

# The 2019 Technology Transfer Society Annual Conference

## September 26-28, 2019

**Session 1.4 – Chair: Dan Breznitz**

**Location – Board Room, 315 Bloor Street W.**

**Title:** Counterfeits: An empirical analysis of economic performance and innovative activities of affected companies

**Authors:** Vincenzo Buttice, Federico Caviggioli, Chiara Franzoni, Giuseppe Scellato, Nikolaus Thumm

**Presenter:** Federico Caviggioli

**Abstract:**

Counterfeits are illegal products that are produced and commercialized in violation of a proprietary brand, copyright, patent or other Intellectual Property Rights (IPRs) (Qian, 2014). The latest, and most comprehensive estimate indicates that counterfeits amount to about 2.5% of worldwide and 5% in the European Union (OECD, 2009; OECD-EUIPO, 2015). Recent reports showed that counterfeiting is growing in trend and expanding beyond the traditionally-targeted sectors, like cigarettes, watches, and apparel, and increasingly targeting high-tech products, like memory sticks, solid state drives, sound apparatus, video games (OECD, 2017) and related products (BSA, 2016).

Economic theory has highlighted the potential damages that counterfeits can cause to the welfare (Grossman and Shapiro, 1988a; 1988b) and evidenced that strong IPRs are especially important for companies operating in highly innovative markets (Hu and Png, 2013; Brandstetter et al., 2011; Brandstetter, 2017). At the same time, economic theory has also highlighted that counterfeits and piracy may induce indirect and potentially positive externalities that derive from an increase in the brand circulation or user base of the products of targeted company (Qian, 2008; Qian, 2014), particularly in the presence of network externalities or bandwagon effects (Conner and Rumelt, 1991; Takeyama, 1994). In these cases, a positive externality may partly or totally counterbalance the negative effect of imitation, making the net impact of counterfeiting a question that should be ultimately investigated empirically.

Amid different predictions of economic theory, the empirical evidence concerning the implications of counterfeits at present is scant, limited in scope and breadth and inconclusive (Feinberg and Rousslang, 1990; Staake et al., 2009; Qian, 2008, 2012; Qian et al., 2015). Furthermore, due to the lack of micro-level data on counterfeits, the empirical analyses that exist have attempted to investigate the implications of counterfeits only at the aggregate industry or economy level, and not at the level of single companies. This paper aims at addressing this gap by investigating the implications of counterfeiting for the economic and innovation performance of companies at the firm level.

We focus on a group of highly innovative companies, i.e. the digital technology companies. We build a new database that integrates and combines information on counterfeiting from the OECD-EUIPO database (OECD, 2017), economic and financial data from Orbis-Bureau van Dijk and EIKON Datastream, and patent data from Clarivate. The data cover firm-year information about 260 digital-technology companies in the period 2009-2015. The database enables unprecedented empirical analyses on the counterfeiting and performance of companies affected by counterfeiting. We find that counterfeited activities were targeting

specifically the highly profitable companies and companies that have a high propensity to innovate (larger patent portfolios), prior to the observation of counterfeiting activities.

We assess empirically the correlation between infringement and various indicators of economic and innovation performance by adopting estimation methods based on difference-in-difference and propensity score matching. Results indicate lower growth rates of Operating Profits for digital technology companies targeted by counterfeiting with respect to control samples of digital-technology companies not affected by counterfeiting. In particular the econometric models provide robust evidence of a negative impact of counterfeiting on both EBITDA (Earnings before interest taxes depreciation and amortisation) and EBIT (Earnings before interest taxes). Concerning the innovative performance, the study finds that the companies affected by counterfeiting had larger patent portfolios compared to those not affected by counterfeiting prior to the observation of counterfeiting events and that this difference decreases over time. However, the relative decrease is not statistically significant, when we control for potential confounding factors. Hence the analysis did not find significant impact of counterfeiting on the patenting activities of companies. Furthermore, there is no observable effect on the investment in intangible assets between companies affected and not affected by counterfeiting.

**Title:** The role of patents under different institutional frameworks: A historical perspective

**Authors:** Patrick Llerena, Françoise Olivier-Utard, Véronique Schaeffer

**Presenter:** Véronique Schaeffer

**Abstract:**

The rise of the entrepreneurial university in the 2000s and the evolution of the legislative frameworks for intellectual property, aimed to encourage universities to patent their inventions and to promote the exploitation of scientific discoveries in economic activities (Dasgupta, David, 1994, Henderson et al, 1998, Fabrizio, 2007, Geuna, Rossi, 2011, Grimaldi et al, 2011). This evolution provoked much debates in the academic community about the threats that the entrepreneurial university model poses to the norms and value of open science. The detrimental effect of the use of patents on the dynamic of knowledge creation has been under interest (Dasgupta, David, 1994, Slaughter, Leslie, 1997, Heller, Eisenberg, 1998, Lundvall, 2002, Nelson, 2004). Historical perspectives show that strong links between academic and economic activities are not new phenomenon but are rooted in the activities of universities since their medieval origins (Geuna, 1998, Martin, 2012). Adopting an institutional approach, Sauermann and Stephan (2013) show through a sectorial comparison that the academic and commercial logic of university and industrial science are pure ideal types that does not reflect the reality of behaviors. We consider the question of the hybridity of logics and behaviors of academic researchers, and the influence of the institutional context through an historical approach of innovation and academic patenting.

We focus on the case of the University of Strasbourg which constitute a relevant case to study the involvement of researchers in innovation, and the influence of institutional change. This university which has medieval roots, has been French until 1872 and German from 1872 to 1918 It has adopted the Humboldtian model of university and inventions and patents were constituent of its identity. It becomes

French again, and after the WWII has evolved under a Colbertist approach. We consider the cases of leading scientists (Ferdinand Braun, Nobel Prize, Gustave Ribaud member of the Academy of Science, Charles Sadron), highly involved in academic research and innovative activities, from the end of 19<sup>th</sup> century to the early 21<sup>st</sup> century, We show the influence of the model of university and institutional frameworks on the role of patents.

**Title:** How important are patents in the decision to scale up and commercialize Canadian innovations?

**Authors:** Nancy Gallini, Aidan Hollis

**Presenter:** Nancy Gallini

**Abstract:**

Several studies, attempting to explain why Canada consistently underperforms in innovative output, have noted that Canadian researchers, while productive in early stages of innovation, are less successful at scaling up their operations. Building upon these studies, we attempt to understand more fundamentally the role played by the patent system in impacting incentives for innovators to advance along the innovation process.

While intellectual property (IP) – or property rights on intangible assets – are fundamental to a well-functioning innovation market, we find little evidence that strengthening patents in a small open economy as Canada would have much impact on scaling up innovation activity in Canada. Of greater importance to Canadian inventors is the ability to acquire patents and operate in global markets. Drawing from the economic literature, we argue that patent ownership is a key factor in inventors' ability to advance along the innovation process from discovery to commercialization. However, while patent ownership of Canadian small and medium enterprises (SMEs) can mitigate uncertainties of scale up, patents held by large firms can add to the costs of scale up when the patents are complementary inputs essential for product development. Furthermore, when SMEs anticipate competing with large, vertically integrated firms, they may find that selling their IP and other assets can be a more attractive option than scaling up.

We then turn to data on patent ownership by Canadian residents. USPTO patent data reveal that the majority of patents filed in the U.S. by research teams with at least one Canadian inventor are assigned on the date of issue to a foreign firm or subsidiary, and this pattern holds across several technology areas. For the data we examine in Artificial Intelligence, for example, Canada ranked in the top quarter in “inventiveness” among peer countries, but only in the middle of the pack in “ownership”. In preliminary findings using a sample of patents invented with Canadian input, patents were more likely to be assigned to a Canadian resident, the greater the proportion of Canadians on the research team, and for those patents originally assigned to Canadian residents, approximately one-quarter were reassigned to foreign firms within the next ten years, and therefore not advanced in Canada for commercial exploitation.

Lastly, we examine current and prospective policies in Canada aimed at promoting better management of Canada's IP assets, such as the new National IP Strategy and its initiatives toward patent collectives and patent trolls. We also examine innovation policies that impact IP indirectly, namely tax credit and direct research funding programs. We observe direct support to be more closely associated with high patenting across peer countries than indirect support through tax credits. We recommend that policies be aimed at reducing cost inefficiencies of accessing global markets – such as high search costs of identifying prior art

and overlapping patents – that could incentivize scale up while increasing the return on research investment, in contrast to policies that tax IP sales or inefficiently retain IP in Canada. Toward informing these policies, we conclude with several research questions for further examination.