# PhD Symposium in Industrial Economics and

# Network of Industrial Economists (NIE) Conference

## Loughborough University

## 7th & 8th July 2022

## *Book of Abstracts*

| NIE Symposium: 7th July 2022 |
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| **11.00am – 12.45pm** |

### Choice, Welfare, and Market Design: An Empirical Investigation of Feeding America's Choice System

**Sam Altmann,** *University of Oxford*

Feeding America, an organisation responsible for feeding 130,000 Americans every day, distributes donated food among a network of participating food banks. The eefficient and equitable allocation of food-to-food banks is of first-order importance for the welfare of many of America's most vulnerable. Feeding America's allocation mechanism, the `Choice System', uses first-price auctions to allow food banks to signal which types of food they need from Feeding America. This gives the food banks a large degree of choice over the types of food they receive. This paper examines the welfare and distributional consequences of enabling this choice. I apply a dynamic auction model to Choice System bidding data, estimating the distribution of food banks' heterogeneous and time-varying needs. I then use these estimates to compare the Choice System to the previous allocation mechanism employed by Feeding America which gave food banks very limited choice. I estimate that the Choice System increased welfare by the equivalent of a 78.5% increase in the number of people fed every day. The largest gains are seen by relatively better food banks that only need specificc types of food to supplement existing stocks.

## The Impact of Online Grocery Shopping on Retail Competition and Profit Sharing: Empirical Evidence from the French Soft Drink Market

**Clara Etcheverry**, ***Institut Mines Telecom Business School***
Céline Bonnet, *Toulouse School of Economics, INRAE, University of Toulouse I Capitole*

The online distribution channel expands in many sectors, and the food industry is not left out. This paper analyzes the impact of e-commerce on French grocery shopping. Using purchase data, we develop a structural econometric model of demand and supply to estimate the effect of the emergence of online distribution channels on retail competition, consumer welfare, and profit sharing between retailers and manufacturers in the French soft drink sector. We find that e-commerce leads to an increase in consumer surplus, and the effect on retailers' profits correlates with their online strategy. Retailers which developed independent and remote warehouses for the online distribution channel would get higher market shares, retail margins, and profits. Most retailers that develop online services in existing stores or with warehouses attached to a traditional store would get lower downstream margins, market shares, and profits with ecommerce than counterfactual without e-commerce. Our results also suggest that the introduction of the online grocery channel is profitable to the manufacturers due to an increase in wholesale margins. This increase with the introduction of ecommerce comes from the higher retailers' fear of risking a bargaining breakdown compared to accepting a concession to its trading partner.

## Seller versus Producer concentration: incorporating the impact of foreign trade

**Joseph Carr, *University of East Anglia***
*Steve Davies, University of East Anglia*

The last decade has witnessed many studies pointing to increasing concentration of industries in the USA and beyond. Some have interpreted this as evidence of a pervasive decline in the intensity of competition. We are more cautious - in not necessarily equating high concentration with soft competition - but we do not deny that concentration remains a potentially valuable metric when tracking the evolution of markets over time. Our concern in this paper is with a particularly important measurement issue which has been overlooked in most previous studies: typically, concentration is measured, with data from business registers or censuses, on the size distribution of producers in a given industry rather than the concentration of sellers in its associated market. No account is taken of importers while exports are not subtracted from domestic turnover/production, even though, for domestic consumer choice, the former may count for a lot but the latter for nothing. The major reason for this seeming neglect is the absence of harmonised production and trade data observed at the firm level for most countries. This is certainly true for the UK, and the purpose of this paper is to present a second-best bounds approach for adjusting estimates of producer concentration into seller concentration which requires only industry-level data on imports and exports and their geographical dispersion over partner trading countries. As an illustration this is applied with striking results for a sample of 119 UK manufacturing 4-digit level, 1998-2018. We show that the main result found in most previous UK studies – a distinct upward trend in typical producer concentration – does not apply for trade-adjusted seller concentration, and the incidence of industries which would be defined as "concentrated" or "highly concentrated" using conventional anti-trust policy definitions is much reduced.

## 13.45 – 15.30 – Parallel Session 1a

## AI, Intangibles and productivity growth

**Yanwan Ji,** *Warwick Business School*

This empirical study, motivated by the issue of EU productivity slowing down, establishes the link between investments in AI technology and a specific type of intangible asset - investments in human capital. Based on the sectoral level analysis for multiple countries, our study affirms the robust complementary effects of human capital in terms of AI productivity gains across different estimation methods. The paper constructs the framework by splitting human capital into two aspects: general labour quality and specific training. Relations between AI and various human capital components are unpacked, examined, and compared in our framework, including vocational training, tertiary education and labour composition. The marginal effects of AI, enhancing labour productivity, are quantified under different scenarios. Besides, the study also extends the analysis into the context of emerging economies. Although it is widely considered AI technology poses threats to kill the development of developing economies due to the job displacements, our empirical evidence tends to support the positive side, consistent with the part of the sub-hypothesis. Given each level of growth in human capital, we observe more considerable benefits from an additional increase in AI capital investments in terms of the emerging economies cases.

## Secure and efficient networks

**Oleh Stupak,** *University of Oxford, Oxford Internet Institute*

This study aims to understand efficient network formation in the presence of an intelligent attacker. We present a framework in which two asymmetric players, the Defender and the Attacker, compete over the two stages in a network formation and defence game with heterogeneous vertices' values. In a baseline model, nodes are valued according to their degree centrality, allowing the Defender to manipulate the network value and expected losses from an attack by creating costly links. Additionally, players are not perfectly informed about the allocation of the defensive and offensive resources. Such a model allows for studying the trade-off between network efficiency and security. The model produces three main results. First, contrary to the literature, it demonstrates that centrally protected star network does not yield the maximum payoff for the defending side in most circumstances, even being the most secure network formation. Secondly, it reveals the new type of network that often arises in an equilibrium of the games with limited defensive resources – a maxi-core network with a completely connected core and sparse periphery. Thirdly, the model demonstrates that the density of optimal network formations increases with the number of defensive resources. The theoretical framework can be used to study the optimal organisation of employees and ICT devices in an enterprise or aid the development of optimal cybersecurity awareness strategies.

## How platforms appeal to agents?

**Roberto Cavazos***, University of York*
Bipasa Datta, *University of York*

We provide a framework to examine how platforms appeal to agents, in particular how they appea
to buyers' side. We argue buyers not only join a platform considering membership fees and cross-
network effects but also derived from the rest of functionalities platforms offer. We extenc

Armstrong (2006) model to analyse price competition between two horizontally and vertically differentiated two-sided platforms. We model the vertical dimension introducing attributes developed by platforms on buyers' side. In the first stage of the game, platforms choose simultaneously roles offered on buyers' side. At the second stage, platforms choose simultaneously membership fees. This allows to have asymmetric platforms in equilibrium. We develop three scenarios depending on the strength of the cross-group network effects. The first case where the indirect network effects on both sides of the market are identical. The second case where sellers exert a larger network effect on buyers than buyers do on sellers. The third case where the cross-group network effect buyers exert on sellers is larger than vice versa. We find functionalities relative difference among platforms developed on buyers' side are part of both agents' equilibrium membership fees for two of the three scenarios analysed. When the network effects are identical on both sides of the market, only buyers' equilibrium membership fees are affected and Armstrong (2006) result for sellers' side emerge. We derive comparative statics over the strategic variables and identify that equilibrium features on buyers' side and equilibrium market-shares relative difference on both sides of the market are decreasing in product differentiation on both buyers and sellers' side and increasing on cross-side network effects no matter if one side exerts a stronger network effect on the other side, or even if they are identical as long as platform is more efficient developing roles than its rival and product differentiation on both sides of the market is within a reasonable range. We also find the impacts of the model parameters on the equilibrium membership fees are opposite when one side exert a stronger cross-group network effect on the other side than vice versa. urthermore, the impacts of the parameters on buyers' equilibrium membership fees relative difference are the same no matter if the cross-group network effects are identical on both sides of the market or when sellers exert a larger network effect on buyers than buyers do on sellers. On the other hand, the impacts on sellers' equilibrium membership fees relative difference are the same no matter if the cross-group network effects are identical on both sides of the market or the indirect network effect buyers exert on sellers are stronger than vice versa. Our results lead to conditions for platforms to maximise both dimensions, product differentiation on the horizontal dimension and roles on buyers' side on the vertical dimension to maximise profits, like in Garella and Lambertini (2014) and Barigozzi and Ma (2018), in the case where the cross-group network effect sellers exert on buyers is larger than vice versa. In addition, we derive conditions where the platforms strategy is to maximise functionalities on buyers' side and minimise product differentiation for both agents, to increase profits in the case where the cross-group network effects on both sides of the market are identical. Moreover, minimise roles on buyers' side and maximise product differentiation on both sides of the market in the case where buyers exert a larger network effect on sellers than sellers do on buyers as in the early work of Economides (1989) and Neven and Thisse (1990) and the generalised model of Irmen and Thisse (1998).

**13.45 – 15.30 – Parallel Session 1b**

### Financial development and patents during the First Industrial Revolution: England and Wales

**Jinlin Wei,** ***University of Warwick***

Using a district-level dataset on patents and banks in England and Wales during the First Industrial Revolution, I show that better access to financial services increased patents of invention between 1750 and 1825. My baseline estimation includes district and year fixed effects. I also construct an instrumental variable based on the locations of historical post towns before country banks appeared. Better banking access increased patents by increasing the supply of short-term credit. The effects are larger for the patents in the manufacturing sector that lacked credit, and in districts where credit supply was insufficient.

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### *Of Shrimps and Men: Innovation, Competition and Product Diversity*

**Amanda De Pirro, *Lancaster University***
Renaud Foucart, *Lancaster University*

We build a model showing how a cost-reducing innovation can hurt the profit of the innovator by decreasing product diversity and strengthening competition. We illustrate this result using data from the shrimp industry. In the late 1990s, a US governmental program designed a new breed reducing the production cost of a variety of shrimp. This innovation gave a temporary boost to the profit of American producers. Over time, other countries abandoned their native production to adopt the new breed. In this catch-up phase, US producers not only lost their cost advantage, but also the market power derived from product differentiation.

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### **Competitive consequences of delegating retail pricing and assortment decisions to a category captain**

**Karishma Patel, *Aston University***
Luke Garrod, *Loughborough University*
Matthew Olczak, *Aston University*

An increasing number of retailers have delegated the task of "category management" to one or more of their manufacturers who become known as a "Category Captain" (CC). The category captain will usually be responsible for providing recommendations about: assortment, shelving allocations, prices and/ or promotion. Whilst there exists potential benefits of category captainship (e.g. increased efficiency, lower prices and a more organised category), there is also a possibility of harm to competition in the form of competitive exclusion, which in an extreme case can result in monopolisation of a category. Many of the existing theoretical studies on category captainship are limited to analysing the impact of service provision by the category captain, for example, to increase traffic into a category (see Subramanian, 2010), and/ or retail price delegation to a category captain (see Kurtulus and Toktay, 2011; Wang, 2003; Nijs, 2014). There are only a handful of papers in which the scope of category captainship is assortment decisions i.e. deciding which brands the retailers will stock (see Kurtulus and Nakkas, 2011; Gabrielsen and Johansen et al., 2018; Kurtulus and Nakkas, 2014; Kurtulus, 2014; Nakkas and Kurtulus, 2020). However, in practice, the scope of category captainship is often not limited to pricing delegation, but may also include assortment decisions (Kurtulus and Toktay, 2009). We have only identified one paper, which is that of Kurtulus and Toktay (2007), which does this. However, all of the aforementioned papers assume exogenous retail prices and/ or overlook retail competition. Thus, our key contribution to the category captainship literature lies in examining category captainship in the context of both endogenous prices and retail competition. Our model therefore allows us to examine the competitive consequences of category captainship by considering the impact on both assortment and retail prices. We also contribute to the literature on exclusive dealing. As Fix (2022) suggests, exclusive dealing agreements in reality, are multi-dimensional and may include agreements on prices and other variables. However, previously this has not been fully analysed in a setting with downstream competition. Following Gabrielsen and Johansen (2014), we use a game theoretical model based on a two-stage supply chain in which there is a single manufacturer with market power and a competitive fringe

upstream, selling their brands through two competing retailers downstream. We assume that the level of upstream competition is fixed at a moderate level. In the benchmark case, we consider a scenario under which the retailer remains responsible for category management i.e. there is no category captain. In this case the manufacturer with market power is able to decide whether or not it wants to sell its brand through one or both retailers. In contrast, under category captainship, we consider the possibility of the manufacturer with market power being a category captain for one of the retailers. This eliminates the wholesale price/transaction cost between the captain and retailer and there is full pricing delegation i.e. that the category captain sets the retail prices of both brands sold at the retailer it serves. Furthermore, the category captain is able to decide whether or not it will supply its brand to the outsider retailer, and also whether or not the retailer it serves, will sell the outsider manufacturer's brand. We find that the manufacturer with market power and a single retailer, can always increase their joint profits by forming a category captainship agreement. This agreement may be of double common agency, under which both retailers continue to retail both brands, or the agreement may include an exclusive purchasing clause such that the retailer which is served by a category captain, only retails the captain's brand. Which of these agreements emerges in equilibrium depends on the level of retail competition. Double common agency will only occur when retail competition is sufficiently weak. In this case, the effect of category captainship is pro-competitive, and the outsider retailer suffers from a decrease in profits. In contrast, when retail competition is sufficiently strong, exclusive purchasing will emerge in equilibrium. Here, category captainship is anti-competitive with retail prices always higher than they would be absent the agreement. In this case the outsider retailer also benefits from an increase in profits under the agreement. Thus, we should worry about category captainship agreements in markets where retail competition is intense due to the potential for monopolisation of the captain's category.

## 16.00 – 17.15 – Parallel Session 2a

### Firm-Level Trade Policy Uncertainty: Evidence from Vietnam

**Nhan Le, *De Montfort University***
Tuan Luong, *De Montfort University*
Zheng Wang, *De Montfort University*

Recent years have witnessed the growing trend of nationalism and protectionism, reflected in a wide range of remarkable and unprecedented events such as Brexit or US – China trade war. Trade shocks have stimulated flourishing literature on trade policy uncertainty (TPU). Surprisingly, while extensive research has been carried out on TPU in countries initiating trade shocks, namely US (Baker et al., 2016) and China (Davis, Liu and Sheng, 2019), empirical evidence on TPU in other countries is quite limited (MFAT, 2020). This study contributes to the existing literature in two ways. Firstly, we construct a new dataset of TPU for a small open economy and Vietnam is used as a case study. Secondly, we explore the sources and consequences of TPU. While a number of recent studies have focused on the direct impacts of trade shocks, our approach highlights how trade conflicts affect third countries through the TPU channel. Previous studies use various approaches to measure TPU, including volatility of trade policy indicators, survey-based measures and text based measures. In this study, our TPU measure is based on a textual analysis of annual reports of Vietnamese firms that were listed on the Hanoi Stock Exchange and Hochiminh City Stock Exchange during the period from 2011 to 2020. TPU index reflects the frequency of joint occurrences of trade policy and uncertainty terms across annual reports. The text – analysis approach is employed due to its obvious advantages over other approaches in terms of cost, effectiveness and availability of historical data. Our results indicate that the TPU index increased considerably since 2016, the period that

witnessed the rise of trade protectionism with major events such as Brexit, the withdrawal of US from TPP and the US–China trade war. Noticeably, it reached a peak in 2018 in response to the escalation of trade tensions between US and China. Our regression model indicates that an increase in TPU would deter investments. Firms with a greater share of exports or a lower level of state ownership are more concerned about trade shocks.

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### Regulating service quality and water retention: the case of Eastern European water industries

**Selvin Thanacoody,** *University of East Anglia*

This paper analyses how economic regulation affects water utilities' performance in terms of water loss reduction and service quality by empirically modelling the interaction between a sector regulator and water utilities who are confronted to either price cap or rate of return regulation. We estimate a model of network water retention and a model of quality of service with accounting data from a panel of 505 water utilities in 11 Eastern Europe countries from 1996 to 2015. The results show a trade-off between water retention and service quality with respect to economic regulation. Namely, price cap regulation entails less water retention but leads to better quality of service than rate of return. Regardless of the regulation type, a lower price incentivises the firm to more water retention but less quality when price is instrumented. We find that an independent regulator weakly leads to more service quality but has no significant impact on water retention. The adoption of the cost recovery principle through European Union accession acts as an incentive to increase scale efficiency in an attempt to reduce prices.

## 16.00 – 17.15 – Parallel Session 2b

### Local Energy for Sale: An Experimental Analysis of Consumers' Decision-Making in Peer-to-Peer Energy Trading Platforms

**Shandelle Steadman,** *Cranfield University*
Anna Rita Bennato, *Loughborough University*
Monica Giulietti, *Loughborough University*

As energy markets are becoming more decentralised, energy trading platforms are emerging as a promising tool which can facilitate the integration and coordination of energy consumption, encouraging the use of renewable source of energy. Peer-to-peer energy trading platforms represent a new market place where consumers who can both generate and use their own energy (i.e. prosumers) are able to share part of their energy production with those who can be considered as traditional consumers. By empirical exploring three different European countries, Italy, Spain and the United Kingdom, we study the effectiveness of both economic and non-economic incentives in understanding consumers' willingness to pay for electricity in a platform. We collect our data making use of an incentivized online survey experiment. To determine if consumers will use the proposed energy platform to maximise their individual benefits in the form of electricity bill savings or if they will act pro-socially and maximise community benefits, we employ a set of contingent valuation experiments. We also explore how individuals' socio-economic characteristics, attitudes and behavioural biases affect their decisions and willingness to pay. In our findings emerges that determinants such as pro-environmental attitudes and wish for independence from the current electricity suppliers influence individuals' willingness to pay for electricity in the platform. Results also show that consumers exhibit pro-social behaviour in their pricing decisions, suggesting that the use of peer-to-peer energy trading platforms can be beneficial to all participants.

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### To switch or have it switched? Automation and delegation of decision rights in the context of energy contract switching

**Gerald Zunker,** ***Ruhr University Bochum***
Christoph Feldhaus *Ruhr-Universität Bochum*
Jorg Lingens, *University of Münster*
Andreas Loschel, *University of Münster*

Digitalization allows to increasingly automate human tasks and decisions, which offers the potential to save both physical and cognitive resources. A prerequisite for this is, however, that households are willing to forgo the intrinsic value of taking decisions on their own. In this paper, we want to understand how important this intrinsic value of decision rights is for households' automation choices in a real world context. To this end, we conduct an online lab-in-the-field experiment with a German service provider that offers to automate customers' electricity contract choice. Using the customer base of the service provider as a subject pool, we quantify how much intrinsic value customers attach to their decision right (using the conceptual approach presented in Bartling et al. 2014), and correlate this value with their 'automation status'. We observe that customers who automate their contract choice attach on average 55 percent more value to their decision right, compared to customers who do not. We speculate that this result is due to the fact that the gains from automation in the real world are multidimensional. Automation requires to delegate the decision right to a third party, but it also protects consumers from forgetting to choose. As such, we should be more optimistic about the take up of automation in the future.

## NIE Conference: 8th July 2022

10.30 – 12.10

### First Session

### Cartel Birth and Death Dynamics: Empirical Evidence

**Chloé Le Coq,** ***University of Paris II Panthéon-Assas (CRED), Stockholm School of Economics – Stockholm Institute of Transition Economics (SITE)***
Tove Forsbacka, *Stockholm School of Economics*
Catarina Marvão, *Technological University Dublin and Stockholm School of Economics*

This paper examines how the legal environment impacts cartel births and deaths. We exploit a gradual tightening of the competition law to study how cartels react to increased anti-trust enforcement. To avoid the inherent sample selection bias in prosecuted cartel studies, we use a unique dataset covering the population of Swedish legal cartels registered between 1946 and 1993. We run a count model (which considers only registered cartels) and a Hidden Markov Model (which also accounts for possible non-registered cartels). We find that strengthening the competition law has some deterrent effect. However, as the competition law becomes stricter, and the threat of cartel prohibition becomes credible, cartels continue to form but do so undercover.

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### Influencer Cartels

**Toomas Hinnosaar,** ***University of Nottingham, Center for Economic and Policy Research (CEPR)***
Marit Hinnosaar, *University of Nottingham, Center for Economic and Policy Research (CEPR)*

Influencer marketing is a large and growing but mostly unregulated industry. The majority of influencers are not paid based on their marketing campaigns' success. Instead, their prices are based on engagement (number of likes and comments). This gives incentives for fraudulent behavior---for inflating engagement. We study influencer cartels, where groups of influencers collude to increase engagement to improve their market outcomes. Our theoretical model shows that such cartels mitigate the free-rider problem and may increase or decrease welfare, depending on the quality of induced engagement. We use a novel dataset of Instagram influencer cartels and confirm that the cartels increase engagement as intended. Importantly, we show that engagement from non-specific cartels is of lower quality, whereas engagement from topic-specific cartels may be as good as natural engagement. Therefore topic-specific cartels may sometimes be welfare-improving, whereas typical non-specific cartels hurt everyone.

13.00 – 13.50

### Second Session

### Banking and Credit Market Competition with AI and Cryptocurrencies

**John E. Thanassoulis,** ***University of Warwick - Warwick Business School, UK Competition and Markets Authority, and Oxford-Man Institute, University of Oxford***
Tamas Vadasz, *KU Leuven - Faculty of Economics and Business*

We study the impact of AI and cryptocurrencies on consumer surplus in banking, on the price of credit, and on the price of checking accounts. We solve a competition model of banking and credit which includes client naivety, heterogeneous client risk, and imperfect risk screening. These features, together, can explain the international pattern of banking costs. In countries where free accounts are prevalent (eg US/UK) both better AI and more crypto use lower consumer surplus, while reducing the amount of naivety improves consumer surplus. Where free-banking is not prevalent (e.g. France/Germany), only one of these three results holds.

14.10 – 15.50

## Third Session

### The Effect of Input Price Discrimination on Retail Prices: Theory and Evidence from France

**Marie-Laure Allain,** ***CNRS Research Director at CREST, École Polytechnique***
Claire Chambolle, *Université Paris-Saclay, INRAE, AgroParisTech, Paris-Saclay Applied Economics and CREST*
Stéphane Turolla, *INRAE, Institut Agro, SMART*

We develop a model of vertical relations between national brand and private label producers and competing multi-product retailers to derive new predictions on the impact of input price discrimination on retail prices. A reform that lifted a ban on input price discrimination in France provides a natural experiment to test these predictions. Using household scanner data on food prices, we run a difference-in-differences analysis and show that the reform caused a significant decrease of the relative prices of national brand products. These results suggest a pro-competitive effect of authorizing input price discrimination.

### Inventors in the Time of Acquisitions: Evidence from Pharmaceutical Industry

**Carmine Ornaghi,** ***University of Southampton***
Lorenzo Cassi, *Paris School of Economics University of Paris 1*
Matias Oriz de Zarate, *University of Southampton*

In this paper we use data of the European Patent Office to investigate changes in the quantity and quality of scientists working for pharmaceutical companies that are targets of acquisitions. We estimate an increase of 10% in exit rate - the number of inventors are no longer observed in the dataset - and 15% in separation rate - the number of inventors moving to another research lab -, around the period of consolidation. Looking at the quality of scientists that exit our dataset, we find they are more senior, less productive and do not have a central role in network of collaborations: findings compatible with a positive selection of R&D personnel. However, this not true for inventors that move to other firms. These inventors have better external connections and their decision to leave is positively correlated with the departure of their close collaborators. Taking together, our findings indicate that the reduction in R&D expenditures and in patenting observed in previous studies using firm-level data is not entirely the outcome of a deliberate cost-minimization decision, but it is in part an unwanted by-product of the unexpected departure of some key employees, too. Our findings have important implications for merger control enforcement which are discussed in the Conclusions.