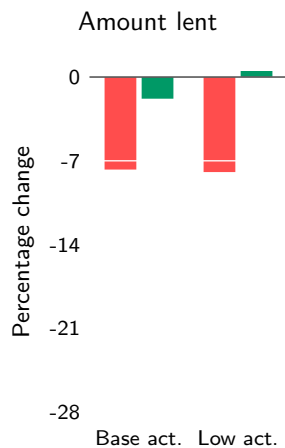
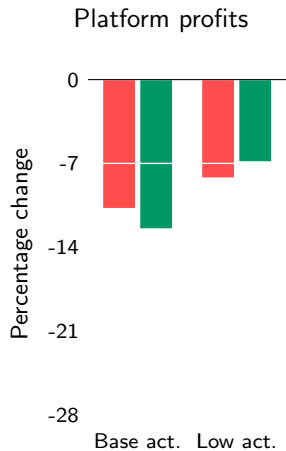
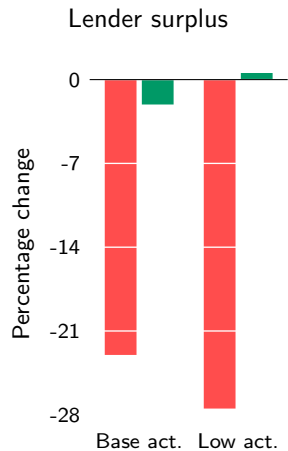
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Marketplace Bank-like

## Welfare effects

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Marketplace Bank-like

## Welfare effects



The image shows a screenshot of the Financial Times website. At the top, there is a navigation bar with a hamburger menu icon on the left, a search icon, and the text "FINANCIAL TIMES" in a large, bold, serif font. Below the navigation bar is a horizontal menu with the following items: HOME, WORLD, US, COMPANIES, TECH, MARKETS, GRAPHICS, OPINION, WORK & CAREERS, LIFE & ARTS, and HOW TO SPEND IT. The main content area features a red headline "Zopa Ltd" followed by a red button with a white plus sign and the text "+ Add to myFT". Below this is the main headline "P2P lender Zopa wins UK banking licence" in a large, bold, serif font.

## 8. Wrap up

- ▷ Develop an equilibrium model to study different paradigms of online debt crowdfunding: peer-to-peer, marketplace, bank-like
- ▷ Welfare effects (credit provision, platform profits, lender surplus)
- ▷ Role of lender risk aversion
- ▷ Implications for likely development of the segment

$$\begin{aligned}
& \sum_k S_{kt}^P \mathcal{T}_t \left\{ \sum_{c \in m \leq \mathcal{M}} w_{kct} (r_{ct} - \mathcal{C}_{1kct}) m_{ct} \right. \\
& + \sum_{c \in m > \mathcal{M}} w_{kct} (r_{ct} - \mathcal{C}_{1kct}) \left[ m_{ct} - \left( 1 - S_{kt}^{Roll} \right) \frac{m_{ct}}{\mathcal{M}_{kt}} \mathcal{L}_{ct} \right] \\
& \left. - \mathcal{R}_{kt} \mathcal{M}_{kt} - \mathcal{C}_{2kt} \right\}
\end{aligned}$$

[Back](#)



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 & \left. - \mathcal{R}_{kt} \mathcal{M}_{kt} - \mathcal{C}_{2kt} \right\}
 \end{aligned}$$

Earn net profit  
 $r - \mathcal{C}_1$  over loan  
 duration  $m$

Back

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\end{aligned}$$

If  $S^{Roll} = 1$ : No problem

Back

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If  $S^{Roll} = 0$ : We do not earn net profit...

Back

$$\begin{aligned}
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... for a period  
of length  $\mathcal{L}$ ...

Back

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 \end{aligned}$$

... How often?  
 $m/\mathcal{M}$  times

Back

1. Increase resale time  $\mathcal{L}$  (all else unchanged)
2. Re-optimize  $\Rightarrow$  Weights  $w_{ckt}$  change and different portfolios are offered
3. Investors change their demands for portfolios and direct loans
4. Platform's profits change
5. Iterate steps 2.  $\rightarrow$  4. until convergence

Back