

# Wei Zhao

<https://weizhao-econ.weebly.com>

Email: [wei.zhao1@hec.edu](mailto:wei.zhao1@hec.edu)

Mobile: +33 6 24 96 13 94

1 Rue de la Liberation  
78350 Jouy-en-Josas, France

## Education

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2016 - 2022 (expected)	Ph.D Candidate in Economics	HEC Paris
2013 - 2016	MSc. in Economics	National University of Singapore
2009 - 2013	BSc. in Economics	Central University of Finance and Economics

## Research Interests

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Dynamic Information Design, Network Theory, Financial Intermediary, Corporate Finance

## Working Papers

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1. Dynamic Progress Report *Job Market Paper*.
2. Moral Hazard in Network (with Yang Sun) *reject and resubmit at GEB*.
3. Structural Interventions of Social Ties (with Yang Sun and Junjie Zhou) *revise and resubmit at IER*.
4. Dynamic Contracting over Information (with Claudio Mezzetti, Ludovic Renou and Tristan Tomala) *under review*.
5. Designing Efficient Networks Sequentially (with Yang Sun and Junjie Zhou) *draft available*.
6. Sell-Side Research and Buy-Side Agency Issue (Junli Zhao) *under review*.

## Work in Progress

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1. Moral Hazard on Network with Interactive Effect (with Yang Sun).
2. Information Transmission with Hybrid Channel.
3. Contracting over Private Experimentation (with Wentao Fu).

## Seminar and Conference Presentation

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2021: Transatlantic Theory workshop, TSE applied theory workshop, INET Network Conference  
2020: Paris Game Theory seminar,  
2019: Workshop in information design and splitting games at Paris, Coalition network theory 24<sup>th</sup> conference, 2nd EAYE Workshop at Paris School of Economics.  
2018: Applied Economics Lunch Seminar at PSE, 2018 International Conference on Economic Theory and Applications at Southwest University of Finance and Economics.  
2017: PGMODAYS 2017 at EDF.

## Other Activities

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- Grants and Awards: GREGHEC funding, HEC Foundation Scholarship, NUS Master Scholarship, CUFE Scholarship
- Referee: Operations Research Letters
- Teaching experience: TA for Micro-economics  $\times 3$

## Personal Information

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Born: 1992/11

Gender: Male

Citizenship: China

Languages: Mandarin (Native), English (Fluent)

Software: Mathematica, MATLAB, Stata

## References

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### **Tristan Tomala (Advisor)**

HEC Paris  
1 rue de la liberation,  
Jouy-en-Josas  
tomala@hec.fr

### **Nicolas Vieille**

HEC Paris  
1 rue de la liberation, Jouy-en-Josas  
vieille@hec.fr

### **Ludovic Renou**

Queen Mary University  
E1 4NS, London, United  
Kingdom  
lrenou.econ@gmail.com

### **Bruno Biais**

HEC Paris  
1 rue de la liberation,  
Jouy-en-Josas  
biaisb@hec.fr

### **Junjie Zhou**

National University of Singapore  
AS2 06-02, 1 Arts Link, Singapore  
zhoujj03001@gmail.com

## Abstract

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### **Dynamic Research Progress Report**

This paper studies information design in a dynamic moral hazard environment. An agent and an expert face a common uncertainty regarding the effectiveness of a collective decision. The agent bears the cost of effort of information acquisition and makes the final decision. The expert is the only observer of research outcomes and provides information over time to the agent. Both parties are equally affected by the decision but the expert prefers more accurate decision making since she does not afford the research cost. I show that one optimal information policy consists in disclosing truthfully with delay. In the first periods of time, the delay is zero, then strictly increases and finally vanishes. By the time the delay decreases back to zero, the agent has taken the decision with probability one.

### **Moral Hazard in Networks** (with Yang Sun)

In a multi-agent contracting setting, agents' performances are related due to both correlated noise and effort spillovers. We study the optimal linear contract when agents are risk averse.

Imposing compensation weights on peer performance helps to filter out common noise, which relaxes the participation constraint (hedge effect). However, it may also reduce the incentive to exert effort due to effort spillovers, which therefore tightens the incentive compatibility constraint (incentive effect). We show that the optimal compensation sensitivity is determined by the dot product between the pure hedge vector and spillover vector. Furthermore, we propose an index called informativeness along the spillover direction to capture the balance between the hedge and incentive effects. As a result, both the effort and profit induced in equilibrium are positively related to this index. Finally, we demonstrate the disparity between spillover depth (measuring the strength of the spillover effect) and spillover width (summarizing the density of spillover structure).

### **Structural Interventions of Social Ties**(with Yang Sun and Junjie Zhou)

Two types of interventions are commonly implemented in networks: characteristic intervention which influences individuals' intrinsic incentives, and structural intervention which targets at the social links among individuals. In this paper we provide a general framework to evaluate the distinct equilibrium effects of both types of interventions. We identify a hidden equivalence between a structural intervention and an *endogenously determined* characteristic intervention. Compared with existing approaches in the literature, the perspective from such an equivalence provides several advantages in the analysis of interventions targeting on network structure. We present a wide range of applications of our theory, including determining whether a structural intervention is beneficial, identifying the most wanted criminal(s) in delinquent networks and targeting the key connector for separated communities.

### **Dynamic Contracting over Information** (with Claudio Mezzetti, Ludovic Renou and Tristan Tomala)

We consider a dynamic moral hazard problem between a principal and an agent, where the sole instrument the principal has to incentivize the agent is the disclosure of information. The principal aims at maximizing the (discounted) number of times the agent chooses a particular action, e.g., to work hard. We show that there exists an optimal contract, where the principal stops disclosing information as soon as its most preferred action is a static best reply for the agent or else continues disclosing information until the agent perfectly learns the principal's private information. If the agent perfectly learns the state, he learns it in finite time with probability one; the more patient the agent, the later he learns it.

### **Building Up Efficient Networks Sequentially** (with Yang Sun and Junjie Zhou)

We study the problem of designing efficient network sequentially. In each period, the planner connects two unlinked agents in the network formed in previous period, then the agents play a game with local complementarity under the newly formed network. The planner benefits from the entire discounted stream of equilibrium welfare. We show that, forming a nested split graph in each period is an optimal strategy for the planner for any specific values of discount factors.

Moreover, when the planner heavily discounts future welfare, the optimal strategy induces a quasi-complete graph in each period regardless of the strength of complementary effect. Our paper therefore provides a micro-foundation for quasi-complete network since it is formed under greedy algorithm. We also discuss the robustness of these results under non-linear best response and heterogeneous agents.

### **Sell-Side Research and Buy-Side Agency Issue** (with Junli Zhao)

We study whether and how sell-side research affects the agency issue between asset managers and their clients. We show that even if sell-side research alone does not generate conflicts of interest, it can exacerbate the moral hazard problem of asset managers. Imposing transparency on the use of sell-side research, as the recent European directive MiFID II does, helps investors alleviate this negative effect. Forcing the managers to absorb sell-side research costs has a similar effect. Our model explains the empirical findings on how transparency affects the supply of buy-side research, the demand for and the quality of sell-side research. This paper contributes to the debate on the regulation of sell-side research, with a view to improving the organization of the asset management industry.