Fintech Risk Management

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Milano, 6 dicembre 2018

FINancial TECHnologies

- Fintech denotes innovative financial services (peer to peer lending, robot advisory asset management, crypto assets,..) , enabled by disrupting technologies (big data analytics, artificial intelligence, blockchain).

- Fintech services are competitive, but may bring higher risks: credit risk; compliance risk, market risk; cyber risk, fraud detection, money laundering. All amplified by systemic risk, due to the high interconnectdness of Fintech platforms.

- Our aim is to build a risk management framework that encourages a safe digital finance, regtech and suptech.

FIN-TECH @unipv

- We have a fintech laboratory, with 4 Faculty members and 8 Phd students, in the departments of economics and of computer engineering.
- in 2019-2020 we will be coordinating a CSA European H2020 project: FIN-TECH (FINancial supervision and TECHnological compliance)
- The project aims to create a European platform for fintech risk management, through 3 research workshops, 6 R coding sessions and 72 hours of common lectures x 29 countries in: i) P2P lending; ii) robot advisory; iii) blockchain payments.

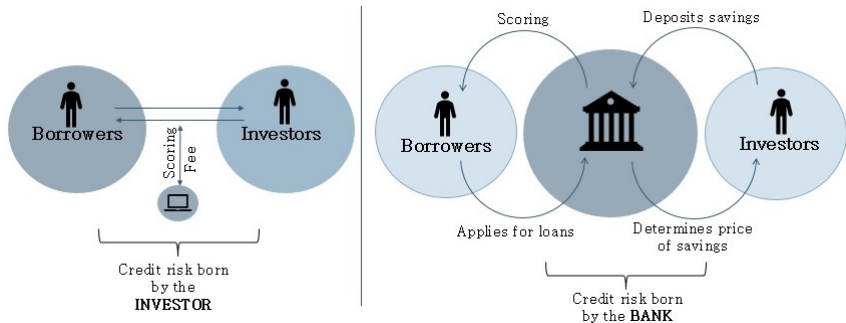# FIN-TECH partners

Peer to peer lending

Figure: The business models of a P2P lender (left) and of a bank (right)

Credit scoring Models

- The most employed model to estimate the probability of default is the logistic regression:

$$ln(\frac{p_i}{1-p_i}) = \alpha + \sum_j \beta_j x_{ij},$$

from which:

$$p_i = \frac{1}{1+e^{\alpha+\sum_j \beta_j x_{ij}}},$$

a measure of idiosyncratic risk for each borrower node.

Network-based scoring models

- We propose to extend scoring models including network centrality components:

$$ln(\frac{p_i}{1-p_i}) = \alpha + \sum_j \beta_j x_{ij} + \gamma c_i + \lambda d_i$$

- from which:

$$p_i = \frac{1}{1 + e^{\alpha + \sum_j \beta_j x_{ij} + \gamma c_i + \lambda d_i}}$$
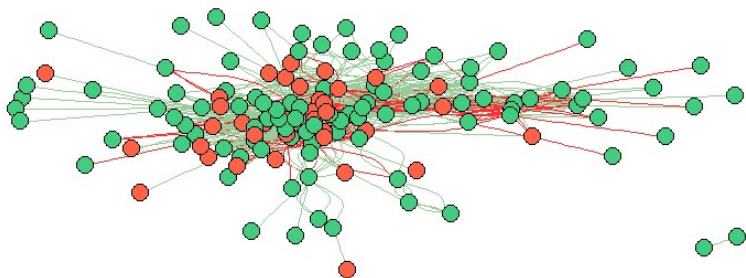
The network based on the activity indicator

Figure: Correlation network based on the activity indicator

Predictions: Standard Model

Variable	Estimate	P-value	Significance
Intercept	-3.39	0.011	*
Solvency ratio	0.01	0.539	
Debt to equity ratio	-0.07	0.517	
Current ratio	0.21	0.032	*
Cash over total assets	-2.51	0.579	
Return on equity	-0.08	0.008	**
Return on assets	0.01	0.963	
Return on Capital Employed	0.09	0.044	*
Coverage	-0.01	0.875	
Activity ratio	-1.92	0.001	***
Predictive utility (average AUC)			**0.721**

Figure: The estimated baseline regression model

Predictions: Network based model

Variable	Estimate	P-value	Significance
Intercept	-1.53	0.033	*
Solvency ratio	-0.02	0.012	*
Debt to equity ratio	-0.00	0.576	
Current ratio	0.24	0.072	*
Cash over total assets	1.08	0.443	
Return on equity	-0.11	0.000	***
Return on assets	0.02	0.876	
Return on capital employed	0.01	0.212	
Coverage	0.02	0.248	
Activity ratio			
Degree Centrality	0.01	0.026	*
Closeness	1.05	0.002	**
Predictive utility (average AUC)			**0.82**

Figure: The estimated network-based regression model

Some recent papers on p2p risk management

- (2018) Paolo Giudici, Branka Hadji-Misheva. Scoring models for P2P platforms: a network approach. Under revision
- (2018) Daniel Ahelegbey, Paolo Giudici, Branka Hadji-Misheva. Scoring models for p2p with latent variables. Under revision
- (2017) Stefan Avdjiev, Paolo Giudici, Alessandro Spelta. Measuring contagion risk in international banking. **Journal of Financial Stability, forthcoming**
- (2017) Paolo Giudici, Peter Sarlin, Alessandro Spelta. The interconnected nature of financial systems: direct and common exposures. **Journal of Banking and Finance.**
- (2016) Paolo Giudici, Alessandro Spelta. Graphical network models for international financial flows. **Journal of Business and Economic Statistics**, 34 (1), pp. 126-138.