



Università degli Studi di Cagliari

DOTTORATO DI RICERCA

Economia

Ciclo XXVIII

DISCUSSION ON RELATIONAL NETWORKS AND KNOWLEDGE FLOWS FROM A CORPORATE TO A REGIONAL PERSPECTIVE

Settore scientifico disciplinare di afferenza

Economia Applicata SECS-P/06

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Esame finale anno accademico 2015 – 2016
Tesi discussa nella sessione d'esame Settembre 2017

Abstract

On the channels through which is encouraged the spread of knowledge coming to firms and regions from outside many research and studies have been written. The debate has considered many questions and this thesis focuses on two different paths that have in common some forms of inter-firm relationships, that are mergers and acquisitions (M&A), Joint Ventures (JV) and Strategic alliances (SA).

The first study investigate the effects of international mergers and acquisitions (M&As) on the long run performance of the acquirer firm. The paper uses a dataset that cross information from two different databases on a large sample of Italian companies in order to obtain performance data of Italian firms involved in an international M&A as acquirer. The main data for our analysis are from Thomson SDC Platinum, and comprise acquisitions of international firms by Italian companies during the years 2000-2012, merged firm-level performance data from BvD Amadeus. Considering the fact that companies that expand by M&As are usually bigger than others, with the possible occurrence of selection bias caused by the absence of a valid counterfactual, we used the Propensity score matching methodology (PSM) to estimates whether there is an effect in performance of enter into an agreement. It is assumed the result is positive, even if with differences. Such a study should give deep insights into the workings of deals between companies in the Italian case, taking into account previous analysis and improve the literature with a view that include data on both cross-border and intra-national M&As.

The second study investigates the factors that determine patenting performance, including relational activities. We provide an original framework within a knowledge production function model. We focus on the role of relational networks, proxied with mergers and acquisitions, joint ventures and strategic alliances, in influencing the behaviour of local innovation systems, considering Italian provinces data (NUTS3) from 2000 to 2012. We use a variable that counts the number of joint memberships of provinces within the considered concluded agreements.

Considering the knowledge production function (KPF) approach presented by Griliches in 1979 we used an extension of it, to model the process by which firms transform knowledge into innovation. We reformulate the basic formulation of the KPF: we have the purpose to analyze the effect on province innovation, of various kind of deals (Mergers and Acquisitions, Social alliances, Joint Ventures) signed between firms, creating those formal networks that allow knowledge spillovers. We expect spillovers to occur over longer distances when a province is involved in deals with firms located in other provinces or abroad. Even though exist a broad collection of studies on this subject, we can't say that the argument about the localization of knowledge spillovers reached an in-depth result, and this study should give more insights considering this type of formal networks as input which contributes generating the innovative output.

“La presente tesi è stata prodotta durante la frequenza del corso di dottorato in Economia dell’Università degli Studi di Cagliari, a.a. 2015/2016 - XXVIII ciclo, con il supporto di una borsa di studio finanziata con le risorse del P.O.R. SARDEGNA F.S.E. 2007-2013 - Obiettivo competitività regionale e occupazione, Asse IV Capitale umano, Linea di Attività I.3.1 “Finanziamento di corsi di dottorato finalizzati alla formazione di capitale umano altamente specializzato, in particolare per i settori dell’ICT, delle nanotecnologie e delle biotecnologie, dell’energia e dello sviluppo sostenibile, dell’agroalimentare e dei materiali tradizionali”.

”Benedetta De Magistris gratefully acknowledges Sardinia Regional Government for the financial support of her PhD scholarship (P.O.R. Sardegna F.S.E. Operational Programme of the Autonomous Region of Sardinia, European Social Fund 2007-2013 - **Axis IV Human Resources, Objective I.3, Line of Activity I.3.1.**)”.



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Chapter I –Survey

Innovation, R&D and knowledge spillovers as key factors of firm's growth

On the reasons that may lead companies to growth, research and studies are almost innumerable. Economic literature widely recognize innovation and R&D as key factors, even if empirical studies had shown difficulties in identifying a strong link between innovation and sales growth, and the results have often been modest and disappointing (Coad and Rao 2008). The principal problem is about the "conversion" of an economically valuable knowledge into economic performance, analyzing both innovative input (R&D expenses) and output (patents) in order to understand the importance of knowledge stems from internal sources (Coad and Rao 2008).

Another aspect certainly worth to analyze is about the exchange of knowledge, namely innovation acquired from the outside, or knowledge spillovers. Duguet (2006) describes how those two types of knowledge are linked together, stating that radical innovations depend on spillovers because of the use of both informal and formal R&D together with external sources of knowledge, as well as the knowledge codified in patents and licenses.

A firm's capacity of innovating rely on the acquisition of new (technological and market) knowledge from outside the firm, its recombination with internally existing knowledge, and the exploitation of the available knowledge stock (Moos et al. 2013).

Su, Ahlstrom, Li and Cheng (2013), using Chinese firms' data, analysed both knowledge creation capability and how and in what way do knowledge creation capability and absorptive capacity impact product innovation, finding that besides the positive effect that those have considered one at a time, they have a synergistic effect.

Scholars recognize various channels through which is encouraged the spread of knowledge coming to firms from outside: through interactions with other firms (Fons-Rosen, 2010; Borin, Mancini, 2013; among others) or because of institutional ownership (Aghion, Van Reenen and Zingales, 2009), thanks to the interaction with customers (Joshi and Sharma, 2004) and coming with tourist that arrive in the country's firm (Marrocu and Paci 2010), these last two channels allow enterprises to absorb information about preferences and needs and turning those into intangible assets.

Aghion, Van Reenen and Zingales (2009), exploring the mechanism through which institutional ownership in publicly traded companies is associated with more innovation, found that this is generated by the fact that even if managers may wanted to live a quiet life, however their institutional investors (both more incentivised by their larger shares and ablest or more skilled, thanks to the ownership of stock in many firms, so they benefit from economies of scope in monitoring) force them to innovate. The authors compare investors to high competition, stating that the first perform intensive monitoring in absence of the second, in order to demonstrate an alternative way to discipline.

The first channel through which is encouraged the propagation of knowledge from the environment around the company, is the one coming between firms, consider that when companies have access to each other's information and tools, they are supplied with the opportunity to realize all the potential benefits of an association of skills and activities in a manner not feasible in all forms of partnership and face a renewal we cannot note in the internal development of a single firm. In this way, enterprises can take advantage of R&D and innovation achieved by other firms. Economic literature has been extremely interested in study the reasons that drive enterprises to establish economic relationships with others, but the possible effect on performance that this connection may have, has been less analyzed (Borin and Mancini, 2013).

Knowledge spillovers generated thanks to proximity: geographical, cultural, technological, institutional, organizational

The spread of knowledge in terms of propagation of good practices, management activities, sharing of technologies and so on, occurs when driven by proximity, which can be considered in geographical, but also cultural, technological, institutional or organizational sense (Usai et al., 2013).

In their article Morosini, Shane and Singh (1998), confronting with prior studies, provided empirical support to the idea that cultural distance enhances cross border acquisition' performance over time by providing a way to lead the target's and/or the acquirer's diverse set of routines and repertoires embedded in national culture. They analyzed the cross-border acquisition activity in Italy between 1987 and 1992 finding a positive association between national cultural distance and cross-border acquisition performance: the most distant were, on average, routines and repertoire of the target's respect to the acquirer's, the better they perform.

Chakrabarti et al. (2009) investigated, stressing in particular the role of cultural distance, on factors affecting performance of cross-border M&As. Culture is examined using the Hofstede measure of cultural dimension, but also with other measure relative to language, religion and legal origin of the firm's countries involved. The results of their study show that best performance is associated with the cooperation of firms coming from two countries culturally more disparate: cultural disparity between two merging firms emerge as an economically significant beneficial factor.

As Guiso, Sapienza and Zingales (2007) stated, culture can be a double-edged sword, which limits agreements from the start: they prove that trust, which is correlate with cultural heritage, have economically relevant effects on trade, portfolio investment and FDI among European countries. They find that two countries trade less when they do not trust each other, they don't do many portfolio or direct investment.

The debate about the relevance of cultural difference between firms and its effect on performance it is not been conclusive: some studies have argued that this effect should be negative and others that it should be positive. Slangen (2006) argues that this depends on the level of post-acquisition integration: national cultural differences damage cross-border acquisitions performance when the acquirer is not granted with a degree of autonomy. Firm performance is better when post-acquisition integration is limited and the acquired enterprise can take advantage only of those practices it considers more useful and worthy of interest.

Dikoba and Sahib (2013) suggested that the effect of cultural distance on cross-border acquisition performance depends on the level of acquisition experience of the acquirer. The more expert is the acquirer about international relations, he will be aware of cross-border acquisition pitfalls and more skilled at resolving acquisition related conflicts, benefiting from cultural differences. On the contrary, inexperienced acquirers are unlikely to solve conflict in the best way.

Knowledge spillovers between firms: trade, FDI, M&A, JV, SA

Analyzing knowledge spillovers generated between firms, in literature we notice that those can be promoted in different ways: it is possible the transmission of knowledge among firms at the local level, though the trade of goods, by setting up R&D labs abroad to "listen in" on new ideas and use these to improve productivity (the so called "technology sourcing", described by Griffith, Harrison and Van Reenen (2004) or also with various form of international movement of firms such as Foreign Direct Investments (Fons-Rosen, 2010; Borin and Mancini, 2013) Mergers & Acquisitions (Chakrabarti et al., 2009; Martynova and Renneboog, 2008; Martynova and Renneboog, 2006), Greenfield direct investment (Stepanok, 2013), Joint Ventures and Strategic alliances.

Christian Fons-Rosen (2010) analyzed knowledge flows between firms generated through FDI using patent citations as a proxy: he studied whether inventors located in CEE cite patents developed by FDI foreign firms more often after these companies have established themselves in CEE on the belief that when these are placed in CEE their knowledge and skills would flow easily. He used data on Central and Eastern Europe since 1990, using firm-level information from BvD Amadeus and construing a large data set of foreign firms in CEE and then a smaller data set on foreign bidders of privatization cases resolved by a public tender during the 1990s. The paper estimates a difference-in-difference effect of FDI on citations received, finding

an increase in citations for winning bidders, and this result is particularly relevant because the theoretical debate couldn't find empirical confirms on positive effect of FDI activity on the productivity of local firms. We found interested that FDI firms, in order to diffuse knowledge and skills, have to spend an amount of time in the host country. Moreover, seems that FDI firms influence with more effect the host country when reallocating inventors from already established R&D labs in their home country to newly developed ones in CEE: they can play the role of managers, spreading their knowledge in those new labs.

Borin and Mancini (2013) wanted to understand in which way investments in creation or acquisition in foreign firms (FDI) started by Italian companies influence their performance (TFP). A particular aspect they stressed is about the fact that firms investing outside the country shown a competitive advantage before becoming multinational. To overcome the selection bias that could arise from the auto selection of firms, they estimate FDI ex-post effect using the propensity score matching methodology.

Analyzing the causal link between the deal and firm's performance

Mergers & Acquisitions (M&As) activities in particular are a growing important feature of the enterprises world, due to globalization and technological progress (Di Guardo and Paci, 2013). M&As provide the opportunity to realize all the potential benefits of a combination of skills and activities in a manner not permitted by other forms of partnerships, and as a result of the development of this type of deals, actually the corporate world faces a process of renewal. M&As are being used to achieve different aims: enter in new countries or markets, take advantage of economies of scale, reduce transport costs, gain market share so quickly that the mere internal development could not allow, reduce business risk.

It is also true, nevertheless, that in respect of these advantages are offset by risks, too, including in particular the cost and time required to develop the acquisitive process and the subsequent integration.

Managers, scholars and policy-maker discuss about M&As and their impact on economy, but still there is no evidence about what determines the success or failure of an acquisition and the existing literature on the post-merger performance of acquiring firms is divided (Agrawal, Jaffe and Mandelker, 1992). Considering that previous empirical research on M&As did not find convincing results on the identification of variables that have an impact on acquiring firm performance, scholars should change both M&As theory and research methods (King, Dalton, Daily and Covin, 2004).

A particular condition emphasized by academics is about the learning process: a frequent occurrence in M&As market is about learning by observing predecessor's actions in similar situations.

Francis, Hasan, Sun, Waisman (2013) check whether observing predecessor's actions during mergers and acquisitions would help firms make better choices when deciding during an agreement. On the assumption that information spillovers from the acquisition activity of other companies can decrease bargaining and transaction costs coming from information asymmetry, they decided to observe developing countries because of the limited experience in deals in their cases allows to better stress the importance of learning from predecessors. They found a positive effect of predecessor's acquisition activity on the performance of the acquirer analyzing US acquirers. The most numerous the news, about the outcome of the predecessor's acquisition, the better the performance of the acquirer.

Despite of the term, knowledge does not just "spill over" from a firm to another, as stressed by Uhlaner et al. (2012), and managers conduct a fundamental role in convert a company's knowledge to commercial opportunity, new products and process applications.

Like Chakrabarti et al. (2009), Francis, Hasan, Sun, Waisman (2013) confirm the importance that the target firm is located in a culturally distant country, but also the significance that predecessors consist of a firm in the same country and in the same industry.

Delong and Deyoung (2007) in particular analyzed the bank sector, for its "information spillover" and "learning by observing" between banks and investors pricing banks. Stating that it is reasonable to expect that banks learn how to better plan and execute mergers by observing previous bank mergers, and it is similarly reasonable to expect that investors learn how to better value bank mergers as they observe and evaluate more of them, they stressed the fact that reasonably, the frequency and magnitude of

informational shocks caused by previous mergers tends to decrease as a result of the stabilization of the informational environment of bank mergers.

Studying the same sector, Zollo and Leshchinskii (2000) described two explanations for the variation in post-acquisition performance: the decision making process (which defines the approach that will be taken during the post-acquisition phase) and the reached capability to integrate after the deal. They found that if the acquirer use the proper integration approach, investing time and striving to study the strengths and weaknesses of previous agreements and uses that information to improve its management of the integration process, then the post-acquisition performance would be above the others that didn't invest with the same effort.

Agreement such as M&As can be seen as a channel of knowledge exchanges among firms involved, during all three phases of the deal: pre-announcement, announcement to completion or withdrawal and post-merger integration. Scholars analyzed all three moments, with different purpose, but the common thread seems to be related to learning, the approach that is used taking contacts, the differences between the companies.

Very and Schweier (2001) studied the acquisition process, wondering why most deals do not create value. Through the use of top managers interviews they investigated process problems and solutions implemented by acquirers when acquiring at home and abroad. The results of their study reveal the importance of the acquirer's experience in a particular target country.

Aguilera, Dencker and Escandell (2007) analyzed a little exanimate stage in M&As process, which is the moment between the announcement and the withdrawal, because not all "marriages are made in heaven", and some stops before the sign. In their work, studying world's largest M&As in 1990's, they experienced that uncertainty has a negative effect on M&As integration success, both in the target firm and in the target-acquirer dyad. They find that strategic capabilities of the acquirer, combined with shared incentives in the target-acquirer dyad, increase completion rates.

Di Guardo and Paci (2013) on the contrary, did not stop at the stage preceding the signature, but have observed the effect subsequent to it: they used M&As transactions as a proxy for the exchange of knowledge flows across the regions where enterprises involved are located. They analyzed in particular deals occurred between firms located in European Union (EU) and European Neighbouring Countries (ENC). M&As data, considering years 2000-2011 provide interesting evidence on the overall market-level impact of M&As on ENC and thus on the knowledge links that have been generated.

They stressed the way the exchange of knowledge take place, considering not only new technologies and competencies, but also the role of managers (their commitment and reliability before the withdrawal), human resources (how they cooperate, the integration of tasks), organizational aspects (how different cultures work together), capabilities and resources (transfers and shares).

How to measure firm performance after a deal

Zollo and Meier (2008) deeply analyzed the dependent variables used in most of the empirical studies focusing on the M&As process. Explaining the importance of studying the performance of corporate acquisitions, underlined how there is little convergence both across as well as within the disciplines (strategic management, corporate finance and organizational behaviour) on how the concept of acquisition performance should be measured in empirical studies. They discern several dimensions of that analysis, in terms of:

- Subjective or objective measurement (that means qualitative assessments VS financial or accounting figures);
- Short-term or long-term time horizon (few days VS up to 5 years after the closing of the deal);
- organizational level or process or transaction level examinations (improvement of firm performance or competitive position VS quality of execution of the post acquisition plans, magnitude of premium paid, etc).

About accounting returns as performance criteria we notate those could be more reliable, in fact administrative data such as tax data may be considered desirable because, for example, firms could be made subject to audits with penalties for inaccurate filing (Fabling Grimes Stevens, 2008), moreover, the

strategic aim of a business is to earn a satisfactory return on capital (McGee, Thomas and Wilson, 2005), and any benefit arising from takeovers will finally reflected in the firm's accounting statements (Tuch and O'Sullivan, 2007). Definitely synergies obtained from an acquisition are best reflected in accounting measures such as ROA (Hitt et al., 1998).

Researches differed on definition of operating performance, ratios chosen, benchmarks constructed, time frame and methodology design when they using accounting based method (Wang and Moini, 2012). In general we can notate that the basic methodology in accounting-based studies is to compare post-acquisition returns to the weighted average of the pre-bid returns of each of the target and acquiring firm (Sudarsanam, 2003).

Wang and Moini (2012) wondering how the performance of M&As is measured, whether using different measures or samples affect the results and what are the evidences from fieldwork, analysed various performance measures advantages, disadvantages and their empirical evidence. About accounting-based measures of performance they underlined the need for a long-term perspective of acquisition performance like long-term event study but embody ex-post, actual, realized returns and which consists of a comparison of accounting measures prior and subsequent to a takeover.

Listing literature's most cited studies, they stated accounting measures have a wide meaning, such as profitability, employing earning-based measures and cash flow performance measures (Healy et al., 1992), productivity (Bertrand and Zitouna, 2008), innovation indicators (Bertrand, 2009), growth rate of sales, or assets (Gugler et al., 2003).

A broad range of accounting ratios in M&As performance assessment can be found in Martynova and Renneboog' (2008) research. Return on assets (ROA) is widely used in the M&As literature (Bertrand and Betschinger, 2011). Meeks (1981) compared profit/sales ratio, return on equity (ROE) and ROA and concluded that ROA is the most appropriate ratio for measuring M&As performance. However, Barber and Lyon (1996) stated operating cash flows is optimal in measuring the performance of firms after significant events, such as takeovers, as earnings can be easily manipulated. Studies then vary in term of definitions of operating performance, deflator choice (e.g., market value of assets or equity, book value of assets or sales), performance benchmarks, and methodology. And the empirical results are sensitive to these aspects.

Talking about advantages to adoperate accounting-based measures, Barber and Lyon (1996) stressed 4 main effects: the first is about the need to capture the realized returns, that is satisfied with them; the second is the similarity with the measures of long-term event study, but with a better valuability of information to assess M&As effect; the third is the simpleness to be implemented in comparison with event study; the fourth consider that effects of multiple motives can be covered.

The use of accounting-based measures can shows also disadvantages (Barber and Lyon, 1996): first of all, considering like long-term event study, it also incorporate the impacts of outside factors; the second drawback is that it reflects the past rather than present performance expectations; thirdly, accounting data can be distorted by manipulation; the fourth consideration is about the difference in accounting standards across countries and years, that affect their valuability (Hult et al., 2008); the fifth note consider changes in accounting policy choices overtime and between companies, impairing their comparison with their benchmarks; the sixth is about the lack in evaluating the single effect of a specific acquisition, as they provide aggregated data measuring the performance of the whole organization (Bruton et al., 1994); the seventh disadvantage is linked to the difficulties in find a valid combined performance after M&A, as the financial reporting regime is different when the target is dissolved or be an independent subsidiary of the bidder (Powell and Stark, 2005); the eight is about the fact that some financial ratios, like ROA, are affected by the method of accounting for the merger (purchase vs. pooling accounting) and the method of financing the merger (cash, debt or equity).

We can say that, broadly, results of this research stream provide no clear evidence of improved post-acquisition performance (Tuch and O'sullivan, 2007).

Papadakis and Thanos (2010), in a non-Anglo Saxon setting, compared the three most widely used M&As performance criteria, namely accounting returns (return on assets, ROA), stock-market-based measures cumulative abnormal returns (CARs) and managers' personal assessments regarding the materialization of the objectives set before the acquisition.

The last two measures used by Papadakis and Thanos (2010) are in common with Schoenberg (2006) who found no correlation between objective and subjective measures of acquisition performance.

Morosini et al (1998) concentrated on operating performance analysis even if market-based measures have been suggested as superior alternatives for performance measurements (Woo et al., 1992) for two important reasons: the first is that they were considering Italian firms, and the Italian stock market is considerably small relatively to other developed economies, both in terms of the number of companies quoted and as a proportion of the total size of the economy (Marelli, 1994; Morosini, 1994) and because of this the acquisition activity taking place through the Italian stock market is not always representative of the total level of activity; the second reason is linked to the lack of market efficiency in this country (but also in other, such as France and Germany, according to Morosini et al., 1998), that cause hindrances to the usefulness of stock price measures. The proxy for firm performance they used was the percentage rate of growth in sales (denominated in U.S. dollars) over the two-year period following the acquisition, following other research on management (Woo et al., 1992; Morrison and Roth, 1992) and post-acquisition studies (Datta, 1991; Haspeslagh and Jemison, 1991). Morosini et al.(1998) measured performance for two years following the acquisition based on two justifications: first because a large literature suggests that the first two years after an acquisition are critical to its overall performance (Jemison and Sitkin, 1986; Balloun and Gridley, 1990); second, by the end of a two-years period after the acquisition, the process of combining the firms usually has been completed, and the results of the underlying integration effort can be measured effectively (Jemison and Sitkin, 1986).

Hitt et al. (1998) used info of 191 firms completed data for industry-adjusted return on assets (ROA) and industry adjusted R&D intensity for three years prior to (for both firms) and following (combined firm) the acquisition. To calculate ROA they consider the net income after taxes divided by total assets. The adjustment of the firm's ROA was calculated by subtracting average industry's ROA. Moreover, to calculate the R&D intensity they divided R&D expenditures by total annual firm sales. Then they adjusted this number by subtracting average industry R&D intensity. The authors indentified two sets of acquisitions, successful (those that showed increases in industry-adjusted performance (ROA) and industry-adjusted R&D intensity subsequent to the acquisition) and unsuccessful.

Ramaswamy and Waegelein (2003) analysed a sample of 162 firms between U.S. firms that were publicly traded and had data on Standard & Poor's COMPUSTAT tapes using as performance criteria industry-adjusted cash flow returns on market value of assets over a 5-year post-merger period in relation to the corresponding pre-merger period. They found that post-merger performance is negatively associated with relative target size and positively associated with long-term incentive compensation plans.

Ramaswamy and Waegelein (2003) used industry-adjusted operating cash flow returns on market value of assets as the measure of performance because they felt that accrual accounting-based performance measures, such as ROI, are inappropriate for comparing the post-merger performance with that of the pre-merger period because such measures could be affected by accounting methods and choices for consolidation of financial statements.

Cheng and Leung (2004) made a comparative analysis of the short-term market-based and long-term accounting-based performance of acquisitions in Hong Kong during the period 1984–1996, conducting firstly an event-study to evaluate the short-term market performance of the target, the bidder and a simulated combined portfolio consisting of both firms involved in the acquisition. In a second moment they provide long-term performance indicators based on composite indices created from key financial ratios. What they found is that the event-study indicates that there are immediate share price gains to the target, acquiring and combined firms around the time the acquisition is announced. However, the long-term accounting based performance analysis does not show a significant improvement in the 2 years following the acquisition for both the target and acquiring firms. No correlation is found between the short-term returns and the long-term performance indicators.

Fee and Thomas (2004) used industry-adjusted operating performance changes to analysed effect on firms involved in horizontal mergers and acquisitions from 1980 to 1997. They examined changes in several operating performance measures, including cash-flow; cost of goods sold to sales; selling, general, and administrative expenses to sales; net working capital to sales; and employees to sales. The industries with the most merger activity over their US sample period are energy, business services, retail, health care, electronic equipment, and wholesale.

Zollo and Singh (2004) used as a measure for acquisition performance the return on assets. Their accounting data of US firm in the bank sector were collected from 1985 to 1997 with the use of three different databases (Compustat, Compact Disclosures, and Moody's) in order to maximize the coverage. Their dependent variable was the difference between return on assets (ROA) of the acquiring bank 3 years after the acquisition vs. the same measure 1 year before the acquisition, adjusted against the performance of its peers in the same geographic area in order to control for competitive conditions in the acquirer's market. As a result, the period of observation to acquisitions completed was restricted between 1986 and 1994.

DeLong and DeYoung (2007) concentrated on 216 M&As between publicly traded U.S. commercial banking companies that took place between 1987 and 1999. They consider as the variation in post merger performance the difference between the performance of a hypothetical combination of the acquirer and target 1 year before the merger announcement and the actual performance of the bank 3 years after the merger is signed, where both pre- and post merger performance are adjusted for industry-level performance.

They measured the long-run change in financial performance along seven dimension of performance: the ROA (change in the ratio of book assets to net income), the ROE (change in the ratio of book equity to net income), the interest margin (change in the ratio of net interest income to book assets), cost efficiency (change in the ratio of non-interest expense to operating income), loans-to-assets (change in the ratio of loans to book assets), core deposits-to-assets (change in the ratio of transactions deposits plus small time deposits to book assets), and non-interest income ratio (change in the ratio of non-interest income to operating income).

On the reasons which lead to measure long-run post-merger performance based on accounting ratios rather than market returns, DeLong and DeYoung (2007) stated that the firsts capture actual financial performance over a period of time, while seconds are forward-looking measures of expected earnings, moreover, accounting ratios allow to analyze important components of financial performance (e.g., cost efficiency or core deposit funding) in addition to overall financial performance (e.g., ROA and ROE).

The regional perspective

The further step we went through on our study on relational networks and knowledge flows, moved from a corporate to a regional perspective. Of course the performance of an economic system is considered closely related to its technological activities and the spillover of knowledge and many studies have been followed on this topic.

Regularly, relational networks between firms, also in the form of M&A as well as JV or SA, whatever is their motivation, implicate for both companies involved relevant knowledge flows between them (Hussinger, 2010) and therefore between the geographical areas where those firms are located (Di Guardo, Paci 2012). Knowledge created in determined regions influence innovation in both regions where knowledge is created, their contiguous regions and other regions which establish relations, regardless of their geographical proximity, with the one creating. Knowledge is diffused and exchanged either through a diffusive pattern based on spatial contiguity, or according to intentional relations based on a-spatial networks (Maggioni M., Nosvelli M., Uberti E., 2007). Literature count on a growing field of research that consider flows of knowledge generated by various kind of relations such as participation in research programmes (Autant-Bernard et al.,2007; Maggioni et al.,2007;Balland 2012), co-patenting (Cantner and Meder,2007; Maggioni et al., 2007; Cassi and Plunket, 2012), citations (Maurseth and Verspagen, 2002; Paci and Usai, 2009), co-publications (Ponds et al., 2007), applicant-inventors relationships (Maggioni et al.,2011; Picci,2010) and human capital mobility (Miguelez and Moreno,2011; Breschi and Lissoni, 2009), JV and SA (Usai et al;2012).

Merging two datasets

A field of studies this paper is involved in is about the merge of two datasets not sharing a common identifying code. For our analysis we needed to combine two datasets containing information on mergers

and acquisitions, and other firm-level information, in the absence of a common identifying code, relying only on the entity names, provinces and sectors. We followed what described in literature and usually employed to overcome the problem of the lack of firm-level data on innovations, that is the combination of measure of invention activities with other firm-level information such as financial or accounting data, with the resulting problem of the harmonization.

Thoma and Torrisi (2007) built a database merging two datasets: the PATSTAT db of patents, designed for serving statistical purposes, and the firm-level information from BvD Amadeus, comparing two approaches: -the character-to-character match of standardized company names (perfect matching); -the string-similarity-functions (approximate matching).

They found that the second approach is preferable to the first because of frequency of positive matches, without important loss in terms of precision (i.e., low rates of false matches and false negatives).

A principal difficulty in this field is the harmonization of information coming from different data sources, because imprecision in data merging can cause measurement errors and biased results.

Thoma, Torrisi et al. (2010) in their paper explained two useful methods to integrate different source of data: the dictionary-based approach, that relies on the collection of large datasets of names and their variants and rule-based approaches that consider a set of rules defining similarity links across different entity names.

Pezzoni, Lissoni and Tarasconi (2012) in order to identify investors within any given set of patent data and to match them with other lists tested the Massacrator© 2.0 algorithm originally proposed by Lissoni et al. (2006). This "disambiguation" algorithm is necessary to analyse the text string containing all information on investors, such as name, surname and addresses. They described disambiguation as a 3-step process: cleaning&parsing, matching, and filtering.

Considering possible occurrence of selection bias: use of PSM

Another field of studies our paper is related with is about evaluate programs, which consider whether changes are due to a program intervention and not to other factors (Khandker, Koolwal and Samad, 2010). Various approaches can be used to evaluate programs and those can be carried out using quantitative methods (survey data collection or simulations) before or after a program is introduced. Analysing the effect on performance of a treatment (such as a deal that could be an M&A, but also an FDI or a JV or another), considering that in observational studies assignment of subjects to the treatment and control groups does not benefit of randomization (Rosenbaum and Rubin, 1984), consequently, treatment groups may differ systematically with respect to relevant characteristics and, therefore, may not be directly comparable. The main challenge across different types of impact evaluation is to find an appropriate counterfactual to consider that the effect of treatment may be biased by the existence of confounding factors. The "appropriate counterfactual" means what would have happened to the subjects exposed to the program (or firms involved in a deal), if they had not invested abroad (Barba Navaretti and Castellani, 2003).

Variants of impact evaluation are randomized evaluations, propensity score matching, double-difference methods, use of instrumental variables, and regression discontinuity and pipeline approaches.

A methods that is growing widespread in medical trials and in the evaluation of economic policy interventions is the Propensity score matching, that allows to "correct" the estimation of treatment effects based on the idea that the bias is reduced when the comparison of outcomes is performed using treated and control subjects who are as similar as possible (Becker and Ichino, 2002).

As previously mentioned, Borin and Mancini (2013) using Italian firm data to check on FDI effect on performance, bother about the reliability of the results of an empirical analysis, because firms investing outside the country shown a competitive advantage even before becoming multinational. Using PSM they could find an appropriate counterfactual of firms involved in FDI, taking into account their "confounding factors".

Chapter II - International M&As of Italian firms, a long-run performance analysis

Abstract

The aim of this work is to investigate the effects of international mergers and acquisitions (M&As) on the long run performance of the acquirer firm. The paper uses a dataset that cross information from two different databases on a large sample of Italian companies in order to obtain performance data of Italian firms involved in an international M&A as acquirer.

The main data for our analysis are from Thomson SDC Platinum, and comprise acquisitions of international firms by Italian companies during the years 2000-2012, merged firm-level performance data from BvD Amadeus.

Considering the fact that companies that expand by M&As are usually bigger than others, with the possible occurrence of selection bias caused by the absence of a valid counterfactual, we used the Propensity score matching methodology (PSM) to estimates whether there is an effect in performance of enter into an agreement. It is assumed the result is positive, even if with differences.

Such a study should give deep insights into the workings of deals between companies in the Italian case, taking into account previous analysis and improve the literature with a view that include data on both cross-border and intra-national M&As.

Introduction

Innovation and R&D along with knowledge spillovers are widely recognized as key factors to the economic growth of firms (Fons-Rosen, 2010). Therefore is notable an increasing consideration of the ways through which enterprises achieve innovation, and have access to knowledge spillovers: companies can benefit from the innovation achieved by others, learning by observing or working together, in fact technological development and innovation, may develops through local processes of learning by imitation. The exchange of ideas, information and working methods, but also of high-skilled workers and endowed of specific knowledge, between a company and another, fosters innovation.

Scholars discussed on how is possible the spread of knowledge spillovers between firms that cause an effect of performance. The diffusion of knowledge among firms is simplified by proximity, a concept that can be considered in a very broad sense: we can consider geographical, but also cultural, technological, institutional or organizational proximity. (Usai et al., 2013).

Literature identified some channels of knowledge diffusion: the effect on firms performance of knowledge spillovers can be generated by other firms, through interactions with suppliers, sellers or competitors, but also by direct relation with consumers, local or foreigners, or by direct contacts with tourism flows (Marrocu and Paci, 2010).

Analyzing knowledge spillovers generated between firms, in literature we notice that it can be promoted in different ways: Trade, Foreign Direct Investments (Fons- Rosen, 2010) Mergers & Acquisitions, Joint Ventures and Strategic alliances.

Different internationalization strategies can have very different effects on firm's performance (Borin and Mancini, 2013), depending on the reason pushing firm to invest in internationalization (decrease costs or enter in a foreign market) and the countries where investment are direct. Anyway, an agreement signed between companies is a medium to develop knowledge flows allowing the companies to approach each other's procedure and routines that are embedded in firm's culture, spreading in this way the knowledge flows.

In particular, considering mergers and acquisitions, the assessment of those deals in terms of understanding the reasons that drive firms to invest abroad under various conditions and different ways, have been a field of deep studies in economics literature. Less analyzed and empirically assessed is the causal link between the deal and firm's performance (Borin and Mancini, 2013).

This paper uses data on Italian firm's performance between 2003 and 2012 to analyze the economic effect of entering a foreign market or increasing their potential in Italy, through mergers and acquisitions (M&As). Our work aims to help fill the gap formed by the low number of empirical studies in our country, using the detailed database Thomson SDC Platinum, considering acquisitions of international firms and other Italian firms by Italian companies during the years 2000-2012. That information has been matched with firm-level data from BvD Amadeus.

In order to achieve the matching with harmonization of observations from the two datasets in the absence of a common identifying code, relying only on the entity names, provinces and sectors, we use some filtering criteria and then dictionary rule-based approaches. (Thoma, Torrisi et al., 2010).

Doubtless, analyzing ex-post performance, we have to consider that growth depends on many variables that can be observed ex-ante: companies that expand through mergers and acquisitions, which count a small proportion of firms operating in the economy, are usually larger and more efficient than others enterprises and there are many studies about it (Borin and Mancini, 2013). Those firms have a competitive advantage, thanks to the ability of management, skills and technologies available, even before becoming multinationals, and for those reasons the results of an empirical analysis on the actual ex-post impact of an agreement with another company on corporate performance is not reliable. Our purpose is to get through the fundamental evaluation problem and approach the possible occurrence of selection bias.

To keep in consideration this endogeneity problem, we had to use an econometric methodology commonly used in such cases: the propensity score matching developed by Rosenbaum e Rubin (1983).

This paper is then aimed to, addressing the question at the firm-level, focus on the effect of an M&As, considering what would have happened if companies had not invested abroad, finding an appropriate counterfactual.

This paper is related to a number of paths in the literature: empirical literature on factors linked to firms growth, particularly innovation and R&D; knowledge spillovers caused by proximity (geographical, cultural, technological, institutional, organizational); proximity led by trade, FDI, M&As, JV, SA; causal link between the deal (M&As) and firm's performance; literature on merging of two datasets without common variable; use of various econometric methods to avoid selection bias: use of PSM.

With respect to previous works this paper introduces three innovations in the empirical analysis of these issues: first, it form a new database of Italian firms involved in M&As coming from the Thompson SDC and containing their financial data from 2003 to 2012; second, we analyze both M&As between Italian firms and cross-border; the third important contribution is the novel identification strategy used: in our PSM we obtain a credible counterfactual group of firms non involved in deals and using Nearest-Neighbour, Kernel and stratification method of matching and difference-in-difference estimator we compare the performance of the two groups.

The structure of the chapter is as follows: section 2 we introduced our data with a descriptive analysis, in section 3 we deep explained the econometric methodology used, in section 4 we analysed the results, in section 5 we analysed the data with a deeper view of the propensity score and give a conclusion in section 6.

Data and descriptive analysis

Construction of the database

For our analysis, we built a database merging two datasets: the SDC Platinum, containing information of mergers and acquisitions, and the BvD Amadeus, with the firm-level data.

In this section we describe how we set the work in order to achieve the matching with harmonization of observations from the two datasets in the absence of a common identifying code, relying only on the entity names, provinces and sectors. In the next section we'll deepen the analysis of data content.

Bureau Van Dijk - Amadeus provides, above all, company information for both Western and Eastern Europe, with a focus on private company information; company financials in a standard format so you can compare companies across borders and financial strength indicators on around 21 million companies across Europe. The main advantage of Amadeus over other data sources is its coverage of small and medium sized firms for a large set of countries.

SDC Platinum™ dataset provides in-depth information on new issues, M&As, syndicated loans, private equity, project finance, poison pills, and more.

Using this dataset implemented and constantly updated by an international team of expert analysts, SDC Platinum™ allowed us to consider internationalization strategies such as mergers and acquisitions with homogeneous data.

We integrate those two datasets using the methods for harmonization and string matching with automatic matching techniques usually utilized for the combination of large-scale patent and trademark datasets with each other and other sources of data.

Following Pezzoni, Lissoni and Tarassi (2012) we divided our work in 3 phases:

1. **Cleaning & Parsing:** the harmonization of data refers to the name standardization, and is the first activity to implement (Thoma, Torrisi et al. 2010), and requires both punctuation and company name standardization. To better explain, both datasets contained typographical errors, and needed to be settled with standard to be matched.

For example we could find the same type of corporate form, defined with different terms, e.g. "XXXX Società per azioni" and "XXXX S.p.a." or "XXXX SPA" is all the same firm, defined with three different abbreviation of the same corporate form, and we determined to use one single definition for each corporate form.

Moreover, many companies were registered with 2 names: the long and the shortcutted version of the name, separated by an "or", "also called", "abbreviated with" or others, with the result that the company names were too long and impossible to automatically match with the same firm named with the long name in the other datasets.

2. **Matching:** using the Massacrator 2.0 (Pezzoni, Lissoni and Tarassi, 2012) disambiguation algorithm, we selected pairs of firms from the two databases, considering their names, which are the same or similar.

3. **Filtering:** the pairs are then filtered using further information about the Province of the Headquarter.

The result gave us a number ranging from 0 (= maximum similarity or perfect matching) to 1 (= minimum similarity). Then we controlled the results considering whether the algorithm had produced a matching corresponding to our needs.

Definitely, this method does not perform satisfactory in terms of completeness since a high number of good matches may remain unmatched, and is not possible to define, without a check of the analyst if the match had paired similar or same firms name (except when the result is 0). Of course using matched data when massacrator resulted > 0 implies a higher risk of false matches.

Data on M&As and Firms

Our database, as we described in the previous section, is the result of a merge of two datasets: the SDC Platinum™, containing information of mergers and acquisitions by Italian companies during the years 2000-2012, and the firm-level information from BvD Amadeus. In this section, we provide a broad description of the data we'll use in our analysis.

Mergers and acquisitions data, belonging to the SDC Platinum™ database, contains both data on agreement and firms (partner1 and partner2) characteristics, describing a consolidation of companies: deals between two enterprises that decide to combine their resources to form a new company (Merger) or deals with the purchase of one company by another in which no new company is formed (Acquisitions).

BvD Amadeus contains comprehensive information on around 21 million companies across Europe. We used data on Italian companies, search for companies contained in the M&As database and other firms not involved in those deals but with specific profiles and similar characteristics with the firms considered in our analysis.

In table 1 we reported information on all the M&As that were undertaken with the participation of an Italian firm either as a target or as acquirer. From 2000 to 2012 took place 2357 M&As, of which almost 81% of the total (1907 in number) were completed. About the 20% uncompleted we can note that more than 13% is pending, and this means that even if at an early stage of the contract, those result as they were proceeding.

Aggregating the uncompleted category (excluding the pending group of deals) we count only the 7% of the total number of mergers and acquisitions, and those are rumours, withdrawn or intended. Most of them (95%) took place in the North (49% in North-west, 28% North-east) or Centre (17%).

The table 2 aims to show in particular where those M&As took place and we reported results sorting for Italian regions. As we could expect, Lombardy is the region most involved in deals, followed by Emilia-Romagna, Veneto and Lazio. All regions show similar percentages in the division between the status of the agreement, as if there were a "physiological" numbers of deals that do not reach completeness. It seems interesting to consider, however, that among the four most active regions, the Veneto shows 87% of the agreements completed, while Lazio "only" 76% (80% Emilia-Romagna, 81% Lombardy).

To show a deeper analysis we reported also the division of completed/uncompleted deals for provinces (only for those that were involved in 20 or more deals) in table 2bis. Milan and Rome are at the beginning of the list, but with a significant difference between the two cities: the agreements that have taken place the capital of Lombardy are approximately three times those of the Romans. The only city located in the south that is present in this list is Naples (28 deals), emphasizing again as the Italian "Mezzogiorno" is little involved in M&As. Analysing in detail the number of deals undertaken between 2000 and 2012, per province we can see that Milan and Rome, followed by Bologna and Turin are the province where the most of the deals took place (see table 2bis). We can see the difference between the 20 provinces more involved in M&As, observing that Milan is a particular case, economic centre of the country, exceeds Rome, the second city in terms of agreements, for more than 300 deals.

In the Map 1, we divided all provinces in 5 groups to note the differences in numbers. The fifth group (dark black) comprises the 20 more involved provinces (showed also in table 2bis), while the first group (white) comprises the province where 2 or none M&As took places.

Table 1. M&A with at least an Italian participant, per macro-region of the Italian participant, 2000-2012

		Macro-Regions					Total M&A	
		North-west	North-east	Center	South	Islands	Number	%
Status of the deal	Completed	923	546	325	76	37	1907	80,91
	Dis Rumor	2		2			4	0,17
	Intended	13	8			1	22	0,93
	Pending	165	87	54	11	10	327	13,87
	Rumor	24	6	7	2	2	41	1,74
	S Buyer	12	9	14	3	5	43	1,82
	Status Unknown	1					1	0,04
	Withdrawn	5	4	1	2		12	0,51
Total M&A	Number	1145	660	403	94	55	2357	
	%	48,58	28,00	17,10	3,99	2,33		100,00

Table 2. M&A with at least an Italian participant, per region of the Italian participant, 2000-2012

		Status of the deal								Total M&A	
		Completed	Dis Rumor	Intended	Pending	Rumor	S Buyer	Status Unknown	Withdrawn	Number	%
Regions	Lombardy	722	1	10	127	17	5	1	4	887	37,63
	Emilia Romagna	247		3	50	2	3		4	309	13,11
	Veneto	213		3	22	1	4			243	10,31
	Lazio	174	2		35	6	10		1	228	9,67
	Piedmont	146	1	3	26	2	6			184	7,81
	Tuscany	94			16	1	1			112	4,75
	Liguria	49			10	5	1			65	2,76
	Friuli-Ven.-Giulia	48		1	8	2	2			61	2,59
	Trentino-Alto Adige	38		1	7	1				47	1,99
	Campania	31			6	1	2			40	1,70
	Marche	32			2		3			37	1,57
	Sicily	25			6		4			35	1,48
	Puglia	21			4		1		1	27	1,15
	Umbria	25			1					26	1,10
	Sardinia	12		1	4	2	1			20	0,85
	Abruzzo	15			1				1	17	0,72
	Valle d'Aosta	6			2				1	9	0,38
	Molise	4								4	0,17
Basilicata	3								3	0,13	
Calabria	2					1			3	0,13	
Total M&A	Number	1910	5	38	310	36	42	1	15	2357	
	%	81,04	0,21	1,61	13,15	1,53	1,78	0,04	0,64		100,00

Table 2bis. M&A with at least an Italian participant, per province of the Italian participant, 2000-2012

		Status of the deal		Total M&A
		Completed	Uncompleted	Number
Provinces	Milano	525	130	655
	Roma	160	56	216
	Bologna	82	22	104
	Torino	75	23	98
	Brescia	58	10	68
	Bergamo	52	10	62
	Treviso	49	8	57
	Vicenza	49	5	54
	Firenze	42	10	52
	Genova	40	11	51
	Reggio Emilia	34	15	49
	Modena	44	5	49
	Verona	44	4	48
	Parma	34	5	39
	Padova	33	5	38
	Varese	24	9	33
	Venezia	30	3	33
	Napoli	22	6	28
	Bolzano - Bozen	20	7	27
	Udine	23	4	27
Alessandria	20	5	25	
Cuneo	21	3	24	
Trento	17	3	20	
Forlì-Cesena	18	2	20	
	
Total M&A	Number	1898	459	2357

From now on, we examined firm participants to deals, which are, from 2000 to 2012 a total of 5701.

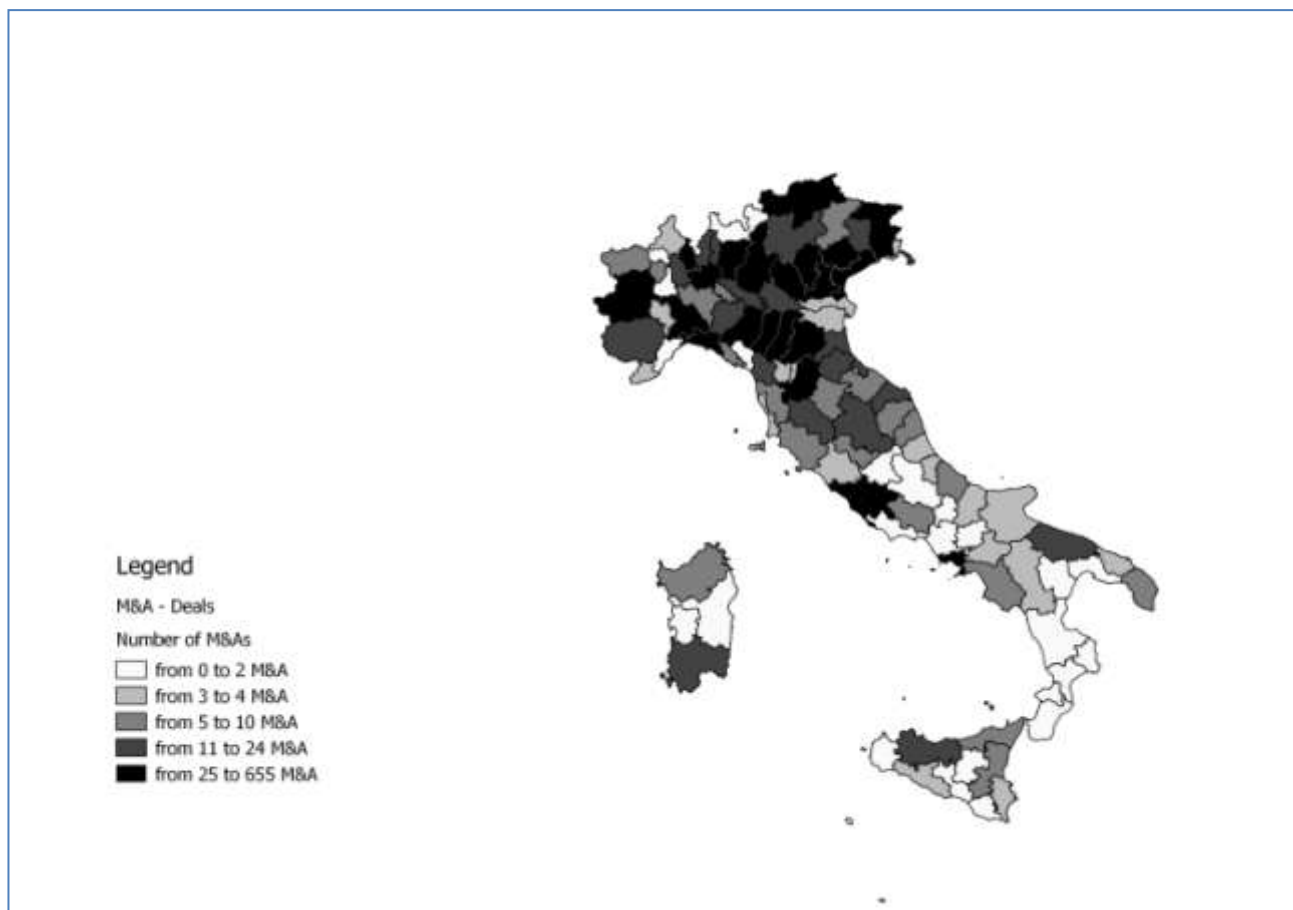
In table 3 we divided them into macro-regions and into industry sectors (reporting only the most numerous sectors). The first three sectors are respectively Electric, gas and water distribution (510 deals), Business services (442, of which almost half of them took from the North West) and Machinery (almost all companies located in the north). Moreover, as we could imagine, of all the Italian participants to M&As, 49% are located in the north-west (2787), 26% in north-east (1493) and 20% in the centre (1133). Only 5% added together are from south or islands.

In table 4 we submitted the same analysis of table 3 but considering regions instead of macro-regions. We reported the most numerous group of regions and sectors. The first in the list is again Lombardy, with 37% of the participants (2106 of 5701), followed by Emilia-Romagna (825 participants, 14%) and Lazio (721, equal to 13%). It's newsworthy to consider that in the selection is present also Sardinia, only region from south & islands part of the country, with 85 participants in M&A (1%) located in the regional land. Taking into account provinces, reported in table 4bis, it is important to consider the number of participants to M&As in relation to the totality of active firms per province, in order to considerate a sort of "propensity to cooperate".

In Map 2 we reported the firms participant to mergers and acquisition between 2000 and 2012, dividing them per province, in order to show where the firms involved in M&As were located geographically. As we explained, is evident the prominence of the north side of the country, talking about the presence of firm involved in a deal.

In Map 3 we reported the most active provinces, noting that the most actives are, as expected, Milan, Bologna Reggio Emilia, Parma and Trieste between all, and all of them are located in the north. In the centre the propensity to cooperate is stronger in Rome (of course) and Terni, but the south part of the country show little propensity, with the exception of Cagliari, in Sardinia, that occupied the upper quintile of the scale.

In table 5 we focused on provinces and industry sector, taking a deeper sight on the 5 provinces more active: Milan, Bologna, Reggio Emilia, Parma and Trieste. In the Lombardy capital city, the principal sector is



Electric, Gas and Water distribution, and the same for Bologna. The Machinery sector is for Reggio Emilia the more numerous, while Food and Kindred Products are more popular in Parma (not surprisingly) and Trieste (equally with Electric sector).

Going ahead with the analysis, we investigated about the dimension of the Italian firms involved and, as we can observe in table 6, the majority (almost 62%) of the firms involved in M&As are big firms, with 250 and more employees, and nearly the 26% are medium firms (between 50 and 249 people in the staff). Only 13% are Small (10/49 employees) or micro firms (less than nine). Big firms are located largely in the centre-north side of the country, particularly in the north-west, where almost 2 of 3 enterprises involved in an M&A are big. Anyway, in general, participants are usually Big or Medium firms (then, more than 50 employees).

In table 7, we can note the details, observing that 2106 enterprises of 2787's north-west are located in Lombardy, the region of Milan. It is interesting to note that even if the greatest part of the deals are reached between big firms, in some regions of the south side (but also Aosta, which is in the north-west, but it's scarcely populated), the few firms involved in an agreement are usually smaller than in the rest of the booth. In the further page, in Map 4 we observe the provinces, dividing them in 5 groups: the first (no M&As) include all the provinces where no M&As were undertaken; the fifth is the (most numerous) group where the majority of firms involved in a deal are big; from the second to the fourth group, micro, small and medium-sized enterprises.

Table 8 provides the same information on dimension but from the province perspective, analyzing only the more involved. This table confirm what we found earlier: big firms are the more involved in M&As, regardless of the province considered.

		Macro-Regions					Participants	
		North-west	North-east	Center	South	Islands	Number	%
Industry Sectors	Electric, Gas, and Water Distribution	191	114	175	17	13	510	8,95
	Business Services	202	89	87	9	55	442	7,75
	Machinery	142	196	13	5		356	6,24
	Food and Kindred Products	94	129	21	17	3	264	4,63
	Investment & Commodity Firms,Dealers,Ex	161	40	55	4		260	4,56
	Transportation Equipment	138	76	15	8	2	239	4,19
	Metal and Metal Products	132	77	12	8	2	231	4,05
	Transportation and Shipping (NO air)	86	32	72	21	13	224	3,93
	Textile and Apparel Products	109	63	36	4		212	3,72
	Telecommunications	70	27	107			204	3,58
	Electronic and Electrical Equipment	77	75	42	5		199	3,49
	Printing, Publishing, and Allied Servic	155	13	12	3		183	3,21
	Measuring, Medical, Photo Equipment; CI	103	36	38	2		179	3,14
	Real Estate; Mortgage Bankers and Broke	104	27	22	2		155	2,72
	Oil and Gas; Petroleum Refining	34	4	74	2	10	124	2,18
	Construction Firms	67	24	22	5		118	2,07
	Drugs	74	11	29	1		115	2,02
	Stone, Clay, Glass, and Concrete Produc	43	46	23	2		114	2,00
Air Transportation and Shipping	26	18	43	3	14	104	1,82	
Miscellaneous Retail Trade	58	27	13			98	1,72	
	
Participants	Number	2787	1493	1133	154	134	5701	
	%	48,89	26,19	19,87	2,70	2,35		100,00

Table 4. Italian participants to M&A per Industry sector, per region of the Italian participant, 2000-2012

		Regions										Participants	
		Lombardy	Emilia Romagna	Lazio	Piedmont	Veneto	Tuscany	Friuli-Venezia-Giulia	Liguria	Sardinia		Number	%
Industry Sectors	Electric, Gas, and Water Distribution	160	67	126	14	21	22	12	13	2	.....	510	8,95
	Business Services	142	64	40	46	10	41	2	14	51	.....	442	7,75
	Machinery	115	128	5	24	45	2	18	3		.....	356	6,24
	Food and Kindred Products	56	79	7	35	31	11	16	2	2	.....	264	4,63
	
Participants	Number	2106	825	721	551	455	286	134	116	85		5.701	
	%	36,94	14,47	12,65	9,66	7,98	5,02	2,35	2,03	1,49			100,00

Table 4 bis. Italian participants to M&A per province, on active firms 2000-2012

		Participants		Active firms	
		Number	%	Number	%
Provinces	Milano	1.654	29,01	363.333	0,46
	Roma	698	12,24	323.932	0,22
	Torino	359	6,3	174.209	0,21
	Bologna	323	5,67	86.938	0,37
	Reggio Emilia	168	2,95	41.592	0,40
	Firenze	163	2,86	92.016	0,18
	Brescia	145	2,54	103.314	0,14
	Bergamo	133	2,33	86.409	0,15
	Treviso	122	2,14	71.734	0,17
	Modena	118	2,07	53.064	0,22
	Genova	99	1,74	67.987	0,15
	Parma	94	1,65	38.122	0,25
	Verona	92	1,61	75.408	0,12
	Vicenza	83	1,46	70.983	0,12
	Cagliari	71	1,25	49.491	0,14
	Padova	69	1,21	84.031	0,08
	Venezia	68	1,19	66.127	0,10
	Alessandria	64	1,12	32.100	0,20
	Udine	61	1,07	40.873	0,15
	Varese	57	1	65.707	0,09
Cuneo	51	0,89	47.408	0,11	
Trieste	49	0,86	15.067	0,33	
Napoli	49	0,86	172.213	0,03	
Bolzano - Bozen	47	0,82	43.059	0,11	
Participants		.....	.....	.....	.....
	Number	5.701	100	4.425.950	0,13

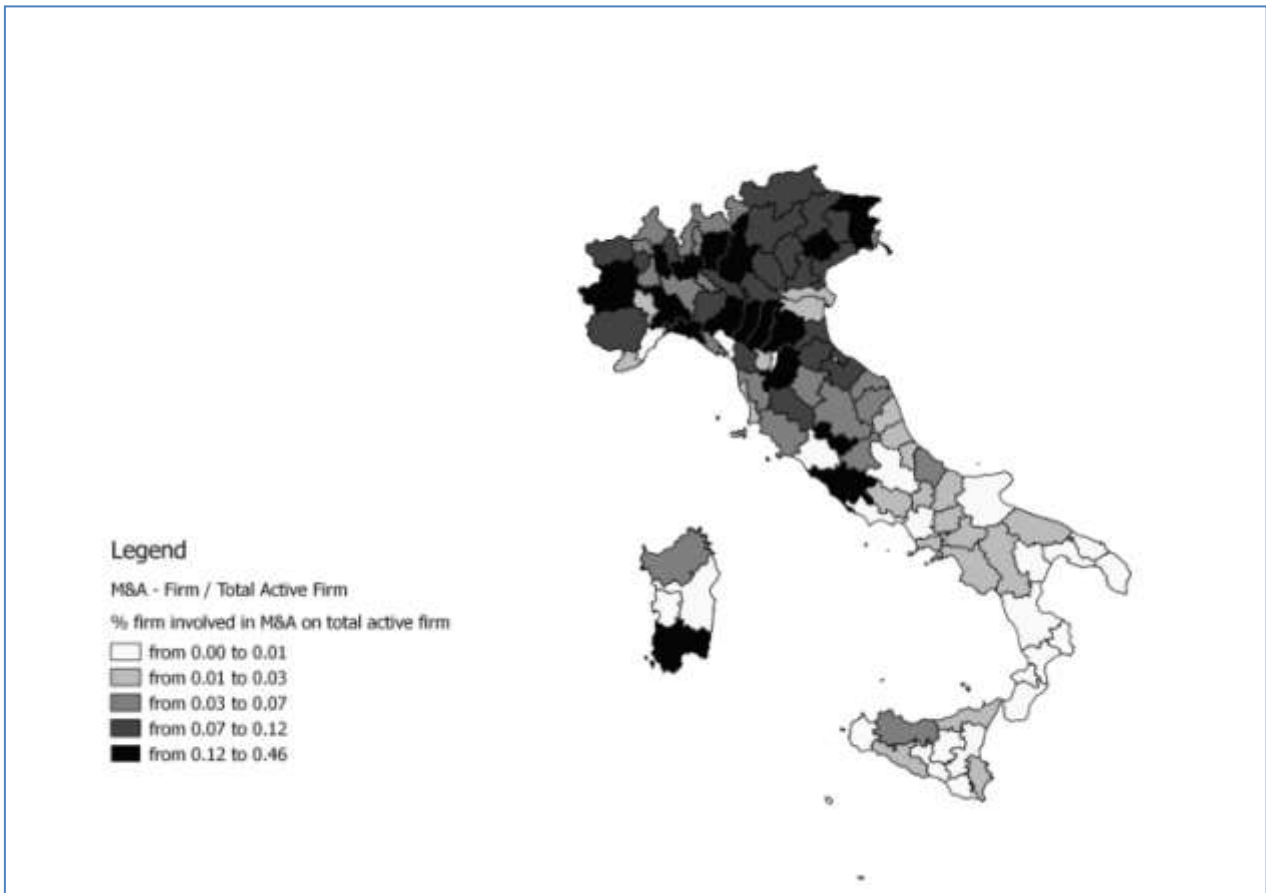
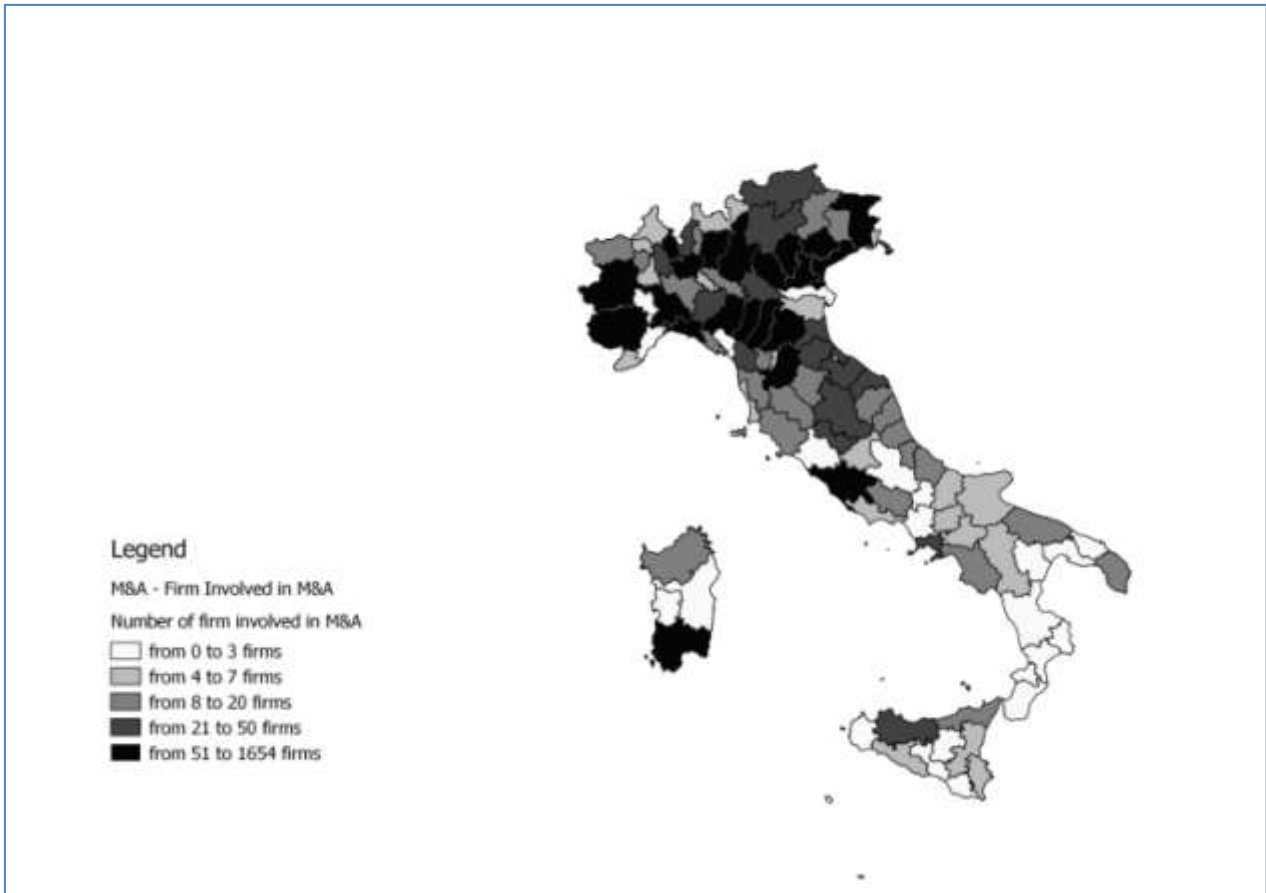


Table 5. Italian participants to M&A per Industry sector, in the most active provinces, 2000-2012

		Province					
		Milano	Bologna	Reggio Emilia	Parma	Trieste	
Industry Sectors	Electric, Gas, and Water Distribution	142	50	3	4	10	
	Business Services	121	41	1	7		
	Machinery	59	43	64	3		
	Investment & Commodity Firms,Dealers,Ex	133	13	2	1		
	Food and Kindred Products	33	9	6	34	10	
	Real Estate; Mortgage Bankers and Broke	74	9	2	1	5	
	Textile and Apparel Products	60	7	19	3		
	Measuring, Medical, Photo Equipment; CI	80	2	1	1		
	Printing, Publishing, and Allied Servic	72	12				
	Transportation and Shipping (except air	54	5	2	8	7	
	Radio and Television Broadcasting Stati	71					
	Construction Firms	58		2	4		
	Miscellaneous Retail Trade	43	9	11			
	Drugs	58	1		3		
	Metal and Metal Products	49	7	3	1	1	
	Electronic and Electrical Equipment	27	23	8			
	Transportation Equipment	19	22	2		6	
	Chemicals and Allied Products	40	5	1			
	Telecommunications	40		2	4		
	Wholesale Trade-Durable Goods	38	3	4		1	
		
	Participants	%	29,01	5,67	2,95	1,65	0,86
		Number	1.654	323	168	94	49
		% on active firm	0,46	0,37	0,40	0,25	0,33

Table 6. M&A and participants per dimension, per macro-region of the italian participant, 2000-2012

		Macro - Regions					Participants	
		North-west	North-east	Center	South	Islands	Number	%
Firm size	Micro firms (1/9 empl.)	114	42	35	10	5	206	3,61
	Small firms (10/49 empl.)	269	134	79	17	7	506	8,88
	Medium firms (50/249 empl.)	709	394	288	66	20	1477	25,91
	Big firms (250 and more empl.)	1695	923	731	61	102	3512	61,60
Participants	Number	2787	1493	1133	154	134	5701	
	%	48,89	26,19	19,87	2,70	2,35		100,00

Table 7. M&A and participants per dimension, per region of the Italian participant, 2000-2012

		Firm size				Total
		Micro firms (1/9 empl.)	Small firms (10/49 empl.)	Medium firms (50/249 empl.)	Big firms (250 and more empl.)	
Regions	Lombardy	103	222	548	1233	2106
	Emilia Romagna	18	71	218	518	825
	Lazio	22	39	118	542	721
	Pidmont	7	29	125	390	551
	Veneto	12	43	111	289	455
	Tuscany	9	29	116	132	286
	Friuli-Ven.-Giulia		8	43	83	134
	Liguria	4	16	29	67	116
	Sardinia		9		76	85
	Trentino-Alto Adige	12	12	22	33	79
	Marche	3	3	20	48	74
	Campania	2	8	28	35	73
	Umbria	1	8	34	9	52
	Sicily	5	7	11	26	49
	Puglia	6	5	15	12	38
	Abruzzo		2	14	14	30
	Valle d'Aosta		2	7	5	14
	Molise	2		3		5
Basilicata			4		4	
Calabria		2	2		4	
Participants	Number	206	506	1477	3512	5701
	%	3,61	8,88	25,91	61,60	100

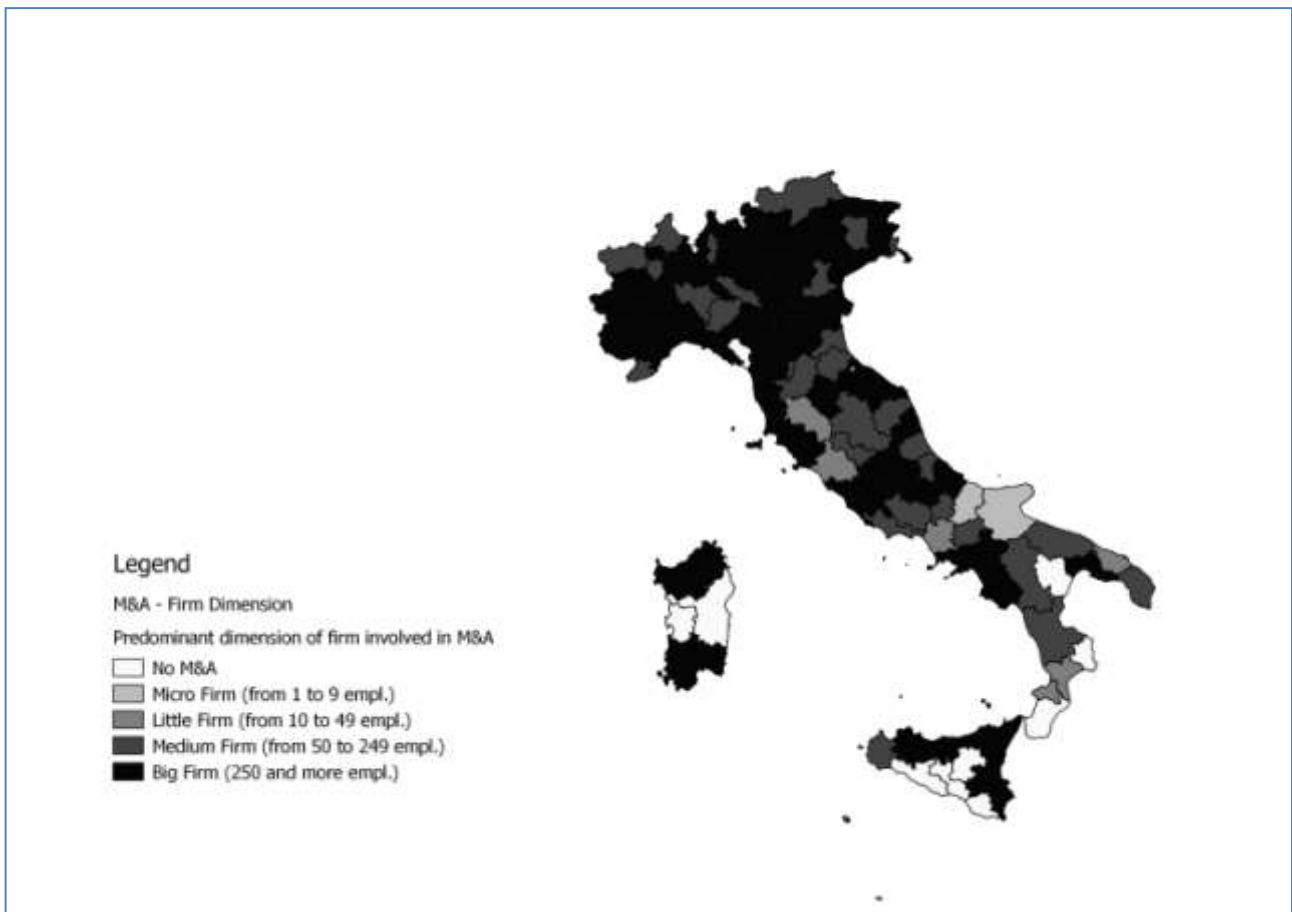


Table 8. M&A and participants per dimension, per region of the italian participant, 2000-2012

		Firm size				Total
		Micro firms (1/9 empl.)	Small firms (10/49 empl.)	Medium firms (50/249 empl.)	Big firms (250 and more empl.)	
Provinces	Milano	90	190	407	967	1654
	Roma	21	38	107	532	698
	Torino	3	9	66	281	359
	Bologna	12	21	77	213	323
	Reggio Emilia	1	7	33	127	168
	Firenze	1	11	86	65	163
	Brescia	5	13	56	71	145
	Bergamo	4	8	37	84	133
	Treviso	2	14	22	84	122
	Modena	2	18	38	60	118
	Genova	2	15	24	58	99
	Parma	1	7	23	63	94
	Verona	2	8	18	64	92
	Vicenza	2	8	29	44	83
	Cagliari			7	64	71
	Padova	5	9	28	27	69
	Venezia	1	3	10	54	68
	Alessandria	3	7	17	37	64
	Udine		1	14	46	61
	Varese		3	8	46	57
	Cuneo		6	14	31	51
	Trieste		6	12	31	49
	Napoli		7	19	23	49
Bolzano - Bozen	10	11	14	12	47	
	
Participants	Number	206	506	1477	3512	5701
	%	3,61	8,88	25,91	61,60	100

From now on the analysis turn to observe the two sides of the deal: the Target and the Acquirer firm side, taking into account only Italian firms of agreements.

In Table 9 and 10 we concentrated the ten countries with which Italian firms have undertaken the majority of deals, and the ten Industrial sectors most involved in those agreements.

In table 9 the Italians are the target enterprises, while in table 10 are the acquirers.

First of all we can note that the sectors, even with little differences, are more or less the same, if the Italian firm is the target either the acquirer. In both cases, there is strong evidence that there is a preference to enter into agreements with domestic companies: 68% of cases when the Italian firm is the target nation, 77% when is the Acquirer.

The foreign enterprises that came to Italy to undertake an agreement are from US, or EU, whilst an Italian firm that look for a deal goes also farther: to Brazil and India among others.

Taking a look on the distribution per Italian macro-regions, it is clear that the north-west part of the country is the most involve in deals, in fact in table 11, where the Italian firm is the target enterprise, we note that the centre-north in general seems to be more attractive than the rest of Italy.

In table 12 when Italian firms are the acquirers, we note that islands, above others, undertake agreements with foreign partners, in fact 50% of deals began by islands enterprises are addressed to an Italian firm, but the other 50% involved a foreign partner. The others macro-regions M&A are addressed mainly (around 70% of the total per macro-regions) to an Italian firm rather than a foreign firm.

In tables 13 and 14 we observe the distribution of exchanges per Italian regions, taking into account only the ten regions where there were undertook more M&As. It's interested that is present in both tables Sardinia, the only region from the south and islands.

The tables that follow consider only the M&As undertaken between Italian firms, divided per regions (15) and per provinces (16). In the table 15, we can see in the main diagonal the number of deals undertaken by firms of a same region. It's notable that for some regions seems to be true that geographical proximity helps closing deals, but some other regions engage agreements with others region's firms rather than their fellow.

In table 16 we report only values from the main diagonal, investigating about the relations between firms from the same province. Considering the "total as Acquirer" seems true for some province's firm that it is easier to make a deal with a geographically close enterprise rather than a further company. Taking as example the province of Bolzano – Bozen, of 14 deals undertaken by a Bolzano's firm as acquirer, all 14 are close with another Bolzano's firm as target. To better explain: 21 are the Bolzano's firms took as target, that means only 7 firms on 21 are taken in consideration by companies located in another province.

Table 9. Distribution of Acquirers when the Target is Italian, per country partner, per Industry sector 2000-2012

Acquirer Nation	Sectors											Number	%
	Business Services	Electric, Gas, and Water Distribution	Investment & Commodity Firms, Dealer	Commercial Banks, Bank Holding Company	Real Estate; Mortgage Bankers and Broke	Machinery	Transportation and Shipping (except air)	Food and Kindred Products	Metal and Metal Products	Textile and Apparel Products			
Italy	636	562	501	456	349	255	227	216	167	180	6,720	67,80	
United States	52	4	27	11	25	32	10	14	20	17	481	4,85	
United Kingdom	40	10	23	11	16	12	25	5	7	6	364	3,67	
France	38	27	13	18	14	9	19	15	10	12	363	3,66	
Germany	25	22	8	11	12	10	18	4	19	5	285	2,88	
Netherlands	7	5	14	8	12	5	7	11	2	6	159	1,60	
Switzerland	8	23	11	4	2	17	8	9	2	1	141	1,42	
Spain	9	18	8	6	2	5	4	10	6	1	130	1,31	
Luxembourg	8	1	8	5	11	1	0	2	8	5	89	0,90	
Austria	2	4	3	0	1	4	0	3	4	1	58	0,59	
.....	
Participants	905	751	664	559	493	422	349	318	303	285	9,912	100,00	

Table 10. Distribution of Target when the Acquirer is Italian, per country partner, per Industry sector 2000-2012

Target Nation	Sectors											Number	%
	Investment & Commodity Firms, Dealer	Commercial Banks, Bank Holding Company	Electric, Gas, and Water Distribution	Business Services	Machinery	Food and Kindred Products	Insurance	Telecommunications	Printing, Publishing, and Allied Services	Real Estate; Mortgage Bankers and Broke			
Italy	1907	634	515	426	183	157	190	152	166	196	6,720	76,87	
France	15	15	12	15	17	7	7	7	18	5	221	2,53	
Germany	30	6	3	20	27	3	4	5	7	2	215	2,46	
Spain	24	6	11	14	5	5	6	12	12	0	188	2,15	
United States	18	2	7	17	15	11	2	1	2	0	186	2,13	
United Kingdom	21	4	3	19	6	7	1	4	4	2	172	1,97	
Switzerland	11	8	4	7	5	1	4	1	0	1	80	0,92	
Brazil	2	0	2	1	4	6	0	6	1	0	58	0,66	
Netherlands	9	3	1	5	4	3	0	4	0	2	58	0,66	
India	3	0	0	1	5	3	0	1	1	0	48	0,55	
.....	
Participants	2,119	758	599	555	308	241	235	223	217	215	8,742	100	

Table 11. Distribution of Acquirer when the Target is Italian, per country partner, per Italian Macro-Region 2000-2012

Target Nation= Italy							
		Macro - Regions					
		North-west	North-east	Center	Islands	South	Number
Acquirer Nation	Italy	1.390	818	567	123	88	2.986
	United States	103	32	43	2	5	185
	United Kingdom	76	30	36	2	3	147
	France	69	41	30	1	2	143
	Germany	43	23	74	0	3	143
	Netherlands	19	14	5	0	0	38
	Switzerland	41	12	6	2	2	63
	Spain	15	9	14	1	1	40
	Luxembourg	46	14	7	0	1	68
	Austria	11	4	0	0	1	16
	
Participants	Number	2.076	1.120	948	147	119	4.410

Table 12. Distribution of Target when the Acquirer is Italian, per country partner, per Italian Macro-Region 2000-2012

Acquirer Nation= Italy							
		Macro - Regions					
		North-west	North-east	Center	Islands	South	Number
Target Nation	Italy	1.566	822	650	43	54	3.135
	France	73	46	28	9	2	158
	Germany	84	47	21	4	1	157
	Spain	45	16	26	9	0	96
	United States	89	51	14	1	4	159
	United Kingdom	62	18	19	3	3	105
	Switzerland	18	10	7	2	0	37
	Brazil	30	5	16	0	1	52
	Netherlands	16	12	3	2	2	35
	India	25	4	15	0	3	47
	
Participants	Number	2.226	1.140	951	86	80	4.483

Table 13. Distribution of Acquirer when the Target is Italian, per country partner, per Italian Region 2000-2012												
Acquirer Nation	Regions											Number
	Lombardy	Emilia Romagna	Lazio	Pidmont	Veneto	Tuscany	Friuli-Venezia-Giulia	Sardinia	Liguria	Trentino Alto-Adige	Number	
Italy	1.055	479	329	275	213	181	76	82	49	50	....	2.986
United States	54	17	22	47	12	9	2	2	2	1	....	185
United Kingdom	64	11	2	11	11	23	6	1	1	2	....	147
France	63	24	25	6	15	4	2	1	0	0	....	143
Germany	39	12	66	2	7	5	0	0	2	4	....	143
Netherlands	17	8	4	2	4	0	1	0	0	1	....	38
Switzerland	34	6	2	5	1	0	4	1	2	1	....	63
Spain	11	3	13	3	6	1	0	0	1	0	....	40
Luxembourg	29	4	3	16	9	4	0	0	1	1	....	68
Austria	9	2	0	2	1	0	1	0	0	0	....	16
....
Participants	1.574	633	597	412	313	247	107	99	79	67	....	4.410

Table 14. Distribution of Target when the Acquirer is Italian, per country partner, per Italian Region 2000-2012												
Target Nation	Regions											Number
	Lombardy	Emilia Romagna	Lazio	Pidmont	Veneto	Tuscany	Friuli-Venezia-Giulia	Liguria	Sardinia	Marche	Number	
Italy	1.187	494	422	316	243	162	45	55	29	37	....	3.135
France	58	34	26	11	5	2	5	4	5	0	....	158
Germany	50	27	13	28	10	6	8	6	4	2	....	157
Spain	24	8	22	14	8	4	0	7	9	0	....	96
United States	53	27	11	35	14	3	10	1	1	0	....	159
United Kingdom	42	13	12	18	3	6	2	2	3	1	....	105
Switzerland	14	5	5	3	4	2	1	1	2	0	....	37
Brazil	24	2	14	6	1	2	2	0	0	0	....	52
Netherlands	11	5	3	4	6	0	1	1	2	0	....	35
India	20	1	7	5	3	5	0	0	0	3	....	47
....
Participants	1.637	673	657	499	324	212	97	80	68	49	....	4.483

* Table 15. Distribution of Acquirer when the Target is Italian, per Italian region 2000-2012

		Target									
		Abruzzo	Basilicata	Campania	Emilia Romagna	Friuli-Venezia-Giulia	Lazio	Liguria	Lombardy	Marche	Molise
Acquirer	Abruzzo	0	0	0	0	0	1	0	1	0	0
	Basilicata	0	0	0	0	0	0	0	0	0	0
	Campania	0	0	7	1	0	0	0	2	0	0
	Emilia Romagna	1	0	2	141	1	1	2	39	2	0
	Friuli-Venezia-Giulia	0	0	0	0	2	0	0	5	0	0
	Lazio	1	0	7	4	13	115	0	16	4	0
	Liguria	0	0	0	1	0	1	1	2	0	0
	Lombardy	0	2	4	59	11	18	8	281	2	0
	Marche	0	0	0	0	0	0	0	6	6	0
	Molise	0	0	0	0	0	0	0	0	0	0
	Pidmont	0	0	0	9	1	6	0	16	1	0
	Puglia	0	0	0	0	0	0	0	0	0	0
	Sardinia	0	0	0	0	0	3	0	2	0	0
	Sicily	0	0	0	0	0	1	1	0	0	0
	Trentino Alto-Adige	0	0	0	0	0	0	0	1	0	0
	Tuscany	0	0	1	1	0	6	0	8	0	0
	Umbria	0	0	0	0	0	0	0	1	0	0
Valle d'Aosta	0	0	0	0	0	0	0	1	0	0	
Veneto	1	0	5	4	11	0	0	22	0	0	
Total		3	2	26	220	39	152	12	403	15	0
		Target									
		Pidmont	Puglia	Sardinia	Sicily	Trentino Alto-Adige	Tuscany	Umbria	Valle d'Aosta	Veneto	Total
Acquirer	Abruzzo	0	0	0	0	0	0	0	0	0	2
	Basilicata	0	0	0	0	0	0	0	0	0	0
	Campania	0	0	0	0	0	0	0	0	0	10
	Emilia Romagna	1	2	0	0	5	4	0	1	20	222
	Friuli-Venezia-Giulia	1	0	0	0	0	0	0	0	1	9
	Lazio	5	0	3	6	0	8	0	0	2	184
	Liguria	2	0	0	0	0	1	0	0	0	8
	Lombardy	19	0	8	2	5	5	5	0	10	439
	Marche	0	0	0	0	0	0	0	0	1	13
	Molise	1	0	0	0	0	0	0	0	0	1
	Pidmont	91	0	0	0	0	1	0	0	1	126
	Puglia	0	1	0	0	0	0	0	0	0	1
	Sardinia	3	0	2	0	0	1	0	0	0	11
	Sicily	1	0	0	4	0	0	0	0	0	7
	Trentino Alto-Adige	0	0	0	0	16	0	0	0	2	19
	Tuscany	0	0	0	0	0	32	0	0	0	48
	Umbria	0	0	0	0	0	0	1	0	0	2
Valle d'Aosta	0	0	0	0	0	0	0	0	0	1	
Veneto	9	5	0	1	0	1	0	0	38	97	
Total		133	8	13	13	26	53	6	1	75	1.200

Table 16. Distribution of Acquirer when the Target is Italian, per Italian province 2000-2012

		Target	Total as Acquirer	Total as Target			Target	Total as Acquirer	Total as Target
Acquirer	Alessandria	2	6	6	Acquirer	Milano	266	371	310
	Ancona	0	4	2		Modena	1	10	21
	Aosta	0	1	1		Napoli	7	10	17
	Avellino	0	0	2		Novara	0	6	0
	Bari	0	0	2		Padova	2	7	21
	Belluno	0	0	4		Palermo	4	5	12
	Benevento	0	0	2		Parma	1	10	32
	Bergamo	7	8	24		Pavia	0	0	4
	Biella	0	1	11		Perugia	0	0	2
	Bologna	38	95	71		Pesaro e Urbino	4	9	10
	Bolzano - Bozen	14	14	21		Pescara	0	0	1
	Brescia	19	25	28		Piacenza	0	1	1
	Cagliari	2	7	10		Pisa	1	3	2
	Catania	0	1	1		Pistoia	0	2	2
	Chieti	0	2	2		Pordenone	0	0	5
	Como	0	3	3		Potenza	0	0	2
	Cremona	0	5	7		Ravenna	1	1	3
	Cuneo	0	3	4		Reggio Emilia	67	91	79
	Ferrara	0	0	2		Rimini	1	11	5
	Firenze	23	31	35		Roma	115	184	150
	Foggia	1	1	2		Salerno	0	0	5
	Forlì-Cesena	0	3	6		Sassari	0	4	3
	Frosinone	0	0	1		Savona	0	0	1
	Genova	1	6	10		Siena	0	6	6
	Gorizia	0	0	1		Terni	1	2	4
	Grosseto	2	2	3		Torino	86	110	111
	Isernia	0	1	0		Trento	1	5	5
	La Spezia	0	2	1		Treviso	20	45	23
	Latina	0	0	1		Trieste	0	7	13
	Lecce	0	0	4		Udine	0	2	20
Lecco	3	5	8	Varese	2	4	15		
Livorno	0	0	1	Venezia	2	10	4		
Lodi	0	4	0	Vercelli	0	0	1		
Lucca	1	4	4	Verona	1	23	7		
Macerata	0	0	3	Vicenza	4	12	16		
Mantova	3	14	4						
Messina	0	1	0						
					Total		1.200	1.200	

In the following last tables and graphics, we give a further analysis that differentiates between companies that have done or have not done a merger or an acquisition.

In table 17 and 18, using a different proxy for firms we reported the total number of companies, divided per dimension, distinguishing between firms that were not involved in an agreement in all 10 years and firms that signed a deal (or more) in those years. As we can note in table 17 (where we used the number of employees as a proxy for dimension), only 3% of micro firms (with less than 9 employees) and 4% of small (more than 9 but less than 49) were involved in an M&A, on the contrary, 26% of big firms and 10% of medium (more than 250 or between 50 and 249 workers) signed a deal in those years.

Considering Turnover, this result is much more evident: if we divide companies for this dimension, we'll note that 100% of big firms (with more than 50 millions euro of turnover) were involved in an agreement, as well as 93% of medium firms (between 10 and 50 millions) and 87% of small firms (between 2 and 10 millions), while the number decrease at 10% if we consider micro firms (less that 2 millions).

In tables 19 and 20 we reported stats of the two variables Employees and Turnover, per year, and in graphs 1 and 2 we inserted the mean, for both proxies, of 3 groups, to stress the difference between the group of firms involved in an agreement and the group not involved, and showing the mean value of all firms.

Table 17. Italian firms per mean dimension (2003/2012 - measured in Employees), M&A's participant/not participant

		Total Number	M&A non- participants			M&A participants		
			Number	% on non participant	% on total	Number	% on participant	% on total
Firm size	Micro firms (1/9 empl.)	6.313	6.107	0,14	0,97	206	0,04	0,03
	Small firms (10/49 empl.)	14.353	13.847	0,31	0,96	506	0,09	0,04
	Medium firms (50/249 empl.)	15.389	13.912	0,32	0,90	1.477	0,26	0,10
	Big firms (250 and more empl.)	13.624	10.112	0,23	0,74	3.512	0,62	0,26
Firms	Number	49.679	43.978		0,89	5.701		0,11

Table 18. Italian firms per mean dimension (2003/2012 - measured in Turnover), M&A's participant/not participant

		Total Number	M&A non- participants			M&A participants		
			Number	% on non participants	% on total	Number	% on participants	% on total
Firm size	Micro firms (<2 Millions Eur Turnover)	48.490	43.569	1,00	0,90	4.921	0,86	0,10
	Small firms (2/10 Millions Eur Turnover)	576	75	0,00	0,13	501	0,09	0,87
	Medium firms (10/50 Millions Eur Turnover)	129	9	0,00	0,07	120	0,02	0,93
	Big firms (>50 Millions Eur Turnover)	159	0	0,00	0,00	159	0,03	1,00
Firms	Number	49.354	43.653		0,88	5.701		0,12

Table 19. Italian firms Employees summarized per year, All Firms/M&A's not-participant/M&A's not participant

Year	All firms						M&A non-participants						M&A participants					
	Number observations	Mean	St.Dev.	Min	Max		Number observations	Mean	St.Dev.	Min	Max		Number observations	Mean	St.Dev.	Min	Max	
2003	23.118	1428	10615	1	192.532		20.100	140	2092	1	192.532		3.018	10006	27378	1	149.019	
2004	24.490	1292	10034	1	179.774		21.127	156	1512	1	179.774		3.363	8430	25690	1	161.494	
2005	25.887	521	3728	1	99.057		22.658	165	1265	1	99.057		3.229	3018	9650	1	99.057	
2006	31.037	865	6337	1	155.347		27.167	162	921	1	98.447		3.870	5802	16980	1	155.347	
2007	32.814	864	6323	1	156.529		28.717	167	936	1	96.187		4.097	5745	16940	1	156.529	
2008	33.323	958	6735	1	150.379		28.882	171	937	1	91.441		4.441	6078	17449	1	150.379	
2009	33.481	1183	9539	1	190.651		29.013	166	845	1	87.422		4.468	7783	25041	1	190.651	
2010	33.195	1211	9746	1	196.723		28.620	177	1145	1	117.066		4.575	7683	25150	1	196.723	
2011	36.383	1127	9373	1	195.404		32.223	163	890	1	76.417		4.160	8596	26444	1	195.404	
2012	12.533	2593	15471	1	205.112		10.180	161	870	1	47.762		2.353	13117	33698	1	205.112	

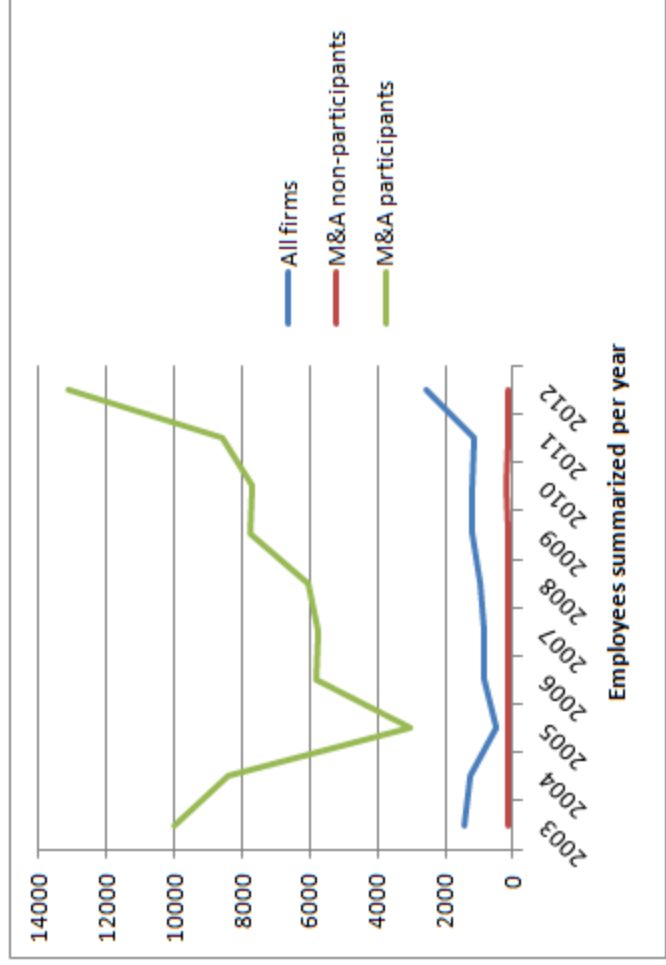
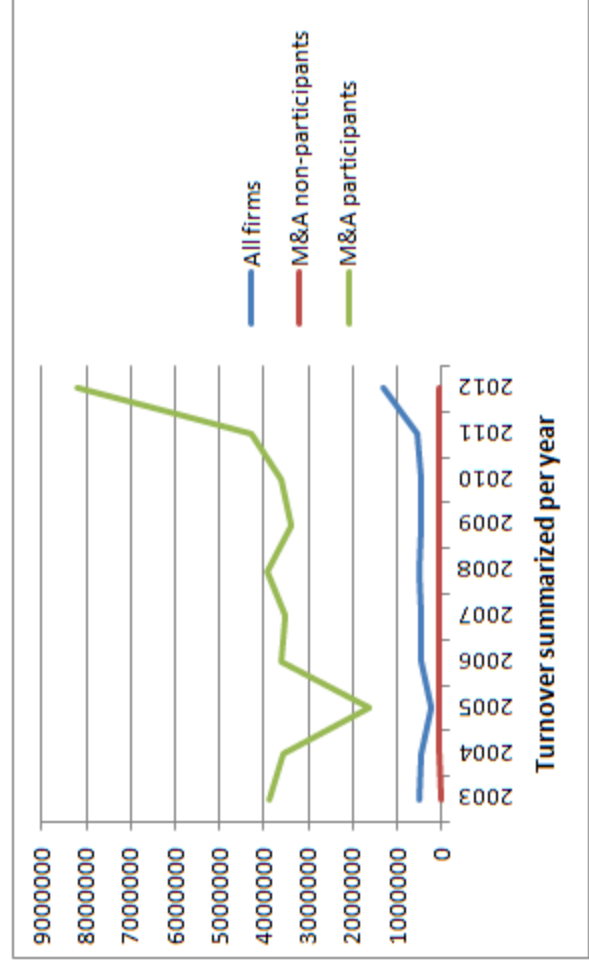


Table 20. Italian firms Turnover summarized per year, All Firms/M&A's not-participant/M&A's not participant

Year	All firms						M&A non-participants						M&A participants								
	Number observations	Mean	St.Dev.	Min	Max	Number observations	Mean	St.Dev.	Min	Max	Number observations	Mean	St.Dev.	Min	Max	Number observations	Mean	St.Dev.	Min	Max	
2003	27,081	507733	4657732	-3070	71,400,000	23,729	32901	157287	-3070	10,000,000	3,352	3869098	12700000	0	71,400,000						
2004	33,744	445507	4516172	-8008	79,300,000	29,872	38783	374967	-8008	54,300,000	3,872	3583337	12900000	0	79,300,000						
2005	34,967	219727	1990227	-4474	35,100,000	31,082	41862	274471	-4474	23,900,000	3,885	1642738	5725183	0	35,100,000						
2006	37,837	460752	4651142	-39188	87,800,000	33,421	47353	306420	-39188	23,900,000	4,416	3589421	13200000	0	87,800,000						
2007	42,283	439149	4595701	-7426	89,600,000	37,483	46809	276034	-7426	24,400,000	4,800	3502913	13200000	-382	89,600,000						
2008	42,951	494643	5425991	-60000	110,000,000	38,010	50400	358417	-60000	31,600,000	4,941	3912104	15500000	-14908	110,000,000						
2009	42,750	439907	4585932	-60000	85,400,000	37,745	46449	318664	-60000	24,800,000	5,005	3407158	13000000	-10772	85,400,000						
2010	42,835	470226	5070602	-50464	99,900,000	37,797	50702	356466	-20358	32,400,000	5,038	3617661	14400000	-50464	99,900,000						
2011	41,700	544610	5829103	-15223	111,000,000	36,887	53513	363503	-15223	37,500,000	4,813	4308398	16700000	-9218	111,000,000						
2012	17,716	1304913	10300000	-50101	129,000,000	14,993	52498	459755	-50101	43,200,000	2,723	8200786	25200000	-39905	129,000,000						



Indicators of performance

Analysing literature we could notate that an extremely large number of studies have analyzed the effect of M&As on firm's performance, but there exists much heterogeneity both on the definition of the performance of M&As and on its measurement (Zollo and Singh, 2004). Following Morosini et al. (1998) we decided to focus on operating performance analysis even if market-based measures have been suggested as superior alternatives for performance measurements (Woo et al., 1992) for two reasons: first of all the fact that our analysis consider Italian firms, and in Italy the stock market is substantially small if compared to all other developed economies, both in terms of enterprises listed and as a proportion of the economy in its entirety. The second reason is about the inefficiency of the market in the country that restricts the utility of stock price measures.

It's also important to consider that accounting returns as performance criteria may demonstrate a superior reliability, because firms could be made subject to audits with penalties for inaccurate filing (Fabling, Grimes and Stevens, 2008) and many authors consider the combined interaction of two firms better reflected in accounting measures (McGee, Thomas and Wilson, 2005; Tuch and O'Sullivan, 2007; Hitt et al., 1998; among others).

On the definition of operating performance and ratios to be used, other than benchmarks constructed, time frame and methodology design when they using accounting based method, we understand scholars did not left many actions brought (Wang and Moini, 2012). We decided not to follow the basic methodology in accounting-based studies, comparing post-acquisition returns to the weighted average of the pre-bid returns of each of the target and acquiring firm (Sudarsanam, 2003) because of the lack of accounting data of both firms involved in the merge for many deals. We decide instead of comparing post-acquisition returns to economic results of the deal's year for the acquiring firm.

About the accounting metrics used to evaluate the performance of M&As, we notate how ROA is widely used (Haleblian and Finkelstein, 1999; Hitt et al., 1998; Kusewitt, 1985; Ramaswamy, 1997; Zollo and Singh, 2004; Papadakis et al., 2010; among others) and considered the most appropriate ratio for measuring M&As performance if compared with profit/sales ratio and return on equity (Meeks and Meeks, 1981).

In our context, we decided to use ROA and ROE as proxies for performance, following literature.

We measured performance of the firm 1, 3 (such as Zollo and Singh, 2004; DeLong and DeYoung, 2007; for example) and 5 years (following Ramaswamy and Waagelein, 2003; among others) after the acquisition.

Morosini et al (1998) measured performance for two years following the acquisition based on two justifications: first because a large literature suggests that the first two years after an acquisition are critical to its overall performance (Jemison and Sitkin, 1986; Balloun and Gridley, 1990); second, by the end of a two-year period after the acquisition, the process of combining the firms usually has been completed, and the results of the underlying integration effort can be measured effectively (Jemison and Sitkin, 1986).

We adjusted the acquiring firm's performance variable against the performance of its peers in the same geographic area, in order to control for competitive conditions in the acquirer's market, following Zollo and Singh (2004). For all firms we don't know the geographical position we adjust the variable for its peers mean in the whole country.

About controls we used, following Borin and Mancini (2014) we provide general variables in order to keep observed many important factors. In particular we used acquirer's size (Borin and Mancini, 2013; Zollo and Singh, 2004; among others), geographic localization, sector (Morosini et al., 1998).

Here we reported the list of variables used:

-Dependent variables:

+RTAS = ROA using Profit or Loss before tax, in percentage, for years 2003/2012 $[(\text{Profit before tax} / \text{Total assets}) * 100]$, adjusted against the performance of its peers in the same geographic area – Bureau Van Dijk;

+RSHF = ROE using Profit or Loss before tax, in percentage, for years 2003/2012 $[(\text{Profit before tax} / \text{Shareholder funds}) * 100]$, adjusted against the performance of its peers in the same geographic area – Bureau Van Dijk;

-Independent variables: The key independent variable in this study is a dummy M&A considered for each year between 2003 and 2012 – SDC Platinum;

-Control variables:

+Geographical position = dummies for each of the 110 Italian province: Agrigento, Alessandria, Ancona, Arezzo, Ascoli Piceno, Asti, Avellino, Bari, Barletta-Andria-Trani, Belluno, Benevento, Bergamo, Biella, Bologna, Bolzano, Brescia, Brindisi, Cagliari, Caltanissetta, Campobasso, Carbonia-Iglesias, Caserta, Catania, Catanzaro, Chieti, Como, Cosenza, Cremona, Crotone, Cuneo, Enna, Fermo, Ferrara, Firenze, Foggia, Forlì-Cesena, Frosinone, Genova, Gorizia, Grosseto, Imperia, Isernia, L'Aquila, La Spezia, Latina, Lecce, Lecco, Livorno, Lodi, Lucca, Macerata, Mantova, Massa-Carrara, Matera, Medio Campidano, Messina, Milano, Modena, Monza e della Brianza, Napoli, Novara, Nuoro, Ogliastra, Olbia-Tempio, Oristano, Padova, Palermo, Parma, Pavia, Perugia, Pesaro E Urbino, Pescara, Piacenza, Pisa, Pistoia, Pordenone, Potenza, Prato, Ragusa, Ravenna, Reggio Calabria, Reggio Emilia, Rieti, Rimini, Roma, Rovigo, Salerno, Sassari, Savona, Siena, Siracusa, Sondrio, Taranto, Teramo, Terni, Torino, Trapani, Trento, Treviso, Trieste, Udine, Aosta, Varese, Venezia, Verbano-Cusio-Ossola, Vercelli, Verona, Vibo Valentia, Vicenza, Viterbo.

+Sector = dummies for 18 sectors: Accommodation and food service activities, Activities of extraterritorial organisations, Administrative and support service activities, Agriculture forestry and fishing, Arts entertainment and recreation, Construction, Education, Electricity gas steam and air conditioning, Financial and insurance activities, Human health and social work activities, Information and communication, Manufacturing, Mining and quarrying, Other service activities, Professional scientific and technical, Public administration and defence, Real estate activities, Transportation and storage, Water supply sewerage waste management, Wholesale and retail trade.

+Company size = dummies for company size, measured by employees, divided in 4 classes: Micro Firm (between 1 and 9 empl.), Small Firm (between 10 and 49 empl.), Medium Firm (between 50 and 249 empl.), Big Firm (250 empl. and more).

+Stock exchange listing = dummies for stock exchange listing, for 11 classes: Boerse Frankfurt, Borsa Italiana - MTA (Mercato Telematico Azionario), Delisted, Euronext Paris, Hong Kong Stock Exchange, London Stock Exchange, Mercato Alternativo del Capitale, NASDAQ National Market, New York Stock Exchange, Swiss Exchange, Unlisted.

+Type class = dummies for type classes: Consortium, Consortium by shares, Consortium of cooperatives, Consortium with external activity, Cooperative company with limited liability, Cooperative company with limited liability, Cooperative company with unlimited liability, European economic joint venture - GEIE, Foreign company, Foundation, Foundation business, General partnership - SNC, Joint stock company - SPA, Limited liability company - SRL, Limited liability consortium, Limited partnership - SAS, Limited partnership by shares - SAPA, Not classified, One-person company with limited liability, One-person joint stock company - SPA, Partnership - SS, Public agency, Social cooperative company.

The theoretical framework

Implementation of Propensity Score Matching

Taking into account our data, we could note in the last tables and graphs that in Italy firms that expand (locally or abroad) through mergers and acquisitions have a competitive advantage on firms that don't, and the results of an empirical analysis on the actual ex-post impact of an agreement with a foreign company on corporate performance is not reliable. Our purpose is to get through the fundamental evaluation problem and approach the possible occurrence of selection bias.

The first question is: what is the difference between the firm that was involved in an M&A during the time considered and a firm that wasn't? What we are considering is a treatment evaluation: the estimation of the average effects of a program or treatment on the outcome of interest. The purpose is to carry out a comparison of outcomes between treated and control observations.

More precisely: what would have happen to the same firm that was involved in an M&A if that precise firm would have not been involved? Obviously it's impossible to know that answer, because we can't observe both outcomes for the same enterprise at the same time. We could compare the firms involved in an M&A with the ones that does not, but as we noted before, firms that expand abroad are usually different from firms that don't.

It is possible to effectuate a treatment evaluation in two types of studies:

1. Controlled experiments (assignment into treated and control groups is random: treated and control units have the same expected outcome in absence of the program)
2. Observational studies (assignment into treated and control groups is not random).

In case data result from observational studies, where the assignment of subjects to the treatment and control groups is not random, the treatment evaluation can be affected by the attendance of confounding factors. Specifically for our work, considering the M&As activity as a treatment that not all enterprises are affected to and taking the ex-post performance of non-treated firms as an approximation is not appropriate because companies differ regardless of the treatment, and this is the problem known as selection bias. In order to decrease the bias in the estimation of treatment effects with observational datasets, Rosenbaum and Rubin (1983) suggested the method of the Propensity Score Matching (PSM).

The PSM methodology assign the observations into two groups: the treated group that received the treatment (the firms in the M&As dataset) and the control group that did not (all others Italian firms present in the Amadeus database). The treatment (in our case, the M&A) is a binary variable that determines if the observation has the treatment or not (take value equals to 1 for treated observations and equals to 0 for control observations).

This approach calculate the probability of receiving the treatment, taking into account the effects of different observed characteristics, implement a single propensity score or single-index variable (that makes the matching achievable): $P(x) = \Pr(T=1 | x)$.

The PSM is efficient under two conditions:

Conditional independence assumption:

For random experiments= the outcomes are independent of treatment. $Y_0, Y_1 \perp D$

For observational studies= the outcomes are independent of treatment conditional on x . $Y_0, Y_1 \perp D | x$
that is unobserved factors do not influence participation

This is a strong assumption but if unobserved factor influence participation to the treatment, PSM is not a correct methodology.

Presence of a common support: Matching or overlap assumption

For each value of x , there are both treated and control observations

For each treated observation, there is a matched control observation with similar x $0 < \text{prob}(D=1 | x) < 1$

This assumption guarantee there's a comparison for each treated observation.

The problem called selection bias we mentioned before, is reduced using PSM, because of the estimation of the treatment effect that takes into account pre-treatment factors, comparing subjects as similar as possible which both participate and do not participate to the treatment.

The only way to which the bias can be eliminated is when the participation to the treatment is completely random among subjects which show the same value of the PS, but PSM in cases when randomization of the treatment is not possible, it's the second best: it try to mimic randomization, that is try to have an observational analogue of a randomized experiment (Khandaker Gayatri Samad, 2010). Insofar as the bias can be reduced using PSM, depends on the variables used to calculate the index and the performance of the matching.

Using this propensity score, treated and not treated groups are then matched (observations for which there's not a match are eliminated), and is calculated the Average Treatment effect on the Treated of the treatment itself. The ATT is the difference between the outcomes of treated and the outcomes of the treated observations if they had not been treated, it is the mean difference across the two groups.

$$ATT = E(Y_1 | p(x), D=1) - E(Y_0 | p(x), D=0)$$

In the empirical estimation each treated observation i is matched with a j control observation and their outcomes Y_0 are weighted by w .

$$ATT = 1/N_1 [\sum_{i \in (D=1)} Y_{1,i} - \sum_j w(i,j) Y_{0,j}]$$

The weights used to aggregate outcomes for the matched nonparticipant can be various.

In order to implement the estimation of the Average treatment effect, we should calculate the $P(x)$: participation D should be estimated on all the observed covariates X in the data that are likely to determine participation. When one is interested only in comparing outcome for those participating ($D=1$) with those not participating ($D=0$) this estimate can be constructed from a probit or logit model of program participation. Thus, after assigned the observations into two groups, we estimate a probit/logit model for the propensity of obs to be assigned into the treated group, using x variables (which are the pre-treated characteristics) that could influence the likelihood of being assigned into the treated group as independent variables and the treatment variable as dependent.

PSM will be biased if covariates relevant for participation are not included in participation equation due to for example, poor-quality data of misunderstanding of the local context in which the treatment take place. Heckman, Ichimura and Todd (1998) suggest three provisions: a) Use of the same data source for both the participant and nonparticipants, in order to ensure that the observed characteristics are measured the same way; b) use of a large sample of nonparticipants, but considering the importance that participants and nonparticipants should be facing the same economic incentives to participate to the program (one possible is choose observations from the two groups, coming from the same geographic area); c) Prevent from include too many variables in the participation equation, because overspecification of the model can result in higher standard errors for the estimated PS.

Subsequently to the calculation of the Propensity Score, we do the matching, using different method, to match obs from treated and control group, considering their score (instead of using the x).

There are different methods available:

Nearest-Neighbour matching: using the propensity score calculated, this method consists in taking each treated unit and searching for the control unit with the closest value of PS. Matching can be done with or without replacement (that means the same nonparticipant can be use as a control for various participant).

Radius matching: sometimes, find a unit between the control groups with a PS near the value of each treated unit, can be difficult. This situation result in poor matches and can be avoided using the radius method, with which each treated unit is matched only with the control units whose propensity score falls into a predefined neighbourhood of the propensity score of the treated unit. We must consider that, imposing this threshold of maximum distance between the values can have, as a result that if the dimension of the neighbourhood C (i.e. the radius) is set to be very small, could be possible that some treated units are not matched because the neigh does not contain control units. At the same time, chose a small size of the neighbourhood, can ensure us a better quality of the matches

Kernel matching: All participants are matched with a weighted average of all nonparticipants with weights that are inversely proportional to the distance between the PS of participants and nonparticipants.

Stratification method: this method split the common support into various strata dividing the range of variation of the PS in intervals such that with each interval. Specifically, within each interval, treated and control units have on average the same PS.

Difference in difference model

The difference in difference model is applied when panel data on outcomes are available before and after the experiment occurs. It is an improvement over the one-period model and compares treated and non-treated groups in terms of outcome changes over time relative to the outcome observed for a pre-treatment baseline.

In other terms, for our case, given two periods: b= before and a=after the M&A, letting Y_1 and Y_0 respectively the outcomes for the firms involved or not involved in a deal in time t, the difference-in-difference average treatment effect on the treated is specified as:

$$ATT_{DID} = E(Y_a - Y_b | D=1)$$

$$ATT_{DID} = E((Y_{1a} - Y_{0a}) - (Y_{1b} - Y_{0b}) | X, D=1)$$

$$ATT_{DID} = E((Y_{1a} - Y_{1b}) | X, D=1) - (Y_{0a} - Y_{0b}) | X, D=1)$$

The first term refers to the difference in outcomes before and after the treatment for the treated group. This term may be biased if there are time trends.

The second term uses the difference in outcomes from the control group to eliminate this bias.

Unlike only PSM, the estimator DID takes into account unobserved heterogeneity, which can lead to selection bias. This estimator is based on a comparison of the observed mean outcomes of treated and non-treated group, before and after the intervention.

It is possible to estimate the effect of a treatment, in case there's availability of baseline data, under the hypothesis that unobserved heterogeneity is time invariant it isn't correlated with the treatment along time. Conditional exogeneity is an hypothesis much more strong of this, making DID a better method to compare the two groups.

To apply the difference-in-difference model: instead of the outcomes from the treated and the control groups, we use the difference in outcomes after the treatment and before the treatment. We calculate the average difference in outcomes separately for the two groups over the two periods and then considering the difference between the average changes in outcomes for participant and nonparticipant: $DID = (Y_4 - Y_0) - (Y_3 - Y_1)$. This model considers unobserved characteristics as time invariant: the gap between the participants and non participants does not change during the period, and this implicates that $(Y_3 - Y_2) = (Y_1 - Y_0)$. Using the equation before mentioned: $DID = (Y_4 - Y_2)$

The rest of the analysis is the same.

Econometric Results

Performance today of firms involved in an M&A today

As we mentioned in the previous chapters, it is widely recognized that firms that expand (locally or abroad) have noticeable advantages as compared to those enterprises that does not, even before the investment itself. We showed that in our database, Italian firms involved in M&As, both in the country or beyond the Alps, confirm this evidence. For this reason it seems newsworthy to analyze the differences between firms involved and not-involved in M&As, considering also other peculiarities of the firm, before explore the causality between deals and performance.

A standard methodology to verify the existence of a difference in performance between companies consists on an estimate of this equation (Borin and Mancini, 2013):

$$Z_{it} = \alpha + \gamma M\&A_{it} + \beta \text{control}_{it} + \epsilon_{it}$$

Where the dependent variable (Z) is the proxy for the performance for the i firm at time t adjusted against the performance of its peers in the same geographic area, in order to control for competitive conditions in the acquirer's market; the independent variable we are interested in observe is γ : M&A is a dummy equal to 1 if the i firm reach an agreement at time t and thus γ is a parameter that detects differences in characteristics compared to non-M&As companies; Control is a vector of control variables, such as regional location, company size, sector, stock exchange listing, type class.

We use different proxies for the performance of firms and we analyzed ten different years: from 2003 to 2012. As we can observe in tables 1 results, using OSL regressions, it's hard to say that firms that are involved in a merger or acquisition performed better than the others. Seems interesting that we cannot find the assumptive advantage position: in fact we find weak and/or even contrary results obtained with ROA and ROE.

In the appendix A we reported results including controls, in those tables, below the first line we reported results of control variables. As described above, our control variables were used to check on geographical, size, sector, type and listing aspects.

The geographical variables are dummies for each provincial capital city. For the sake of simplicity we reported only results for the regional capital city. In general we can observe that we find negative significance in various years and both performance proxies for the provinces of Bari, Cagliari, Campobasso, Catanzaro and Trento; weak results of negative significance (only one year/proxy significant) for provinces of Napoli, Palermo, Perugia, Torino, Trieste and Aosta, and only Milan has a pale positive result. Those results imply that companies that are involved in a merger or acquisition and are located in Bari, Cagliari, Campobasso, Catanzaro and Trento, have a worse performance than the others.

Considering the sector variables, we find stronger results: Administrative and support service activities, Human health and social work activities, Water supply, show strong positive significance in many years and whit both proxies, so did Financial and insurance activities, but with weaker results. Agriculture, forestry and fishing together with Arts entertainment and recreation sector seem to have a significative negative effect on performance, confirmed in years and variables from 2003 to 2007, but not in recent years. On the contrary Construction and Education sectors show better results from 2008 to 2012. Electricity gas steam and air conditioning, Public administration and defence together with Manufacturing show contrasting results.

About company size, again we found different results for 2003 and 2004 respect to others. Being a Micro Firm (between 1 and 9 empl.) has a negative impact on performance on those years but a positive impact from 2006 on. Being Medium Firm (between 50 and 249 empl.) or having a number of employees comprised between 10 and 49 (s.c.Small Firm) is positive since 2004. This result is in line with literature: Baldwin (2012) suggests that it is thanks to the reduction of costs associated with the internationalization that also relatively less productive firms can turn up in foreign markets. Being listed on a stock exchange has contrasting effects on the economic performance of an Italian company that completes a merger or an

acquisition in relation to years observed and proxy used. Considering the type class, Consortiums, Cooperatives and SRL in particular among others are the corporate forms that notice a positive effect on performance of a firm involved in M&A in many years (with exceptions for the 2012). Partnership, on the contrary shows a negative effect on performance.

Table 1. Performance today of firms involved in an M&A today - 2003/2012

M&A YEAR		Performance difference between firms involved/not involved in M&A									
		2003		2004		2005		2006		2007	
Dep.Var.		RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*
		ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %
M&A	coef	-0.176	-18.128	-0.963	-4.410	-0.515	-15.706	-2.495**	-10.289**	0.920	0.136
	s.e.	1.608	13.274	1.505	4.596	1.043	12.077	1.078	5.178	1.016	6.690
Geographical position controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sector controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Company size controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Stock exchange listing controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Type class controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	coef	-6.963***	-40.296***	-6.120	-7.322	-1.989	-5.153	-5.669***	-55.130***	-8.960***	-34.451**
	s.e.	2.008	12.822	4.063	17.547	1.844	12.493	1.570	15.453	2.328	15.995
Number of obs.		24,162	23,562	30,401	29,687	31,634	30,919	34,048	33,208	37,734	36,619
R-sq		0.012	0.026	0.013	0.028	0.013	0.027	0.013	0.035	0.009	0.029

Table 1. Performance today of firms involved in an M&A today - 2003/2012

M&A YEAR		Performance difference between firms involved/not involved in M&A									
		2008		2009		2010		2011		2012	
Dep.Var.		RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*
		ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %
M&A	coef	-1.836	-12.223	-1.042	4.574	-3.537**	-21.154**	-0.244	-11.473	-2.090	9.507*
	s.e.	4.627	8.055	1.908	7.734	1.432	9.433	1.039	10.829	3.141	5.602
Geographical position controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sector controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Company size controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Stock exchange listing controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Type class controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	coef	-21.692	-22.676	-3.683**	-8.145	-5.934*	-7.641	2.483	2.317	-22.510	26.635
	s.e.	28.504	14.531	1.860	14.068	3.487	14.578	1.959	10.239	16.082	25.123
Number of obs.		38,304	37,048	38,391	37,126	38,432	37,213	37,490	36,037	15,208	14,794
R-sq		0.002	0.025	0.009	0.028	0.003	0.036	0.008	0.034	0.001	0.035

Performance yesterday of firms involved in an M&A today

As we pointed out, firms that are involved in mergers and acquisitions have a competitive advantage even before the deals, but to control the trueness of this assumption in our data it is necessary to compare the productivity and other characteristics of the enterprise before it carries out an agreement, locally or abroad, with those companies that are not involved in deals. To assess these differences we estimated the following equation:

$$Z_{t^*-s} = \alpha + \gamma M\&A_{start_{it^*}} + \beta control_{i(t^*-s)} + \epsilon_{i(t^*-s)}$$

Where Z is again the proxy for the performance for the i firm, adjusted against the performance of its peers in the same geographic area, but in this equation we consider it at a time s-t*: s years before the deal's sign in time t*; M&A_{start} is a dummy equal to 1 if the i firm reach an agreement at time t* and thus γ is a parameter that detects differences in characteristics compared to non-M&As companies (firms involved in M&As in other years are not included); Control is a vector of control variables general, such as regional location, company size, sector, stock exchange listing, type class.

As before, we wanted to try the same equation using different proxies for the performance of firms, and also in this case we analysed many different years. Moreover, we use three different "s" years before the deal's sign in time t* to analyse the difference: s=1, s=3, s=5. As we can see in table 2 results, using OLS regressions.

Again, results in tables 2 did not showed the advantage in the characteristics of the enterprise before it carries out an agreement, both locally and abroad. We can note differences between years, and we can find some positive results in some years, but making a comprehensive consideration we cannot state that already five, three or (even less) one year before carrying out a merger or acquisition, companies have particular characteristics, indeed did not appear larger in economic terms of the companies that will not carry out any agreement. This analysis does not confirm the existence of a "natural" pre-selection of Italian companies inherent in making economic agreements with other companies, both in Italy and abroad.

Considering control variables, all results are reported in Appendix B. Our control variables were used to check on geographical, size, sector, type and listing aspects and are reported with the years on columns and the variables on rows.

Again, the geographical variables are dummies for provincial capital city. What is notable is that, disrespecting of the lag used, the regional capital cities of Bari, Cagliari, Campobasso, Catanzaro and Trento show negative and significative results. That means that firms located in those provinces and involved in a M&A used to have worse performance than the others even before 1, 3 of 5 years. Only the city of Milan shows (even if weak) positive result.

Controls for the sectors show also in this case that Administrative and support service activities, Human health and social work activities, Water supply, Information and communication, Manufacturing, shows strong positive significance in many years and whit both proxies, so did Financial and insurance activities, but with weaker results. Also in this case agriculture, forestry and fishing together with arts entertainment and recreation sector seem to have a significative negative effect on performance, confirmed in years, lags and variables from 2003 to 2007, but not in recent years. Public administration and defence sector shows contrasting results.

About company size we found results varying with years and lags considered for Micro firm respect to others. Being a Micro Firm (between 1 and 9 empl.) has a negative impact on performance on the first years but a positive impact from 2008 on. Being Medium Firm (between 50 and 249 empl.) or having a number of employees comprised between 10 and 49 (s.c. Small Firm) is significative and positive.

Being listed on a stock exchange has contrasting effects on the economic performance of an Italian company that completes a merger or an acquisition in relation to years observed, lags and proxy used.

Considering the type class, Consortiums, Cooperatives and SRL in particular among others are the corporate forms that notice a positive effect on performance of a firm involved in M&A in many years and with different lags. Partnership, on the contrary shows a negative effect on performance.

Table 2. Performance yesterday of firms involved in an M&A today - s=1 - 2004/2012

M&A YEAR	Performance difference between firms involved/not involved in M&A												
	2007		2008		2009		2010		2011		2012		
	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	
Dep.Var.		ROE using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %
M&A	coef	1.819	4.181	-0.188	-7.447	-3.089	-19.694*	-2.669**	-22.536**	-0.272	-6.514	-0.173	-8.475
	s.e.	1.271	4.211	1.050	9.482	3.287	10.202	1.264	9.734	1.595	7.481	1.483	8.820
Geographical position controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sector controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Company size controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Stock exchange listing controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Type class controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	coef	-5.614***	-54.966***	-9.989***	-26.336	-21.460	-26.619**	-3.731**	-8.112	-5.882*	-7.478	2.360	2.489
	s.e.	1.570	15.448	2.310	19.009	20.017	12.071	1.918	14.379	3.477	14.264	1.976	10.202
Number of obs		34,810	33,174	37,759	36,638	38,265	37,868	38,485	37,136	38,448	37,227	37,453	36,082
R-sq		0.013	0.035	0.009	0.030	0.002	0.025	0.009	0.029	0.003	0.036	0.088	0.034

Table 2. Performance yesterday of firms involved in an M&A today - s=3 - 2006/2012

M&A YEAR	Performance difference between firms involved/not involved in M&A														
	2006		2007		2008		2009		2010		2011		2012		
	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	
Dep.Var.		ROE using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %		
M&A	coef	2.390**	14.318**	1.213	2.788	-2.756	-1.650	0.313	-8.096	-1.575	4.361	2.402	1.942	1.425	-1.408
	s.e.	0.645	3.709	1.190	4.900	1.701	7.072	1.170	6.700	1.120	6.804	3.595	6.401	1.193	7.432
Geographical position controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sector controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Company size controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Stock exchange listing controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Type class controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	coef	-5.974***	-40.549***	-8.115	-7.365	-2.890	-5.190	-5.614***	-55.015***	-6.929***	-34.459**	-21.338	-28.759**	-3.994**	-8.033
	s.e.	2.002	12.080	4.042	17.506	1.806	12.417	1.372	15.428	3.202	15.090	28.104	12.308	1.685	14.542
Number of obs		24,219	23,629	38,438	29,721	31,678	30,962	34,007	33,172	37,725	36,608	38,276	37,024	38,395	37,994
R-sq		0.012	0.026	0.013	0.028	0.014	0.027	0.013	0.035	0.009	0.029	0.002	0.025	0.009	0.028

Table 2. Performance yesterday of firms involved in an M&A today - s=5 - 2008/2012

M&A YEAR	Performance difference between firms involved/not involved in M&A										
	2008		2009		2010		2011		2012		
	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	
Dep.Var.		ROE using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %
M&A	coef	0.862	16.841	0.075	5.875	-0.731	7.796	0.905	11.269*	-0.391	-5.625
	s.e.	1.185	10.779	1.433	4.257	0.762	5.347	1.013	6.167	1.525	11.082
Geographical position controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sector controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Company size controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Stock exchange listing controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Type class controls		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	coef	-7.024***	-41.455***	-5.110	-7.302	-2.031	-5.299	-5.567***	-55.893***	-9.104***	-34.876**
	s.e.	2.078	13.726	4.001	17.525	1.828	12.459	1.572	15.474	2.314	15.952
Number of obs		24,201	23,610	30,437	29,721	31,663	30,936	34,019	33,184	37,685	36,571
R-sq		0.012	0.026	0.013	0.028	0.013	0.027	0.013	0.035	0.009	0.028

Performance tomorrow of firms involved in an M&A today

Given what we have seen through this introductory analysis, namely, that our dataset does not tend to confirm without doubts what the literature had shown widely, which means that are necessary initial characteristics so that a company is involved in a merger or an acquisition with others. This fact makes it more complicated our analysis on the effect that an agreement can result in the performance of the company.

If there was a kind of ex-ante selection for which not all companies are potentially suitable to carry out a merger or acquisition agreement with others, either abroad or in Italy, as we said, in order to analyze the effect of the "M&As treatment", we should ideally analyze the same company in two cases in which it carries out or not the merger, but this is not possible, then we should analyze companies as similar as possible to those who have entered into an agreement, using the technique of matching.

In this sense would be therefore necessary to identify a set of observable variables that constitute the vector x on which this similarity ex-ante and the matching between the treated and untreated, that way it would be possible to analyze the performance difference between the two groups (the treated and untreated) after treatment. This is commonly defined as the average treatment effect on the treated (ATT). So as we have explained in previous chapters, what we did was to estimate a propensity score, the probability that a firm carries out a merger or an acquisition, based on a vector of observable variables X , measured in t^*-1 for businesses begin to sign the agreement in t^* . This way we built a control group of firms that did not merge but were similar to those who did merge.

The explanatory variables we used to check on similarities of those companies were dummies to check on size, sector and size class. We used 9 different regressions varying proxies or years.

$$\text{Prob M\&A start}_{it^*} = \alpha + \beta \text{control}_{i(t^*-1)} + \varepsilon_{i(t^*-1)}$$

Where $M\&A \text{ start}_{it^*}$ is a dummy equal to 1 if the i firm reach an agreement at time t ; $\text{Control}_{i(t^*-1)}$ is also this time the vector of control variables, such as sector, company size and type class, to detect differences in firms.

In table 3B, placed in Appendix C, we reported the control variables results. What we found is that the size of the company, being Small, Medium or Big size, is significant: being Small has negative effect or not significative, while it is confirmed the importance of being a Medium or (with better results) Big firm to expand (locally or abroad).

The type class variables are always negative and significative for SRL (with one or more person in the company), while we find contrasting results for SPA (with more than one person in the company) and positive results for one-person joint stock company - SPA.

About sectors we can affirm Information and communication, together with Manufacturing, Arts and Electricity have a positive effect.

After the estimation of the propensity score, the observations were then paired with the companies most similar in terms of PS, but that have not carried out later mergers or acquisitions. The control sample so selected did not differ in mean values of the main variables of interest in the sample of the treated. The matching method we used is the Average treatment effect on the treated (ATT or ATET), where the weights used to aggregate outcomes for the matched nonparticipant can be various:

$$ATT = 1/N_1 [\sum_{i \in (D=1)} Y_{1,i} - \sum_j w(i,j) Y_{0,j}]$$

And the Difference in difference method:

$$ATT_{DID} = 1/N_{M\&a} [\sum_{i \in (D=1)} (Y_{1a} - Y_{1b})_{,i} - \sum_j w(i,j) (Y_{0a} - Y_{0b})_{,j}]$$

Where $N_{M\&a}$ is the number of firms that begin doing M&A, Y_1 and Y_0 are respectively the variation in performance between t^* (a) and t^*+s (b) of company i that is investing in M&As and of j that does not and the weight of j firm associated by matching to the i firm involved in M&As. More simply: ATT did is the difference between the mean (performance of firms involved in M&A) and weighted mean (performance of

companies not involved). This way we obtained an approximation of the difference in performance due to the decision to be involved in an M&A.

In table 3A we reported the results of the analysis using both PSM (ATT) and Difference in difference model (ATTDID), finding none or contrasting results. The ATT results does not confirm that firms involved in an M&A shows, 1, 3 and 5 year after the deal, better economic results of firms that before the treatment were very similar but that did not performed it the year later. The ATT_{DID} results either do not confirm the hypothesis.

Table 3A. Performance tomorrow of firms that could be involved in an M&A today - $\alpha=1$, $\beta=3$, $\gamma=5$

		Performance after M&A using PSM																		
M&A YEAR		2003		2004		2005		2006		2007		2008		2009		2010		2011		
Lag		1		1		1		1		1		1		1		1		1		
		PSM		DID		PSM		DID		PSM		DID		PSM		DID		PSM		
Dep.Var.		RTAS		RTAS		RTAS		RTAS		RTAS		RTAS		RTAS		RTAS		RTAS		
		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		
ATTND		coef	-1.749*	-0.173	4.708	1.162	-1.140	-0.946	-1.260	0.687	-3.361**	-3.669**	-2.831	4.889*	0.796	-0.087	-0.438	3.450*	-1.857	1.474
		std	0.797	0.540	0.924	1.100	0.926	0.587	1.614	0.844	1.862	1.162	1.436	2.615	1.428	2.528	1.334	1.586	2.161	2.558
Number of controls			16,522	12,598	21,605	26,561	25,760	23,953	26,194	23,636	23,277	22,831	38,426	28,947	29,963	28,684	26,828	27,908	11,361	11,133
Number of treated			104	104	99	99	138	138	187	187	176	176	215	215	168	158	179	179	194	194
ATTK		coef	-0.863*	-0.387	4.848	1.641	-1.536	-0.969	-1.079	0.668	-0.358	0.516	-2.704**	0.287	-0.171	-0.475	-1.602	2.220**	-2.636	1.440
		std	1.077	0.884	1.734	1.764	1.223	0.823	1.437	0.465	1.069	0.586	0.787	2.452	1.836	1.703	2.060	0.893	2.172	1.482
Number of controls			32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949	38,959	38,959	39,636	39,636	36,272	36,272	38,538	38,538
Number of treated			104	104	99	99	138	138	187	187	176	176	215	215	168	158	179	179	194	194
ATTS		coef	-1.896**	-0.118	4.708	1.534	-1.568	-0.896	-1.066	2.140	1.686	2.168	-2.429**	1.980	0.349	-0.680	-1.172	2.928	-1.112	2.828
		std	0.742	0.504	0.944	0.941	1.070	1.167	0.732	0.703	1.474	0.782	1.020	0.172	0.388	0.913	1.165	1.059	1.183	1.825
Number of controls			32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949	38,959	38,959	39,636	39,636	36,272	36,272	38,538	38,538
Number of treated			104	104	99	99	138	138	187	187	176	176	215	215	168	158	179	179	194	194

Table 3A. Performance tomorrow of firms that could be involved in an M&A today - $\alpha=1$, $\beta=3$, $\gamma=5$

		Performance after M&A using PSM																		
M&A YEAR		2003		2004		2005		2006		2007		2008		2009		2010		2011		
Lag		1		1		1		1		1		1		1		1		1		
		PSM		DID		PSM		DID		PSM		DID		PSM		DID		PSM		
Dep.Var.		RSHP*		RSHP*		RSHP*		RSHP*		RSHP*		RSHP*		RSHP*		RSHP*		RSHP*		
		ROE using P/L before tax %		ROE using P/L before tax %		ROE using P/L before tax %		ROE using P/L before tax %		ROE using P/L before tax %		ROE using P/L before tax %		ROE using P/L before tax %		ROE using P/L before tax %		ROE using P/L before tax %		
ATTND		coef	4.466	12.955	-3.993	1.527	-8.864	4.885	2.029	1.689	-10.581*	-0.811	-15.307**	-4.184	-6.746	1.030	-9.915	16.216	1.842	12.371
		std	5.038	11.163	7.036	5.479	10.487	11.738	5.326	6.950	16.950	7.507	7.382	11.408	11.603	6.315	8.269	15.864	6.665	15.194
Number of controls			16,580	12,568	21,268	26,854	25,275	23,287	25,574	22,838	22,634	21,171	28,557	27,919	29,115	27,582	27,868	26,728	11,111	18,758
Number of treated			104	104	99	99	138	138	187	187	176	176	215	215	168	158	179	179	194	194
ATTK		coef	-10.026	12.281*	5.544	2.360	-10.960**	5.134	-1.886	7.863*	22.532**	-13.087**	-20.860**	-2.549	-11.883	1.786	-5.382**	18.967*	4.882	12.789
		std	7.928	6.888	8.381	3.874	8.629	6.884	7.839	2.762	8.888	5.248	7.744	6.478	8.339	7.359	2.577	7.105	5.640	12.477
Number of controls			32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949	38,959	38,959	39,636	39,636	36,272	36,272	38,538	38,538
Number of treated			104	104	99	99	138	138	187	187	176	176	215	215	168	158	179	179	194	194
ATTS		coef	6.147	18.831**	3.588	1.918	-14.954	0.321	2.376	-11.719**	-17.608**	-11.724**	-18.548**	-2.546	-6.084	1.091	-11.759**	18.719*	-11.769**	18.719*
		std	6.913	4.291	7.579	3.135	10.680	11.384	2.374	8.365	3.764	5.885	6.688	11.629	2.883	16.327	5.579	10.883	3.579	10.680
Number of controls			32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949	38,959	38,959	39,636	39,636	36,272	36,272	38,538	38,538
Number of treated			104	104	99	99	138	138	187	187	176	176	215	215	168	158	179	179	194	194

Table 3A. Performance tomorrow of firms that could be involved in an M&A today - $\alpha=1$, $\beta=3$, $\gamma=5$

		Performance after M&A using PSM																	
M&A YEAR		2003		2004		2005		2006		2007		2008		2009					
Lag		3		3		3		3		3		3							
		PSM		DID		PSM		DID		PSM		DID							
Dep.Var.		RTAS		RTAS		RTAS		RTAS		RTAS		RTAS							
		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %		ROA using P/L before tax %							
ATTND		coef	-0.516	1.725	-0.945	-0.821	-1.568	-1.156	-1.100**	1.594	-0.234	-0.843	-3.435*	3.289	-1.420	-3.544			
		std	1.307	1.488	1.538	1.177	1.254	0.868	0.549	1.123	2.788	2.204	2.095	2.597	1.935	5.017			
Number of controls			16,881	12,869	25,302	26,671	28,173	23,303	28,388	22,126	23,083	28,628	29,706	26,952	12,111	11,260			
Number of treated			104	104	99	99	138	138	187	187	176	176	215	215	158	158			
ATTK		coef	-0.462	1.746	-1.151	-0.424	1.690	-1.497	-1.619**	0.997	-0.839	-1.467	-3.948**	-1.342	-1.882	-2.765**			
		std	0.720	1.457	1.051	1.230	2.432	1.758	0.709	1.039	1.859	1.404	6.490	2.421	1.502				
Number of controls			32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949	38,959	39,959	39,636	39,636			
Number of treated			104	104	99	99	138	138	187	187	176	176	215	215	158	158			
ATTS		coef	-0.275	2.247	-1.107	-0.163	-0.865	-0.940	-1.117	1.501	-0.078	-0.828	-3.639**	-0.253	-3.639**	-0.253			
		std	0.700	2.337	1.788	1.538	1.459	1.540	1.118	1.307	0.635	2.628	1.157	1.178	1.157	1.178			
Number of controls			32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949	38,959	39,959	39,636	39,636			
Number of treated			104	104	99	99	138	138	187	187	176	176	215	215	158	158			

Table 3A. Performance tomorrow of firms that could be involved in an M&A today - s=1, s=3, s=5

M&A YEAR Lag		Performance after M&A using PSM															
		2003		2004		2005		2006		2007		2008		2009			
		3		3		3		3		3		3		3			
Dep.Var.		PSM		DID		PSM		DID		PSM		DID		PSM		DID	
		RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %
		coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.
ATTND	coef	-6.165	25.874*	-14.982	-17.963	-3.958	5.891	8.038	5.728	-1.274	18.725	-6.894	5.738	-2.935	2.366		
	s.e.	7.007	14.978	16.558	12.725	3.794	7.186	3.920	3.044	7.382	8.483	5.081	5.638	5.411	10.600		
		16,640	12,577	24,749	26,878	27,483	22,655	25,688	21,347	22,436	19,757	28,727	25,745	11,853	18,846		
		104	104	99	99	138	138	187	187	176	176	215	215	158	158		
ATTK	coef	-10.844***	25.474**	-18.128	-15.739***	-11.937*	5.595	-4.754	5.888	-5.071	9.477	-11.038**	4.366	-8.781	2.378		
	s.e.	1.919	10.432	10.678	5.957	6.352	10.729	3.961	7.914	7.221	10.640	6.394	12.782	5.345	9.728		
		32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949	38,959	39,959	39,638	38,638		
		104	104	99	99	138	138	187	187	176	176	215	215	158	158		
ATTS	coef	-7.735	23.263***	-14.546**	-16.958	-5.218	5.656	8.618	6.551	-0.889	18.328	-6.679	6.134	-6.679	6.134		
	s.e.	6.269	7.378	8.048	15.817	8.351	7.807	8.121	8.738	8.512	8.158	4.607	10.118	4.607	10.118		
		32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949	38,959	39,959	39,638	38,638		
		104	104	99	99	138	138	187	187	176	176	215	215	158	158		

Table 3A. Performance tomorrow of firms that could be involved in an M&A today - s=1, s=3, s=5

M&A YEAR Lag		Performance after M&A using PSM											
		2003		2004		2005		2006		2007			
		5		5		5		5		5			
Dep.Var.		PSM		DID		PSM		DID		PSM		DID	
		RTAS	ROA using P/L before tax %	RTAS	ROA using P/L before tax %	RTAS	ROA using P/L before tax %	RTAS	ROA using P/L before tax %	RTAS	ROA using P/L before tax %	RTAS	ROA using P/L before tax %
		coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.
ATTND	coef	-4.635	0.462	0.163	-0.189	-1.937	-0.185	-1.805**	0.688	-2.024	-2.761		
	s.e.	4.797	1.336	1.778	1.505	1.647	1.616	0.867	1.167	2.895	4.060		
		18,305	12,598	25,571	19,703	27,984	22,149	25,621	20,654	9,244	8,143		
		104	104	99	99	138	138	187	187	176	176		
ATTK	coef	0.125	0.511	-1.046	-0.332	-2.627***	-0.762	-2.089*	0.042	-3.110	-3.129*		
	s.e.	4.535	2.030	1.786	2.078	0.887	1.326	1.267	0.871	2.038	1.892		
		32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949		
		104	104	99	99	138	138	187	187	176	176		
ATTS	coef	-3.441	0.705	-0.697	0.446	-2.184	-0.243	-1.566	0.557	-2.594	-3.731		
	s.e.	3.111	0.858	1.031	0.444	1.645	2.355	0.987	3.103	4.343	4.146		
		32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949		
		104	104	99	99	138	138	187	187	176	176		

Table 3A. Performance tomorrow of firms that could be involved in an M&A today - s=1, s=3, s=5

M&A YEAR Lag		Performance after M&A using PSM											
		2003		2004		2005		2006		2007			
		5		5		5		5		5			
Dep.Var.		PSM		DID		PSM		DID		PSM		DID	
		RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %	RSHF*	ROE using P/L before tax %
		coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.	coef	s.e.
ATTND	coef	7.403**	28.629**	10.369	-0.763	-3.829	10.369	-6.665	7.188	-1.035	14.224		
	s.e.	3.410	11.646	22.082	6.224	5.599	7.180	7.688	9.679	6.302	8.839		
		17,926	12,266	24,916	19,079	27,306	21,419	24,775	19,828	9,022	7,826		
		104	104	99	99	138	138	187	187	176	176		
ATTK	coef	3.780	31.246***	2.997	0.580	-11.168*	11.754	-11.406	7.036	-5.250	12.966		
	s.e.	4.944	10.548	5.687	4.915	5.898	20.919	8.088	7.777	3.743	17.207		
		32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949		
		104	104	99	99	138	138	187	187	176	176		
ATTS	coef	7.366***	28.634***	8.591	0.885	-4.357	-5.170	-5.580	7.203	-0.397	8.485		
	s.e.	1.533	10.648	10.735	3.643	6.291	9.700	4.104	8.192	8.224	13.461		
		32,197	32,197	35,317	35,317	38,478	38,478	35,864	35,864	35,949	35,949		
		104	104	99	99	138	138	187	187	176	176		

Data analysis using PSM

In this last section we wanted to give a deeper view on data after the identification of a propensity score that make possible the analysis of the performance difference between the two groups (treated and untreated).

So as we have explained in previous chapters, what we did was to estimate a propensity score, the probability that a firm carries out a merger or an acquisition, based on a vector of observable variables X , measured in t^*-1 for businesses begin to sign the agreement in t^* . This way we built a control group of firms that did not merge but were similar to those who did merge.

What follows are data on the two groups, divided for blocks that vary between years. The number of blocks for each year ensures that the mean propensity score is not different for treated and controls in each blocks. We used all propensity scores where the balancing property is satisfied.

2003

Table 4 - 2003 Data analysis using PSM: firm size		Treated					Untreated				
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 1	Block 2	Block 3	Block 4	Block 5
Firm size	Micro firms (1/9 empl.)	1					1835				
	Small firms (10/49 empl.)	8	1				9472	171			
	Medium firms (50/249 empl.)	4	27	4	2		5371	6621	413	111	
	Big firms (250 and more empl.)	2	7	20	22	6	3837	854	2007	1323	182

Table 4 - 2003 Data analysis using PSM: type class		Treated					Untreated				
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 1	Block 2	Block 3	Block 4	Block 5
Type class	Joint stock company - SPA	6	21	22	5	3	5300	5368	2233	269	66
	Limited liability company - SRL	4					8854				
	One-person company with limited liabili	3	5				5115	505	56		
	One-person joint stock company - SPA	2	9	2	19	3	1246	1773	131	1165	116

Table 4 - 2003 Data analysis using PSM: sector		Treated					Untreated				
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 1	Block 2	Block 3	Block 4	Block 5
Sector	Accommodation and food service activiti	1					330	89	31	14	
	Administrative and support service acti	2	1		1	2	668	102	152	94	62
	Agriculture, forestry and fishing				1		204	34	37	12	2
	Arts, entertainment and recreation			3			130	37	7	5	
	Construction	1		2	6		2098	570	77	233	
	Financial and insurance activities		2				678	349			
	Information and communication		1	2	1	4	424	98	203	102	118
	Manufacturing	6	19	7	10		7122	4305	707	471	
	Professional, scientific and technical		5	4	1		1573	385	471	172	
	Public administration and defence						1				
	Real estate activities	4	2				1929	179	350	116	
	Transportation and storage		2	2	2		714	295	124	82	
	Water supply; sewerage, waste managemen		1	2			277	166	45	17	
	Wholesale and retail trade; repair of m	1	2	2	2		4367	1037	216	116	

2004

Table 4 - 2004 Data analysis using PSM: firm size		Treated							Untreated						
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7
Firm size	Micro firms (1/9 empl.)	1		4					2647	533	1146	143	32		
	Small firms (10/49 empl.)	1	6	8		2			4198	4739	2296	410	118		
	Medium firms (50/249 empl.)	2	6	7	13	8	1		1360	2513	2356	3965	1219	107	
	Big firms (250 and more empl.)				5	12	9	11	3		618	2979	1865	1471	547	55

Table 4 - 2004 Data analysis using PSM: type class		Treated							Untreated						
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7
Type class	Joint stock company - SPA		5	13	20	8	1			2271	4269	4532	1080	71	
	Limited liability company - SRL	4	5	2	1				6457	4345	1730	348	51		
	One-person company with limited liabili		1	5	3	1			1748	1714	2018	374	46		
	One-person joint stock company - SPA		1	4	1	10	11	3		73	760	1129	1663	583	55

Table 4 - 2004 Data analysis using PSM: sector		Treated							Untreated						
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7
	Administrative and support service acti			2	1				188	299	279	204	156		
	Arts, entertainment and recreation				1					74	63	96	21	5	
	Education		1						14	8	11	7	1		
	Electricity, gas, steam and air conditi		1						97	410	54	66			
	Financial and insurance activities		1	1					22	641	282	82			
	Information and communication					5	2	2			207	198	375	168	52
	Manufacturing		5	9	15	11	10			4415	2290	3959	1731	471	
	Mining and quarrying							1			20	15	53	10	3
	Professional, scientific and technical	1	3	4	2				730	250	1229	563	172		
	Public administration and defence										1				
	Real estate activities			4	1				861	125	1786	383	116		
	Transportation and storage			2	3	1			675	247	401	211	82		
	Water supply; sewerage, waste managemen				1				230	125	203	77	17		
	Wholesale and retail trade; repair of m	3	1	2	1	2			5388	1809	1951	522	116		

2005

Table 4 - 2005 Data analysis using PSM: firm size		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Firm size	Micro firms (1/9 empl.)	3						4925	28		11		
	Small firms (10/49 empl.)	10	3		1			11495	959		29	12	
	Medium firms (50/249 empl.)	8	24	15		1	1	5683	5025	1809	21	26	11
	Big firms (250 and more empl.)	2	6	20	24	19	1	2933	1888	1665	1456	495	7

Table 4 - 2005 Data analysis using PSM: type class		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Type class	Joint stock company - SPA	8	25	20	11	1	1	5809	5215	1583	775	26	7
	Limited liability company - SRL	8			1			13893		25	11		
	One-person company with limited liabili	7	4					4924	1638		21	10	
	One-person joint stock company - SPA		4	15	13	19	1	410	1047	1866	710	497	11

Table 4 - 2005 Data analysis using PSM: sector		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Sector	Accommodation and food service activiti		2					406	112	18	31	14	
	Administrative and support service acti	1	1	1	1			716	200	148	62		
	Arts, entertainment and recreation				2	1	2	74	17	25	72	48	18
	Construction	2	1	3				2174	77	172	61		
	Electricity, gas, steam and air conditi			1	2			448	224	71	26		
	Financial and insurance activities		2					678	267	82			
	Information and communication	3	3	7	1			536	244	168	52		
	Manufacturing	10	12	11	10	19		7035	3629	1024	707	471	
	Mining and quarrying	1	1					53	35	10	3		
	Professional, scientific and technical		4	4	2			1587	622	563	172		
	Public administration and defence								1				
	Real estate activities	2	2		1			2054	718	383	116		
	Transportation and storage		3	2	2			1018	305	211	82		
	Water supply; sewerage, waste managemen			1				395	163	77	17		
	Wholesale and retail trade; repair of m	4	2	5	4			7862	1286	522	116		

2006

Table 4 - 2006 Data analysis using PSM: firm size		Treated							Untreated						
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7
Firm size	Micro firms (1/9 empl.)	5	5						4667	426	114	39	40	3	
	Small firms (10/49 empl.)	10	9	4		2			6355	2291	398	44	70	12	
	Medium firms (50/249 empl.)	7	21	17	1	19	2		4546	2888	3951	55	1294	113	
	Big firms (250 and more empl.)	3	5	1	24	26	24	2	2365	1975	413	1519	1636	598	52

Table 4 - 2006 Data analysis using PSM: type class		Treated							Untreated						
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7
Type class	Joint stock company - SPA	7	18	11	23	21	5		3603	4031	3380	1463	1028	73	
	Limited liability company - SRL	11	1		1				10576	393	51	11			
	One-person company with limited liabili	7	12	2	1		1		3719	2329	378	21	212	10	
	One-person joint stock company - SPA		9	9		26	20	2	35	827	1067	162	1800	643	52

Table 4 - 2006 Data analysis using PSM: sector		Treated							Untreated						
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7
Sector	Accommodation and food service activiti	1			1				311	86	37	49	14		
	Administrative and support service acti	1	2			1			515	213	148		62		
	Arts, entertainment and recreation				1	1	2		49	50	11	17	84	43	
	Construction	4	2	1	3				1831	635	124	172	61		
	Education								22	7	5	2	1		
	Electricity, gas, steam and air conditi		3		1	3			154	214	57	75	243	26	
	Financial and insurance activities	1	2						684	282		82			
	Human health and social work activities			1	1	1			105	50	100	13	65	13	
	Information and communication	1		2		3	6	52	210	96	207	15	252	168	2
	Manufacturing	8	10	13		32	18		4415	2,62	3611	18	1731	471	
	Other service activities		1						32	30	26	8	24	5	
	Professional, scientific and technical		5		6				1411	668	92	471	172		
	Public administration and defence									1					
	Real estate activities	4	3		3				1839	805	33	350	116		
	Transportation and storage	1	5		5	3			721	315	87	124	82		
	Water supply; sewerage, waste managemen	1		1	2				281	168	32	45	17		
	Wholesale and retail trade; repair of m	3	7	4	2	3			5353	1340	306	216	116		

2007

Table 4 - 2007 Data analysis using PSM: firm size		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Firm size	Micro firms (1/9 empl.)	6	4	1				4572	632	80	37	14	
	Small firms (10/49 empl.)	15	3	1				8547	588	62	49		
	Medium firms (50/249 empl.)	10	19	17	17	3		4379	3011	3819	1313	306	
	Big firms (250 and more empl.)		8	18	5	40	9	2055	1123	2536	536	2142	148

Table 4 - 2007 Data analysis using PSM: type class		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Type class	Joint stock company - SPA	7	17	31	1	18	3	5181	2496	4634	120	1083	66
	Limited liability company - SRL	11	4					10483	560	51			
	One-person company with limited liabili	10	8	4	6	1		3319	1519	1213	546	91	
	One-person joint stock company - SPA	3	5	2	15	24	6	570	779	599	1269	1288	82

Table 4 - 2007 Data analysis using PSM: sector		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Sector	Accommodation and food service activiti		3				1	215	128	67	71	86	14
	Administrative and support service acti	2	2		1	1		339	361	13	117	156	
	Arts, entertainment and recreation				1			101	73	13	18	5	
	Construction	2	5	1				1896	694	172		61	
	Education	1						23	6	7		1	
	Electricity, gas, steam and air conditi		2	1		2		223	240	60	180	66	
	Financial and insurance activities	1	3					523	464		82		
	Human health and social work activities	1		1		1		101	25	130		77	13
	Information and communication		1	1	1	3	8	136	145	133	155	313	118
	Manufacturing	10	6	14	18	29		5878	1487	3046	1277	1178	
	Mining and quarrying				1			25	17	5	35	16	3
	Professional, scientific and technical	4	2	6		2		1477	339	826		172	
	Public administration and defence							1					
	Real estate activities	1	3	4				1881	233	913		116	
	Transportation and storage	2	1	4	1			771	218	258		82	
	Water supply; sewerage, waste managemen		2	1				293	139	94		17	
Wholesale and retail trade; repair of m	7	4	4	4			5670	785	760		116		

2008

Table 4 - 2008 Data analysis using PSM: firm size		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Firm size	Micro firms (1/9 empl.)	2	1	11	1			2385	722	2072	386	30	
	Small firms (10/49 empl.)	6	11	8		2		5954	3423	2769	406	46	
	Medium firms (50/249 empl.)	3	6	14	31	30	5	2079	2108	2819	4601	1334	113
	Big firms (250 and more empl.)	1	4	9	19	35	16	246	2050	1105	3072	1711	528

Table 4 - 2008 Data analysis using PSM: type class		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Type class	Joint stock company - SPA		8	22	27	28		360	2857	4787	4658	973	
	Limited liability company - SRL	12	7	3	1			10084	3930	429	77		
	Limited liability consortium		1	1				49	109	176	78	17	
	One-person company with limited liabili		5	14	14	3		171	1326	2714	2164	400	
	One-person joint stock company - SPA		1	2	9	36	21		81	659	1488	1731	641

Table 4 - 2008 Data analysis using PSM: sector		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Sector	Accommodation and food service activiti				1	1		164	106	127	86	14	
	Administrative and support service acti				5	1		347	248	272	232	62	
	Agriculture, forestry and fishing			1				99	76	109	30	2	
	Arts, entertainment and recreation				2			49	25	65	84	31	5
	Construction		3	5				1134	1239	469	138		
	Education												
	Electricity, gas, steam and air conditi	2	4	5	3			103	180	225	250	26	
	Financial and insurance activities	1	2	1				387	219	464	82		
	Human health and social work activities		1					97	25	134	79	13	
	Information and communication				1	9	5		81	200	151	426	154
	Manufacturing	3	3	9	21	48	15	2040	1766	2412	4205	1988	471
	Other service activities					1	1		8	24	27	56	11
	Professional, scientific and technical	1	3	10	4	3		520	701	720	888	172	
	Public administration and defence									1			
	Real estate activities			3	7			642	804	712	1002	116	
	Transportation and storage	2	1	3	2	1		564	309	432	291	82	
	Water supply; sewerage, waste managemen	1	1		1			194	151	200	100	17	
	Wholesale and retail trade; repair of m	2	4	5	4	3		4324	2365	2199	820	116	

2009

Table 4 - 2009 Data analysis using PSM: firm size		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Firm size	Micro firms (1/9 empl.)	1	3	6	2	2		2560	1162	1509	139	99	
	Small firms (10/49 empl.)	3	13	6	2			5643	5560	1093	251	12	
	Medium firms (50/249 empl.)	3	2	37	13	7	1	3461	299	6774	2018	409	11
	Big firms (250 and more empl.)	3		7	39	7	1	2339	204	1996	3663	382	52

Table 4 - 2009 Data analysis using PSM: type class		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Type class	Joint stock company - SPA		9	32	27	11	2	42	3824	6399	2843	452	63
	Limited liability company - SRL	10	3					13649	503	262	11		
	Limited liability consortium			1				133	189	75	18		
	One-person company with limited liabili		6	15	3	2			2636	3368	278	222	
	One-person joint stock company - SPA			8	26	3		179	73	1268	2921	228	

Table 4 - 2009 Data analysis using PSM: sector		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Sector	Accommodation and food service activiti			1				234	104	134			
	Administrative and support service acti			2	3			350	219	271	321		
	Arts, entertainment and recreation				1	1	1		49	50	57	80	11
	Construction		4	3	1			1204	659	884	233		
	Electricity, gas, steam and air conditi		1	2	3	3			91	131	199	337	
	Financial and insurance activities	1		3	1			401	58	380	364		
	Human health and social work activities		1			2		16	81	29	144	78	
	Information and communication		1		1	9	1		136	199	246	379	52
	Manufacturing	3	5	16	30			4065	2159	4456	2202		
	Other service activities					1		12	35	10	46	28	
	Professional, scientific and technical	3	1	8	7			968	365	933	735		
	Public administration and defence									1			
	Real estate activities		1	7				1300	318	1159	499		
	Transportation and storage	1	1	4	5			618	312	455	293		
	Water supply; sewerage, waste managemen			1	1			217	135	216	94		
Wholesale and retail trade; repair of m	2	3	9	3			4618	2504	2064	638			

2010

Table 4 - 2010		Treated					Untreated				
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 1	Block 2	Block 3	Block 4	Block 5
Firm size	Micro firms (1/9 empl.)	6					4904	34			
	Small firms (10/49 empl.)	19					12247	91			
	Medium firms (50/249 empl.)	18	25	19	7		5598	4883	1728	388	
	Big firms (250 and more empl.)	11	4	33	25	12	4107	356	2208	1526	202

Table 4 - 2010		Treated					Untreated				
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 1	Block 2	Block 3	Block 4	Block 5
Type class	Joint stock company - SPA	12	26	30	7	9	5786	4923	2185	370	106
	Limited liability company - SRL	21		3			13702	26	111		
	One-person company with limited liabili	18	1		2		6130	198	12	201	
	One-person joint stock company - SPA	3	2	19	23	3	1238	217	1628	1343	96

Table 4 - 2010		Treated					Untreated				
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 1	Block 2	Block 3	Block 4	Block 5
Sector	Administrative and support service acti	1	3		3		755	161	54	156	
	Arts, entertainment and recreation				2		153	47		54	5
	Construction	6	2	2			2174	77	172	61	
	Electricity, gas, steam and air conditi			2	3	3	350	76	60	217	66
	Financial and insurance activities	3	3				788	282		82	
	Human health and social work activities	1			2		141	15	112	65	13
	Information and communication			1	3	9	378	148	51	305	118
	Manufacturing	23	10	28	13		7618	3046	1731	471	
	Professional, scientific and technical	4	1	7	2		1916	293	563	172	
	Public administration and defence						1				
	Real estate activities	2	2	1			2626	146	383	116	
	Transportation and storage	3	3	4	2		1115	208	211	82	
	Water supply; sewerage, waste managemen			3	1		424	134	77	17	
Wholesale and retail trade; repair of m	11	5	4	1		8417	731	522	116		

2011

Table 4 - 2011 Data analysis using PSM: firm size		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Firm size	Micro firms (1/9 empl.)	4	2					4983	369	11	1		
	Small firms (10/49 empl.)	13	10	10	1			8085	3719	1117	56	1	
	Medium firms (50/249 empl.)	10	29	21	1	2		4483	6067	1844	202	119	5
	Big firms (250 and more empl.)		9	28	46	6	2	176	2515	3407	2250	76	52

Table 4 - 2011 Data analysis using PSM: type class		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Type class	Joint stock company - SPA	4	32	19	19	6		1812	8855	1535	1167	79	
	Limited liability company - SRL	15	11		1			12123	2650	4	71	3	
	One-person company with limited liabili	8	4	13	1			3740	792	2098	59		
	One-person joint stock company - SPA		3	27	27	2	2	52	373	2742	1212	114	57

Table 4 - 2011 Data analysis using PSM: sector		Treated						Untreated					
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Sector	Accommodation and food service activiti		2					336	124	82	14		
	Administrative and support service acti	1	1					697	148	62			
	Agriculture, forestry and fishing	1						234	88	31	5		
	Arts, entertainment and recreation				1	2		25	88	64	59	18	
	Construction	4	5	2				1968	767	521	61		
	Education				1					4	19	10	5
	Electricity, gas, steam and air conditi	2	4	9				296	189	258	26		
	Financial and insurance activities		4	2	3			257	403	194	349		
	Information and communication		2	4	1	6	2	55	195	235	295	168	52
	Manufacturing	6	21	19	26			4492	5607	1589	1178		
	Professional, scientific and technical	3	5	4	5			979	901	892	172		
	Public administration and defence									1			
	Real estate activities			5				1213	987	955	116		
	Transportation and storage	2		5	2			792	434	308	82		
	Water supply; sewerage, waste managemen		1	3				277	252	106	17		
	Wholesale and retail trade; repair of m	8	5	6	9			6106	2487	1077	116		

As explained before, in order to answer the question about what is the difference between the firm that was involved in an M&A during the time considered and a firm that wasn't; we considered a treatment evaluation and estimated the average effects of a program or treatment on the outcome of interest.

Here we wanted to represent in graphs the evolution of ROA of firms involved in merger and acquisitions, comparing those firms with other enterprises as much similar as possible, but that did not participate in a deal that very year, and for this reason we divided firms in two groups (treated and not treated) how resulted using the method of the Propensity Score Matching (PSM), namely calculating the probability of receiving the treatment, taking into account the effects of different observed characteristics.

In the table we can see the blocks of pscore we found using PSM, for 2007.

The first graph represents the mean ROA of companies that perform better (inferior block of pscore 0.025) in 2007 and analyses their evolution over time distinguishing between firms involved in a merger or an acquisition in that year (red line) and other companies not involved but with similar results in terms of probability of being involved in an M&A (blue line). That means that, given the value of the propensity score, we had 6 block of firms, all balanced between treated and not treated firms, with 6 mean values of ROA, and in this figure we took in analysis the mean ROA of the upper block of firms. The central value represented by the horizontal axis defines the year in which the deals were signed. The vertical axis displays the average ROA of the firms, from 3 year before to 3 years after the sign.

We can observe that after the deal the firms involved face a decrease in growth of ROA in average, not observed in the firms not involved in deals. Both kinds of companies show the effect of 2008 crisis, but enterprises that were involved in M&As seems to better recover after that.

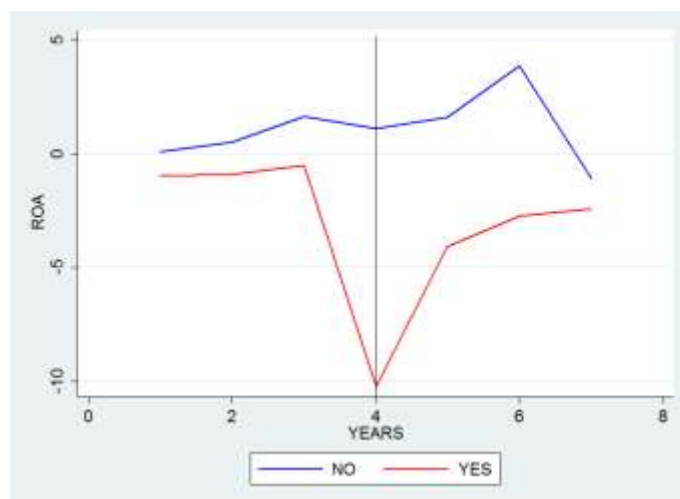
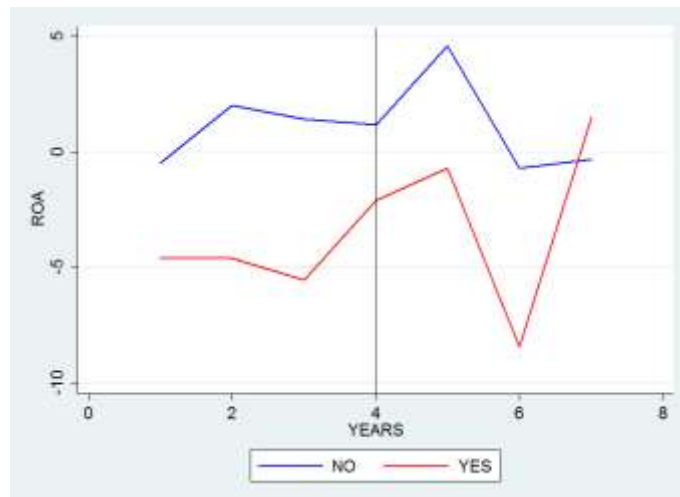
We replicate the same analysis using different years and block of firms, finding various results.

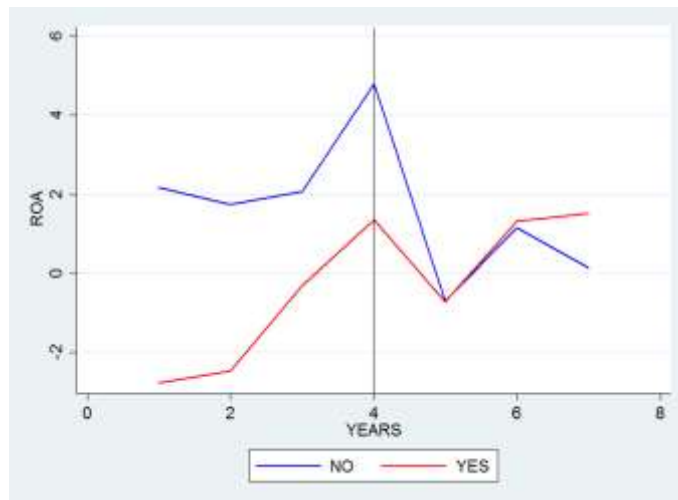
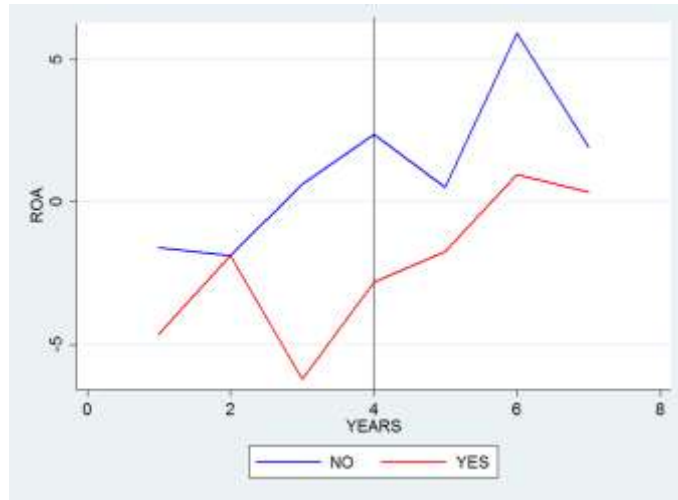
In graph 2 we took in analysis 2006, with upper block (above, graph 2) and second block (below, graph 3). In the first case, firms behave very different: treated firms face a decrease of ROA during the year preceding the merge, but after it they have a strong recover.

In the third graph, considering the same year but with firms that have in mean less high results in ROA, we note a constant growth or a less strong de-growth of ROA for firms involved in M&As, even when similar companies face a not efficient year.

In graph 4 we analyzed 2008 upper class: before the deal, even with less high ROA results, firms that will be involved in M&As shows a two years story of growth. Both type of companies, treated and not treated, decrease after the deal, probably because of the economic crisis, but firms treated seems to better perform in the long run.

	2007		
Inferior of block of pscore	Non treated	Treated	Total
.0004993	19,553	31	19,584
.003125	5,354	34	5,388
.00625	6,497	37	6,534
.009375	1,935	22	1,957
.0125	2,462	43	2,505
.025	148	9	157
Total	35,949	176	36,125





Conclusions

The objective of this paper is to understand how mergers and acquisitions affect the ability to create value of Italian companies. The empirical literature on M&As has not expressed, so far, unambiguously, and the results have often been inconclusive, did not find convincing results on the identification of variables that have an impact on acquiring firm performance, suggesting that academic research should shift both M&As theory and research methods (King, Dalton, Daily and Covin 2004).

About this, considering prior studies and in order to innovate literature on this regard, we first construct a new database that could be enough broad and informative and would contain both information on M&As and accounting data 2003 to 2012. The outcome allowed us to check on both intra-national and cross-border M&As of Italian firms with the rest of the world.

Analysing our database we clarified that companies involved in M&As possess a competitive advantage over the others, even before the deal itself. Stating that the selection of firms that are responsible for agreements with other firms is not random make our analysis on the economic effect of the deal more complex, suggesting us the use of the propensity score method in order to avoid selection bias.

Anyway the results obtained through this estimation methodology show that firms that are involved in M&As does not have better results than the others. We here give a short review of our findings.

Our econometric results were divided into three tables related to three different analyses.

To check whether the firms engaging in mergers had an advantage on those that were not engaging, we firstly verified the existence of a difference in performance between those two kinds of companies, considering the year of the deal.

Our control variables were used to check on geographical, size, sector, type and listing aspects of firms.

Results of OLS regressions showed, using different two proxies for the performance of firms (ROA and ROE, Adjusted for their geographical peers results) and analysing ten different years (from 2003 to 2012) that firms that are involved in an M&A does not perform better than the others: there are not clear positive differentials in productivity to the benefit of companies involved in deals. Performed worse firms that invest in M&As if they are located in the south side of the country; worst companies in the arts entertainment and recreation sector, better Medium firms (between 50 and 249) and Big firms (more than 250), enterprises listed shows contrasting effects and being incorporated in form such as Consortiums, Cooperatives or SRL makes companies performed better.

The second point we wanted to ensure was that the firms engaging in mergers had an advantage on those that were not engaging, even 1, 3 or 5 years before the sign on the deal, to demonstrate that the difference in performance between those two kinds of companies was established from long time before the deal itself. Also in this case control variables were used to check on geographical, size, sector, type and listing aspects of firms. Again, as our results of OLS regressions showed, disrespecting of the proxy used, enterprises that will be involved in an M&As did not perform better than the others even 1, 3 or 5 years before the deal itself. This analysis didn't stress what we thought to find: the existence of a "natural" pre-selection of Italian companies inherent in making economic agreements with other companies. Results of control variables confirm what stated for the previous regression: we can observe a general negative significance for regional capital cities of the south regions, good performances in sectors of Administrative and support service activities, Information and communications, Human health together with Manufacturing.

Performed worst micro firms (between 1 and 9 employees), or companies born after Partnerships.

In the third stage, even if we did not stressed, thanks to the introductory analysis performed with the first two phases, that are necessary some initial characteristics so that an enterprise would be able to participate to an M&A with others, we confirm the importance of using an econometric methodology that could help us avoid the selection bias problem, finding it in the Propensity Score Matching.

We then identified a vector of variables on which the treated group (firms involved in an M&A) would have been similar to a group of untreated (firms not involved) one year before the year of the deal, in order to analyze the performance difference between those two groups after the "treatment" M&A. We used 9 different regressions varying proxies or years. The explanatory variables we used to check on similarities of those companies were dummies to check on size, sector and size class. The control variables results showed

that the size of the company has positive effect, confirming the importance of being a Big firm to expand (locally or abroad); the sector control variables are positive and significant only for Electricity, Information and communication, Manufacturing, confirming that firms in those sectors are involved often in M&As; the type class variables are always positive and significant only for SPA with only one person in the society.

We reported the results of the analysis using both PSM (ATT) and Difference in difference model (ATTDID). The ATT results confirm that firms involved in M&As does not show 1, 3 and 5 year after the deal better economic results of firms that one year before the treatment were very similar but that did not performed it the year later. Coad and Rao (2008) stressed how an innovation strategy can be more unsure than participating to a lottery, because every knowledge accession way (R&D expenses, patents registrations or deals with other firms) can't guarantee in advance a correspondent growth. The ATTDID results did confirm the same results regardless of the proxy or the year took in analysis.

We can say that those results confirm, broadly, results of this research stream, providing no clear evidence of improved post-acquisition performance (Tuch and O'sullivan, 2007).

Appendix A

Table 1. Performance today of firms involved in an M&A today - 2003/2012											
Performance difference between firms involved/not involved in M&A											
M&A YEAR	2003		2004		2005		2006		2007		
Dep.Var.	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	
	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	
M&A	coef. -0.176	-18.128	-0.963	-4.410	-0.515	-15.706	-2.495**	-10.289**	0.920	0.136	
	s.e. 1.606	13.274	1.505	4.596	1.043	12.077	1.078	5.178	1.016	8.690	
Bari	coef. -2.725*	-9.099	-0.817	-1.775	-2.635**	-6.304	-1.518	-0.205	-2.004	-5.935	
	s.e. 1.465	10.322	0.921	8.307	1.229	8.902	1.075	9.035	1.828	8.299	
Cagliari	coef. -5.123***	-17.288**	-1.588	-1.696	-2.839**	-9.709	-2.871**	-8.775	-2.839	-10.110	
	s.e. 1.624	8.287	1.299	9.134	1.296	8.717	1.333	8.847	1.872	9.484	
Campobasso	coef. -3.018*	4.062	-2.086*	4.311	-4.226**	-33.606**	-3.416	2.395	-3.496	-27.320	
	s.e. 1.750	13.125	1.186	9.690	1.649	16.285	2.153	14.175	2.950	27.312	
Catanzaro	coef. -1.633	0.350	-2.147*	-10.243	-2.552**	-20.616*	-2.155*	-6.410	-2.728	-20.243**	
	s.e. 1.696	9.910	1.263	9.496	1.266	12.510	1.107	9.189	1.903	9.190	
Milano	coef. -2.065	-1.485	1.199	5.436	-0.303	0.223	0.615	13.357*	-0.782	-0.250	
	s.e. 1.372	6.280	0.860	7.338	1.127	7.668	1.006	7.956	1.833	7.413	
Napoli	coef. -2.583*	-4.857	0.058	0.053	-1.719	-5.921	0.303	11.038	-1.445	-0.089	
	s.e. 1.364	6.740	0.882	7.796	1.151	8.114	1.308	8.226	1.811	7.742	
Palermo	coef. -2.812*	-6.678	0.631	5.218	-1.858	-2.254	-1.387	4.798	-2.557	2.217	
	s.e. 1.477	8.422	1.050	9.637	1.315	10.721	1.360	11.082	1.875	10.806	
Perugia	coef. -3.082**	-9.442	0.451	4.906	-0.665	-0.968	-0.468	4.099	-1.215	-3.648	
	s.e. 1.419	7.071	0.934	7.790	1.165	7.905	1.012	8.808	1.825	8.084	
Roma	coef. -3.444**	0.385	-0.775	3.850	-1.711	-0.553	-1.265	11.687	-2.429	-0.724	
	s.e. 1.472	6.817	0.855	7.640	1.199	7.887	1.031	8.128	1.858	7.642	
Torino	coef. -2.369*	-3.517	0.460	2.869	-1.013	0.219	0.348	11.493	-0.421	-1.347	
	s.e. 1.417	6.777	0.891	7.640	1.174	7.848	0.997	8.145	1.823	7.603	
Trieste	coef. -0.943	-12.777	0.136	-3.647	-1.539	-18.422	-0.332	-10.604	-0.726	-22.307*	
	s.e. 1.798	23.257	1.179	14.732	1.507	13.115	1.311	13.358	1.931	13.158	
Aosta	coef. -2.996*	0.565	0.380	6.995	-1.567	-7.729	-2.444	6.654	-2.059	-5.026	
	s.e. 1.718	10.066	1.197	9.712	1.329	8.994	1.633	15.884	2.111	10.036	
Activities of extraterritorial organisa	coef. -1.172	-43.541*	-1.859	-63.642	-3.068	-9.114	-0.217	8.507	-0.790	3.167	
	s.e. 5.136	25.283	2.936	48.939	2.850	31.953	2.800	40.085	1.553	15.752	
Administrative and support service acti	coef. 1.932***	19.573***	2.854***	26.498***	1.103*	26.750***	1.843	39.381***	1.274**	25.766***	
	s.e. 0.746	7.487	0.846	6.187	0.656	5.239	1.144	6.247	0.650	5.722	
Agricultureforestry and fishing	coef. -2.161*	-21.221***	-0.639	-27.952***	-3.057***	-24.622***	-1.964**	-23.784***	-1.859***	-21.960***	
	s.e. 1.136	6.752	0.807	5.708	1.117	5.326	0.864	6.066	0.549	5.673	
Artsentertainment and recreation	coef. -8.297***	-27.820**	-4.603**	-35.993**	-4.116***	-29.609***	2.657	-11.130	-4.142**	1.495	
	s.e. 2.853	13.376	1.887	15.046	1.434	9.757	4.333	11.208	1.700	7.598	
Construction	coef. -0.719	-1.341	0.829	-1.121	0.002	1.437	-0.160	9.397*	-1.127*	0.125	
	s.e. 0.831	5.803	0.748	4.883	0.461	4.185	0.749	5.330	0.672	4.574	
Education	coef. 5.171*	20.767	4.146	26.007	1.367	14.961	0.980	17.022	1.290	19.911*	
	s.e. 2.849	16.681	3.148	34.853	2.481	22.446	2.317	19.320	4.046	11.535	
Electricitygassteam and air conditi	coef. 0.779	1.896	3.013***	8.667	1.116*	1.457	1.070	3.754	-0.984	-10.420*	
	s.e. 1.087	7.762	0.944	6.155	0.657	5.052	1.011	6.326	0.836	5.647	
Financial and insurance activities	coef. 0.824	-11.725	2.173**	-5.095	-1.945	-6.081	1.791**	-0.656	1.571**	-1.430	
	s.e. 1.570	12.754	0.899	5.236	2.670	4.914	0.729	5.864	0.693	4.682	
Human health and social work activities	coef. 2.911***	0.340	5.324***	8.055	2.725***	14.784**	3.402***	16.374***	1.520**	2.906	
	s.e. 0.731	7.703	1.293	5.565	0.641	5.952	0.645	5.948	0.660	5.900	
Information and communication	coef. -1.759	-10.728	2.836***	8.519	2.187***	10.316*	3.226***	13.943**	2.420***	14.847***	
	s.e. 2.697	7.683	0.959	6.035	0.699	5.578	0.729	6.187	0.752	5.554	
Manufacturing	coef. 1.414***	-9.838*	2.646***	-4.173	1.361***	-1.690	2.076***	2.988	1.501***	-0.752	
	s.e. 0.544	5.495	0.724	4.603	0.463	3.836	0.551	5.104	0.440	4.369	
Mining and quarrying	coef. -2.405	-11.676*	1.299	-10.726	2.511**	-2.553	2.688**	1.898	0.185	-8.515	
	s.e. 4.054	6.183	2.035	6.833	1.182	4.929	1.128	6.263	1.368	8.123	
Other service activities	coef. 0.785	14.268	2.238	13.938	1.885*	20.877**	2.756***	37.725***	-3.041	21.310***	
	s.e. 1.870	12.522	1.750	17.435	1.022	8.521	1.002	9.199	3.749	8.034	
Professionalscientific and	coef. 2.091***	8.787	3.121***	7.180	0.546	4.851	2.239***	12.545**	1.241**	2.310	

Table 1. Performance today of firms involved in an M&A today - 2003/2012											
Performance difference between firms involved/not involved in M&A											
M&A YEAR		2003		2004		2005		2006		2007	
Dep.Var.		RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*
		ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %
Company size	Micro Firm (between 1 and 9 empl.)	coef. -0.601	-8.564***	-0.070	-3.353*	-0.140	0.625	-0.211	4.080**	1.069*	4.364**
		s.e. 0.558	2.831	0.435	2.021	0.411	1.907	0.403	1.773	0.596	1.741
	Small Firm (between 10 and 49 empl.)	coef. -0.004	-2.987	0.429	4.177**	0.467	4.459***	0.770**	5.907***	1.978***	9.584***
		s.e. 0.471	2.181	0.362	1.700	0.297	1.628	0.357	1.518	0.588	1.409
	Medium Firm (between 50 and 249 empl.)	coef. -0.079	-2.793	0.471	4.193**	0.347	3.927**	0.412	7.712***	1.625***	11.040***
		s.e. 0.478	2.141	0.375	1.685	0.276	1.639	0.342	1.524	0.519	1.454
	Borsa Italiana - MTA	coef. 2.926	18.659***	-5.705***	-45.218***	-2.935*	-10.351**	1.023	14.117***	7.508***	18.903*
		s.e. 1.880	7.073	1.497	8.002	1.544	5.174	1.139	4.071	1.516	11.115
	Delisted	coef. 2.934	20.752**	-5.906***	-33.616***	-2.305	-18.361	-2.119	9.122*	5.127***	14.099
		s.e. 2.190	9.720	2.047	6.346	2.122	16.658	1.851	5.519	1.626	9.816
	Euronext Paris	coef. 4.280**	33.981***	-7.749***	-27.977***	-3.489*	-8.280	2.614**	17.482***	1.295	5.188
		s.e. 1.682	7.865	1.442	6.764	1.805	6.298	0.640	5.518	5.211	8.721
	London Stock Exchange	coef.							-50.116***	-61.368***	-45.439***
		s.e.							3.640	0.780	4.819
	Mercato Alternativo del Capitale	coef. 2.745**	27.324***	-8.293***	-51.730***	-7.821***	-31.108***	-2.930***	1.265	3.948***	20.825***
		s.e. 1.122	6.893	0.999	5.054	0.762	4.287	0.925	4.420	0.863	4.218
	NASDAQ National Market	coef. 5.118***	28.051***	-27.028***	-178.602***	-27.478***	-49.305***	-30.049***	-34.280***	-46.035***	-64.294***
		s.e. 0.918	6.405	5.921	4.377	0.811	3.685	0.532	4.147	0.738	4.253
	New York Stock Exchange	coef. 9.180***	37.356***	-0.819	-22.793***				0.949	22.571***	-5.117***
		s.e. 1.148	9.872	0.996	5.552				0.656	5.449	0.783
	Unlisted	coef. 6.249***	37.349***	-3.283***	-24.676***	-1.191*	-4.645*	1.089***	18.398***	6.379***	26.135***
		s.e. 0.704	4.273	0.893	2.971	0.627	2.737	0.352	2.504	0.510	2.352
	Consortium	coef. -1.595	42.946**	3.178	43.446**	0.533	24.986	0.355	37.603**	0.093	22.616
		s.e. 1.479	20.387	3.824	21.434	1.286	19.706	1.102	17.395	1.190	16.902
	Consortium by shares	coef. 2.369	22.379	5.070	40.410**	2.153*	28.246*	0.534	13.971	0.529	3.448
		s.e. 1.474	17.362	3.842	18.977	1.263	14.825	1.199	15.950	1.295	13.694
	Consortium with external activity	coef. -1.109	32.698	3.796	50.642**	-1.244	-0.342	-1.649	36.512	0.078	34.761
		s.e. 1.978	22.274	3.850	22.505	1.611	29.759	1.937	27.382	1.655	26.482
	Cooperative company with limited liabil	coef. -1.137	19.537*	4.177	28.562*	1.990	20.730*	1.724	42.198***	0.035	21.189
		s.e. 2.099	11.815	3.829	15.979	1.252	11.240	1.069	14.054	1.404	14.375
	Cooperative company with limited liabil	coef. 1.677	18.051*	5.143	32.576**	2.362**	15.124*	1.279	17.827	0.190	8.730
		s.e. 1.163	9.265	3.797	15.006	1.173	8.792	1.052	12.188	1.173	13.305
	European economic joint venture - GEIE	coef. 0.012	-17.141*	2.834	-5.471	0.744	-9.634	1.452	-19.785	0.332	-18.948
		s.e. 1.368	9.667	3.911	16.265	1.393	10.059	1.691	18.356	1.518	14.938
	Foundation	coef. 6.627**	22.482	3.234	26.869	0.147	-96.331	-4.840	-36.714	1.207	-6.676
		s.e. 3.103	15.553	4.141	18.624	2.012	87.350	3.555	30.904	2.455	23.832
	Foundation business	coef. 3.413	-3.778	8.586*	41.849**	2.893	17.951	-15.905	10.906	15.634	-17.308
		s.e. 3.189	17.454	4.482	20.950	2.442	13.429	10.725	17.440	11.709	16.129
	General partnership - SNC	coef. -4.760	0.043	2.429	-113.412	0.487	-86.117	-0.053	-279.178**	-1.108	-51.643
		s.e. 3.501	56.104	4.064	124.893	2.814	61.685	4.290	139.127	4.753	61.088
	Joint stock company - SPA	coef. 2.287**	8.725	6.417*	21.408	3.150***	3.291	2.720***	9.501	1.876	-2.941
		s.e. 1.121	8.396	3.790	14.636	1.125	8.326	1.002	11.708	1.150	12.956
	Limited liability company - SRL	coef. 2.940***	23.074***	7.005*	34.997**	3.638***	16.564**	3.272***	24.193**	2.224*	9.919
		s.e. 1.087	8.396	3.796	14.645	1.129	8.325	0.994	11.704	1.143	12.937
	Limited liability consortium	coef. -0.175	50.039***	4.191	36.558**	1.617	39.599***	1.306	53.337***	0.381	44.609***
		s.e. 1.257	18.016	3.818	18.451	1.165	13.239	1.076	16.058	1.211	16.767
	Limited partnership by shares - SAPA	coef. 5.941	-1.249	6.411	16.719	5.838***	3.718	3.236**	5.948	1.780	-4.618
		s.e. 5.737	12.328	3.943	14.987	1.906	9.146	1.280	12.071	1.391	13.183
	Not classified	coef. 2.893	25.348*	11.983	8.547	7.399	-7.908	9.455	-29.958	6.744	16.376
		s.e. 1.947	13.467	8.793	23.728	6.793	16.762	8.531	38.416	8.130	15.697
	One-person company with limited liabili	coef. 0.849	17.542**	5.640	25.699*	2.083*	7.202	2.655***	13.844	0.532	-0.018
		s.e. 1.181	8.641	3.794	14.740	1.196	8.476	1.023	11.796	1.135	13.020
	One-person joint stock	coef. 1.390	-0.106	5.860	15.127	2.983***	-1.398	2.347**	5.804	1.635	-9.354

Table 1. Performance today of firms involved in an M&A today - 2003/2012											
Performance difference between firms involved/not involved in M&A											
M&A YEAR		2008		2009		2010		2011		2012	
Dep.Var.		RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*
		ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %
Company size	Micro Firm (between 1 and 9 empl.)	coef. 12.340	7.917***	0.626	7.114***	2.347**	8.083***	0.908**	6.189***	-6.751	11.355***
		s.e. 10.684	1.684	0.490	1.670	1.169	1.683	0.441	1.560	8.051	2.671
	Small Firm (between 10 and 49 empl.)	coef. 10.959	10.044***	1.998***	10.328***	2.932***	9.247***	1.681***	7.908***	-3.987	6.107***
		s.e. 8.185	1.394	0.232	1.398	1.107	1.409	0.603	1.774	4.984	2.364
	Medium Firm (between 50 and 249 empl.)	coef. 10.903	9.561***	0.693***	6.944***	2.057*	6.733***	2.133***	8.373***	-4.285	3.137
		s.e. 9.216	1.400	0.251	1.446	1.186	1.440	0.534	1.507	4.696	2.367
Stock exchange	Borsa Italiana - MTA	coef. 28.222	4.173	-1.094	-7.583	-4.945	-14.967***	-8.480***	-16.903***	-0.112	-1.021
		s.e. 28.161	7.517	1.288	5.557	3.581	5.554	1.398	4.536	2.516	6.693
	Delisted	coef. 25.736	6.222	-0.493	8.973	-3.314	15.533	-7.964***	-9.933	15.064***	36.456**
		s.e. 28.159	7.756	3.070	5.899	7.564	22.334	2.219	6.757	3.784	14.593
	Euronext Paris	coef. 16.780	0.211	-2.234	-6.454	0.233	2.026	-4.832***	-9.399	8.102***	36.452***
		s.e. 18.705	4.179	2.041	6.827	2.568	7.524	1.479	7.065	2.792	11.304
	London Stock Exchange	coef. -46.343***	-71.355***	-62.807***	-139.176***	-37.617***	-170.256***	-33.751***	-291.689***		
		s.e. 8.115	3.554	0.587	4.516	0.900	2.622	0.884	4.210		
	Mercato Alternativo del Capitale	coef. -5.387***	-13.385***	-20.774***	-30.627***	-7.115***	-14.350***	-4.275	-33.004***	4.173***	-1.869
		s.e. 1.812	4.585	0.606	3.859	0.749	4.332	4.673	3.713	1.260	5.470
	NASDAQ National Market	coef. -23.584***	-45.693***	-8.088***	-12.648***	1.811	-9.658***	4.325***	-7.339*		
		s.e. 9.069	4.660	0.644	4.500	1.294	3.268	0.717	3.857		
	New York Stock Exchange	coef. 9.842	-1.207	-0.959	5.651	-3.211	-12.314***	-11.268***	-20.125***	-2.982	-0.679
		s.e. 18.419	4.728	0.835	4.942	2.506	4.435	0.663	5.928	2.485	7.048
	Swiss Exchange	coef. 19.283	24.510***	6.460	6.400	-2.050	-10.600***	-28.620	-49.131*		
		s.e. 0.000					0.001	21.073	29.520		
	Unlisted	coef. 18.816	8.724***	0.430	0.775	-2.265	-10.857***	-5.719***	-12.267***	7.063***	12.841***
		s.e. 17.351	2.056	0.488	2.154	1.598	2.169	0.463	2.180	0.849	3.256
Type class	Consortium	coef. -5.848	24.945*	-0.014	22.116	2.153*	41.591**	0.501	41.234***	17.083	5.120
		s.e. 11.222	15.083	1.493	15.470	1.306	17.312	1.708	13.326	19.898	26.723
	Consortium by shares	coef. 0.939	7.695	0.321	2.740	0.877	0.022	-0.517	16.771*	15.812	-44.377*
		s.e. 13.491	12.830	1.421	11.199	1.234	13.138	1.766	9.974	18.420	23.617
	Consortium with external activity	coef. -5.503	20.511	0.603	46.717**	3.204	48.329*	0.550	24.077	16.418	-11.153
		s.e. 10.824	17.640	1.471	20.181	1.970	25.607	1.713	18.315	19.537	43.952
	Cooperative company with limited liabil	coef. -5.552	16.098	0.521	10.340	2.295**	26.155*	0.657	27.698**	15.558	-39.644*
		s.e. 11.089	12.670	1.404	12.203	1.142	13.966	1.656	11.269	18.667	21.764
	Cooperative company with limited liabil	coef. -3.839	13.749	0.850	6.014	0.219	19.605	-0.873	23.346***	16.194	-27.580
		s.e. 11.441	11.521	1.299	10.903	1.322	12.736	1.718	8.136	18.926	21.685
	Cooperative company with unlimited liab	coef. 43.906	42.871	34.824	53.657	8.584*	17.325	-0.704	7.393		
		s.e. 53.560	31.825	21.762	39.010	5.045	15.739	1.966	8.507		
	European economic joint venture - GEIE	coef. -4.542	8.396	0.849	-7.930	5.049*	-37.617	1.829	-7.569	5.365	-42.751**
		s.e. 10.904	12.047	1.627	12.415	3.006	33.623	1.888	12.538	7.430	21.658
	Foundation business	coef. 25.124	-1.372	9.152***	6.720	2.001	4.953	6.496	9.129		
		s.e. 38.230	19.095	3.450	14.901	2.544	16.263	4.202	17.778		
	General partnership - SNC	coef. -4.667	-1.185	1.223	0.515	1.406	13.407	-0.343	7.029	16.073	-41.664*
		s.e. 11.443	13.277	1.380	11.610	1.387	16.021	2.157	8.319	17.783	21.319
	Joint stock company - SPA	coef. 1.757	-0.924	1.697	-6.616	3.448***	-3.103	1.433	-0.639	16.189	-43.169**
		s.e. 12.870	11.318	1.253	10.526	1.310	12.308	1.639	7.169	17.267	21.082
	Limited liability company - SRL	coef. 0.073	9.586	2.342*	2.064	4.362***	7.448	2.088	9.430	17.649	-36.030*
		s.e. 11.949	11.289	1.242	10.507	1.248	12.278	1.589	7.134	17.517	21.081
	Limited liability consortium	coef. -5.356	50.699***	0.995	51.713***	1.875	73.684***	0.684	83.318***	16.381	23.708
		s.e. 11.097	14.798	1.338	14.824	1.167	16.639	1.668	13.272	19.184	26.132
	Limited partnership by shares - SAPA	coef. 42.363	4.302	3.201**	-1.101	7.959*	2.981	3.225*	7.390	10.898	-41.808**
		s.e. 47.349	11.596	1.484	10.874	4.452	12.860	1.786	7.502	12.885	21.275
	Not classified	coef. 3.774	-4.753	5.894**	-1.827	7.517**	8.270	2.620	14.782	16.411	-32.206
		s.e. 15.312	17.120	2.971	13.599	3.465	15.554	2.165	20.893	18.410	77.284
	One-person company with	coef. -24.559	-1.073	0.897	-9.678	-0.286	-3.349	1.608	0.663	24.651	-40.507*

Appendix B

Table 2. Performance yesterday of firms involved in an M&A today - s=1 - 2004/2012

Performance difference between firms involved/not involved in M&A												
M&A YEAR	2007		2008		2009		2010		2011		2012	
Dep.Var.	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	
	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	
M&A	coef.	1.819	4.181	-0.188	-7.447	-3.089	-19.694*	-2.809**	-22.536**	-0.272	-6.514	-0.173
	s.e.	1.271	4.211	1.050	9.462	3.367	10.302	1.294	9.734	1.595	7.481	1.483
Ancona	coef.	-0.083	2.153	-1.239	-11.052	-2.630	-6.232	-0.803	1.720	2.154	-4.830	-1.015
	s.e.	1.044	9.442	1.834	8.686	3.785	7.515	1.272	9.574	2.048	7.807	1.154
Bari	coef.	-1.545	-0.331	-2.039	-5.854	-0.275	-9.925	-1.695	-3.772	1.632	-0.791	-1.788*
	s.e.	1.074	9.050	1.827	8.276	3.805	7.859	1.269	9.952	2.064	6.397	0.994
Bologna	coef.	1.210	8.377	0.344	1.457	5.048	-2.285	-0.913	-3.290	2.542	-3.528	-0.379
	s.e.	0.990	8.291	1.819	7.577	6.061	7.196	1.205	9.320	2.130	5.871	1.037
Cagliari	coef.	-2.938**	-7.791	-2.637	-9.101	-2.925	-19.561**	-1.348	-4.599	-0.451	-15.300*	-5.297***
	s.e.	1.334	8.764	1.875	9.472	3.629	8.344	1.296	9.859	2.084	8.857	1.964
Campobasso	coef.	-3.353	2.568	-3.664	-53.125	-1.805	-9.457	-0.887	-12.760	1.372	-24.429	-4.703*
	s.e.	2.152	14.182	2.908	36.765	5.750	16.557	1.993	19.126	2.520	20.837	2.531
Catanzaro	coef.	-2.162*	-6.418	-2.725	-20.223**	-3.014	-25.320**	0.049	-14.636	2.010	-18.609*	-2.299
	s.e.	1.111	9.242	1.903	9.172	3.589	11.624	1.473	12.461	2.240	10.680	1.455
Firenze	coef.	0.991	10.434	-0.037	-7.661	0.199	-10.966	-0.200	-4.477	2.537	-3.217	-0.546
	s.e.	1.017	8.472	1.828	8.109	3.600	7.573	1.233	9.521	2.098	5.928	1.091
Genova	coef.	0.605	12.576	-0.261	-2.720	3.420	-5.009	-0.811	1.825	2.417	-1.600	-0.007
	s.e.	1.046	9.039	1.905	8.515	4.994	7.945	1.309	9.643	2.061	7.470	1.063
L'Aquila	coef.	-0.368	5.649	-0.198	8.595	-3.223	17.507	-0.646	20.401	1.702	7.392	-1.990
	s.e.	1.934	10.411	2.384	12.873	4.922	19.374	2.083	13.548	2.285	8.016	1.465
Milano	coef.	0.617	13.412*	-0.779	-0.366	6.472	-6.018	-0.881	-3.018	3.404	-1.349	-0.903
	s.e.	1.004	7.968	1.833	7.390	8.173	7.023	1.181	9.137	2.148	5.521	1.223
Napoli	coef.	0.282	11.019	-1.451	0.039	-1.450	-5.077	-0.811	-0.047	1.350	1.656	-1.491
	s.e.	1.307	8.238	1.811	7.721	3.404	7.434	1.215	9.460	2.035	5.826	1.053
Palermo	coef.	-1.401	4.661	-2.581	2.350	-2.687	-0.067	-1.649	4.153	0.788	-3.114	-0.833
	s.e.	1.356	11.063	1.875	10.837	3.582	9.977	1.268	11.212	2.104	8.902	1.167
Perugia	coef.	-0.485	4.199	-1.201	-3.638	-2.730	-3.775	-0.869	1.515	1.845	-4.184	-1.024
	s.e.	1.010	8.809	1.825	8.071	3.605	7.812	1.231	9.479	2.029	5.847	1.018
Potenza	coef.	-0.620	-1.734	-2.845	-8.476	-0.306	-9.168	-2.207	-4.720	1.654	2.453	-0.915
	s.e.	1.296	17.926	1.907	13.197	4.799	8.312	1.535	11.536	2.310	7.417	1.257
Roma	coef.	-1.305	11.557	-2.447	-0.642	3.515	-2.183	-1.175	3.629	-1.350	3.037	-1.468
	s.e.	1.029	8.138	1.858	7.621	6.666	7.207	1.313	9.262	3.807	5.670	1.008
Torino	coef.	0.296	11.149	-0.368	-1.067	-85.971	-7.854	-1.382	-3.195	3.175	1.634	-0.066
	s.e.	0.995	8.158	1.823	7.581	85.331	7.286	1.207	9.335	2.044	5.694	1.003
Trento	coef.	0.059	-1.109	-0.438	-6.346	0.164	-18.103**	-0.466	-2.967	1.714	-7.315	0.239
	s.e.	1.027	9.057	1.829	7.752	3.511	8.427	1.239	9.335	2.104	6.092	1.006
Trieste	coef.	-0.393	-11.489	-0.728	-22.846*	0.884	-11.113	-1.266	-19.006*	2.039	-3.755	0.068
	s.e.	1.321	13.527	1.939	13.104	4.384	7.964	1.395	11.490	2.303	7.815	1.329
Aosta	coef.	-2.449	6.621	-2.031	-5.047	0.833	-24.371**	1.727	2.322	2.987	-2.285	-0.421
	s.e.	1.633	15.889	2.103	9.964	5.483	10.234	1.362	10.616	2.141	6.770	1.458
Venezia	coef.	0.485	11.132	0.038	-5.677	1.348	-7.830	-0.250	-0.847	2.240	-8.763	-0.285
	s.e.	1.044	8.621	1.843	8.512	3.844	8.121	1.249	9.618	2.050	6.689	1.051
Activities of extraterritorial organisa	coef.	-0.199	8.459	-0.799	3.324	4.378	28.415*	4.519**	14.625	1.776	6.345	3.561**
	s.e.	2.805	40.106	1.554	15.730	3.367	15.251	2.112	9.285	1.575	10.121	1.405
Administrative and support service acti	coef.	1.912*	39.630***	1.253*	25.372***	5.503***	28.707***	2.939***	25.964***	3.309***	38.704***	2.167***
	s.e.	1.145	6.250	0.649	5.691	1.824	6.474	0.606	5.441	0.695	5.974	0.695
Agricultureforestry and fishing	coef.	-1.962**	-23.833***	-1.868***	-23.454***	-1.088	-8.618	0.010	-5.829	0.568	-6.661	-0.479
	s.e.	0.864	6.071	0.549	5.870	1.589	6.163	0.750	4.692	0.733	5.767	0.837
Artsentertainment and recreation	coef.	2.682	-11.458	-4.050**	2.002	-4.062	10.946	-3.441	-4.809	0.544	-0.251	2.586*
	s.e.	4.375	11.309	1.695	7.579	3.375	9.695	3.125	10.600	1.413	10.981	1.513
Construction	coef.	-0.165	9.293*	-1.130*	0.270	0.968	10.085*	0.894	9.059**	0.983*	11.634**	-0.120
	s.e.	0.749	5.337	0.673	4.574	1.235	5.409	0.766	4.197	0.555	5.131	0.500
Education	coef.	1.432	17.020	0.881	17.267	1.779	50.474***	5.447***	29.646*	3.346**	17.271	3.713***

Geographical position

Table 2. Performance yesterday of firms involved in an M&A today - s=1 - 2004/2012

Performance difference between firms involved/not involved in M&A												
M&A YEAR		2007		2008		2009		2010		2011		2012
Dep.Var.		RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*
		ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %
Company size	Micro Firm (between 1 and 9 empl.)	coef. -0.205	4.106**	1.963***	9.760***	12.326	8.189***	0.590	6.999***	2.381**	8.180***	1.725***
		s.e. 0.403	1.773	0.588	1.414	10.704	1.684	0.490	1.668	1.166	1.678	0.606
	Small Firm (between 10 and 49 empl.)	coef. 0.763**	5.941***	1.601***	11.281***	10.964	10.271***	1.984***	10.392***	2.934***	9.073***	2.177***
		s.e. 0.358	1.520	0.519	1.464	8.231	1.400	0.231	1.402	1.105	1.411	0.536
	Medium Firm (between 50 and 249 empl.)	coef. 0.391	7.689***	1.047*	4.346**	10.914	9.884***	0.671***	6.992***	2.048*	6.501***	0.954**
		s.e. 0.343	1.526	0.596	1.732	9.262	1.404	0.251	1.453	1.185	1.442	0.442
Stock exchange	Borsa Italiana - MTA	coef. -0.094	11.091***	7.459***	20.089*	27.017	6.224	-1.746	-5.400	-5.244	-15.443***	-9.021***
		s.e. 1.167	4.121	1.538	11.285	27.318	7.481	1.369	6.375	3.755	5.564	1.452
	Delisted	coef. -2.042	6.086	5.136***	19.102*	31.171	18.116***	-2.444	-0.335	-5.103	-12.320	-6.777***
		s.e. 1.494	6.151	1.900	9.977	31.614	6.237	2.974	14.121	7.114	26.057	2.182
	Euronext Paris	coef. 2.670***	17.577***	1.270	5.437	16.562	0.096	-2.260	-7.082	0.275	2.227	-4.874***
		s.e. 0.636	5.516	5.209	8.670	18.764	4.254	2.029	6.894	2.557	7.643	1.441
	London Stock Exchange	coef. -50.123***	-61.398***	-45.467***	-49.930***	-46.243***	-71.122***	-62.841***	-139.492***	-37.642***	-170.353***	-33.762***
		s.e. 0.569	3.639	0.779	4.807	8.162	3.554	0.589	4.531	0.901	2.622	0.884
	Mercato Alternativo del Capitale	coef. -2.880***	0.717	3.837***	18.965***	-5.465***	-12.065***	-20.839***	-31.205***	-6.924***	-14.635***	-4.057
		s.e. 0.930	4.405	0.858	3.899	1.900	4.673	0.610	3.878	0.752	4.300	4.713
	NASDAQ National Market	coef. -30.033***	-34.185***	-46.031***	-64.291***	-23.528**	-45.295***	-8.083***	-12.787***	1.718	-10.358**	4.361***
		s.e. 0.530	4.163	0.738	4.254	9.157	4.671	0.646	4.563	1.291	3.248	0.718
	New York Stock Exchange	coef. 0.914	22.689***	-5.091***	10.577**	9.962	-0.562	-1.079	5.233	-3.228	-12.571***	-11.167***
		s.e. 0.657	5.457	0.784	5.051	18.506	4.730	0.831	4.958	2.507	4.435	0.663
	Swiss Exchange	coef.				19.283	24.510	6.460***	6.400***	-64.160	-92.549	1.108***
		s.e.						0.000	0.000	44.019	58.199	0.000
	Unlisted	coef. 1.056***	18.323***	6.364***	26.158***	18.809	8.794***	0.433	0.393	-2.296	-11.039**	-5.688***
		s.e. 0.352	2.502	0.510	2.355	17.431	2.060	0.488	2.172	1.597	2.162	0.462
Type class	Consortium	coef. 0.347	37.535**	0.056	14.321	-5.928	30.825**	0.075	22.837	2.123*	41.553**	0.568
		s.e. 1.116	17.385	1.159	20.406	11.315	13.621	1.437	15.195	1.288	17.135	1.716
	Consortium by shares	coef. 0.527	13.880	0.480	-4.989	0.864	13.700	0.413	3.423	0.870	0.089	-0.463
		s.e. 1.210	15.940	1.266	17.867	13.543	11.057	1.363	10.814	1.216	12.904	1.775
	Consortium of cooperatives	coef. 1.414	38.389	-0.032	17.611	-8.131	15.163	-0.183	-4.366	1.112	49.674	-0.460
		s.e. 1.196	23.826	1.259	32.446	11.342	14.871	1.377	13.911	1.154	31.087	1.735
	Consortium with external activity	coef. -1.660	36.345	0.034	26.412	-5.581	26.332	0.668	47.445**	3.179	48.343*	0.610
		s.e. 1.946	27.382	1.633	28.824	10.921	16.414	1.414	19.977	1.962	25.484	1.723
	Cooperative company with limited liabil	coef. 1.706	42.055***	-0.004	13.109	-5.638	21.838**	0.589	10.944	2.278**	26.261*	0.733
		s.e. 1.083	14.040	1.379	18.270	11.186	10.954	1.345	11.846	1.123	13.747	1.666
	Cooperative company with limited liabil	coef. 1.263	17.670	0.142	0.615	-3.912	19.487**	0.920	6.561	0.200	19.700	-0.804
		s.e. 1.066	12.174	1.142	17.451	11.523	9.603	1.235	10.500	1.306	12.498	1.728
	Cooperative company with unlimited liab	coef. 7.476	15.983	0.865	-13.801	43.742	48.526	34.891	54.601	8.554*	17.321	-0.636
		s.e. 8.309	23.419	1.338	18.437	53.512	31.232	21.739	38.754	5.036	15.521	1.967
	European economic joint venture - GEIE	coef. 1.424	-20.088	0.275	-27.212	-4.734	14.327	0.913	-7.312	5.060*	-37.282	1.914
		s.e. 1.701	18.347	1.487	18.859	11.000	10.143	1.579	12.128	3.005	33.702	1.908
	Human health and social work activities	coef.								-0.769	-18.777	
		s.e.								1.448	12.346	
	Foundation	coef. -4.858	-36.486	1.061	-14.949	7.162	-7.778	-7.514	-3.314	-12.553	-26.979	-11.201
		s.e. 3.585	30.924	2.438	26.199	20.516	28.046	10.158	16.905	10.402	17.346	7.256
	Foundation business	coef. -15.918	10.780	15.411	-26.289	25.311	3.922	8.917***	9.490	2.157	4.622	6.549
		s.e. 10.740	17.374	11.704	19.769	38.340	18.015	3.434	14.354	2.536	16.100	4.196
	General partnership - SNC	coef. -0.066	-279.294**	-1.162	-59.986	-4.826	4.680	1.352	1.357	1.388	13.396	-0.262
		s.e. 4.292	139.136	4.741	62.176	11.530	11.507	1.320	11.217	1.376	15.816	2.162
	Joint stock company - SPA	coef. 2.707***	9.352	1.822	-11.389	1.606	4.927	1.821	-5.936	3.444***	-2.918	1.480
		s.e. 1.017	11.694	1.118	17.298	12.923	9.261	1.187	10.112	1.292	12.059	1.650
	Limited liability company - SRL	coef. 3.264***	24.114**	2.172*	1.479	-0.037	15.422*	2.434**	2.660	4.345***	7.585	2.148
		s.e. 1.009	11.690	1.110	17.276	12.013	9.235	1.175	10.091	1.228	12.031	1.597
	Limited liability consortium	coef. 1.298	53.185***	0.325	36.085*	-5.429	57.278***	1.083	52.406***	1.856	73.682***	0.754

Table 2. Performance yesterday of firms involved in an M&A today - s=3 - 2006/2012

		Performance difference between firms involved/not involved in M&A											
M&A YEAR		2006		2007		2008		2009		2010		2011	
Dep.Var.		RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	
		ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	
M&A	coef.	2.386***	14.318**	1.213	2.788	-2.756	-1.650	0.313	-8.096	-1.575	4.361	2.402	
	s.e.	0.845	5.789	1.199	4.909	1.721	7.072	1.375	6.760	1.120	6.604	5.586	
Ancona	coef.	-1.572	3.152	1.015	-0.502	-0.655	-7.539	-0.085	2.084	-1.205	-10.940	-2.500	
	s.e.	1.471	8.732	0.969	9.181	1.210	9.023	1.044	9.460	1.834	8.689	3.780	
Bari	coef.	-2.722*	-9.084	-0.813	-1.772	-2.678**	-6.597	-1.725	-0.287	-1.987	-5.881	-0.146	
	s.e.	1.466	10.320	0.921	8.307	1.230	8.911	1.087	9.054	1.828	8.279	3.811	
Bologna	coef.	-1.151	-6.521	0.676	1.424	0.179	-0.696	1.219	7.863	0.355	1.652	5.011	
	s.e.	1.388	6.824	0.886	7.604	1.141	7.952	0.989	8.312	1.820	7.585	5.964	
Cagliari	coef.	-5.030***	-16.972**	-1.589	-1.698	-2.879**	-9.961	-2.842**	-7.489	-2.758	-9.638	-2.899	
	s.e.	1.624	8.269	1.299	9.134	1.296	8.718	1.335	8.778	1.872	9.480	3.630	
Campobasso	coef.	-2.960*	4.827	-2.111*	4.127	-3.847**	-30.220*	-3.387	2.470	-3.492	-27.142	-2.224	
	s.e.	1.759	13.156	1.184	9.688	1.668	16.183	2.153	14.193	2.953	27.317	5.836	
Catanzaro	coef.	-1.734	-0.463	-2.146*	-10.243	-2.544**	-20.598*	-2.157*	-6.382	-2.728	-20.240**	-3.018	
	s.e.	1.684	9.789	1.263	9.496	1.267	12.517	1.110	9.251	1.903	9.176	3.585	
Firenze	coef.	-1.573	-0.210	1.378	9.134	-0.272	1.466	0.984	10.130	-0.003	-7.804	0.180	
	s.e.	1.447	6.875	0.920	7.791	1.317	8.400	1.016	8.484	1.828	8.114	3.594	
Genova	coef.	0.069	-1.166	1.272	3.416	1.395	1.086	0.632	12.664	-0.297	-2.576	3.608	
	s.e.	1.571	7.675	1.180	8.674	1.207	8.509	1.045	9.043	1.906	8.530	5.122	
L'Aquila	coef.	-0.977	5.603	-0.055	0.709	-1.399	3.944	-0.358	5.660	-0.200	8.580	-3.223	
	s.e.	1.621	10.504	1.561	8.463	1.701	16.308	1.933	10.413	2.385	12.877	4.912	
Milano	coef.	-2.061	-1.458	1.222	5.422	-0.301	0.344	0.618	13.370*	-0.788	-0.231	6.452	
	s.e.	1.373	6.280	0.860	7.336	1.128	7.678	1.004	7.979	1.833	7.392	8.180	
Napoli	coef.	-2.576*	-4.894	0.056	0.025	-1.751	-5.973	0.282	11.054	-1.463	-0.004	-1.288	
	s.e.	1.365	6.740	0.882	7.796	1.150	8.125	1.306	8.247	1.811	7.724	3.413	
Palermo	coef.	-2.811*	-6.702	0.652	5.352	-1.796	-2.253	-1.427	4.650	-2.582	2.319	-2.654	
	s.e.	1.476	8.393	1.047	9.612	1.318	10.756	1.361	11.125	1.876	10.840	3.570	
Perugia	coef.	-3.082**	-9.501	0.445	4.947	-0.656	-0.898	-0.491	4.114	-1.451	-4.113	-2.713	
	s.e.	1.420	7.073	0.933	7.786	1.165	7.915	1.010	8.823	1.840	8.080	3.604	
Potenza	coef.	-2.260	-2.782	-0.913	6.473	-2.045	-7.461	-0.622	-1.741	-2.791	-6.504	-0.312	
	s.e.	1.954	13.557	1.350	11.142	1.289	9.444	1.295	17.937	1.905	13.022	4.790	
Roma	coef.	-3.418**	0.446	-0.780	3.836	-1.681	-0.542	-1.316	11.535	-2.427	-0.583	3.526	
	s.e.	1.474	6.819	0.854	7.637	1.200	7.898	1.029	8.149	1.858	7.623	6.680	
Torino	coef.	-2.390*	-3.665	0.439	2.640	-0.971	0.233	0.288	11.306	-0.407	-1.103	-85.772	
	s.e.	1.418	6.778	0.890	7.639	1.174	7.858	0.995	8.168	1.823	7.584	85.183	
Trento	coef.	-0.164	-4.251	0.659	0.709	-0.080	-5.614	0.164	-0.908	-0.311	-6.244	0.090	
	s.e.	1.558	7.078	1.000	7.615	1.161	8.301	1.023	9.049	1.826	7.757	3.509	
Trieste	coef.	-1.008	-12.332	0.054	-3.121	-1.590	-17.809	-0.400	-11.517	-0.665	-22.612*	0.851	
	s.e.	1.778	22.645	1.175	14.618	1.494	12.950	1.320	13.533	1.932	13.114	4.380	
Aosta	coef.	-2.999*	0.388	-0.117	5.211	-1.462	-7.674	-2.428	6.598	-2.059	-5.391	0.404	
	s.e.	1.720	10.108	1.101	9.625	1.327	8.964	1.630	15.889	2.103	9.967	5.217	
Venezia	coef.	-0.923	3.581	0.264	4.371	-0.905	-3.414	0.453	11.091	0.034	-5.796	1.366	
	s.e.	1.404	7.489	1.046	8.033	1.193	8.516	1.044	8.631	1.844	8.509	3.801	
Activities of extraterritorial organisa	coef.	-1.163	-43.465*	-1.870	-63.748	-3.050	-8.989	-0.153	8.601	-0.811	3.205	4.344	
	s.e.	5.129	25.235	2.930	48.919	2.854	32.017	2.822	40.093	1.554	15.748	3.379	
Administrative and support service acti	coef.	1.898**	19.351***	2.809***	26.340***	1.079*	26.841***	1.883	39.582***	1.257*	25.474***	5.625***	
	s.e.	0.745	7.487	0.845	6.179	0.654	5.237	1.146	6.262	0.650	5.706	1.823	
Agricultureforestry and fishing	coef.	-2.155*	-21.176***	-0.673	-28.131***	-3.018***	-24.326***	-1.971**	-23.811***	-1.846***	-21.873***	-1.040	
	s.e.	1.136	6.754	0.806	5.700	1.116	5.325	0.865	6.081	0.550	5.686	1.575	
Artsentertainment and recreation	coef.	-8.351***	-28.013**	-4.621**	-36.089**	-5.066***	-29.510***	2.220	-11.691	-4.089**	1.584	-3.768	
	s.e.	2.809	13.266	1.887	15.044	1.799	9.848	4.374	11.315	1.700	7.607	3.396	
Construction	coef.	-0.713	-1.335	0.801	-1.360	0.007	1.524	-0.161	9.404*	-1.114*	0.224	0.968	
	s.e.	0.831	5.803	0.747	4.874	0.462	4.187	0.750	5.348	0.673	4.589	1.238	
Education	coef.	5.168*	20.768	3.916	26.501	1.370	15.095	0.986	17.074	0.883	16.642	2.230	
	s.e.	2.849	16.677	3.122	34.862	2.480	22.435	2.317	19.326	4.124	11.328	6.619	
Electricitygassteam and air conditi	coef.	0.891	2.465	2.957***	8.713	1.233*	2.123	0.975	4.658	-0.901	-8.734	6.166	
	s.e.	1.071	7.676	0.942	6.142	0.654	5.017	1.009	6.310	0.837	5.452	4.531	

Geographical position

Table 2. Performance yesterday of firms involved in an M&A today - s=3 - 2006/2012

		Performance difference between firms involved/not involved in M&A											
M&A YEAR		2006		2007		2008		2009		2010		2011	
Dep.Var.		RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	
		ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	
Company size	Micro Firm (between 1 and 9 empl.)	coef.	-0.582	-8.436***	-0.023	-3.294	-0.143	0.727	-0.202	4.258**	1.000*	4.291**	12.315
		s.e.	0.556	2.818	0.434	2.021	0.411	1.888	0.403	1.774	0.596	1.728	10.712
	Small Firm (between 10 and 49 empl.)	coef.	0.010	-2.889	0.462	4.277**	0.452	4.372***	0.791**	6.136***	1.938**	9.636***	10.941
		s.e.	0.469	2.166	0.361	1.701	0.297	1.616	0.358	1.520	0.589	1.409	8.218
	Medium Firm (between 50 and 249 empl.)	coef.	-0.044	-2.560	0.512	4.291**	0.301	3.793**	0.393	7.805***	1.595***	11.140***	10.977
		s.e.	0.476	2.123	0.375	1.684	0.276	1.630	0.343	1.527	0.520	1.456	9.327
Stock exchange	Borsa Italiana - MTA	coef.	2.365	11.939*	-5.448***	-43.432***	-2.778*	-12.511***	0.503	12.136***	7.672***	17.542	28.606
		s.e.	1.742	6.590	1.485	7.862	1.516	4.759	1.225	4.269	1.512	10.908	27.520
	Delisted	coef.	2.452	15.823*	-6.429***	-38.925***	-3.586	-27.669*	-0.729	10.703*	5.522***	-0.823	27.499
		s.e.	2.423	9.483	1.899	7.287	2.258	16.784	1.709	5.658	1.728	15.628	28.712
	Euronext Paris	coef.	4.341***	34.219***	-7.671***	-27.102***	-3.557*	-8.346	2.705***	17.756***	1.139	4.955	16.897
		s.e.	1.680	7.855	1.462	6.866	1.826	6.407	0.636	5.519	5.273	8.819	18.939
	London Stock Exchange	coef.							-50.120***	-61.594***	-45.446***	-49.718***	-46.224***
		s.e.							0.569	3.631	0.780	4.819	8.217
	Mercato Alternativo del Capitale	coef.	2.678**	26.927***	-8.286***	-51.843***	-7.944***	-31.931***	-2.906***	0.066	3.863***	19.135***	-5.191***
		s.e.	1.105	6.792	0.998	5.046	0.759	4.252	0.921	4.375	0.863	3.930	11.792
	NASDAQ National Market	coef.	5.099***	28.109***	-27.033***	-178.516***	-27.466***	-49.165***	-30.010***	-34.338***	-46.041***	-64.374***	-23.542**
		s.e.	0.917	6.371	5.919	4.374	0.813	3.697	0.529	4.158	0.736	4.247	9.208
	New York Stock Exchange	coef.	9.232***	37.557***	-0.781	-22.603***			1.095	22.567***	-5.160***	10.370**	9.909
		s.e.	1.145	9.860	0.997	5.551			0.677	5.449	0.785	5.054	18.602
	Swiss Exchange	coef.											-5.375
		s.e.											17.634
	Unlisted	coef.	6.287***	37.430***	-3.291***	-24.599***	-1.224*	-4.935*	1.033***	18.185***	6.359***	25.905***	18.870
		s.e.	0.702	4.265	0.891	2.969	0.626	2.750	0.352	2.506	0.510	2.355	17.525
Type class	Consortium	coef.	-1.643	42.913**	3.187	43.486**	0.649	26.249	0.376	37.655**	0.123	22.788	-6.138
		s.e.	1.471	20.414	3.803	21.403	1.359	19.649	1.107	17.367	1.180	16.903	11.263
	Consortium by shares	coef.	2.320	22.515	5.065	40.367**	2.289*	29.409**	0.563	13.959	0.557	3.590	0.659
		s.e.	1.465	17.394	3.821	18.946	1.337	14.757	1.202	15.920	1.286	13.692	13.448
	Consortium of cooperatives	coef.	1.409	-1.667	5.447	41.712	2.127	18.364	1.483	38.476	0.062	26.023	-8.323
		s.e.	1.405	15.494	3.815	26.339	1.398	17.084	1.185	23.811	1.278	30.400	11.314
	Consortium with external activity	coef.	-1.156	32.780	3.800	50.656**	-1.112	0.840	-1.619	36.483	0.090	34.798	-5.783
		s.e.	1.971	22.290	3.829	22.483	1.673	29.722	1.942	27.369	1.649	26.489	10.892
	Cooperative company with limited liabil	coef.	-1.186	19.491	4.175	28.565*	2.137	21.957**	1.746	42.169***	0.061	21.354	-5.895
		s.e.	2.093	11.863	3.808	15.939	1.329	11.151	1.073	14.018	1.396	14.373	11.144
	Cooperative company with limited liabil	coef.	1.637	17.999*	5.148	32.588**	2.514**	16.265*	1.298	17.840	0.203	8.822	-4.145
		s.e.	1.153	9.330	3.775	14.964	1.255	8.676	1.056	12.147	1.163	13.304	11.454
	Cooperative company with unlimited liab	coef.	-0.683	-5.822	6.419	26.742	4.038	4.802	7.453	16.033	0.925	-6.206	43.409
		s.e.	1.427	13.186	4.202	22.073	2.887	17.245	8.259	23.322	1.348	14.645	53.267
	European economic joint venture - GEIE	coef.	-0.023	-16.953*	3.319	-3.724	0.789	-8.324	1.449	-19.863	0.354	-18.638	-4.822
		s.e.	1.359	9.732	3.862	16.174	1.456	9.903	1.693	18.324	1.498	14.872	10.950
	Foundation	coef.	6.631**	22.566	3.258	26.813	1.058	-95.226	-4.539	-36.192	1.164	-6.588	6.714
		s.e.	3.058	15.493	4.123	18.582	2.177	87.294	3.539	30.890	2.450	23.829	20.397
	Foundation business	coef.	3.418	-3.491	8.613*	41.930**	3.959	19.225	-15.463	11.053	15.568	-17.183	24.717
		s.e.	3.150	17.427	4.464	20.923	2.701	13.424	10.726	17.346	11.703	16.038	38.217
	General partnership - SNC	coef.	-4.805	0.055	2.437	-113.340	0.585	-85.128	-0.035	-279.185**	-1.088	-51.417	-4.976
		s.e.	3.498	56.121	4.045	124.901	2.850	61.762	4.289	139.152	4.746	61.122	11.478
	Joint stock company - SPA	coef.	2.233**	8.682	6.409*	21.432	3.272***	4.450	2.711***	9.440	1.893*	-3.002	1.421
		s.e.	1.110	8.466	3.769	14.593	1.208	8.201	1.007	11.666	1.140	12.955	12.836
	Limited liability company - SRL	coef.	2.882***	23.013***	6.998*	35.000**	3.767***	17.752**	3.281***	24.147**	2.240**	9.991	-0.236
		s.e.	1.076	8.466	3.775	14.602	1.211	8.200	0.999	11.662	1.132	12.936	11.934
	Limited liability consortium	coef.	-0.227	49.985***	4.192	36.586**	1.752	40.685***	1.334	52.995***	0.413	44.713***	-5.631
		s.e.	1.248	18.055	3.797	18.419	1.246	13.119	1.081	15.997	1.201	16.766	11.146
	Limited partnership - SAS	coef.	1.187	11.568	3.976	22.850	2.044	13.504	-0.915	15.731	-1.043	-16.202	3.270
		s.e.	1.426	10.438	3.843	18.635	1.391	14.739	1.618	16.695	1.690	20.520	15.828
	Limited partnership by shares - SAPA	coef.	5.914	-0.773	6.427	16.763	5.947***	4.907	3.210**	5.992	1.786	-4.594	41.933
		s.e.	5.761	12.550	3.923	14.946	1.956	9.026	1.284	12.031	1.381	13.181	47.075

Table 2. Performance yesterday of firms involved in an M&A today - s=5 - 2008/2012

Performance difference between firms involved/not involved in M&A											
M&A YEAR		2008		2009		2010		2011		2012	
Dep.Var.		RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*	RTAS*	RSHF*
		ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %	ROA using P/L before tax %	ROE using P/L before tax %
M&A	coef.	0.862	16.841	0.075	5.875	-0.731	7.796	0.905	11.269*	-0.391	-5.625
	s.e.	1.185	10.719	1.433	4.257	0.762	5.347	1.013	6.167	1.525	11.092
Ancona	coef.	-1.559	3.399	1.007	-0.603	-0.639	-7.510	0.063	2.651	-0.986	-10.382
	s.e.	1.471	8.735	0.971	9.195	1.210	9.021	1.054	9.446	1.815	8.596
Bari	coef.	-2.706*	-8.833	-1.008	-1.747	-2.641**	-6.416	-1.547	-0.321	-1.806	-5.283
	s.e.	1.466	10.324	0.940	8.302	1.229	8.902	1.074	9.054	1.808	8.183
Bologna	coef.	-1.166	-6.398	0.717	1.428	0.137	-0.625	1.226	8.282	0.492	0.979
	s.e.	1.388	6.827	0.884	7.603	1.141	7.951	0.989	8.290	1.801	7.546
Cagliari	coef.	-5.108***	-17.062**	-1.583	-1.688	-2.842**	-9.767	-2.852**	-7.510	-2.587	-9.138
	s.e.	1.625	8.291	1.299	9.134	1.297	8.723	1.335	8.772	1.852	9.372
Campobasso	coef.	-2.685	9.132	-2.050*	4.336	-4.234**	-33.143**	-3.387	2.566	-3.281	-26.377
	s.e.	1.746	13.301	1.187	9.685	1.649	16.271	2.153	14.186	2.942	27.300
Catanzaro	coef.	-1.622	0.510	-2.144*	-10.224	-2.552**	-20.655*	-2.161*	-6.415	-2.518	-19.605**
	s.e.	1.696	9.907	1.233	9.493	1.267	12.515	1.111	9.246	1.885	9.088
Firenze	coef.	-1.434	0.099	1.337	8.999	-0.355	1.166	1.010	10.563	0.218	-7.110
	s.e.	1.455	6.888	0.920	7.790	1.317	8.404	1.017	8.477	1.809	8.017
Genova	coef.	0.094	-1.018	1.362	3.715	1.383	1.078	0.590	12.773	-0.107	-2.149
	s.e.	1.572	7.688	1.181	8.670	1.208	8.514	1.045	9.035	1.888	8.443
L'Aquila	coef.	-0.969	5.709	-0.046	0.730	-1.427	3.911	-0.369	5.632	0.003	9.171
	s.e.	1.621	10.517	1.561	8.462	1.701	16.299	1.934	10.415	2.370	12.816
Milano	coef.	-2.050	-1.144	1.210	5.391	-0.312	0.353	0.603	13.425*	-0.572	0.426
	s.e.	1.373	6.289	0.860	7.337	1.128	7.673	1.005	7.972	1.813	7.283
Napoli	coef.	-2.570*	-4.626	0.064	0.076	-1.787	-6.128	0.282	11.041	-1.255	0.590
	s.e.	1.365	6.745	0.883	7.795	1.150	8.121	1.307	8.242	1.792	7.620
Palermo	coef.	-2.801*	-6.445	0.646	5.078	-1.799	-2.121	-1.425	4.706	-2.374	2.921
	s.e.	1.478	8.429	1.048	9.617	1.316	10.726	1.358	11.093	1.857	10.779
Perugia	coef.	-3.075**	-9.201	0.456	4.950	-0.671	-0.978	-0.486	4.102	-1.237	-3.456
	s.e.	1.420	7.077	0.934	7.792	1.165	7.911	1.010	8.818	1.823	7.985
Potenza	coef.	-2.634	-2.348	-0.917	6.458	-2.037	-4.341	-0.619	-1.707	-2.519	-5.752
	s.e.	1.962	13.707	1.346	11.151	1.284	8.830	1.296	17.930	1.888	13.075
Roma	coef.	-3.421**	0.711	-0.797	3.811	-1.719	-0.726	-1.330	11.454	-2.227	-0.010
	s.e.	1.474	6.825	0.855	7.639	1.200	7.893	1.030	8.143	1.839	7.520
Torino	coef.	-2.429*	-3.685	0.445	2.844	-1.023	0.152	0.298	11.271	-0.228	-0.740
	s.e.	1.418	6.781	0.891	7.640	1.175	7.856	0.995	8.161	1.804	7.484
Trento	coef.	-0.232	-4.243	0.638	0.541	-0.126	-6.485	0.137	-1.112	-0.114	-5.749
	s.e.	1.559	7.092	0.998	7.610	1.161	8.276	1.025	9.061	1.806	7.657
Trieste	coef.	-0.989	-13.108	0.141	-3.640	-1.543	-18.343	-0.405	-11.439	-0.500	-22.785*
	s.e.	1.789	22.951	1.179	14.732	1.507	13.122	1.321	13.530	1.916	13.129
Aosta	coef.	-2.657	0.496	-0.095	5.235	-1.559	-7.912	-2.393	6.476	-1.767	-4.101
	s.e.	1.727	9.947	1.104	9.624	1.324	8.962	1.620	15.723	2.089	9.896
Venezia	coef.	-0.937	3.690	0.232	4.261	-0.918	-3.520	0.494	11.123	0.219	-5.272
	s.e.	1.404	7.493	1.046	8.030	1.192	8.508	1.044	8.625	1.825	8.413
Activities of extraterritorial organisa	coef.	-1.167	-43.302*	-1.863	-63.600	-3.074	-9.122	-0.201	8.639	-0.818	3.240
	s.e.	5.139	25.273	2.932	48.912	2.858	32.032	2.805	40.084	1.547	15.754
Administrative and support service acti	coef.	1.887**	19.476***	2.834***	26.464***	1.064	27.007***	1.892*	39.713***	1.240*	25.226***
	s.e.	0.742	7.452	0.846	6.186	0.655	5.250	1.147	6.256	0.650	5.710
Agricultureforestry and fishing	coef.	-2.157*	-20.777***	-0.652	-27.995***	-3.053***	-24.537***	-1.958**	-23.721***	-1.845***	-21.855***
	s.e.	1.133	6.728	0.807	5.708	1.118	5.337	0.864	6.072	0.549	5.681
Artsentertainment and recreation	coef.	-8.422***	-27.977**	-5.061***	-35.977**	-3.943***	-29.521***	2.695	-11.444	-4.035**	2.173
	s.e.	2.809	13.256	1.933	15.047	1.443	9.854	4.397	11.359	1.695	7.605
Construction	coef.	-0.713	-1.187	0.825	-1.082	-0.002	1.469	-0.156	9.395*	-1.124*	0.217
	s.e.	0.831	5.776	0.748	4.882	0.463	4.201	0.750	5.338	0.674	4.590
Education	coef.	5.166*	20.947	3.624	25.036	1.381	15.081	1.460	17.074	0.879	16.644

Geographical position

Appendix C

Table 3B. Performance tomorrow of firms that could be involved in an M&A today - controls											
Performance after M&A using PSM											
M&A YEAR			2003	2004	2005	2006	2007	2008	2009	2010	2011
Company size	Small Firm (between 10 and 49 empl.)	coef.	0.315	-0.034	0.082	-0.092	-0.216*	-0.182*	-0.124	0.048	0.224
		s.e.	0.304	0.160	0.187	0.125	0.124	0.107	0.112	0.143	0.139
	Medium Firm (between 50 and 249)	coef.	0.644**	0.108	0.373**	0.114	0.077	0.098	0.110	0.396***	0.345**
		s.e.	0.294	0.155	0.177	0.117	0.112	0.099	0.103	0.132	0.136
	Big Firm (250 and more empl.)	coef.	1.027***	0.379**	0.742***	0.435***	0.367***	0.310***	0.241**	0.647***	0.670***
		s.e.	0.291	0.151	0.174	0.113	0.109	0.097	0.104	0.131	0.133
Type class	Limited liability company - SRL	coef.	-0.796***	-0.542***	2.458	2.530	2.510		-0.667***	-0.537***	-0.601***
		s.e.	0.148	0.111	-	-	-		0.103	0.086	0.081
	One-person company with limited liability	coef.	-0.462***	-0.429***	2.678***	2.888***	2.910***	0.357***	-0.270***	-0.409***	-0.427***
		s.e.	0.123	0.122	0.138	0.110	0.102	0.088	0.090	0.092	0.085
	Joint stock company - SPA	coef.		-0.148*	3.062***	3.117***	3.013***	0.397***	-0.093	-0.149**	-0.254***
		s.e.		0.084	0.109	0.093	0.090	0.077	0.072	0.068	0.065
One-person joint stock company - SPA	coef.	0.130		3.297***	3.373***	3.221***	0.669***				
	s.e.	0.080		0.114	0.098	0.097	0.083				
Sector	Accommodation and food service	coef.	0.037		0.106	0.059	0.336*	-0.071	-0.210		-0.034
		s.e.	0.325		0.254	0.251	0.191	0.255	0.326		0.245
	Administrative and support service activities	coef.	0.292*	0.089	0.013	-0.029	0.171		0.053	0.092	-0.350
		s.e.	0.163	0.200	0.182	0.181	0.153		0.162	0.143	0.232
	Arts, entertainment and recreation	coef.		0.300	0.812***	0.644***	0.127	0.278	0.483**	0.278	0.408*
		s.e.		0.352	0.201	0.213	0.362	0.268	0.231	0.275	0.236
	Education	coef.									0.709*
		s.e.									0.417
	Electricity, gas, steam and air conditioning	coef.		-0.142	0.017	0.313**	0.184		0.414***	0.308**	
		s.e.		0.315	0.221	0.151	0.170		0.133	0.144	
	Financial and insurance activities	coef.	-0.309	-0.188	-0.419*	-0.280	-0.154	-0.208	-0.034	-0.110	0.037
		s.e.	0.243	0.233	0.238	0.199	0.178	0.172	0.156	0.149	0.130
	Information and communication	coef.	0.392***	0.482***		0.446***	0.468***	0.388***	0.377***	0.326***	0.403***
		s.e.	0.151	0.141		0.119	0.120	0.112	0.118	0.117	0.113
	Manufacturing	coef.	0.099	0.216***	0.108	0.183***	0.208***	0.187***			0.059
s.e.		0.082	0.079	0.069	0.065	0.066	0.057			0.061	
Constant	coef.	-3.373***	-2.779***	-6.091***	-5.876***	-5.760***	-3.069***	-2.537***	-2.743***	-2.693***	
	s.e.	0.290	0.156	0.189	0.130	0.121	0.103	0.110	0.136	0.136	
Number of obs			39,084	35,734	39,633	40,093	40,058	40,864	40,435	39,335	39,984
Pseudo R-sq			0.124	0.064	0.113	0.093	0.082	0.070	0.061	0.073	0.070

*a constant variable and controls are included in all regressions

Chapter III - Relational networks and innovation: Do mergers and acquisitions, joint ventures and strategic alliances have an effect on innovation performance? An Italian perspective.

Abstract

The aim of this work is to investigate the factors that determine patenting performance, including relational activities. We will provide an original framework within a knowledge production function model. We focus on the role of relational networks, proxied with mergers and acquisitions, joint ventures and strategic alliances, in influencing the behaviour of local innovation systems, considering Italian provinces data (NUTS3) from 2000 to 2012. Considering the knowledge production function (KPF) approach presented by Griliches in 1979 we used an extension of it, to model the process by which firms transform knowledge into innovation. We reformulate the basic formulation of the KPF: we have the purpose to analyze the effect on province innovation, of various kind of deals (Mergers and Acquisitions, Social alliances, Joint Ventures) signed between firms, creating those formal networks that allow knowledge spillovers. We expect spillovers to occur over longer distances when a province is involved in deals with firms located in other provinces or abroad. Even though exist a broad collection of studies on this subject, we can't say that the argument about the localization of knowledge spillovers reached an in-depth result, and this study should give more insights considering this type of formal networks as input which contributes generating the innovative output.

Introduction

The primary idea of this work is that knowledge created in determined regions influence innovation in both regions where knowledge is created, their contiguous regions and other regions which establish relations, regardless of their geographical proximity, with the one creating. Knowledge is diffused and exchanged either through a diffusive pattern based on spatial contiguity, or according to intentional relations based on a-spatial networks (Maggioni M., Nosvelli M., Uberti E., 2007) .

Our purpose is to analyse deeply a form of a-spatial networks, concerning the signing of agreements such as mergers and acquisitions, joint ventures and strategic alliances. We'll use a Knowledge Production Function (Griliches 1979, in the first instance), reformulated with the inclusion of M&As, JVs, SAs, in order to check if intentional relations based on a-spatial networks can be considered as a determinant of innovation. We consider a database of 103 Italian provinces (NUTS3)

The paper is organized as follows: section 2 presents the theoretical framework; section 3 describes the data on Mergers and Acquisitions, Joint Ventures and Strategic alliances, giving a short descriptive analysis; section 4 contains the empirical analysis; in section 5 we discuss the results; section 6 concludes.

The theoretical frame work

“..spillovers are the ideas borrowed by the research teams of industry i from the research results of industry j. [...] working on similar things and hence benefiting much from each other’s research.” Griliches (1992)

In our preliminary analysis, we use an extension of the knowledge production function (KPF) approach presented by Griliches in 1979, which modelled the process by which firms transform knowledge into innovation, using a function where the main input is R&D, supposing that the innovation activity is higher when/where the investment in R&D is higher.

In literature, R&D is then the most recurrent input which contributes generating the innovative output, usually associated to the level of human capital. This second input is of particular importance when considering innovation results also from informal process of learning by doing and from the absorption of external knowledge and not only formal investment in research (Foddi M., Usai S. 2012). In fact to understand, interpret and exploit external knowledge, firms and regions need to count on individual skills, and, more generally, in a well educated labour force (Marrocu E., Paci R., Usai S. 2013). The basic formulation of the KPF:

$$\text{Ln(Innovation}_i) = a \text{ Ln (R\&D}_i) + b \text{ Ln (HK}_i) + c \text{ Ln (controls}_i) + \varepsilon_i$$

Many studies confirm that innovation performance depends not only from internal factors, but also from knowledge spillovers, flowing from a firm to another (or from a region to another). The channels through which knowledge can flow are various: for example the interaction of employees, a common stock of suppliers or customers, or traded goods (Greunz L., 2004). Studies have emphasized the function of formal (collaborative research in both academia and private sector) and informal (spin-offs, mobility of employees, informal knowledge exchange) networking between individuals and between organizations as a mechanism for knowledge spillovers, showing the necessity to include the structure of this networks in the analysis of knowledge spillovers (Ponds R., Van Oort F. and Frenken K. 2010). Technological and scientific knowledge may be spread through a set of a-spatial networks connecting each cluster (i.e. the concentrations in a certain area of crucial nodes in creating and diffusing knowledge) with others, even if not geographic neighbours (Maggioni M., Nosvelli M., Uberti E. 2007).

Considering the theoretical literature and the several empirical works on KPF existing, we assume that innovation production depends on internal and external factors, and we estimate a Spatial Autoregressive Model (SAR). Following Foddi M., Usai S. (2012) we start from the succeeding model:

$$Y_{it} = a X_{it} + b WY_{it} + u_{it}$$

Where Y is the dependent variable (number of EPO patent applications per priority year & residence region of inventors), X consider a set of explanatory variables measuring internal characteristics (total intramural r&d expenditure; economically active population with tertiary education; number of people at 1st January and country dummy as a control), W is the matrix of spatial weights (multiplied by the dependent variable after its normalization) which describes the geographic interconnectivity among regions, in order to entangle potential externalities in the form of spillovers coming from other provinces and in conclusion, U is a i.i.d error term.

Foddi M., Usai S. (2012) underline that in their case each entry of W is the inverse of the distance among a given pair of regions: with the increase of the distance, spillovers are supposed to lose force and to fade away.

In our case we have the purpose to analyze the effect on province innovation, of various kind of deals (Mergers and Acquisitions, Social alliances, Joint Ventures) signed between firms, creating those formal

networks that allow knowledge spillovers. We expect spillovers to occur over longer distances when a province is involved in deals with firms located in other provinces or abroad.

In this sense we reformulate the model as follows:

$$\ln(\text{Innovation}_{it}) = a \ln(\text{R\&D}_{it-s}) + b \ln(\text{HK}_{it-s}) + c \ln(\text{controls}_{it-s}) + d W \ln(\text{Innovation}_{it}) + e \ln(\text{deals}_{it-s}) + \varepsilon_{it}$$

The innovative output of a province depends on the amount invested in R&D and the human capital available in that area, but also from spillovers coming from nearby province and knowledge spillovers arise from formal networking collaborations.

In this work we examine 103 Italian provinces from 20 Italian regions, analyzed at the NUTS 3 level.

Following the rich literature on Knowledge production function, we decide to measure innovation at the provincial level using the number of patent applications. We use patents filed at the European Patent Office (EPO) which are associated to provinces on the basis of the inventor address, in order to keep the information on the location where the invention occurred more indicative of the reality (Foddi, Usai 2012): we avoid the concentration of patents in metropolitan areas where firms usually locate headquarters (Greunz, 2004). We consider the average of the applications on a three years period, to maintain minimum the number of zeros (Foddi, Usai 2012) and because of the irregularity of the patenting activity at the provincial level over time (Marrocu E., Paci R., Usai S. 2013). In order to account for region's size, patent applications are divided by total population (Foddi, Usai, 2012; Greunz, 2004)

As explained above, traditionally variables used as input in the Knowledge Production Function are R&D and Human capital. In this sense we added as independent variables to our dataset: R&D expenditure total (as % of GDP) unfortunately available only at regional level, and the share of population with First and second stage of tertiary education (levels 5 and 6) over total, per province.

Our data on mergers and acquisition, joint venture, strategic alliances consider only deals "Completed" (deals with "pending", "withdrawn" and others status were not considered) and in particular we consider the number of deals signed per province per year, the number of firms involved in a deal per province per year and the number of "double": number of deals where firms involved and coming for the same province are more than 2, per province per year.

Our control variables take into account differences between provinces in terms of economic development, including GDP pro capite at provincial level; differences in provincial productive pattern, including gross value added in manufacturing; differences in population density to check for agglomeration effect.

Most of our data are available from 2000 to 2012, except for data on education that are available only for 2001.

We should consider an average over a three year period in order to smooth away undue cycle effects, and use variables lagged with respect to the dependent variable in order to consider a congruent time between the cause and the effect: to allow for a congruent response time of the innovation activity to changes in the production inputs and to avoid potential endogeneity problems (Marrocu E., Paci R., Usai S. 2013).

M&A, JV, SA

Assuming that technological and scientific knowledge may be spread through a set of a-spatial networks, even if not geographic neighbours (Maggioni M., Nosvelli M., Uberti E. 2007), we focussed on mergers and acquisitions, joint ventures and strategic alliance: cooperation and networking between institutions, firms and organizations can be represented by deals signed between 2 or more entities.

In particular we analysed firms and organizations located in the 103 Italian provinces (NUTS3) that were involved (both as acquirer or target) in a deal between 2000 and 2012 both in national or international agreements.

In this section we describe the data on M&A, JV and SA, collected from the SDC Platinum™ dataset (Thomson Financial) which provides in-depth information and includes all the deals that comprise at least a partner located in Italy. Using this dataset implemented and constantly updated by an international team of expert analysts, SDC Platinum allowed us to consider internationalization strategies such as mergers and acquisitions, joint ventures and strategic alliances with homogeneous data over the period 2000-2012.

Mergers and acquisitions data contain both data on agreement and firms (partner1 and partner2) characteristics, describing a consolidation of companies: deals between two enterprises that decide to combine their resources to form a new company (Merger) or deals with the purchase of one company by another in which no new company is formed (Acquisitions).

Our data on other agreements contain both joint ventures and strategic alliances. We can define a joint venture as a cooperative business activity, consisting of two or more enterprises, which creates an independent organisation and sets the ownership, the operational responsibilities and the financial risks and rewards to each partner, while preserving their separate identity. A strategic alliance is cooperative activity formed by two or more organizations for a wide range of strategic purposes (manufacturing, licensing, marketing, supply, technology transfer, etc.) which does not create an independent entity but establishes a contractual agreement among the partners which remain independent organizations.

The number of deals completed varies between type of deal and during years considered.

Considering type of deal we can note how M&As are much more frequent (between 86% and 99% on the total of deals completed during the period considered, with the exception of the last year) of SA and JV (see tab.1 below).

About the variability during years, we note a decrease in number of deals and in particular of M&As in 2002, which gradually resumed in the following years, reaching its top in 2007 and 2008, before lose numbers (in graph 1, below).

Observing the number of participants of completed deals we can repeat the same considerations explicated for the number of deals: participants in M&As are much more frequent, even considering that the number of participant per single completed deal is 2 for M&As, but from 2 to 9 for JV and from 2 to 6 in SA (see tab.2 below).

We note the same decrease in number of participants we noted in the number of deals in 2002, which gradually resumed in the following years, reaching its top in 2008, before lose numbers (graph 2).

The number of relations developed shows the same trend of deals completed, in fact vary between type of deal and during years considered (tab. 3). Considering the change in time, we found the same decrease in number of relationships in 2002, which gradually resumed in the following years, reaching its top in 2008, before decrease again (graph 3).

In graphs 4, 5, 6 we reported, respectively, tthe number of deals, participants, relations completed per year, by macroregions, divided per populations.

We can note how north-east and north-west are the macro regions where most of deals have been closed, participants are located and relations are built. On the contrary south and islands are the macro regions less active.

In tab 4 we can see the number of deals involving only Italian firms / involving at least one Italian firm and one or more foreign firms, divided in M&A, SA and JV. On almost 18.000 deals, most of them (56%) seem

happened between Italian enterprises. With a deeper analysis we can note that if 59% of M&A involved only Italian firms, on the contrary, considering SA and JV we can see that the great majority (87% and 81%) involved one or more foreign company.

In maps 1, 2, 3 succeeding, we reported respectively, the number of deals, participants, relations completed from 2000 to 2012, in all provinces of Italy, showing the activity in 4 groups (the last group consider only the province of Enna, where none M&A, JV or SA were completed in those years). The most active provinces are Milan, Rome, Turin, Boulogne, Florence, Brescia, Verona, Bergamo, Genoa, Vicenza as shown in tables 5, 6, 7, for all the three aspect considered (deals, participants, and relations). All percentages in tables 5, 6, 7 are referred to the total number, which means that almost 50% of deals, participants and relations developed from 2000 to 2012, took place in Milan, Rome and Turin.

Focusing on M&As, we wanted to give a deeper descriptive analysis regarding the economic values of deals and the percentage considered in those agreements, discriminating between M&As which took place between two Italian firms, and between an Italian and a foreign enterprise, both in the case the company was the acquirer or the target.

In Graph 7 we can see the mean value of the deal, how it changes during years, and in graph 8 we note the different trends when distinguishing between the groups: in the first the 2 firms are both Italians, in the second the Italian enterprise is the target and in the third the acquirer. The value reach the maximum values and have a higher mean when enterprises are both Italians (we see that also in tab 8)

In Graph 9 we can see the mean percentage of shares object of the agreement, how it changes during years, and in graph 10 we reported the different trends when distinguishing between the same three groups considered above: in the first the 2 firms are both Italians, in the second the Italian enterprise is the target and in the third the acquirer. The percentage is increasing during years, and reaches the maximum values and has a higher mean when the firm acquirer is Italian (we see that also in tab 9).

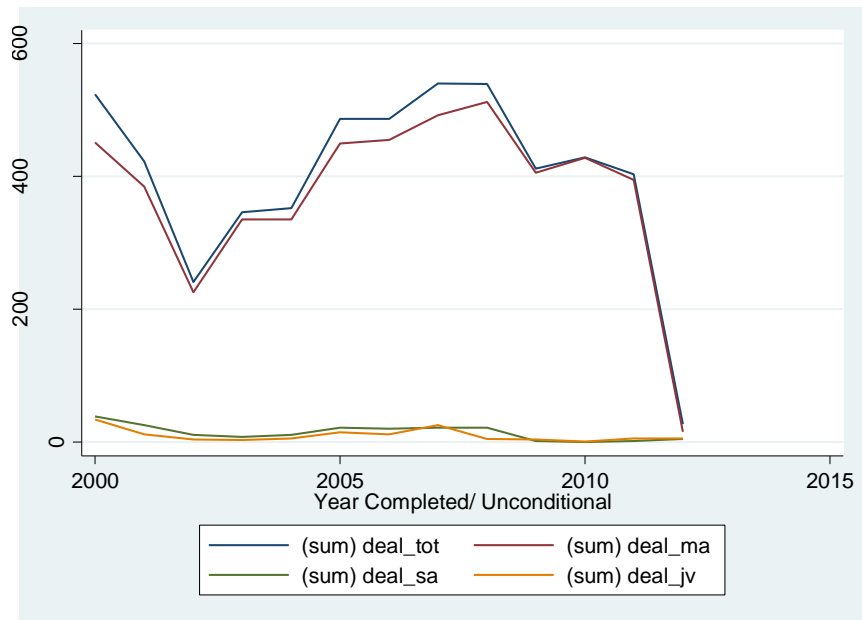
Graphs 11 and 12 represent, respectively, the distribution of the value of deal and of the percentage of shares acquired. We note that the great majority of deals define an acquisition of 100% of shares and with an amount of less than 1000 euro millions.

Graph 13 represent the mean value of the deal for acquirer country (if the firm acquired is Italian), and we underline that countries that invest more in acquiring or merging with Italian enterprises are United Arab Emirates, Germany, Netherlands, Malaysia, Switzerland and Italy.

Graph 14, finally, represents mean percentage of shares for acquirer country (if the acquired firm is Italian). In mean 100% of shares are acquired by Bahrain, Czech Rep., Hong Kong, Hungary, Iceland, New Zealand, Norway, Oman, Poland, Qatar, Romania, Slovenia and Turkey.

		Deals			
		N.Deals - Total	N.Deals - M&A	N.Deals - S A	N.Deals - JV
Years	2000	524	451	39	34
	2001	423	385	26	12
	2002	241	226	11	4
	2003	346	335	8	3
	2004	352	335	11	6
	2005	487	450	22	15
	2006	487	455	20	12
	2007	540	492	22	26
	2008	539	512	22	5
	2009	412	406	2	4
	2010	429	428	0	1
	2011	403	395	2	6
	2012	27	16	5	6

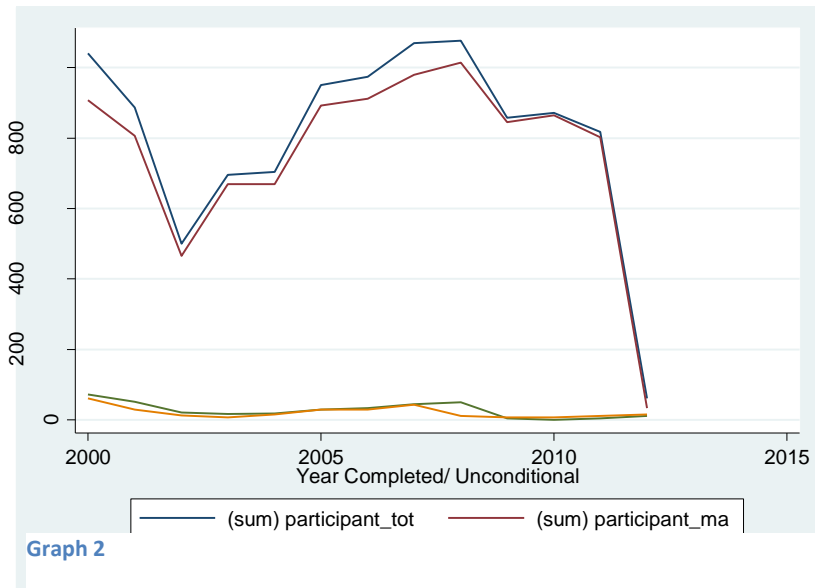
Tab 1



Graph 1

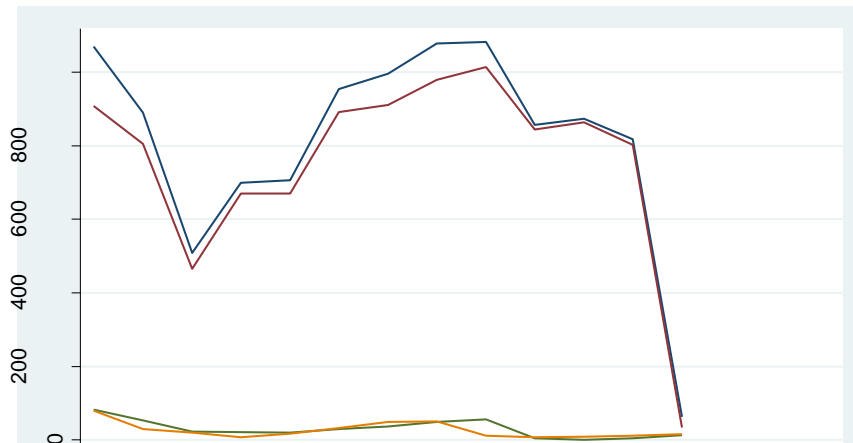
		Participants			
		N.Participants - Total	N.Participants - M&A	N.Participants - SA	N.Participants - JV
Years	2000	1041	908	72	61
	2001	887	806	52	29
	2002	500	466	21	13
	2003	695	670	17	8
	2004	704	670	19	15
	2005	950	892	29	29
	2006	974	911	33	30
	2007	1069	980	45	44
	2008	1076	1014	50	12
	2009	857	845	4	8
	2010	872	864	1	7

Tab 2

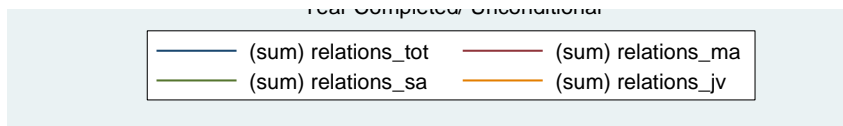


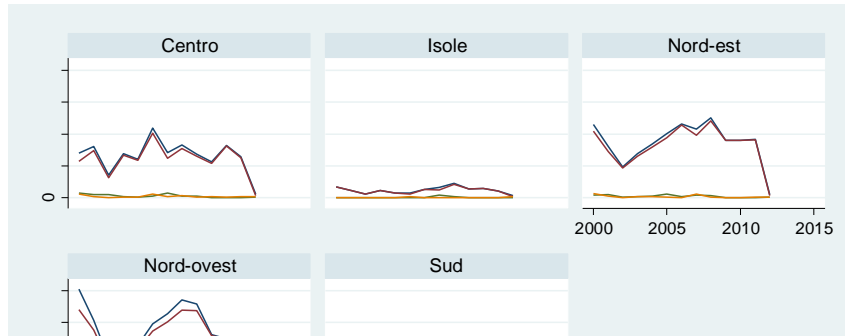
		Relationships			
		N.R relationships - Total	N.R relationships - M&A	N.R relationships - SA	N.R relationships - JV
Years	2000	1070	908	82	80
	2001	890	806	54	30
	2002	509	466	23	20
	2003	699	670	21	8
	2004	707	670	20	17
	2005	954	892	29	33
	2006	996	911	36	49
	2007	1079	980	49	50
	2008	1082	1014	56	12
	2009	857	845	4	8
	2010	874	864	1	9

Tab 3

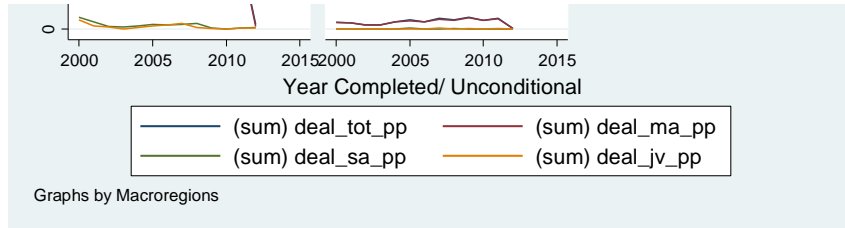


Graph 3

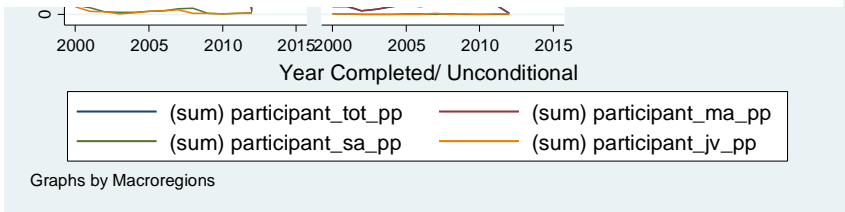




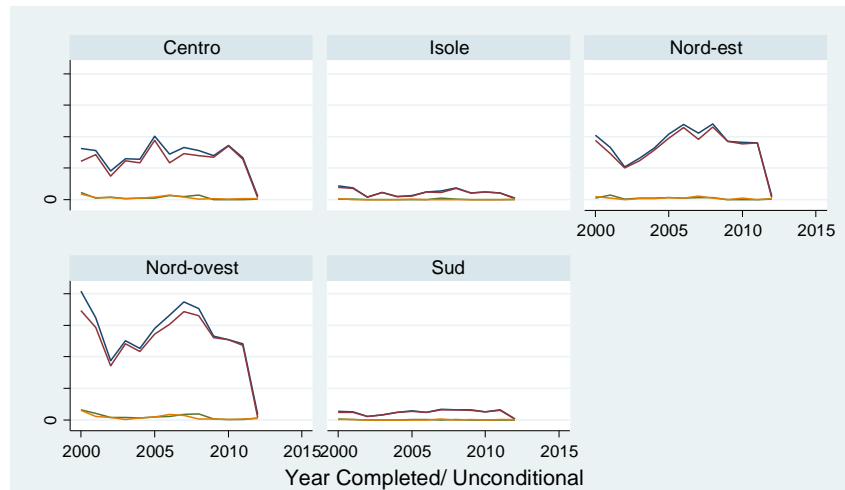
Graph 4



Graph 5



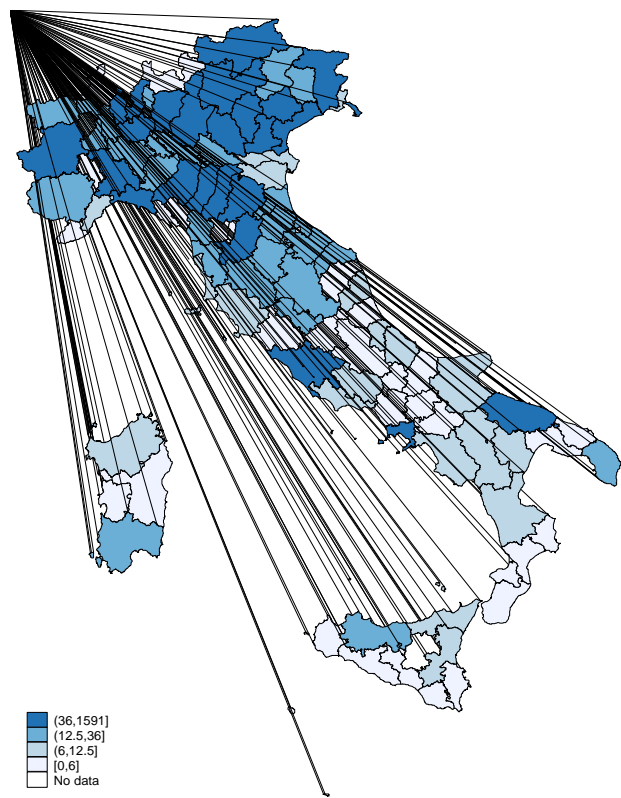
Graphs by Macroregions



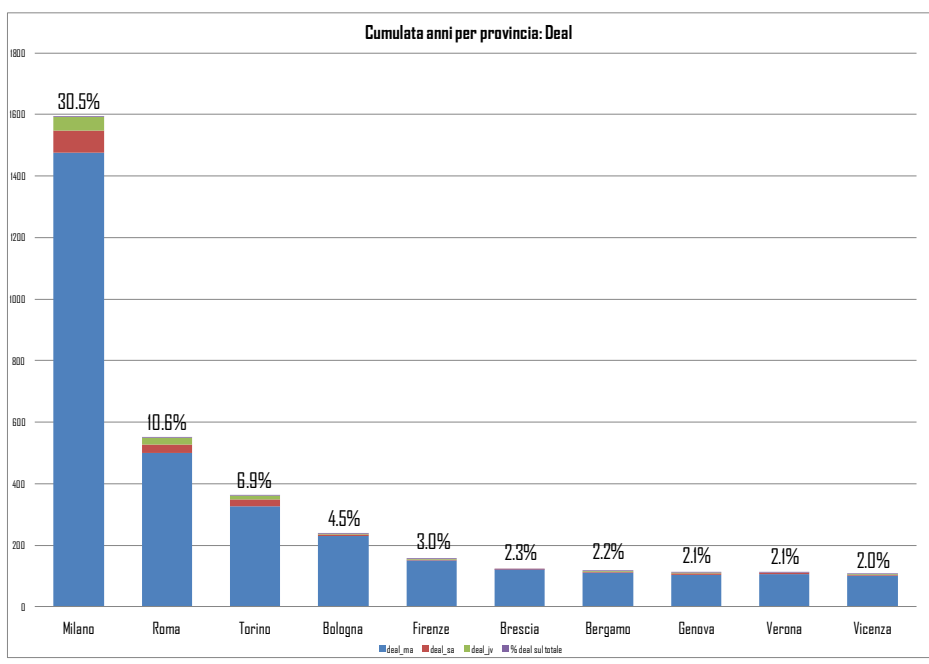
Graph 6

(sum) relations_sa_pp (sum) relations_jv_pp
 Graphs by Macroregions

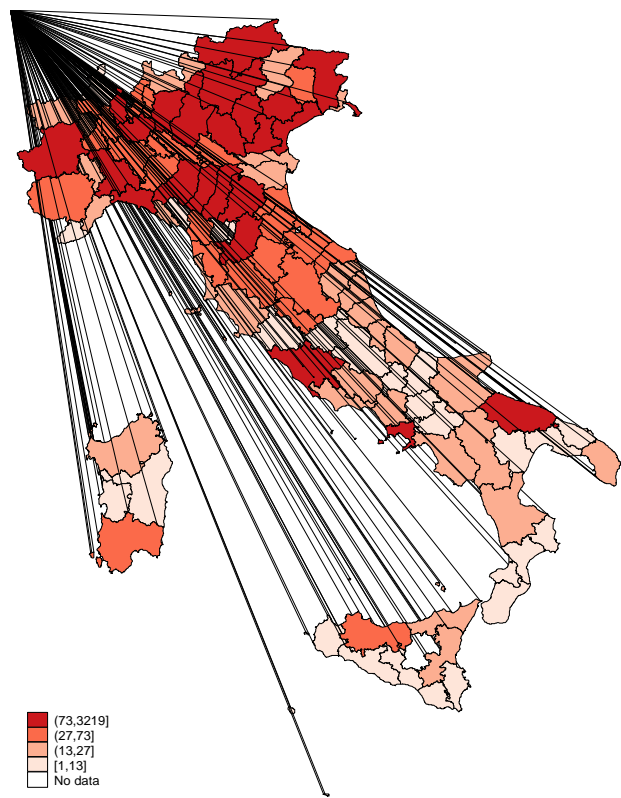
	Deals				%		
	M&A	SA	JV	Total	M&A	SA	JV
Deals involving only italian firms	10,328	87	99	10,514	59%	13%	19%
Deals involving at least one italian firm and one or more foreign firms	7,320	579	415	8,314	41%	87%	81%
Total	17,648	666	514	18,828	100%	100%	100%



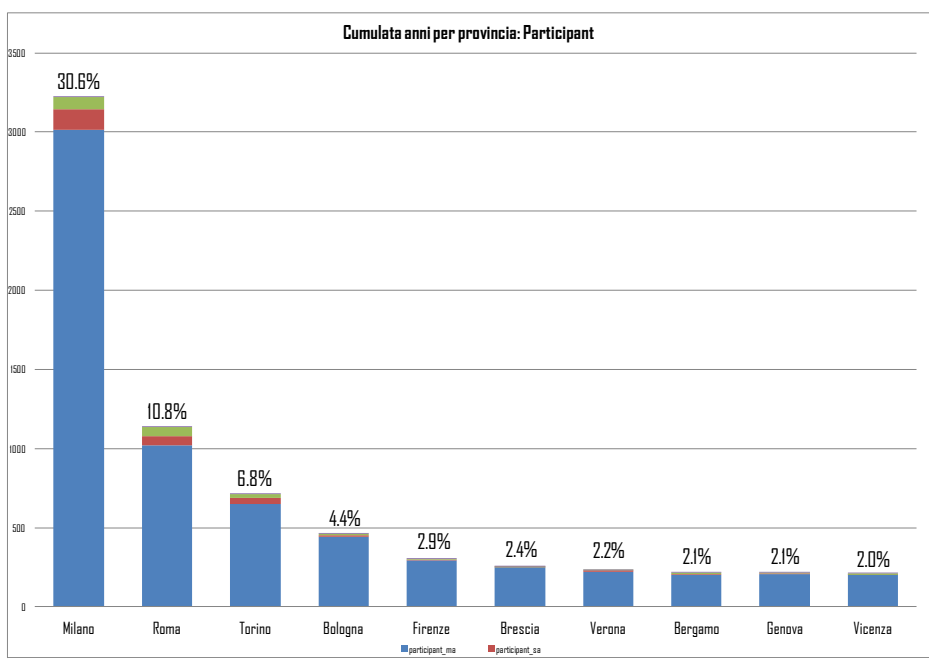
Map 1



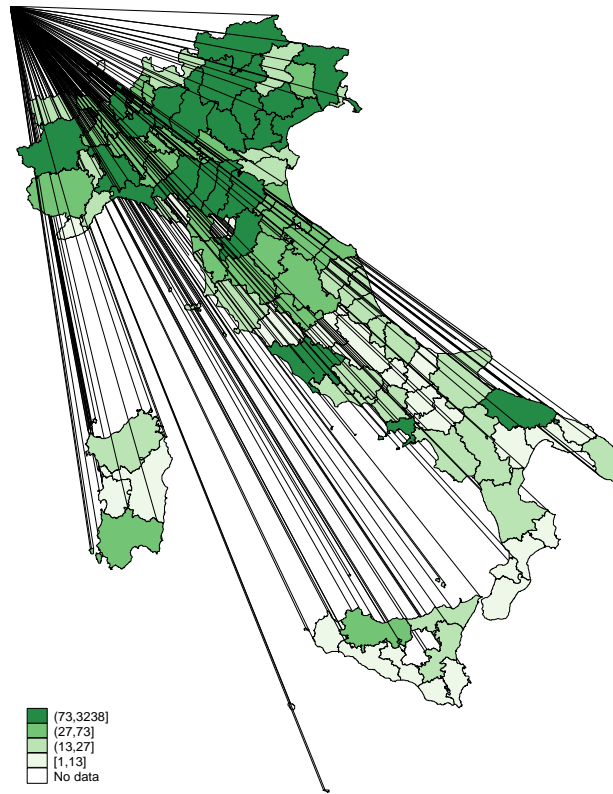
Tab 5



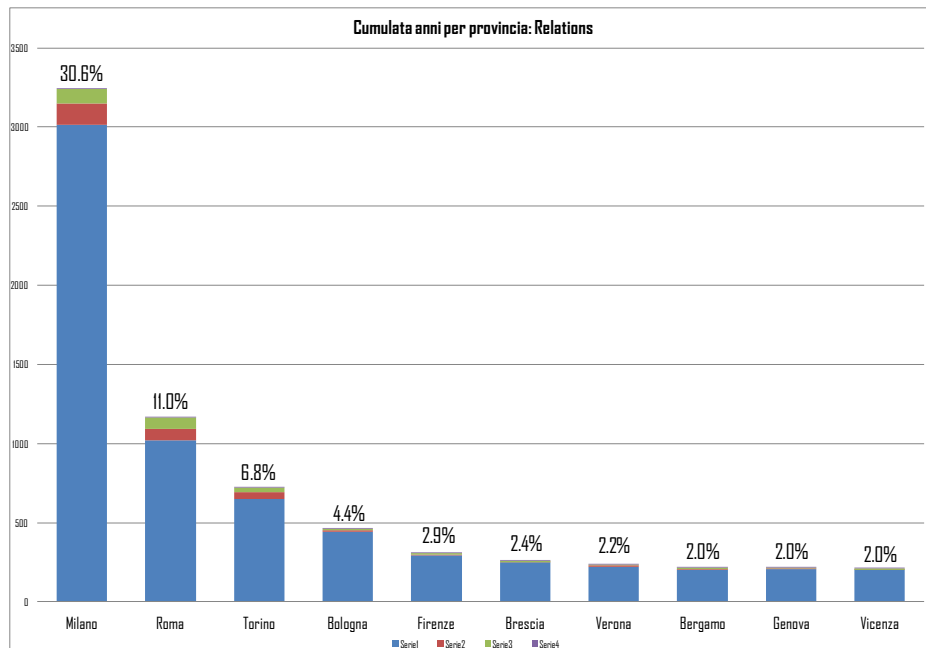
Map 2



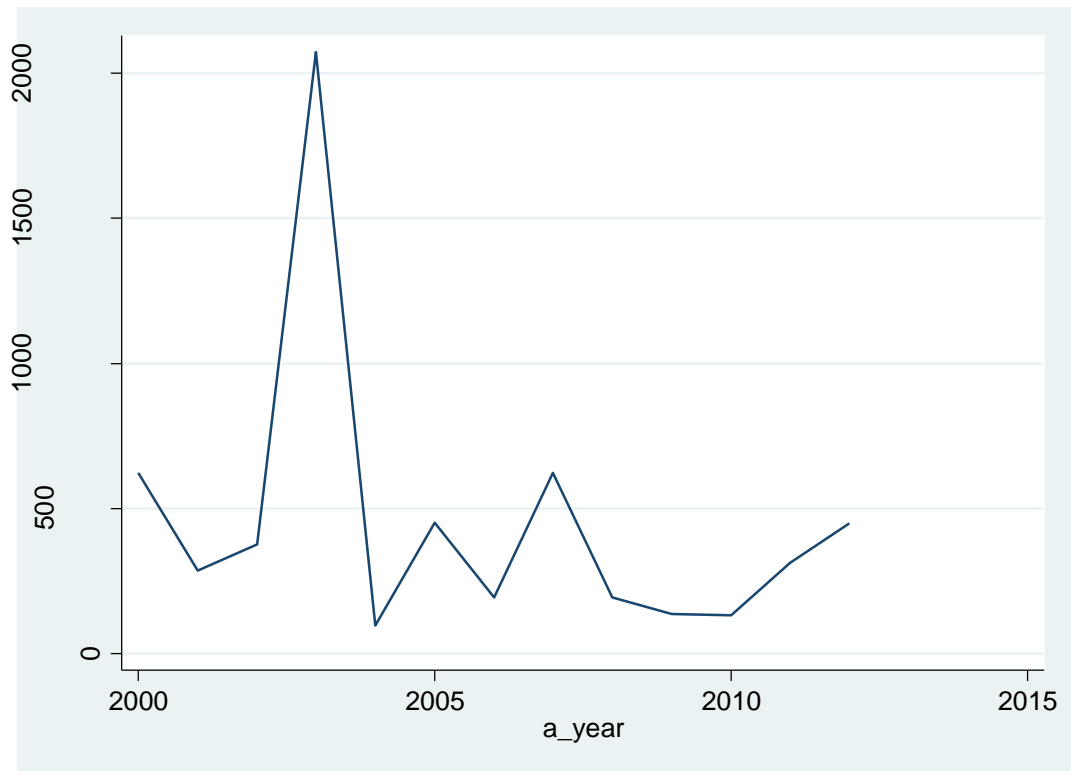
Tab 6



Map 3

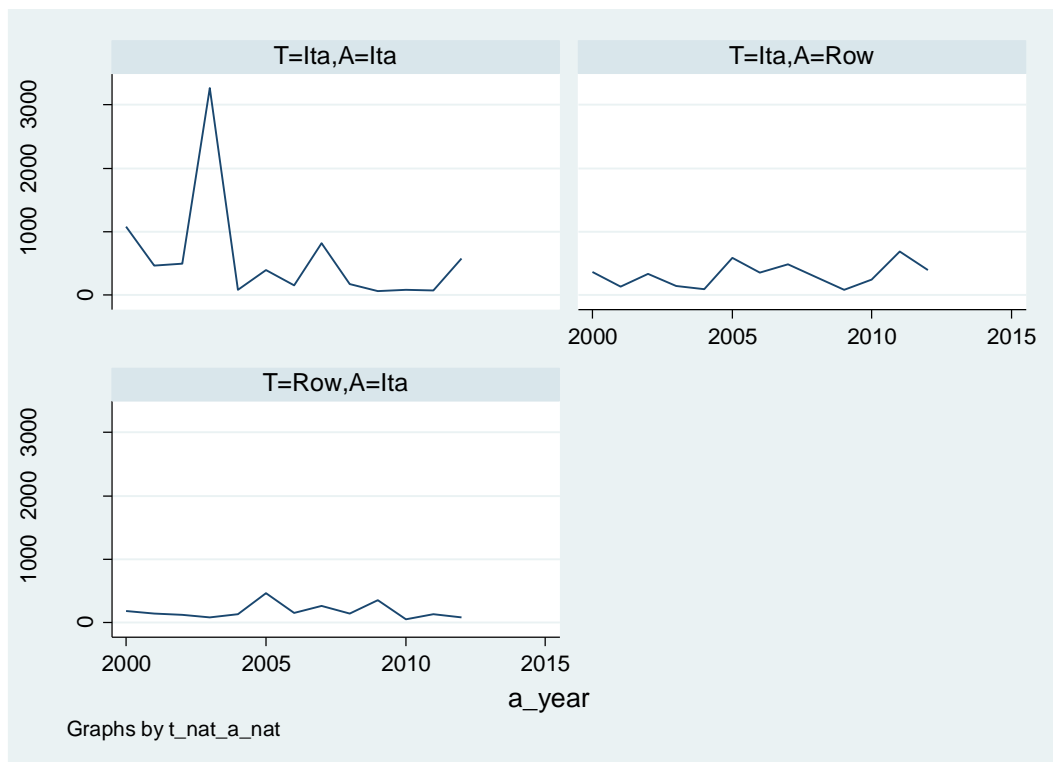


Tab 7

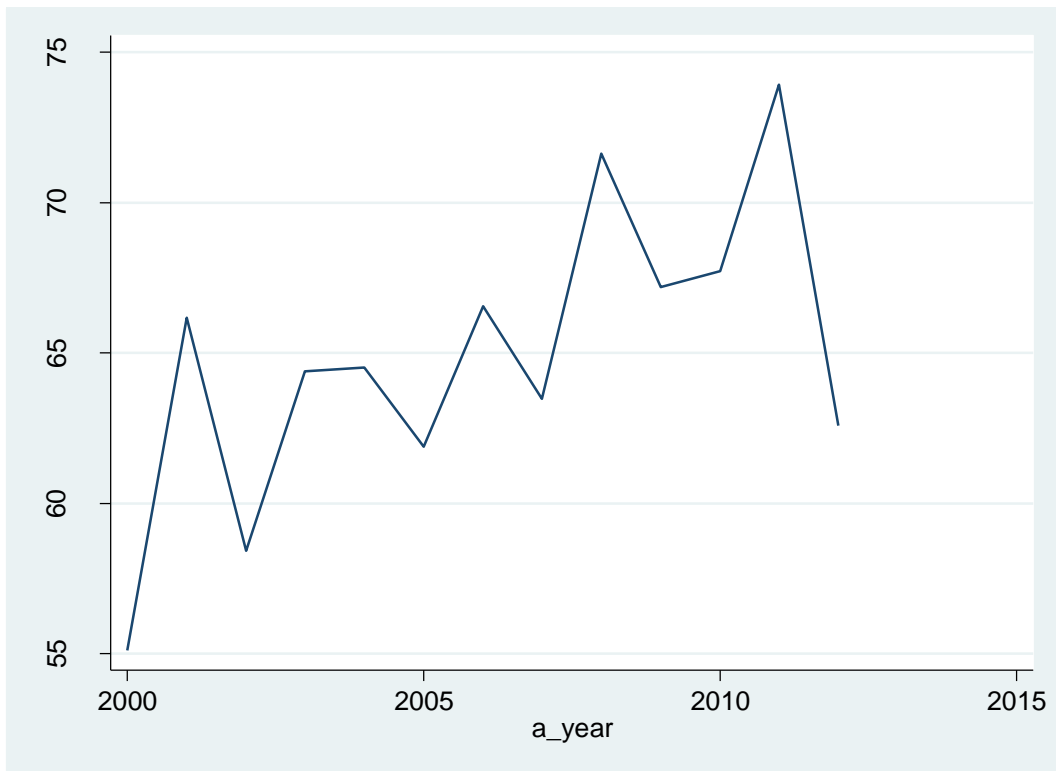


Value of the deal					
Graph 7	Obs.	Mean	Std.Dev	Min	Max
All Completed	3277	510.916	2438.901	0.001	29492.9
T=Ita,A=Ita	1773	723.1545	3193.84	0.001	29492.9
T=Ita,A=Row	725	342.1337	1016.064	0.01	15452.74
T=Row,A=Ita	779	184.9444	785.6363	0.001	15072.57

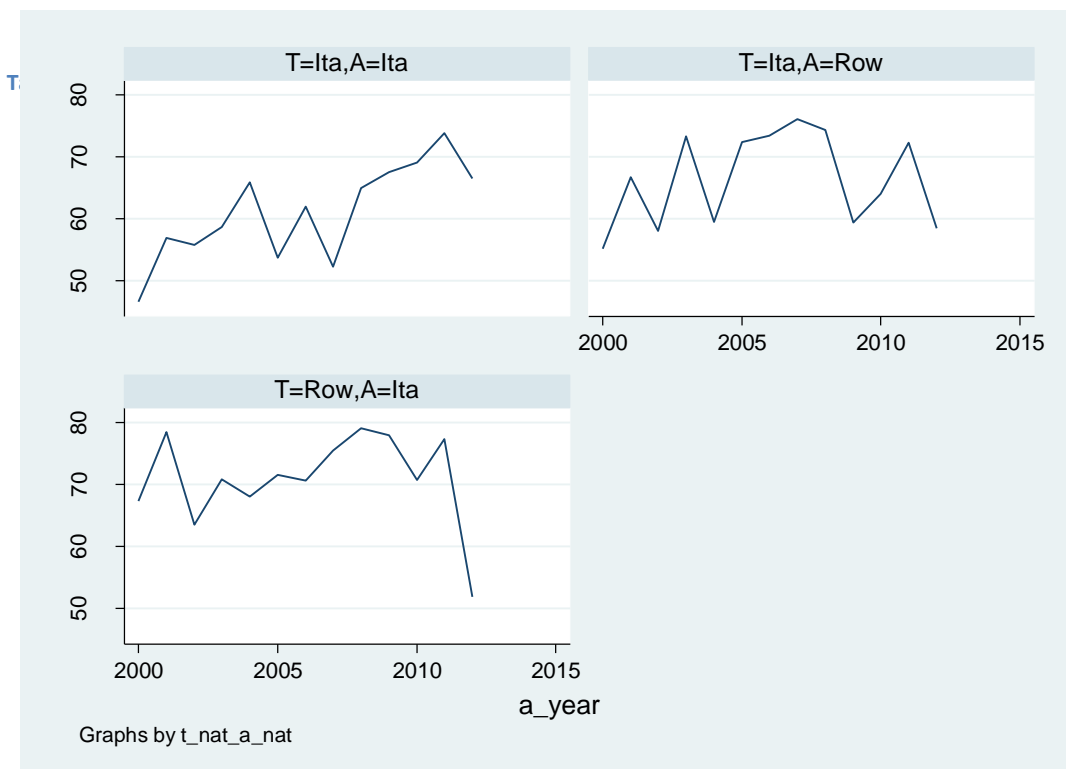
Tab 8



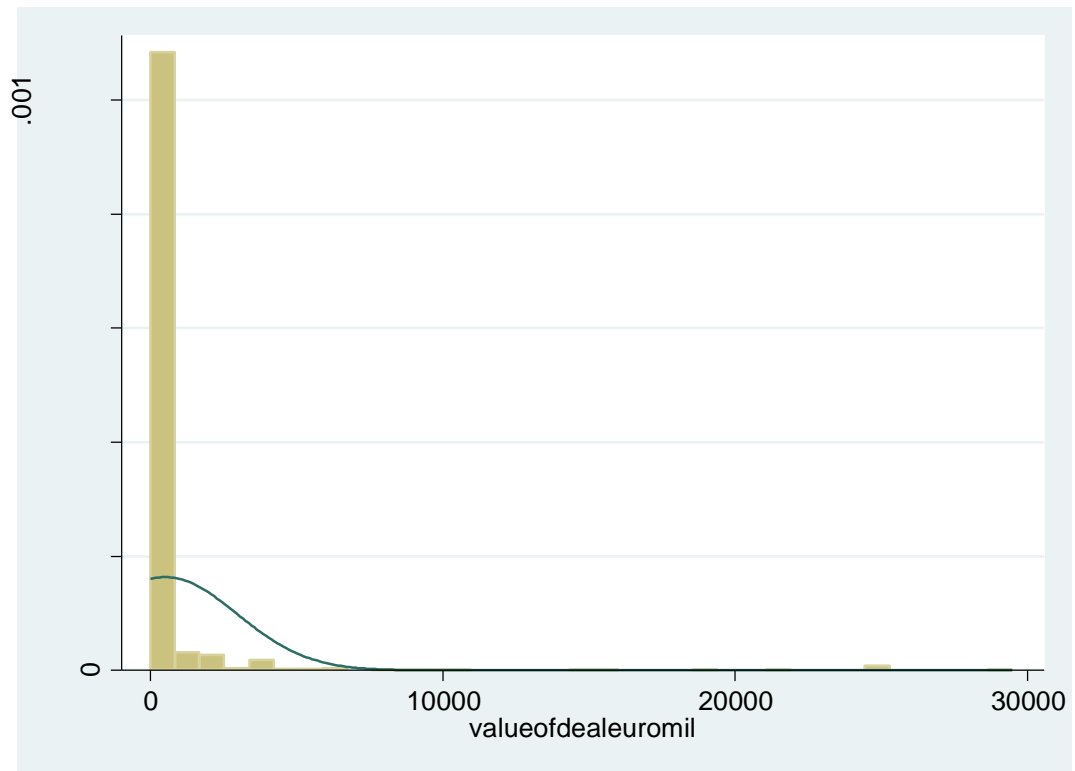
Graph 8



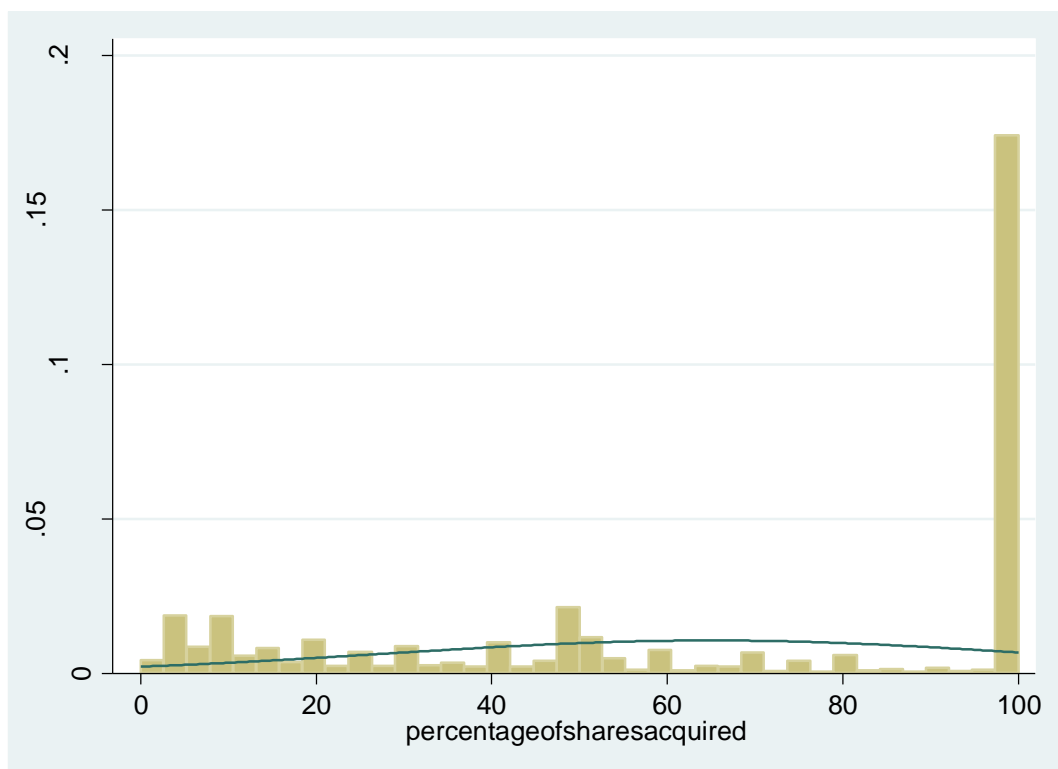
Percentage acquired					
Graph 9	Obs.	Mean	Std.Dev	Min	Max
All Completed	6391	65.04121	36.9821	0.01	100
T=Ita,A=Ita	3234	60.33763	37.72501	0.01	100
T=Ita,A=Row	1685	67.41915	36.73698	0.61	100
T=Row,A=Ita	1472	72.653	33.98745	0.15	100



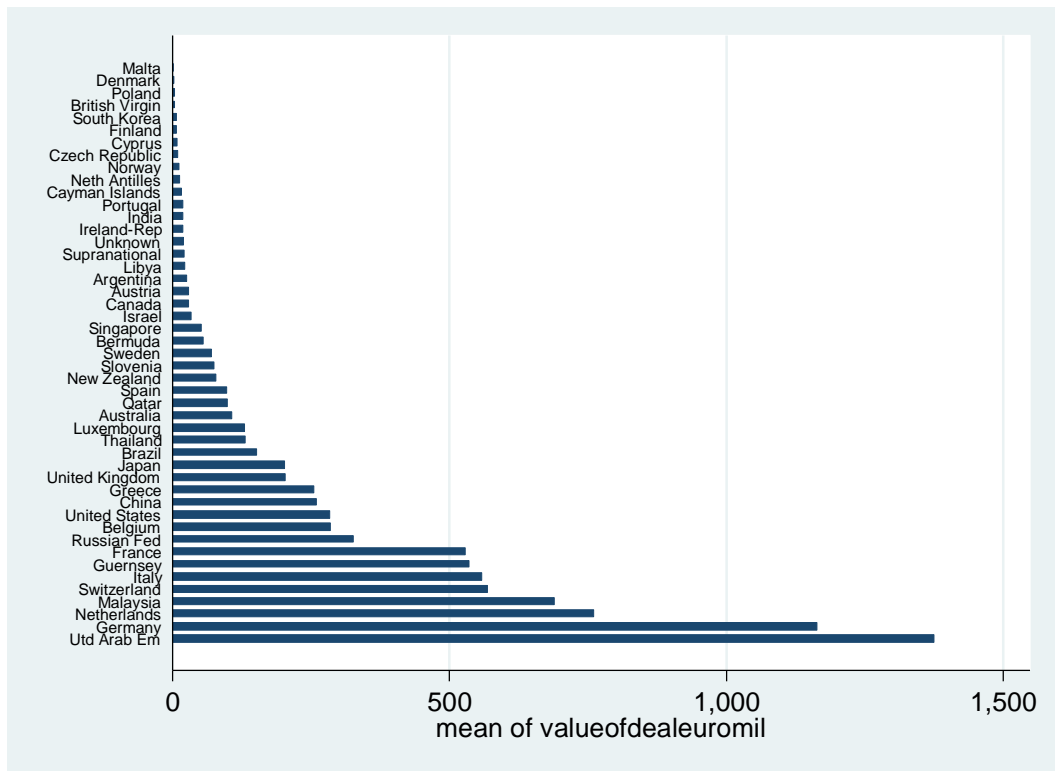
Graph 10



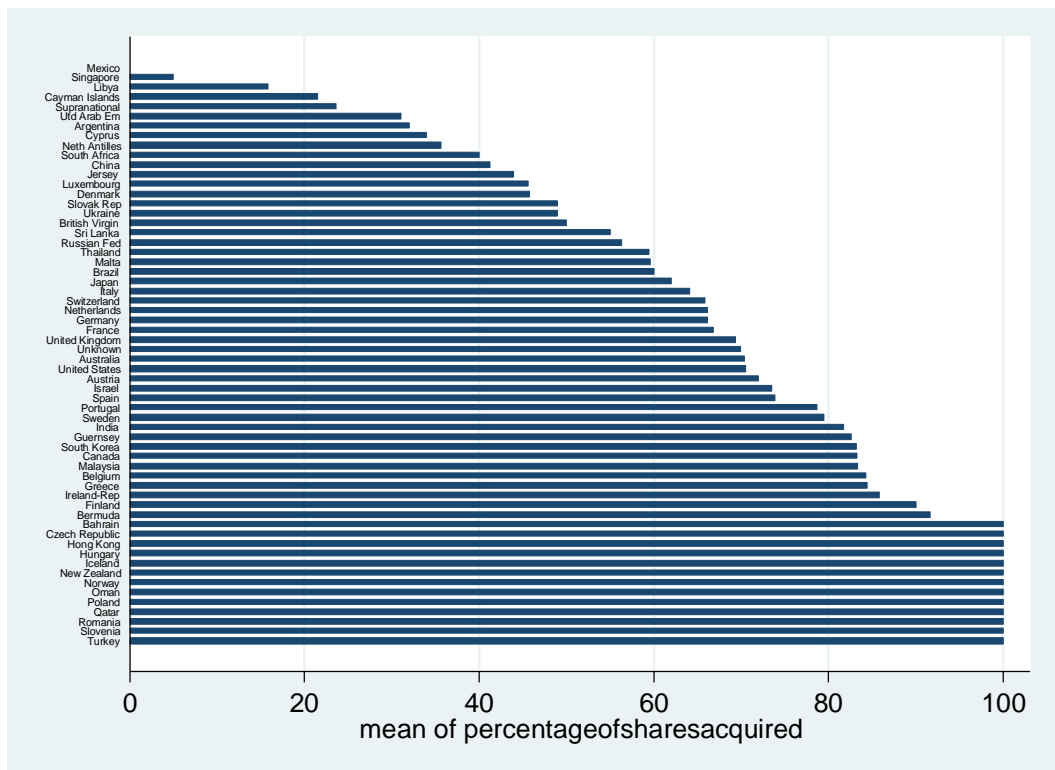
Graph 11



Graph 12



Graph 14



Graph 13

Econometric results

Following Maggioni M., Nosvelli M., Uberti E., (2007), studying how scientific and technological knowledge is both created and diffused through some crucial nodes (such as universities or firms, for example), the purpose of this empirical work is to verify if formal relations based on a-spatial networks (in this case M&As, JVs, SAs) influence knowledge diffusion between geographically distant provinces.

We estimate a model which considers as dependent variable the patenting activity, concentrating on the geographical and relational dependence in the data. We used a Knowledge Production Function (Griliches 1979, in the first instance) from a spatial perspective, reformulated with the inclusion of M&As, JVs, SAs, in order to check if intentional relations based on a-spatial networks can be considered as a determinant of innovation.

We examined 103 Italian provinces from 20 Italian regions, analyzed at the NUTS 3 level.

To measure innovation at the provincial level we used patents filed at the European Patent Office (EPO) which are associated to provinces on the basis of the inventor address, considering the average on a three years period, dividing by total population.

We consider as independent variables: R&D expenditure total (as % of GDP, at regional level), the share of population with First and second stage of tertiary education (over total, per province), Deals completed (per province), GDP pro capite (per province), gross value added in manufacturing (per province), and population density (per province). We considered variables lagged with respect to the dependent.

In the following table we showed the results of the spatial econometric analysis of the patenting activity of the 103 Italian provinces included in our sample.

We present the results for the parametric analysis for 5 regressions (those vary in relations to the years considered). For all regressions we present OLS specification (odd columns one, three, five, seven, nine), which allow for testing the presence of spatial dependence.

We verify the existence or the lack of “spatial” autocorrelation in innovative activity using a weight matrix of distance.

We can note how the results of the econometric exercise do not confirm our hypotheses. According to the robust LM tests (bottom panel), as a matter of fact, we can't find evidence of spatial dependence for all periods considered. We still performed spatial regressions. Even Columns (two, four, six, eight, and ten) present the estimation of the spatial specifications.

We observe that RD show the expected positive sign only in some regressions but the results seems not to be robust. The HK show the expected positive sign confirming that skilled workers are of extreme importance in the knowledge process.

Gdp pro capite and GVA maintain a positive sign, however, we can't find evidence of spatial dependence: results indicate that the coefficient associated with the spatially lagged dependent variable it is not significant, showing that for the same endowments of R&D and human capital, the nearness of a province to the centre of innovation does not imply higher benefits in terms of new knowledge creation.

Moreover, considering results of the effect of deals on innovation, we can say that provinces seem not to benefit of the advantage of the presence of relational networks between company located in their territory and other firms located abroad, indeed the coefficient of the N.Deals variable is not significant and, moreover does not show the expected positive sign. This denotes that is not truly meaningful for a province to be part in firms' networks.

Dependent Variable: Patents										
	Two years lag (dep var 2004-2005 indep vars 2001-2002)		Two years lag (dep var 2006-2007 indep vars 2003-2004)		Two years lag (dep var 2005-2006-2007 indep vars 2000-2001-2002)		Two years lag (dep var 2008-2009-2010 indep vars 2003-2004-2005)		Two years lag (dep var 2009-2010-2011 indep vars 2004-2005-2006)	
Model	Pooled	SAR	Pooled	SAR	Pooled	SAR	Pooled	SAR	Pooled	SAR
Estimation method	OLS	ML	OLS	ML	OLS	ML	OLS	ML	OLS	ML
R&D	0.173***	0.181***	0.090	0.100	0.112**	0.120	0.072	0.080	0.062	0.064
	0.049	0.064	0.061	0.102	0.054	0.083	0.059	0.085	0.056	0.071
Human Capital	1.564***	1.560***	1.563***	1.560***	1.470***	1.469***	1.311***	1.310***	1.363***	1.364***
	0.329	0.310	0.403	0.364	0.360	0.351	0.391	0.374	0.371	0.352
GDP pro capite	0.893***	0.871***	1.079***	1.057***	1.080***	1.057***	1.186***	1.169***	1.367***	1.364***
	0.234	0.281	0.286	0.269	0.257	0.271	0.277	0.308	0.265	0.300
GVA in manuf.	1.035***	1.036***	1.117***	1.117***	1.061***	1.062***	1.067***	1.067***	1.045***	1.045***
	0.077	0.070	0.092	0.081	0.085	0.076	0.089	0.091	0.085	0.078
Pop density	0.044	0.046	0.161	0.163**	0.104	0.104	0.054	0.056	0.055	0.055
	0.084	0.068	0.104	0.072	0.092	0.068	0.101	0.070	0.096	0.065
N.Deals	-0.004	-0.004	-0.009	-0.009**	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004
	0.005	0.003	0.006	0.004	0.005	0.003	0.006	0.003	0.005	0.003
Spillover		-0.216		-0.239		-0.205		-0.178		-0.042
		0.218		0.244		0.231		0.247		0.226
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-squared	0.903		0.872		0.892		0.867		0.880	
Sigma		0.462***		0.572***		0.508***		0.554***		0.527***
Diagnostic										
Moran's	0.631		0.842		0.626		0.398		0.831	
p-value	0.528		0.400		0.531		0.691		0.406	
Robust LM test - No s	0.912		0.963		0.655		0.549		0.081	
p-value	0.339		0.326		0.418		0.360		0.776	
LM test - No Spatial la	0.673		0.506		0.463		0.350		0.022	
p-value	0.412		0.477		0.496		0.554		0.882	
Robust LM test - No s	0.239		0.483		0.192		0.042		0.084	
p-value	0.625		0.487		0.661		0.838		0.772	
LM test - No Spatial e	0.000	0.673	0.027	0.506	0.000	0.463	0.032	0.350	0.024	0.022
p-value	0.998	0.412	0.870	0.477	1.000	0.496	0.838	0.554	0.876	0.882
Estimation for 103 provinces										

Conclusions

The objective of this paper is to investigate the factors that determine patenting performance, including relational activities.

The empirical literature confirmed that scientific and technological knowledge which leads to patents is both created and diffused through crucial nodes and tends to concentrate in cluster. Although each region influence its neighbour territories, knowledge can also “flow” thanks of a set of a-spatial networks (structured in contracts or agreements between firms, universities, or institutions) (Maggioni M., Nosvelli M., Uberti E., 2007).

About this, considering anterior studies and in order to innovate literature on this regard, we add an unconventional framework within a knowledge production function model, concentrating on the importance of relational networks between firms, considering data on M&As, JVs and SAs.

Considering the knowledge production function (KPF) approach presented by Griliches in 1979 we used an extension of it, to model the process by which firms transform knowledge into innovation. We reformulate the basic formulation of the KPF: we have the purpose to analyze the effect on province innovation, of various kind of deals (Mergers and Acquisitions, Social alliances, Joint Ventures) signed between firms, creating those formal networks that allow knowledge spillovers. We expect spillovers to occur over longer distances when a province is involved in deals with firms located in other provinces or abroad. To measure innovation at the provincial level we used patents filed at the European Patent Office (EPO) which are associated to provinces on the basis of the inventor address, considering the average on a three years period, dividing by total population. We consider as independent variables: R&D expenditure total (as % of GDP, at regional level), the share of population with First and second stage of tertiary education (over total, per province), Deals completed (per province), GDP pro capite (per province), gross value added in manufacturing (per province), and population density (per province). We considered variables lagged with respect to the dependent.

Creating the Deals variable, in particular, we analysed firms and organizations located in the 103 Italian provinces (NUTS3) that were involved (both as acquirer or target) in a deal between 2000 and 2012 both in national or international agreements. We noted how north-east and north-west (as expected) were the macro regions where most of deals have been closed, participants were located and relations built. On the contrary south and islands are the macro regions less active. On almost 18.000 deals, most of them (56%) seem happened between Italian enterprises. With a deeper analysis we can note that if 59% of M&A involved only Italian firms, on the contrary, considering SA and JV we can see that the great majority (87% and 81%) involved one or more foreign company. Almost 50% of deals, participants and relations developed from 2000 to 2012, took place in Milan, Rome and Turin. regarding the economic values of deals and the percentage considered in those agreements, discriminating between M&As which took place between two Italian firms, and between an Italian and a foreign enterprise, both in the case the company was the acquirer or the target. The value reaches the maximum values and has a higher mean when enterprises are both Italians. We note that the great majority of deals define an acquisition of 100% of shares and with an amount of less than 1000 euro millions. Considering those results we could say that companies involved in deals tend to be located in clusters and Italian firms usually sign agreements with other Italian firm.

We here give a short review of our findings. Considering various years, in all OLS specifications we used to verify the presence (or absence) of spatial autocorrelation in innovative activity we can't find evidence of spatial dependence. We note the expected positive sign of RD (even if the result it's not robust) and HK (confirming) that skilled workers are of extreme importance in the knowledge process, but for the same endowments of R&D and human capital, the nearness of a province to the centre of innovation does not imply higher benefits in terms of new knowledge creation.

Gdp pro capite and GVA maintain a positive sign, however, considering results of the effect of deals on innovation, we can say that provinces seem not to benefit of the advantage of the presence of relational networks between company located in their territory and other firms located abroad, indeed the

coefficient of the N.Deals variable is not significant and, moreover does not show the expected positive sign. This denotes that is not truly meaningful for a province to be part in firms' networks.

We can say that those results refuse, broadly, results of this research stream, that has shown that relational networks (proxied with 5FP membership by Maggioni M., Nosvelli M., Uberti E., 2007) impact on the conduct of regional innovation systems, but that spatial proximity plays a more important role in determining their performance.

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