GASTÓN LLANES

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CONTACT INFORMATION

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CURRENT AFFILIATION

Post-doctoral Fellow	Harvard Business School	2008-

EDUCATION

PhD in Economics	Universidad Carlos III de Madrid, Spain	2003-2008
Visiting PhD Student	Washington University in St. Louis	2007
MSc in Economics	Universidad Carlos III de Madrid, Spain	2006
BSc in Economics	National University of Córdoba, Argentina	1997-2003

RESEARCH INTERESTS

Primary Fields	Applied Microeconomics, Industrial Organization.
Secondary Fields	Economics of Innovation, Intellectual Property Rights, Open Source.

RESEARCH PAPERS

- *Mixed Source*, with Ramón Casadesus-Masanell, *Review and Resubmit, Management Science*, September 2009.
- *Patent Policy, Patent Pools, and the Accumulation of Claims in Sequential Innovation,* with Stefano Trento, *Review and Resubmit, Economic Theory*, July 2009.
- *Industry Equilibrium with Open Source and Proprietary Firms,* with Ramiro de Elejalde, June 2009.
- *Anticommons and Optimal Patent Policy in a Model of Sequential Innovation,* with Stefano Trento, June 2009.

WORK IN PROGRESS

- *Innovation and Collusion in Imperfectly Competitive Factor Markets,* with Stefano Trento.
- *A Dynamic Model of Compatible and Incompatible Networks.*
- *Innovation, Entrepreneurship and Venture Capital in Open Source.*

REFERENCES

- Prof. Michele Boldrin (advisor)
  Washington University in St. Louis,
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- Prof. Josh Lerner
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  Universidad Carlos III de Madrid,
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TEACHING EXPERIENCE

2004-2007	TA. Macroeconomics II (English course), Universidad Carlos III de Madrid.
2004-2006	TA. Macroeconomics I, Universidad Carlos III de Madrid.
2005	TA. Macro-econometrics, Universidad Carlos III de Madrid.
2003	TA. Competition Policy, Universidad Carlos III de Madrid.
2001-2003	TA. Introduction to Economics, National University of Córdoba.
2000-2003	TA. Intermediate Macroeconomics, National University of Córdoba.

WORK EXPERIENCE

2002-2003	Researcher	Bureau of Statistics and Census of Córdoba, Argentina. Regional Accounts Department (regional GDP estimation).
2002-2003	Research Assistant	Institute of Economics and Finance. National University of Córdoba.

RESEARCH GRANTS, HONORS AND AWARDS

2008	Doctoral Scholarship	Universidad Carlos III de Madrid.
2004-2007	FPU Scholarship	Ministry of Education of Spain.
2003	Doctoral Scholarship	Universidad Carlos III de Madrid.
2002	First place.	Student Council Academic Competition. Faculty of Economics. National University of Córdoba.
1996	Exchange Student	Rotary International Youth Exchange Program. One-year exchange at the Solihull Sixth Form College (Solihull, Westmidlands, UK).

PERSONAL INFORMATION

Citizenship: Argentinean.	Age: 30.
Marital Status: Married.	Date of Birth: 11-Oct-1978

REFEREEING

Econometrica, Management Science.

OTHER SKILLS

Languages: English (fluent), Spanish (native).
Computer skills: LaTeX, Mathematica, Fortran, Matlab, E-views.

RESEARCH PAPERS

Mixed Source.

We study competitive interaction between profit-maximizing firms that sell software and complementary goods or services. In addition to tactical price competition, we allow firms to compete through business model reconfigurations. We consider three business models: the proprietary model (where all software modules offered by the firm are proprietary), the open source model (where all modules are open source), and the mixed source model (where a few modules are open). When a firm opens one of its modules, users can access and improve the source code. At the same time, however, opening a module sets up an open source (free) competitor. This hampers the firm's ability to capture value. We analyze three competitive situations: monopoly, commercial firm vs. non-profit open source project, and duopoly. We show that: (i) firms may become "more closed" in response to competition from an outside open source project; (ii) firms are more likely to open substitute, rather than complementary, modules to existing open source projects; (iii) when the products of two competing firms are similar in quality, firms differentiate through choosing different business models; and (iv) low-quality firms are generally more prone to opening some of their technologies than firms with high-quality products.

Industry Equilibrium with Open Source and Proprietary Firms.

We present a model of industry equilibrium to study the coexistence of Open Source (OS) and Proprietary (P) firms. Two novel aspects of the model are as follows: (1) participation in OS arises as the optimal decision of profit-maximizing firms, and (2) OS and P firms may (or may not) coexist in equilibrium. Firms decide their type and investment in R&D, and sell packages composed of a primary good (like software) and a complementary private good. The only difference between both kinds of firms is that OS share their technological advances on the primary good, while P keep their innovations private. The main contribution of the paper is to determine conditions under which OS and P coexist in equilibrium. Interestingly, this equilibrium is characterized by an asymmetric market structure, with a few large P firms and many small OS firms.

Anticommons and Optimal Patent Policy in a Model of Sequential Innovation.

We present a model of sequential innovation in which an innovator uses several research inputs to invent a new good. These inputs, in turn, must be invented before they can be used by the final innovator. As a consequence, the degree of patent protection affects the revenues and cost of the innovator, but also determines the incentives to invent the research inputs in the first place. We study the effects of increases in the number of required inputs on innovation activity and optimal patent policy. We find that the probability of introducing the final innovation decreases (increases) as the number of inputs increases when inputs are complements (substitutes). We also find that the optimal strength of patents on research inputs is increasing in the degree of substitution between the inputs, but decreasing in the number of inputs for any degree of substitution.

Patent Policy, Patent Pools, and the Accumulation of Claims in Sequential Innovation.

We present a dynamic model where the accumulation of patents generates an increasing number of claims on sequential innovation. We study the equilibrium innovation activity under three regimes: patents, no-patents and patent pools. Patent pools increase the probability of innovation with respect to patents, but we also find that: (1) their outcome can be replicated by a licensing scheme in which innovators sell complete patent rights, and (2) they are dynamically unstable. We find that none of the above regimes can reach the first or second best. Finally, we consider patents of finite duration and determine the optimal patent length.

WORK IN PROGRESS

Innovation and Collusion in Imperfectly Competitive Factor Markets.

We present a model of innovation in inputs markets. Innovators decide whether to invent a new input or not, and the price of their input in case they decide to invent it. When inputs are priced non-cooperatively, we find there is an inverted U relationship between the number of inputs and the degree of substitution. We also find that a decrease in the cost of invention of the inputs may decrease welfare if the inputs are highly complementary. Finally, we find that collusion always improves welfare when the inputs are complements, but may also improve welfare when they are substitutes. Our analysis has important implications for the literatures of endogenous growth and patent pools.

A Dynamic Model of Compatible and Incompatible Networks.

I present a dynamic model of competition between compatible and incompatible networks. There are n firms competing in quantities and maximizing the discounted sum of current and future profits. Demand increases with the accumulated size of the network. Time is continuous, which allows the use of differential game theory, and the time horizon is infinite. Open-loop (pre-commitment) and Markov-perfect (feedback) equilibria are analyzed. Preliminary findings for the compatible network case are: (1) output is larger in the open-loop equilibrium (i.e. when firms are able to pre-commit to an output path for the entire game), than in the Markov-perfect equilibrium, (2) coordination of output decisions by firms (i.e. formation of a monopoly) decreases output with respect to the compatible network competition case.

Innovation, Entrepreneurship and Venture Capital in Open Source.

In this paper, I propose an alternative explanation for the creation of Open Source projects. With Open Source, individual software developers collaborate in the development of new software programs, and then compete in the final goods market. However, there are large incentives for a unique firm to develop the new product alone. This may be due to returns to scale in investment, higher coordination, or simply to prevent competition in the final goods market. Then, why do not developers merge in a single firm and share the benefits of a higher concentration? I intend to show that Open Source may substitute venture capital financing as a way to share the risks of a risky investment. The traditional way to share the risks of an uncertain project is to collaborate in the financing of a unique firm performing the investment. An agency problem naturally arises, with multiple principals hiring a single agent. The innovation may fail to be developed in the presence of high monitoring costs. Alternatively, if the technology is modular, the project can be partitioned in smaller sub-projects, which allows each investor to become an entrepreneur, perform only a part of the total investment and then share the proceeds of the innovation with the rest. The model can shed light on the history of Open Source and explain why competitors of a large incumbent (like Microsoft) may decide to develop their innovations under Open Source.