Firms are central to the functioning of the economy. Ever since Smith (1838) and Coase (1937), economists have gone a long way trying to understand why firms exist, how they are organized, and how they interact through the market.

This thesis contributes to the study of how regulation and market incentives can affect firm decisions and their organization.

Laws and institutions play a crucial role in shaping competition, international trade and innovation, three pillars of firm behavior.

Competition law is among the oldest and most important regulation of business conduct of modern economies. It contributes to market efficiency by protecting competitors and consumers from abuses of market power and by sanctioning mergers and acquisitions. Economists have long established that healthy competition between firms is a necessary condition for efficient markets. Understanding how firms can use strategic behavior to escape the effects of competition and exploit market power has always been one of the main fields in the Industrial Organization literature (Stigler et al., 1983; Tirole, 1988; Motta, 2004). The first chapter of the thesis is a contribution to the study of collusive behavior and cartels. Collusion occurs when firms coordinate with the objective to charge a supra-competitive price and earn a rent at the expense of efficiency and consumers. Studying collusion and cartels means essentially identifying conditions that make collusive behavior feasible, possibly in order to help design policies aimed at fighting and preventing this kind of firm behavior. The first chapter focuses on enforcement conditions in a multi-market economy, with the objective to understand how antitrust cooperation agreements between different countries can change the geography of collusive agreements.

International trade laws regulate the trade of goods and services between different countries, by, among other things, setting tariffs and duties or by protecting consumers against the use of unfair practices like dumping. Since the beginning of 1990s, economists have been focusing on firms as the economic actors for import and export decisions. Thanks also to the seminal work of Melitz (2003), scholars in the field of international trade have begun using extensively firm level data to examine how firms export, import
or invest in foreign countries. This has allowed economists to get a better understanding of the recent wave of globalization, including the global fragmentation of production (Johnson and Noguera, 2012), or to estimate the impact of trade agreements (Caliendo and Parro, 2015) between different countries. The second chapter of this thesis, using new and detailed legal data, presents new important evidence on the impact of regional trade agreements in the context of the global fragmentation of production.

Intellectual property rights protect the return on R&D activities, for instance through patents and copyrights, with the intent of promoting investment in innovation and new technologies. One of the main problems that innovators face is that of imitation and spillovers that can reduce the returns from innovation and therefore deter investments. While the consequences of spillovers have extensively been analyzed in the economic literature, little is known about how they occur and whether the organization of the firm plays a role. Firm organization usually refers to the literature examining the boundaries and the delegation of power within the organization. More recently, scholars have extended their investigation to new aspects that were previously neglected; the I.T. revolution showed the importance of communication within the organization, while recent evidence suggests that managerial practices can contribute to explain a large fraction of the heterogeneity between firms, also within industries. The third and final chapter of the thesis investigates the missing link in the literature between managerial practices and spillovers, by arguing the existence of a trade-off in the adoption of certain productivity-increasing managerial practices.

My thesis is the collection of three independent research papers. While the nature of the problems treated in each chapter and the novelty of contribution is specific to each different topic, together they provide three complementary approaches to the analysis of the law and economics of firms. In the remainder of this introduction I provide a more detailed summary of the questions tackled in each of the essays, the methodology used in the analysis and their contribution.

**Heterogeneous Cartels and Antitrust Cooperation**

The first chapter focuses on the strategic interactions between firms competing in the same market across different countries. I examine the problem of competition law enforcement when cartels have an international dimension, international antitrust cooperation agreements and their impact on firms’ behavior and consumer welfare.

International antitrust cooperation is at the center of an important policy debate (OECD, 2013). These agreements provide national antitrust authorities a legal framework that allows the exchange of confidential documents and the coordination of investigative activities (e.g. dawn raids). Without such legal provisions, an antitrust authority might fail to obtain the evidence that is necessary to build a successful case and stop the cartel from...
operating. It is important to note that the importance of these antitrust agreements is increasing in the number of foreign firms participating in the cartel, as this increases the probability that a crucial piece of evidence is located beyond the reach of a national authority.

In this work, I develop a theoretical model to explore the link between antitrust cooperation agreements and the formation of cartels with different scope and membership, and I examine the implications for consumer welfare.

This work contributes to a growing literature on international antitrust enforcement (Harrington, 1989; Miller, 2009; Bigoni et al., 2012; Choi and Gerlach, 2012a,b) by considering geographic cartel heterogeneity, an element that is overlooked also in the literature of endogeneous cartel formation (d’Aspremont et al., 1983; Bos and Harrington, 2010, 2015).

The model features a simple two-country setting with heterogeneous cartels, divided in three types: domestic, global, export. Firms participating in a domestic cartel collude in the country where they are located; export cartels members, vice versa, only operate in the foreign country; finally, global cartels operate across countries and with international membership.

The type of a cartel affects the expected collusive profits of a cartel member through two channels: directly, as more inclusive collusive agreements improve the market power of the cartel and increase profits, and indirectly, through the impact of antitrust.

The probability of successful enforcement depends on the type of cartel and the presence of an antitrust cooperation agreement. In the absence of an agreement, firms may choose to collude only in the export market, because of the lower prosecution risk. When cooperation is introduced, the probability of successful enforcement does not depend on the location of colluding firms, but only on the domestic effectiveness of the antitrust authorities. At the beginning of the game, firms observe the antitrust regime and form the cartel that delivers the highest expected payoff. Stability of the collusive agreement is satisfied by the use of Nash-reversion threat, a standard technique in the literature on infinitely repeated games (Stigler, 1964; Abreu, 1988; Porter, 1983; Rotemberg and Saloner, 1986).

I show that antitrust cooperation has two effects: on the one hand, it improves the deterrence and enforcement of international cartels, which has a positive effect on consumers. On the other hand, it can induce firms to switch between different cartel types, which has a potentially harmful impact on consumers. This occurs when antitrust cooperation induces firms to switch from export to a global cartels, leading to an increase in the collusive price. The analysis suggests that, in order to avoid these negative repercussions, international antitrust cooperation should be associated to policies aimed at increasing the effectiveness of domestic antitrust institutions.

From Final Goods to Inputs: the Protectionist Effect of Preferential Rules of Origin
The second chapter focuses on international trade laws and the decision of firms to source input goods. Recent decades have witnessed two major trends in international trade. First, technological progress and falling trade barriers have led to the emergence of global value chains and a surge in trade in intermediate goods. Second, there has been a proliferation of free trade agreements (FTAs). This chapter explores the possibility that FTAs could hinder international trade flows by introducing non-tariff barriers for manufacturing firms.

FTAs use rules of origin (RoO) to distinguish goods originating from member countries from those originating from third countries. In principle, these rules are meant to prevent trade deflection, by ensuring that goods are truly originating from countries that are members of the FTAs and not simply assembled from components originating from third countries. In practice, RoO clearly constrain sourcing decisions. A final good producer faced with RoO restrictions has two options. It can comply with the rules, in which case it can export to the FTA partners at preferential tariff rates, but must source certain inputs within the FTA. Or it can decide not to comply with the rules, in which case it can source its inputs from any supplier around the world, but faces MFN tariffs when exporting to the FTA partners.

Theoretical studies have long pointed out that RoO can give rise to trade diversion in intermediaries (e.g. Grossman, 1981; Falvey and Reed, 1998). On the empirical front, however, direct evidence of this effect has been lacking, due to the legal complexity of the rules.

In this joint work with Paola Conconi, Manuel García-Santana and Laura Puccio, we exploit the legal features of the North-America Free Trade Agreement (NAFTA) to construct a new dataset of RoO, which allows us to track input-output linkages between goods. In particular, we can trace all final goods that impose sourcing restrictions on a particular input.

Using a difference-in-difference approach, which allows us to account for the role of time-invariant unobservable product characteristics, we find that NAFTA RoO on final goods significantly reduced imports of intermediate goods by Mexican producers from third countries. As expected, the magnitude of this effect depends on whether the sourcing restrictions were strict or flexible (i.e. whether change in tariff classification rules were combined with alternative value added rules) and on the extent to which Mexican producers had incentives to comply with them (i.e. on the size of the preference margin and the importance of NAFTA export markets). On average, strict RoO decreased imports of intermediaries by around 30 percentage points. The results are robust to focusing on different sets of rules, using alternative methodologies to construct the treatment variables, using different samples of goods and countries, and instrumenting NAFTA RoO with those contained in the CUSFTA agreement.

Our results show that the extent of trade diversion generated by preferential trade agreements can be much larger than what found in studies.
that do not account for the sourcing restrictions embedded in RoO. Our analysis suggests that free trade areas may violate multilateral trade rules, by substantially increasing the level of protection faced by non-members.

**R&D Management and Spillovers**

In the third and final chapter of my thesis I investigate the relation between managerial practices and spillovers.

The objective of this paper, joint with Marco Ceccagnoli and Nicolas van Zeebroeck, is to examine the cost of adopting managerial practices that can improve the innovative performance of firms. We focus on knowledge integration (KI), a set of practices whose aim is to integrate different bodies of knowledge within the firm across the various business units, in order to prevent lack of coordination and mistakes that would otherwise increase the costs and slow the rate of innovation. We argue that KI, while increasing innovative performance, also increases the risk that valuable knowledge spills over to competitors, thereby decreasing the value of R&D investments.

To do so, we analyze data on R&D research practices conducted by corporate laboratories that are part of manufacturing firms in the U.S., collected by the Carnegie-Mellon University (CMU) survey in 1994. The survey asks lab managers detailed questions about KI practices and knowledge flows, both between the R&D and the other business units of the firm, and between the firm and its competitors. The effect of competition in this paper is identified not only in terms of the number of competitors, but also by controlling for the importance of knowledge spillovers and the channels through which these occurs.

Knowledge spillovers are shown to significantly reduce the probability of a firm to adopt KI practices, even after controlling for a large set of firm- and industry-level characteristics, including the effectiveness of patents and secrecy. This work complements previous research suggesting that competition plays a positive role in stimulating the adoption of managerial practices (Bloom et al., 2015). By bringing R&D into the picture, this paper shows that managerial practices aimed at improving innovation performance can generate a trade-off: while increasing R&D productivity, they also increase the probability that important information can spill to competitors. The risk of decreasing the value of its R&D investment represent therefore a significant costs that can hinder the adoption of beneficial management practices.

**References**


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