

# Apostolos Filippas

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## EDUCATION

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**PhD in Information Systems**, 2012 - 2018 (Expected)

NYU Stern School of Business · New York, NY

Committee: Arun Sundararajan (chair), John Horton, Srikanth Jagabathula

**Diploma in Computer Science** (summa cum laude), 2006 - 2011

University of Patras · Greece

## RESEARCH INTERESTS

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Online marketplaces: design, policy and strategic implications, peer-to-peer marketplaces, the sharing economy, applied economics, data science, business analytics, natural language processing

## AWARDS & HONORS

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Best Paper Award · ICIS 2016

*Received award for the best paper in the Crowdsourcing, Crowdfunding, Blockchain, and the Sharing Economy track*

Ph.D. Student Research Grant · 2016

*Awarded by the Center for Global Economy and Business, NYU Stern School of Business*

Commendation for Teaching Excellence · 2016

*Awarded by the Vice Dean for doctoral education, NYU Stern School of Business*

Onassis Scholarship for Hellenes · 2016-2018

*Fellowship awarded by the Alexander S. Onassis Public benefit Foundation*

Ph.D Alumni Fellowship · 2017

*Fellowship awarded by the NYU Stern school of Business*

Doctoral Fellowship · 2012-2016

*Fellowship awarded by the NYU Stern School of Business*

Gerondelis Doctoral Scholarship · 2013

*Doctoral scholarship awarded by the Gerondelis foundation*

Computer Engineering and Informatics Department, University of Patras · 2012

*Graduated with highest honors*

Scholarships for excellent academic performance · 2009-2011  
*Three scholarships awarded by the Greek State Scholarships Foundation*

Awards for distinction in national mathematics competitions · 2001-2006  
*Six awards by the Hellenic Mathematical Society*

## DISSERTATION

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*“Three Essays on the Sharing Economy: From Market Design to Public Policy.”*

Over the last twenty years, digital technologies have catalyzed a transformation in how markets work, increasingly placing online platforms in the role of mediators of global economic activity. Early online marketplaces like eBay and Amazon have deepened our understanding of the core principles underlying the design and operations of online markets. Today, technology firms operate large online platforms that have transcended retail: online platforms now span a broad range of industries, aggregating demand and supply, facilitating the matching of consumers with various goods and services, and providing digitized forms of trust. My thesis focuses on the sharing economy, and attempts to explicate how these new digitally-enabled firm-market hybrids that rely on decentralized and heterogeneous crowds of providers for the supply of capital, change our understanding about online platform design and management.

The first part of my thesis focuses on the public policy implications of home-sharing platforms, arguably one of the most important applications of the sharing economy. Home-sharing platforms allow hosts to rent out their apartments, imposing costs on their neighbors, and potentially creating a market failure due to uninternalized externalities. We consider four public policy responses that differ with respect to the party that the decision right to host is allocated to. We find that allocating the hosting rights to building owners not only prevents market failure, but also results in a socially optimal hosting level. We test other predictions of our theoretical model on data from NYC rentals, and explore how factors such as moving costs affect the predictions of our model.

The second essay examines how the highly personal nature of consumer-provider interaction in such platforms can lead to the erosion of reputation systems employed therein. Using data from a large online labor market, we find that reputation scores inflate: by using a natural language processing approach, we estimate that at least 36 to 48 percent of the increase in feedback scores is due to inflation. We argue that this is a systematic problem that arises due to (1) giving bad feedback being costly to raters, and (2) what constitutes “bad” feedback being endogenous. We test this conjecture by exploiting a market intervention where the costs of assigning bad feedback were raised. We find that, following the increase in costs, feedback scores immediately began to inflate. We examine the implications of reputation inflation for online platform design.

The third essay examines the implications of a novel feature of the sharing economy business model: unlike traditional firms, sharing economy providers have full control over deciding the availability of their assets and services. We report on the results of a field experiment on a platform where providers could formerly price their assets, and where different degrees of control over this decision were taken from the providers. Providers reacted by communicating their concerns and feedback, and by dropping out of the platform. However, providers also reacted by blocking unwanted transactions, and by reducing the availability of their assets, a behavior which is unique to sharing economy platforms. We examine the relative magnitude of these channels of retaliation, and suggest a method for implementing market design changes in sharing economy platforms.

## RESEARCH<sup>1</sup>

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### Publications

*Pricing in the Sharing Economy: Pricing Dynamics with Awareness-Generating Adoptions*  
International Conference of Information Systems (ICIS), 2016

Filippas, Apostolos and Gramstad, Arne Rogde

★ *Best paper award in the Crowdsourcing, Crowdfunding, Blockchain, and Sharing Economy track*  
★ *Nominated for the ICIS best conference paper award*

*The Tragedy of your Upstairs Neighbors: Is the Negative Externality of Airbnb Internalized?*  
ACM Transactions on Economics and Computation (EC), 2017

Filippas, Apostolos and Horton, John

*Strength in Numbers: Using Big Data to Simplify Sentiment Classification*

Big Data, 2017

Filippas, Apostolos and Lappas, Theodoros

### Working papers

*The Tragedy of your Upstairs Neighbors: When is the Home-Sharing Externality Internalized?*

Filippas, Apostolos and Horton, John

(Revise and resubmit, 2nd round, Management Science)

*Examining the Relationship of Awareness and Seller Pricing in Online Markets*

Filippas, Apostolos and Gramstad, Arne Rogde

(Under review, 1st round, Information Systems Research)

*Reputation in the Long-Run*

Filippas, Apostolos and Horton, John and Golden, Joseph

(Under review, 1st round, the American Economic Review)

*Your Network Matters: Nonlinear Pricing with Local Network Effects*

Filippas, Apostolos and Gramstad, Arne Rogde

(in preparation for submission to Management Science)

*Voice, Exit, and Availability: A Field Experiment on Platform Design in the Sharing Economy*

Filippas, Apostolos, Jagabathula, Srikanth and Sundararajan, Arun

(working paper)

*Peer Management in the Sharing Economy: The Mediating Role of the Platform*

Filippas, Apostolos, Jagabathula, Srikanth and Sundararajan, Arun

(working paper)

*The Microstructure of Sharing Economy Marketplaces*

Filippas, Apostolos, Jagabathula, Srikanth and Sundararajan, Arun

(working paper)

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<sup>1</sup>Abstracts of completed papers can be found in the Appendix.

## TEACHING EXPERIENCE

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**Information Technology in Business and Society**, (Summer 2016, Undergraduate)

Instructor (Overall evaluation: 6.9/7—Department average: 5.3/7)

★ *Commendation for teaching excellence awarded by the NYU Vice Dean for doctoral education*

**Technical Data Mining for Business Analytics**, (Spring 2018, MS in Business Analytics)

Teaching Fellow for Prof. Foster Provost

**Network Analytics**, (Fall 2017, MS in Business Analytics)

Teaching Fellow for Prof. Arun Sundararajan

**Decision Models**, (Spring 2017, MBA)

Teaching Fellow for Prof. Ilan Lobel

**Decision Models**, (Spring 2017, Undergraduate)

Teaching Fellow for Prof. Ilan Lobel

**Decision Models**, (Spring 2017, MS in Business Analytics)

Teaching Fellow for Prof. Ilan Lobel

**Network Analytics**, (Summer 2016, MS in Business Analytics)

Teaching Fellow for Prof. Arun Sundararajan

**Data Mining for Business Analytics**, (Spring 2016, MBA)

Teaching Fellow for Prof. Foster Provost

**Operations Management**, (Winter 2016, MBA)

Teaching Fellow for Prof. Srikanth Jagabathula

**Decision Models**, (Spring 2015, MBA)

Teaching Fellow for Prof. Ilan Lobel

**Decision Models**, (Spring 2015, MS in Business Analytics)

Teaching Fellow for Prof. Ilan Lobel

## ACADEMIC ACTIVITIES & SERVICE

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Editorial Assistant

*Big Data*

Reviewer

*Big Data, ICIS, CIST*

## PROGRAMMING SKILLS

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Python, R, C++, Java, C, SQL, Matlab, CUDA

## **APPENDIX (Abstracts of working, submitted, and published journal papers)**

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*The Tragedy of Your Upstairs Neighbors: Is the Negative Externality of Airbnb Internalized?*  
(with John J. Horton)

A common critique of home-sharing platforms is that they enable hosts to impose costs on their neighbors. We consider four potential public policy responses that differ in whether the decision right to host is allocated to: (1) individual tenants, (2) building owners, (3) cities, and (4) a social planner. We find that (2) and (4) are equivalent, with (3) leading to too little hosting, and (1) to too much hosting. The efficiency of (2) depends on building owners being indifferent between allowing and banning home-sharing in their buildings. To assess this “no policy arbitrage” prediction, we constructed a dataset of NYC rental apartments listings. Although we do not observe building home-sharing policies, there are several “policy” attributes captured in the data, such as whether buildings allow subletting. Consistent with our prediction, we find that policy choices have no detectable effect on rental prices. Despite the attractiveness of the equilibrium of policy (2), tenants must “sort” across buildings, potentially at substantial cost. We explore this sorting with an agent-based model, and show how individual preferences and moving costs affect the equilibrium.

*Reputation in the Long-Run*  
(with John J. Horton and Joseph M. Golden)

Feedback scores in an online marketplace have risen sharply over time, leading to substantial top-censoring. Some of the increase is explained by more satisfied raters, but at least 35-45% is attributable to raters applying lower standards. We show that this “reputation inflation” is the equilibrium outcome of a model in which (a) inferences made by future trading partners determine what constitutes “bad” feedback and (b) giving “bad” feedback is costly to raters. The introduction of a new feedback system confirms our model predictions: raters were candid when feedback was private, but when feedback suddenly became public, reputations began inflating.

*Exit, Voice, and Availability: A Field Experiment on Sharing Economy Platform Design*  
(with Srikanth Jagabathula and Arun Sundararajan)

A novel feature of the sharing economy business model is that providers have full control over deciding the availability of their assets and services. We report on the results of a field experiment on a platform where providers could formerly price their assets, and where different degrees of control over this decision were taken from the providers. Providers reacted by communicating their concerns and feedback, and by dropping out of the platform. However, providers also reacted by blocking unwanted transactions, and by reducing the availability of their assets, a behavior which is unique to sharing economy platforms. We examine the relative magnitude of these channels of retaliation, and suggest a method for implementing market design changes in sharing economy platforms.

*Examining the Relationship of Awareness and Seller Pricing in Online Markets*  
(with Arne Rogde Gramstad)

Online markets play an increasingly important role in facilitating economic transactions. In this paper, we study the link between individual seller pricing behavior and macro-level phenomena in online markets, by employing the notion of population awareness. We develop a model of seller pricing where (i) consumers must first become aware of the seller before they consider adopting the seller’s product or service, (ii) past adoptions increase the probability that consumers will become

aware of the seller in the future, and (iii) awareness decreases over time. For sellers with limited life spans we identify pricing dynamics consistent with penetration pricing. For sellers with longer life spans, the relationship between awareness and price is non-monotonic, and consistent with a tipping point in adoption dynamics. Sellers set higher prices when they have either achieved high population awareness (mass market/superstars) or have been positioned in a market niche, while prices are lower for intermediate awareness levels where competition is most intense. We exhibit the importance of awareness for online market design by examining its relationship with market concentration and platform fee decisions.

*Your Network Matters: Nonlinear Pricing With Local Network Effects*  
(with Arne Rogde Gramstad)

Network effects are a core source of value for a variety of digital products. We develop a model where monopolist offers a menu of price-quantity pairs to consumers who are subject to local network effects: consumer surplus from adoption increases in the number of her neighbors who also adopt. Increased participation generates externalities through a “market size effect” (incentives for consumers to adopt) and a “distribution effect” (incentives for existing customers to upgrade). We find that local network effects can induce the monopolist to serve some consumer segments at a loss (e.g., offer a plan free-of-charge). The combination of network effects and asymmetric information can lead to a complete market failure where no output is produced despite that some production is socially desirable. We further examine the implications of nonlinear seller pricing under local network effects using empirical data.

*Strength in Numbers: Using Big Data to Simplify Sentiment Classification*  
(with Theodoros Lappas)

Sentiment classification, the task of assigning a positive or negative label to a text segment, is a key component of mainstream applications such as reputation monitoring, sentiment summarization, and item recommendation. Even though the performance of sentiment classification methods has steadily improved over time, their ever-increasing complexity renders them comprehensible by only a shrinking minority of expert practitioners. For all others, such highly complex methods are black-box predictors that are hard to tune and even harder to justify to decision-makers. Motivated by these shortcomings, we introduce BigCounter: a new algorithm for sentiment classification that substitutes algorithmic complexity with Big Data. Our algorithm combines standard data structures with statistical testing to deliver accurate and interpretable predictions. It is also parameter-free and suitable for use virtually “out of the box,” which makes it appealing for organizations wanting to leverage their troves of unstructured data without incurring the significant expense of creating in-house teams of data scientists. Finally, BigCounter’s efficient and parallelizable design makes it applicable to very large datasets. We apply our method on such datasets toward a study on the limits of Big Data for sentiment classification. Our study finds that, after a certain point, predictive performance tends to converge and additional data have little benefit. Our algorithmic design and findings provide the foundations for future research on the data-over-computation paradigm for classification problems.