STRUCTURAL REFORMS IN ITALY, 2014-2017

Final report

Università Politecnica delle Marche

Department of Economic and Social Sciences

Ancona, Italy

27 July 2018

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Contact: Tomas Brännström

E-mail: GROW-A2@ec.europa.eu

European Commission
B-1049 Brussels

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EXECUTIVE SUMMARY

This study provides micro-economic, sectoral and regional analyses for the potential or actual impact of the reforms, undertaken by the Italian Government, in the following areas:

- public procurement;
- measures to foster business growth: e-government; SMEs' access to finance; research and innovation;
- competition in services.

With respect to **public procurement**, the Legislative Decree 50/2016 has provided a further impulse for the rationalisation of public expenditures in Italy by focussing on the **aggregation, professionalisation and transparency** of procuring authorities. The increasing transparency, favoured by the digitisation process, has been coupled with a rise in **competitive procedures**.

At the same time, some criticalities and bottlenecks remain. A relevant issue refers to the reduction of the number and value of **tenders for public works**, which are essential for the country's economic growth. Moreover, due to the **high degree of uncertainty** in the new law application, the reform has not sufficiently improved the **speed of procedures**. Hence, a timely clarification of the new rules through guidelines and implementing provisions is needed. In addition, a refit of the reform should define with more clarity the **role and limits of the controlling authorities**, with particular regard to those of the National Anticorruption Agency.

A more intensive use of **public procurement** contracts **to foster innovation** is advisable. Even though the induced innovations do not seem particularly relevant or complex, they are important in stimulating more Italian SMEs to invest in innovation and human capital.

During the last decade, Italy has been able to substantially reduce the gap with respect to the EU partners in terms of provision of digital infrastructures for **e-government** (including e-procurement). However, when looking at the effective usage of these technologies, Italian performance is still unsatisfactory. In this respect, along with the lack of digital competencies of potential users, the tight budget constraints and consequent block of personnel turnover have deprived the Italian Public Administrations of the critical mass of **skills, training and organisational changes** needed to accelerate the digital transformation.

Another important obstacle to e-government development has been played by inadequate institutions: in particular, various norms and administrative procedures have often been duplicated by new digital versions that have been added to (rather than put in place of) the

existing ones. Hence, interventions are needed to **simplify and rationalise the normative framework**.

With respect to the issue of **access to finance**, **Italian SMEs** are still characterised by an **overreliance on bank debt**. Consistently, along with allowing bank-dependent SMEs to operate in a safe set of conditions, the recent fiscal and legislative interventions undertaken by the Italian Government have attempted to facilitate the transition to a more intense use of **equity finance and market-based financial instruments**.

All in all, these interventions have been effective. However, some corrections are advisable in terms of strengthening some measures (such as the allowance for corporate equity) and targeting others (e.g. minibonds and individual investment plans) in a more effective way. Moreover, the above framework should be enriched with other interventions aimed at enlarging the markets for **venture capital** and **private equity**.

In terms of **R&D and innovation**, Italian backwardness has not worsened in the last decade, thanks only to the growing number of SMEs that have started to perform systematic R&D activities. Hence, also to counteract the declining contribution of large R&D investors, the overall share of **public support to business R&D** should be increased. In this regard, as in most EU countries, an **R&D tax credit** also based on the level of R&D expenditures (rather than on their increment only, as in Italy) should be introduced. Instead, the effectiveness of the **Patent Box** measure is doubtful, as it has mainly had an impact on IPRs (such as trademarks) having weak linkages with inventions and technological innovations in a strict sense.

The birth of a large number of **innovative start-ups**, fostered by the 2012 Start-up Act, represents a very important and promising opportunity to rejuvenate the Italian business sector and re-launch its competitiveness. For a more diffused presence of these firms in the Italian territory, local policies should mainly focus on increasing the **knowledge base** and the **educational level** of young people. For the growth prospects of innovative start-ups, the **access to external finance** is a crucial issue. In this respect, although the challenges are not so different from those already discussed for Italian SMEs, the main bottleneck that should be removed refers to the limited opportunities for **exit strategies** of venture capital and private equity companies.

In Italy, according to international indicators, the degree of regulatory restrictiveness in most **professional services** has significantly declined during the last decade. This has exerted a positive impact on the productivity of the same service sectors and the downstream manufacturing industries. In the field of professional services, Italy does not need to adopt a

substantial and comprehensive reform but only **some adjustments** focussed on the professions that are still characterised by a broad range of reserved activities (engineers and, to a lesser extent, architects).

With respect to the Italian **trade sector**, comparative indicators show that the regulatory burden is still significantly higher than the EU average. A lower regulatory restrictiveness in **retail trade** has a positive effect on the productivity of the aggregate trade sector. In this connection, the Legislative Decree 201/2011 has contributed to the modernisation of the trade sector and improved consumer welfare. This has been accompanied by the exit of smaller and probably less efficient firms. However, the impact of the 2011 reform should not be overstated, since the overall performance of the trade sector has been mainly affected by the **trend of domestic consumption**. In any case, the increasing difficulties that **small retailers** have to face cannot be neglected. For these companies to survive and possibly grow, it is necessary to foster innovations, both in terms of **organisational changes** and **digitisation**.

GLOSSARY

AIM: Alternative Investment Market

ANAC: Agenzia Nazionale Anticorruzione (National Anticorruption Agency)

CDA: Code for Digital Administration

CCFG: Central Credit Guarantee Fund

Consip: Concessionaria Servizi Informativi Pubblici (state-owned company responsible of centralised public procurement)

IPO: Initial Public Offering

IPRs: Intellectual Property Rights

M&As: Mergers and Acquisitions

MEF: Ministero dell'Economia e delle Finanze (Ministry of Economy and Finance)

MEPA: Mercato Elettronico della Pubblica Amministrazione (Digital Marketplace of Public Administration)

MISE: Ministero dello Sviluppo Economico (Ministry of Economic Development)

PMR: Product Market Regulation

OSS: One-Stop-Shop Point

RDO: Richiesta di offerta (Request for Offer)

TD: Trattativa Diretta (Direct Negotiation)

1. INTRODUCTION: POLICY ISSUES AND ORGANIZATION OF THE REPORT

The Italian Government provided a comprehensive formalisation of the strategy of structural reforms in the biennium 2014-2015. The strategy represents "a continuity with policies initiated in past years but aim at completing the process eliminating present rigidities and barriers to growth" and comprises "structural reforms, fiscal policies and measures to support investment to boost flexibility, resilience, growth and employment".[1]

According to the IMF and OECD the list of reform initiatives undertaken by the Italian Government has been impressive. It remains to be seen whether these reforms will be effectively implemented and, then, positively impact on the country's economic performances, with particular regard to the business sector's competitiveness.

So far, the expected impact of these reforms, grouped in a few categories (such as "labour market reforms", "product market reforms", etc.) has been mainly analysed by means of macro-economic models.

In line with the request for services, this study, instead, provides micro-economic, sectoral and regional analyses for the potential or actual impact of a set of national reforms aimed at:

a) improving the efficiency and transparency of public procurement markets, the competition in service activities and the conditions for doing business;

b) supporting entrepreneurship, firm growth and innovation.

The issues under point a) are of particular importance in the light of the mounting weight and role of service activities which in Italy, as in the whole EU, are still characterised by a sluggish productivity performance. The tertiary sector includes the Public Administration whose efficiency, along with the functioning of public procurement, directly affects the conditions for doing business.

With respect to the issues under point b), in Italy the overwhelming presence of small family-owned firms and their prevalent recourse to bank credit as a source of external finance represent clear obstacles for the development of a more dynamic, innovative and competitive private sector. In this respect, along with those facilitating the access to finance of SMEs, policy measures aimed at supporting innovative start-ups and the R&D investment of domestic firms (both national and foreign) should play a fundamental role.

Some of the problems affecting the public and private sectors are interconnected. For example, the Italian business sector (as compared to that of the most developed EU countries) is characterised by a low usage of ICT and digital services. A portion of such a gap has long been due to the low level of digitisation of the Italian Government and Public Administration. Joint technological and organisational changes in the field of e-government

[1] Ministry of Economy and Finance, "2014: A turning point for Italy", Rome, February 2015, p. 1.

are likely to bring higher monitoring capability, transparency and speed of the government and administrative functions and, then, positively affect the conditions for doing business in Italy.

This study provides a set of analyses for the three main areas that are indicated in the request for services of the European Commission (DG GROW):

1. Public procurement
2. Measures to foster business growth
   2.1. E-government
   2.2. SMEs access to finance
   2.3. Research and innovation
3. Competition in services

The report is composed of five chapters dealing with the above listed policy issues, and a final chapter providing the policy considerations and suggestions arising from the study.

Most of the proposed analyses have a quantitative nature, being based on micro (i.e. firm-level), sectoral and regional (provincial) data. When necessary, they are integrated with qualitative information and assessments: this is the case of the very recent reforms of the public procurement system and the liberalisation of retail and wholesale trade. Each section includes a survey of the state of the art, some descriptive statistics concerned with the examined issue, the data and the methodology used for empirical analysis. Moreover, when applicable, explicit references are made to the relevant legislative reforms undertaken in Italy. At the end of each chapter there is a summary of the findings and the main policy challenges faced by the Italian Government. The latter are recalled in the final chapter which provides some suggestions on how these challenges should be addressed.

2. PUBLIC PROCUREMENT

2.1 Introduction

The main characteristics of the current Italian model of rationalisation of public spending and public procurement preceded the introduction of the Legislative Decree (henceforth, D.Lgs.) 50/2016, implementing the 2014 EU Directives 23/EU, 24/EU and 25/EU, and de facto anticipated most of its deadlines and provisions. As a matter of fact, the early bricks of the current model were constructed around Consip Spa (a technical arm of the central Government), and date back to 2000 (see Box 1).

Box 1. Brief outline of the Italian model of the rationalisation and digitisation of public procurement

In 2000, the yearly "Finanziaria Law" (or Budget Law, then Stability Law) first entrusted Consip Spa with the management of the programme of rationalisation of public spending and e-procurement activities. The first electronic purchases started in 2001, and in 2003 the MEPA was activated (the business-to-government electronic marketplace for the Italian PA). In 2007, the Finanziaria Law introduced other centralised purchasing bodies at the regional level ("centrali di committenza"), called to form a network system with Consip, and orientated towards pursuing effective spending rationalisation and the capillary diffusion of e-procurement procedures. The operative implementation of these "centrali di committenza" has taken some time and is still ongoing. Since 2012, under the initiatives for "spending review" of the Monti Government, new norms have strengthened the rationalisation trend. With the Law Decree (D.L.) n. 66/2014, a higher degree of rationalisation and centralisation was introduced with the creation of a new subject, the "aggregators" of PA purchases, which play the additional complementary role of forecasting the future needs of the concerned PA, in addition to the management of the purchase. The D.L. foresaw a maximal number of 35 aggregators (32, since January 2018: Consip plus regional, provincial and metropolitan bodies). Another recent act in the direction of further rationalisation was the DPCM[2] 24 December 2015, which set the maximum annual thresholds of autonomous purchases in 19 product categories of goods and services (mostly related to health care), dispensing with the usage of aggregators. Finally, the next major reform has been the D.Lgs. 50/2016, which transposed the 2014 EU Directives into the Italian system. It was revised in 2017, when some "gold plating" prescriptions initially introduced to the Italian Code were modified or eliminated.

Source: authors' compilation

These policy efforts have been chiefly motivated by the urgent need to reduce the Italian public debt and deficit, to be obtained by rationalising public spending and diminishing the high and inefficient number of procuring Public Administrations (henceforth, PAs) (around 35.000 units)[3]. Moreover, other long-term criticalities of the Italian public procurement sector, such as frequent cases of project delays and failures, or even public money mismanagement – see the review in section 2.2 – have been addressed.

[2] Decreto del Presidente del Consiglio dei ministri della Repubblica Italiana (Decree of the President of the Council of Ministries of the Italian Republic).
[3] It is worth noting that public procurement fragmentation is a common issue for all EU Member States.

With D.Lgs. 50/2016, Italy continued the reform of public procurement in line with the 2014 European Directives, orientated along their main goals. A main point of the 2014 EU Directives is that they grant flexibility by limiting the applicability of the award criterion of the "lowest price" to exceptions, while the main criterion is the "most economically advantageous tender," (henceforth MEAT). This appears a very radical normative innovation for the Italian system.

Second, beside rationalisation of public procurement, other main purposes of the EU policies have been the aggregation, professionalisation and transparency of procuring authorities, with the aim to achieve competitiveness and guarantee the development and functioning of the Internal Market. As the Commission states, "Procurement requires expertise, especially in the procurement of innovation solutions. However, many public buyers still do not have the necessary business skills, technical knowledge or procedural understanding" (EC, 2017a. See also EC, 2017b). This is chiefly valid for Italy, as demonstrated by the review of section 2.2.

In Italy, D.Lgs. 50/2016 attempted to provide more flexibility to procuring entities, designing new public procurement instruments and modelling the levels of operational autonomy of contracting authorities on the basis of their actual professional capacity. The EU's strategic objective of professionalising public buyers and increasing their professional skills in Italian reform is strictly connected to the establishment of "centralised contracting authorities" or "centrali di committenza" (see Box 1), and that of the "aggregators" of PA purchases, which refer to 19 product categories of goods and services (mostly related to health care). Both are set up to manage tenders of larger amounts, provide framework contracts and framework agreements and adopt more innovative procedures and instruments; the second type of centralised authorities are also capable of forecasting the future procurement needs of the PA and set up specific purchasing schemes and instruments with the industry (see below). Moreover, Art. 37 of D.Lgs. 50/2016 states that municipalities that are not provincial capital cannot act alone as contracting authorities, but have to adhere to a centralised (qualified) one; finally, Art. 38 defines the criteria for qualification and assigns to Agenzia Nazionale AntiCorruzione (ANAC) the definition of such criteria. ANAC is the national anti-corruption agency, which monitors the correct application of public procurement rules. The guidelines for the criteria are not approved yet in a scheme of DPCM; this delay is causing problems.

The Italian reform also tries to fulfil the EU's objective to support cooperation in procurement activities by public entities. The idea of the reform is to permit the less skilled authorities to manage the tenders with a low level of difficulty, leaving those with a high level of difficulty and high budget (negotiated and competitive dialogue procedures) to more highly skilled, often centralized authorities.

All in all, the objective of increasing the role of the centralised authorities is in line with the so-called Programme for Rationalisation of Public Expenditure. As Cottarelli (2015) states, the fragmentation of public procurement agencies is inefficient and expensive; the same author, during his period as Government Commissioner for the spending review, estimated that the potential savings from centralising public purchasing are about 7.2 billion euros (ibidem).

In order to ensure the accountability, efficiency and efficacy of public procurement, public buyers should invest in human resources and the organisational factor. Complex organisation is needed to carry out contemporary public procurement, especially in the most difficult case – public works.

This purchasing organisation needs to possess, at the same time: planning skills to foresee a procurement activity cohesive with the perceived needs and constraints (e.g., cost-benefit analysis); technical skills, to embed these needs in a feasible project; juridical skills, to fulfil the requirements of accountability and respect of the law; and economic and monitoring skills, to design the correct incentives scheme in order to get the most economically advantageous tender.

It is worth noting that some normative solutions adopted by the Italian Code may configure a case of "gold plating" of EU Directives. Such a risk is not for tenders above European thresholds, but may occur below them, in particular for tenders above 40,000 euro. These negotiations cannot be managed in the portion of MEPA that works as a true marketplace. Indeed, for these negotiations, the procedures cannot be "click and buy," but MEPA is used as an electronic platform where the administrative procedures (defined by the Code in art. 36) have to be used. Only for negotiations below 40,000 euro is MEPA a proper market place and do "click and buy" procedures apply. For tenders below European thresholds, but above 40,000 euro (which are about one half of the total amount negotiated by PA), simplified procedures with preeminence of MEAT criterion should be designed by a national law. Actually, D.Lgs. 50/2016 designs the below-threshold tender by *de facto* forcing the adoption of the lowest price criterion (Art. 36 of the Code and the ANAC Guideline 4 – see ANAC 2017a), going through the reduction of the importance of the elements which actually define MEAT. By a further analysis of the normative text of Art. 36 of D.Lgs. 50/2016 (coupled with the ANAC Guidelines n. 4), we also noted the imposition of additional administrative duties and bureaucratic burdens, since the below-threshold tenders above 40,000 euro are modelled with similar requirements and procedures that apply to the above-threshold ones.

Coming to the more positive evidence, these reforms have resulted in Italy taking a frontrunner position for the diffusion and usage of e-procurement platforms in the PA, also

with respect to the articulation of the system, which now possesses a good regional basis, beside the central Government one. Although the paucity of official data do not yet enable any rigorous international ranking among EU Member States (for an early attempt, see EC, 2015a), there is a widespread belief among the stakeholders that Italy is scoring well in terms of development and maturation of the national e-procurement system: this at least holds in terms of variety and flexibility of electronic purchasing instruments available to the PA. This judgement is also confirmed by the recent trend of the DESI index, and its sub-component registering Digital Public Services (see chapter 3).

Finally, the Italian institutions involved have started to release promising open data evidence on e-procurement, which has enabled the analyses presented in this chapter of the study.

2.2 The performance of procurement of public works before the reform: evidence from the Italian Court of Auditors

This section presents a compact review of the long-term criticalities of the Italian public procurement sector. To present a rigorous overview of the main facts, it builds on some recent evidence gathered from the ex post controls performed by the Italian Court of Auditors on the execution of public works.

To have a meaningful appreciation of the long-term features and criticalities of this crucial component of public procurement in Italy, two main examples of the statutory analyses performed by the Court of Auditors were selected: 1) the public works for building broadband infrastructure, and 2) public works for the construction of urban public transport networks (including railways and underground). Thanks to the availability of the reports and materials statutorily produced by the Court, covering a very long period (basically, from 2004 to 2015 for the first case, and from 1992 to 2016 for the second), it is possible to gain important insights on how public procurement has performed in terms of timeliness, effectiveness and efficiency, as well as transparency and accountability, over a long period of time. The concerned period is that preceding the main reform introduced by D.Lgs. 50/2016.

Further, as a robustness check, the evidence obtained from the Court of Auditors were confronted with some recent studies issued by the Impact Assessment Office of the Senate of the Italian Parliament[4], dealing with more general and procedural issues on public works delays, Municipalities' procurement competencies and the long run trend of public-private

[4] https://www.senato.it/4783?testo_generico=1299

partnerships (PPP). Together, the analysis of the documents is complemented and benchmarked with a review of the specialised press and the scientific literature.

The choice of focusing on these two types of public works is based on robust analytical considerations. The first reason is documental: the availability of specific and matching sets of reports from the Court (Corte dei Conti, 2007-2016 for broadband; Corte dei Conti 2017 for public transport networks), that exploits the Court's special access rights to the PA micro-data[5] in the longitudinal dimension (detecting long run changes). A second reason concerns the typology of public works concerned by the two sets of reports: both cases involve investments that are not characterised by strong "uniqueness" characters typical of major works (such as the MOSE system of mobile gates for the Venetian lagoon, or the prospective bridge on the Sicily channel): these render very risky the whole project, and largely unpredictable its final cost, being subject to major variations of the technical project during its realisation ("varianti in corso d'opera"). The publication of data on contract modifications over a given amount (e.g. +15%) would significantly contribute to transparency and accountability of public buyers on this practice[6].

In particular, in the case of broadband infrastructure public works are rather standardised. In detail, the construction of broadband infrastructure involves standard civil works (digging) and installations of ducts, antennas and wires, which again involve standardised equipment. Consequently, given that these digital connectivity projects do not present idiosyncratic aspects, their analysis qualifies like a quasi-experiment (replicable). In this case, the usage of dynamic average cost considerations across different tenders and time is appropriate (Matteucci, 2015), as done with Table 2.1.

Third, despite their similarities (for not being "too unique" projects), the two examples of public works also present some small differences. Overall, broadband works involve a lower degree of infrastructural complexity and a lower risk of unforeseen events if compared to the construction of underground transportation systems: for example, when carrying out public works in Italian historical towns, it is not rare to discover archeological sites, which leads to a blocking of underground excavations and requires retracing of trajectories.

All in all, it is informative to compare projects presenting different degrees of technical complexity, and to study the influence played by the institutional dimension.

[5] Also, the Court may occasionally experience difficulties of access to the micro-data, as in the case of the report on urban public transport networks (Corte dei Conti, 2017). To carry out that control on a subject where most of the relevant accounting and project data were not digital, the Court needed to ask the concerned Ministries to construct the digital dataset entirely on purpose.
[6] These data should normally be available in SIMOG.

Broadband

The analysis of the Court of Auditors' data sources on broadband infrastructure activities points at three main results.

1) Over time, there has been a positive price performance in broadband tender auctions, even if D.Lgs.50/2016 was not yet formally approved. Going back to the early tenders adjudicated in 2004-7, the price performance of the competitive procedures was rather modest, and the average price discount was around 4.4% (Corte dei Conti, 2007); this happened despite tender texts emphasising price reductions, being built on the "lowest price" (or "maximum price rebate") criterion. Over time, in the most recent period (Corte dei Conti, 2016), the price rebate offered on average by the bidders augmented to around 25%, 'despite' the usage of the most economically advantageous offer (anticipating its final introduction with D.Lgs. 50/2016 and following decrees). Moreover, Table 2.1 shows that these favorable dynamics (longitudinal decrease of the average cost per km of infrastructure built) interested both the civil works (digging costs) and that of the total costs (including equipment), demonstrating the existence of a robust mechanism of efficiency. Hence, one can suppose that the increasing specialisation and technical professionalisation of Infratel (the in-house company of the Ministry of Economic Development) and of the other involved public authorities helped to increase the technical efficiency of public works.

Table 2.1 - Average cost of public broadband infrastructure in Italy (€)

Year	Total average cost (per km)	Digging average cost (per km)
2007	60,2	83,7
2008	52,2	80,3
2009	56,8	104,0
2010	34,7	51,0
2011	36,4	62,4
2012	28,9	43,4
2013	25,6	38,3
2014	27.4	51.8

Source: Infratel and Corte dei Conti

2) Concerning the timeliness of projects execution, a similar improvement cannot be observed. Indeed, public works for broadband infrastructure accumulated significant delays,

which also persisted in the most recent period. However, these delays have been mostly due to the many bureaucratic passages associated with such projects (spanning from the design of the call for tender and permit concession to the execution of works): above all, the main cause was the delays of most local PAs and other public bodies in issuing the digging permits[7]. Occasionally, judicial challenges filed by losing bidders also delayed the execution of tenders. Hence, relevant problems of normative chaos and law enforcement arose. Given the technical simplicity of the works, the institutional effect stands out very clearly as a delaying factor.

3) While the transparency and accountability of the execution of public works for broadband infrastructure has significantly improved over time, the evidence suggests that the situation in Italy still remains below EU standards. For the first period, the Court certified that the degree of transparency of the procedures was very low and detrimental to the public accountability of the operations (Corte dei Conti, 2007), while in the second period it progressed (Corte dei Conti, 2016). A main stimulus were the transparency obligations imposed by the EU Commission while clearing the State aid measures, and authorising the executions of the broadband public works (Matteucci, 2015).

Public transport networks

The Court of Auditors' statutory analysis examined here (Corte dei Conti, 2017) focuses on the long rum implementation of Law n. 211 of 1992, disciplining the assignment and management of central (State) funds to local PAs (mainly, Municipalities), for public works targeting the construction or improvement of rapid public transport systems (urban railway systems, underground, others). 25 years after the Law approval, the Courts reassessed the status of implementation of the originally planned projects (n. 85). Table 2.2 details the main economic characteristics of the monitored projects.

[7] The reasons of delay were cumulative and self-reinforcing: for example, anticipating the presumably long periods needed to obtain the relevant permits, most broadband tenders allowed for artificially long duration of the contracts (typically, 36 months, see Matteucci, 2017), far beyond what was technically needed for the strict execution of the public works.

Table 2.2 - Implementation of public transport projects ex Law 211/1992.					
Status	Number	%	Cost approved	Financing obtained	% financing / cost
Completed	37	64.81	5,672.29	2,542.44	44.82%
Not yet started	2	3.70	176.61	74.88	42.40%
In progress	15	27.78	5,040.74	1,709.99	33.92%
Suspended	2	3.70	217.12	127.94	58.92%
Total final (D)	56	100.0	11,106.79	4,455.25	40.11%
Other indicators					
Original total (A)	85	Replanned total (B)	76	Definanced (discarded) projects (C)	20
Original cost*	8,694.45	"Varianti"*	2,312.53	Final costs*	11,007
				Δ: +26.6%	

Legend: *Limited to the final 56 projects. Monetary values are EUR millions. D=(B-C).
Source: Our elaborations on Corte dei Conti (2017), which registers project updates until 2016 (June) – according to the "SAL" accounting system.

Out of the 85 projects originally presented, there was a subsequent reaggregation of smaller projects into 76 unique financed projects. Over time, 20 projects experienced difficulties due to the planning inadequacies and financial shortages of the proponent local PAs, and were withdrawn. Overall, considering the original 85 projects, 68 experienced project variations ("varianti in corso d'opera" – some projects, like the Rome underground line C, registered 48 variations alone). Based on active projects, these extra costs represented a +26.6% increase in expenditures. Moreover, out of the 56 final projects carried out ex Law 211/1992, (76 less 20 definanced), only 37 (65%) are completed, while 15 (27.8%) are in progress and 2 (3.7%) suspended or not yet started: obviously, if computed with the original number, the rates of implementation are lower. A high number of projects have been delayed with respect to the planned date of technical completion – sometimes reaching a delay of a few years[8]. Finally, serious financial mismanagement of the funds has been reported, with passive interests reaching 80% of the total borrowed capital.

[8] Obviously, this does not include the time needed for preliminary permit and approval phases.

We summarise the main obstacles and problems registered by the extensive Court's analysis as follows. First, there was often an initial deficiency of strategic planning capabilities in the overall conception of the projects (for example, in terms of cost-benefit analysis), with public works motivated by political/electorate reasons rather than by well-defined needs of the territories. Second, a lack of skills for technical planning and execution monitoring of big projects was detected; this had a negative impact on the quality of the subsequent administrative procedures (such as auction design and application of penalties). The previous deficiencies summed up and imposed frequent replanning and project variations, together with provoking the associated extra costs and execution delays. Then, there were also institutional failures, such as the ineffective system of central monitoring by the Ministry of Infrastructures and Transports, and the long bureaucratic procedures regulating permits and approvals, crossing various institutional subjects.

All in all, from this story, with respect to the broadband case, a clearer message of insufficient skills and competencies of the local managing PA arises: indeed, here, increasing the technical complexity and economic size of the public works concerned also augments the risk of project failure or disruption, and the need for a "professionalisation" of the contracting PAs, which was one of the key targets of D.Lgs. 50/2016, better emerges.

PPP and other evidence

These findings are broadly confirmed by the literature. Indeed, leading scholars and experts (for example, Giampaolino, 2015) have long pointed to the normative complexities and institutional inertia present in the previous disciplines of public works (before D.Lgs. 50/2016), without neglecting skills deficits.

Recently, new supporting evidence has come from the documents of the Impact Assessment Office (henceforth, IAO) of the Senate of the Italian Parliament. Table 2.3 draws from a recent report on the status of public-private partnerships for public works (from energy to social housing, from environment to sport facilities), mostly organised by Municipalities: the long-monitored period (2002-2016) largely precedes the new D.Lgs. 50/2016. Table 2.3 highlights two basic facts. First, activated PPP projects (33.164 units, totaling around 137 billion euro) present a non-negligible share (13%) of initiatives aborted[9], accounting for a share equivalent of more than one third (35%) of the total budget. In fact, as stringently demonstrated by the distribution of cases disaggregated by amount classes, the failure rate

[9] The interrupted procedures are attributable to cancelled calls for tender, procedures without bids or procedures not awarded for irregularities.

steadily augments with the increase of the size of the PPP project. In particular, the procedure class containing the first EU threshold (1-5 million euros) already reaches an incidence of failure of 18%, which becomes worrying (one case over three and more) in the larger project classes (15 million euros and above). Moreover, the failing share reaches 54% in the South of Italy.

Table 2.3 – PPP market: interrupted procedures by amount class, 2002-2016.

Amount class of PPP calls	Number			Amount (m €)		
	Interrupted procedures (a)	Processes activated (b)	(a/b)%	Interrupted procedures (a)	Processes activated (b)	(a/b)%
Amount not reported	1,183	12,690	9.3	-	-	-
≤150,000 €	666	8,133	8.2	41	413	10.0
150,001 ≤ 500,000 €	579	3,757	15.4	176	1,099	16.0
500,001 ≤ 1,000,000 €	362	1,981	18.3	270	1,463	18.5
1,000,001 ≤ 5,000,000 €	904	4,244	21.3	2,257	10,320	21.9
5,000,001 ≤ 15,000,000 €	411	1,433	28.7	3,517	12,142	29.0
15,000,001 ≤ 50,000,000 €	208	611	34.0	5,444	15,718	34.6
≥ 50,000,000 €	116	315	36.8	36,607	95,987	38.1
Total	4,429	33,164	13.4	48,312	137,142	35.2

Legend: Monetary values are in EUR millions.
Source: Impact Assessment Office of the Senate of the Italian Parliament (2018).

These failure rates are particularly disturbing when taking into account the structurally harsher macroeconomic conditions faced by Italy, and its tighter public budget constraints that liberate fewer resources for public investments, thereby rendering PPP a more stringent necessity for Italy, with respect to other EU Member States. In particular, according to the analysis of the IAO, the main causal factors explaining PPP failures were: 1) the long period passing between the call for tenders and its awarding, increasing the project risks and the likelihood of local Government changes, 2) the low endowment of technical and planning capacities possessed by smaller PA, such as Municipalities, 3) normative and relationship management difficulties between the two types of participants, which may feed litigiousness.

Finally, the D.Lgs. 50/2016 mandates the realisation of a study of technical and economic feasibility before deciding on relevant public works. In this respect, the past experiences denoted a lack of evaluation competencies in Italia PA. According to IAO (2007), out of the

58 Big Projects notified by the Italian regions of the Convergence Objective in the 2007-13 programming period, the detailed comments of the European Commission's scrutiny are available for 53 of them. Out of 53: a) for the 89% of cases, big criticalities in the cost-benefit analysis emerged, b) for 68%, planning structure issues, c) for 66%, challenges to the Internal Market and d) for 51% problems with the environmental evaluation (the remaining list is omitted). Hence, all in all, the evaluation and planning skills of the Italian PA have been historically unsatisfactory.

2.3 Basic evidence from ANAC data

The analysis of data provided by ANAC (ANAC, 2015; 2017b) permits to investigate the differences between the situation before the entry in force of the new law on public procurement (before D.Lgs. 50/2016) and after it. Focusing on transactions above the EU threshold, the variables that can be analysed are:

- Distribution of tenders (value and number) among procuring entities.
- Distribution of tenders (value and number) considering value ranges.
- Use of public procurement instruments and procedures (value and number of tenders).
- Distribution of tenders (value and number) for goods, services and public works.

For each group of variables it is possible to produce a comparison between the situation before and after the reform, and the evolution from the first quarter of 2015 and the second quarter of 2017 (last available ANAC report). Such a comparison allows assessing if the reform captures the EU's objectives of professionalising public buyers and of cooperating to procure together.

The main limit of these data is that, until now, information on individual tenders has not been available. For this reason, the data analysis presented in this section is only based on descriptive statistics. Moreover, the data aggregation provided by ANAC is occasionally opaque when some figures (see later) add data above and below the threshold, thereby making it difficult to draw clear conclusions. These limitations imply that it is not possible to provide a statistical analysis differentiating by territorial distribution or by the distribution of tender procedures among contracting authorities.

Let us start with the analysis of the aggregate ANAC data (Tables 24-6).

Table 2.4 - Tenders before reforms, January – April 2015					
Contracting authorities	Tenders (number)	Tenders (%)	Value in million €	% of value	Average value
Regional authorities of national health care	5,473	13.4	3,187	8.9	582,302
Hospitals	4,559	11.2	5,182	14.4	1,136,713
Centralised authorities	1,199	2.9	3,779	10.5	3,151,515
Municipalities*	10,547	25.8	4,844	13.4	459,249
Providers of Public Utilities**	10,304	25.3	9,458	26.2	917,888
Regions and Provinces	1,711	4.1	3,508	9.7	2,050,476
Central government	1,585	3.9	1,664	4.5	1,049,894
Other	5,490	13.4	4,383	12.4	798,438
Total	40,868	100.0	36,005	100.0	881,016

*= includes their unions.
**= includes public bodies and public and private firms which provide public utilities such as: transport services and facilities (including railways and airports), ICT and telecoms, waste electricity, water, gas, postal services and multi-utilities.
Source: ANAC - Rapporto quadrimestrale gen-apr 2015.

Table 2.5 - Tenders after reforms, May – August 2017					
Contracting authorities	Tenders (number)	Tenders (%)	Value in million €	% of value	Average value
Regional authorities of national health care	5,287	11.3	2,531	4.8	478,675
Hospitals	3,236	6.9	1,143	2.2	353,255
Centralised authorities in health care	1,768	3.8	6,483	12.3	3,666,836
Centralised authorities	3,379	7.2	12,544	23.9	3,712,298
Municipalities*	11,479	24.5	4,924	9.4	428,946
Providers of Public Utilities**	10,676	22.9	14,096	26.8	1,320,312
Regions and Provinces	2,695	5.8	3,503	6.7	1,299,728
Central government	2,594	5.4	3,410	6.4	1,314,501
Other	5,726	12.2	3,903	7.5	681,585
Total	46,840	100.0	52,535	100.0	1,121,597

*= includes their unions.

**= includes public bodies and public and private firms which provide public utilities such as: transport services and facilities (including railways and airports), ICT and telecoms, waste electricity, water, gas, postal services and multi-utilities.
Source: ANAC - Rapporto quadrimestrale maggio-agosto 2017.

Table 2.6 - Comparison 2015-2017

	Tenders Δ%	Value Δ%	Average Value Δ%
Regional authorities of national health care	-3.4	-20.6	-17.8
Hospitals	-29.0	-77.9	-68.9
Total health care considering centralised authorities	2.6	21.4	18.3
Centralised authorities	181.8	232.0	17.8
Municipalities*	8.8	1.6	-6.6
Providers of public utilities**	3.6	49.0	43.8
Regions and Provinces	57.5	-0.16	-36.6
Central government	63.7	104.9	25.2
Other	4.3	-11.0	-14.6
Total	14.6	45.9	27.3

*= includes their unions.
**= includes public bodies and public and private firms which provide public utilities such as: transport services and facilities (including railways and airports), ICT and telecoms, waste electricity, water, gas, postal services and multi-utilities.
Source: ANAC - Rapporto quadrimestrale maggio-agosto 2017

Comparing the distribution of the number of contracts and their value among different contracting authorities (Table 2.6), it seems that in the second quarter of 2017 (May-August), centralised authorities with more professional competencies have increased their activities, considering both the number and the value of public procurement tenders.

This is evident for tenders in health care, where regional authorities of the national health care system and hospitals strongly decrease the number and value of tenders directly managed, while on the contrary tenders managed by centralised authorities increase. Moreover, after the reform, hospitals and regional authorities (so-called ASUR) manage tenders with a lower average value than before – thus the biggest ones which require more skills are managed by central authorities. Also, tenders for public utilities increase; such tenders usually interest the provision of public utilities to a large population (NUTS3 – i.e. provinces – and often NUTS2 regions).

This tendency towards rationalisation and aggregation is also confirmed by the decrease in the average value of tenders directly managed by Municipalities. In this case, after the reform, Municipalities specialise in simpler and smaller tenders.

Table 2.7 presents an analysis of the volumes of activity, disaggregated by accounting threshold values. In this respect, we recall that the threshold analysis suffers from intricate normative issues since, for ordinary sectors, ANAC only releases data by classes of purchases (goods, services, public works) while for the special sectors the available detail is by sector.

Table 2.7 – Comparison of tenders by threshold values, Jan-Apr 2015 and May-Aug 2017

	Threshold values, € (000)	Number of tenders			Total value of tenders (million €)			Average value of tenders (€)		
		2015	2017	Δ%	2015	2017	Δ%	2015	2017	Δ%
Ordinary	40<150	18,798	20,659	9.9	1,551	1,745	12.5	82,491	84,480	2.4
	150< 1,000	11,665	14,238	22.1	4,080	5,132	25.8	349,776	360,410	3.0
	1,000< 5,000	2,288	3,038	32.8	4,851	6,690	37.9	2,120,213	2,202,187	3.9
	5,000 < 25,000	598	883	47.7	6,000	9,135	52.2	10,033,761	10,345,066	3.1
	≥ 25,000	131	261	99.2	9,715	18,093	86.2	74,163,946	69,323,467	-6.5
Special	40<150	3,945	3,606	-8.6	322	297	-7.8	81,728	82,413	0.8
	150< 1,000	2,591	2,980	15.0	995	1,112	11.7	384,150	373,088	-2.9
	1,000< 5,000	625	828	32.5	1,353	1,839	35.9	2,164,736	2,220,802	2.6
	5,000< 25,000	191	292	52.9	2,018	3,209	59.0	10,567,693	10,988,910	4.0
	≥ 25,000	36	55	52.8	5,119	5,284	3.2	142,186,410	96,070,116	-32.4
Total		40,868	46,840	14.6	36,005	52,536	45.9	881,016	1,121,597	27.3

Source: ANAC - Rapporto quadrimestrale maggio-agosto 2017.

Looking at table 2.7, for the first type of sectors we observe that the number of tenders, as well as their total and average values, generally increase. These dynamics may be explained by two concurrent facts. The first fact is that the stringency of the Internal Stability Pact slackened after 2015, thereby permitting growing expenditure (and so procurement) activity. A second fact corresponds to information gathered from our interviews and states that compliance with the procurement registration has been enhanced by the approval of D.Lgs. 50/2016, although the basic procedure of tender registration ("CIG", in Italian "identifier of

each tender") was set before. Finally, from ANAC data we incidentally note the large share of tenders between 40,000 and 150,000 euros (thus mostly below all the EU thresholds).

Instead, there is a decrease or a less pronounced increase in the number and total value in special sectors (gas, electricity, water, transport services, postal services, fuel extraction or the provision of ports or airports), up to a threshold value of one million euros. "One major reason for the introduction of rules coordinating procedures for the award of contracts in these sectors is the variety of ways in which national authorities can influence the behaviour of these entities, including participation in their capital and representation in the entities' administrative, managerial or supervisory bodies." (Directives 2004/17/EC and 2014/24/EC). These directives apply to contracts valued at or above the following thresholds (excluding VAT): over 400,000 euro in the case of supply and service contracts[10]; over 5 million euro in the case of works contracts[11]. Since such sectors are regulated by national sectorial laws and authorities, they seem more resistant to the general effect of the reform on public procurement law than other tenders under European thresholds, and this explains the diverging variation trends uncovered in Table 2.7. Differences between ordinary and special sectors are confirmed by Table 2.8.

Table 2.8 – Tenders in ordinary and special sectors

		Number of tenders			Total value of tenders, million €		
		Jan–Apr 2015	May–Aug 2017	Δ%	Jan– Apr 2015	May– Aug 2017	Δ%
Ordinary	Goods	12,061	14,061	16.6	10,788	20,023	85.6
	Public works	9,588	9,099	-5.1	4,908	4,601	-6.3
	Services	11,831	15,919	34.6	10,501	16,172	54.0
	Total	33,480	39,079	16.7	26,198	40,795	55.7
Special	Goods	2,449	2,600	6.2	1,890	5,038	166.5
	Public works	1,586	1,667	5.1	2,581	3,139	21.6
	Services	3,353	3,494	4.2	5,336	3,564	-33.2

[10] Precisely 418,000 euros before 2018, and 443,000 starting from 2018.
[11] Precisely 5,225,000 euros before 2018, and 5,548,000 starting from 2018.

	Total	7,388	7,761	5.0	9,808	11,740	19.7

Source: ANAC - Rapporto quadrimestrale maggio-agosto 2017.

Ordinary sectors increase tenders for goods and for services, but decrease them for public works, both in number and in value. On the contrary, special sector tenders increase in number for all the typologies (including public works). Moreover, the total value of tenders in special sectors (summing up goods and services) increases (but less so than in ordinary sectors), even though there is an internal reallocation. Hence, a main difference between the two sectors is the diverging variation in the public works component. A possible explanation is based on the fact that both local Governments and public utility providers issue calls for tenders for public works in the pursuit of their statutory activities: these are more complex, and public utilities providers, when procuring, are better endowed to carry out complex procedures, differently from smaller Municipalities or Provinces[12]. The overall reduction of tender value for local Government (Municipalities, Provinces and Regions), highlighted in Table 2.6, could be due to an increasing difficulty to manage administrative procedures for implementing public works.

To summarise, the data provided by ANAC suggest that the reform of public procurement seems to reach the objective of increasing accountability and competition. This result is supported in particular by the evidence shown in Table 2.9. In fact, open procedures and those negotiated[13] with tender publication increase, both in number and tender value: such procedures are more competitive and accountable. Moreover, the procedure based on direct award decreases both in number (ordinary and special sectors) and in value (only ordinary), even if this decrease is counterbalanced by increases in negotiated procedures without tender publications, that could be considered rather opaque. However, it should be stressed that restricted procedures and direct awards may sometimes be motivated by stringent technical constraints (low product substitutability, patents or other causes of supply uniqueness or monopoly). Further, the negotiated procedures (especially those without publication) were designed towards higher procedural simplification. Finally, public procurement reforms clarified the rules of an innovative instrument, such as the dynamic purchasing system. This resulted in an increased used of DPS (see Table 2.9).

Generally speaking, it is possible to detect an increase in competition and accountability in the data, but some of the critical aspects discussed earlier cannot be clarified using the ANAC data on which these preliminary conclusions rest.

[12] For example, public and private companies such as RFI (railways network operator), ENEL (electricity network operator), Aeroporti di Roma S.p.A (Rome airports operator) have a sizeable critical mass to master the new norms.
[13] Actually, data on negotiated procedures from Table 2.4 have to be considered with caution, in effect they sum up below and above thresholds.

Table 2.9 - Public procurement instruments and procedures

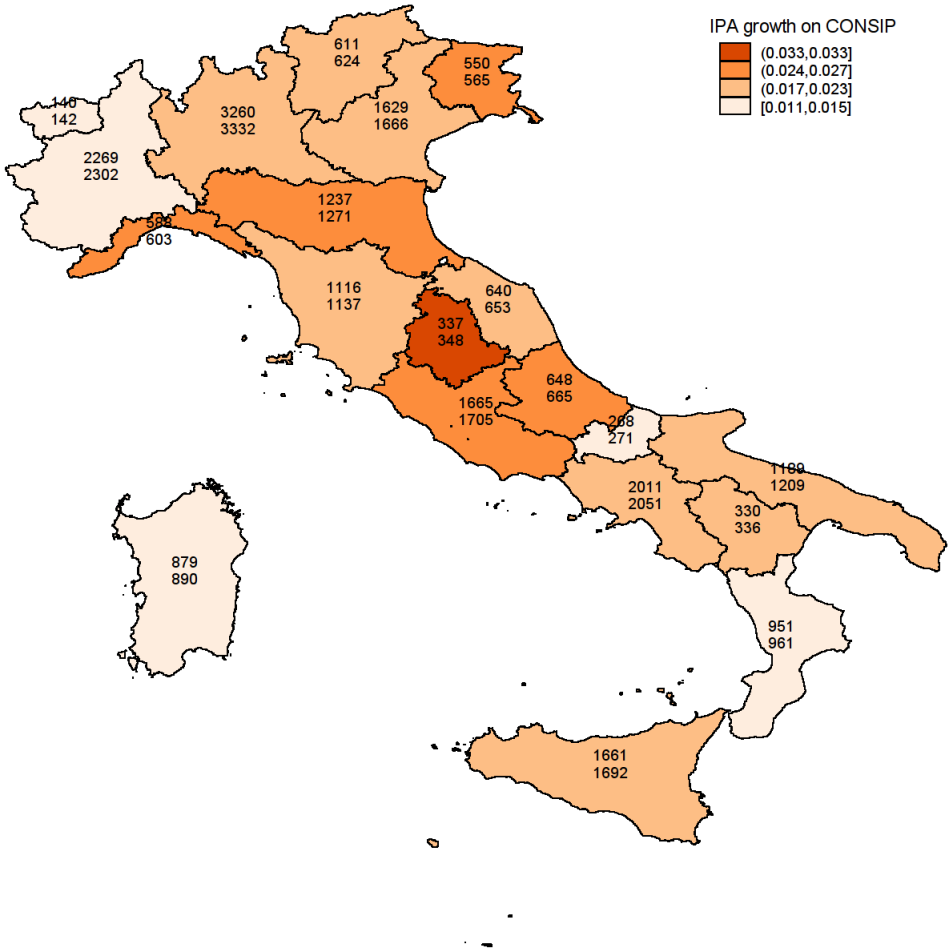
	Procedures	Number of tenders			Total value of tenders, million €		
		Jan–Apr 2015	May–Aug 2017	Δ%	Jan–Apr 2015	May–Aug 2017	Δ%
Ordinary	Open procedures	9,376	10,102	7.7	14,903	21,452	43.9
	Restricted procedures	538	686	27.5	2,746	1,159	-57.8
	Negotiated procedure with tender publication	739	2,090	182.8	447	484	8.3
	Negotiated procedure without tender publication	11,889	15,577	31.0	5,612	7,777	38.6
	Direct award	10,119	8,113	-19.8	1,814	1,493	-17.7
	Dynamic purchasing system		2,449			8,371	
	Other procedures*	819	62	206.6	674	59	1150.7
Special	Open procedures	634	1,056	66.6	1,985	3,059	54.1
	Restricted procedures	244	293	20.1	710	1,103	55.4
	Negotiated procedure with tender publication	506	583	15.2	1,723	4,268	147.7
	Negotiated procedure without tender publication	2,249	2,662	18.4	4,366	2,093	-52.1
	Direct award	1,455	912	-37.3	215	447	107.9
	Dynamic purchasing system		20			22	
	Other procedures*	2,300	2,235	-2.0	808	747	-4.8
Total		40,868	46,840	31.8	36,005	52,536	31.8

* In 2015 other procedures also included a dynamic purchasing system.
Source: ANAC - Rapporto quadrimestrale maggio-agosto 2017.

2.4 Analysis of Consip Data

The Program for the Rationalisation of Public Authority Purchases was launched in the 2000 Finanziaria Law. Consip Spa (http://www.consip.it/) is a corporation controlled by the Ministry of the Economy and Finance (in Italian, MEF), and acts as an intermediary between a number of public and private sector entities, according to PA requirements and providing purchasing know-how and consultancy services to meet specific requirements. In order to grant the matching between demand and supply, different e-tools have been developed by Consip: Framework Contracts (Convenzioni) and Framework Agreements (Accordi quadro), Electronic Marketplace (MEPA) and recently Dynamic Purchasing System (DPS) (Sistema dinamico di acquisizione). In this way, Consip aims to make the public procurement market more efficient and transparent. Figure 2.1. shows the number of PA registered on CONSIP. Note that in the years considered the number of registered PA grows very slowly, since the increasing and compulsory use of Consip is a consolidated fact dating back to previous periods.

Figure 2.1– Rate of growth of the registered PA numbers, 2017-2016



Legend: (Absolute) figures within regions are the numbers of participating PA in 2016 and 2017; colours reflect growth rates of the Index of Registered PA (IPA), going from higher (darker) to lower (clearer) rates.
Source: CONSIP Opendata.

Table 2.10 reconstructs the temporal evolution of the main instruments (Framework Contracts and Framework Agreements) managed by Consip. Main evidence is that they generally increase between 2005 and 2017, even with some annual oscillations. In part, this is due to the multi-annual duration of the instruments. Obviously, the rate of implementation of the tenders increases over time, only reaching 100% for the less recent procedures.

Table 2.10 - Framework contracts and framework agreements on CONSIP: Numbers

Year	Published tenders	Awarded tenders (%)	Activated instruments (%)	Ended instruments (%)
2005	3	100	100	100
2006	7	100	100	100
2008	10	100	100	100
2009	45	100	100	100
2010	28	100	100	100
2011	33	100	100	100
2012	69	99	96	87
2013	65	98	97	92
2014	126	67	61	60
2015	163	47	46	39
2016	113	66	50	24
2017	156	6	1	0

Legend: Percentages refer to the absolute values of the second column.
Source: CONSIP Opendata.

Table 2.11 - Framework contracts and framework agreements on CONSIP: Values

Year	Published tenders	Awarded tenders (%)	Activated instruments (%)	Ended instruments (%)
2005	136,000,000	100	100	100
2006	195,200,000	100	100	100
2008	410,717,500	100	100	100
2009	1,361,941,575	100	100	100
2010	2,679,079,558	100	100	100
2011	964,843,772	100	100	100
2012	4,808,428,499	98	96	79
2013	2,763,157,196	100	94	92
2014	10,043,832,864	47	37	37
2015	9,948,164,593	34	34	25
2016	3,381,715,981	76	62	47
2017	5,999,837,639	12	3	0

Legend: Percentages refer to the absolute values of the second column.
Source: CONSIP Opendata.

It should be stressed that in some years the value of these published tenders falls below the value of MEPA. For example, in 2016 it was 3.381 million euro (Table 2.11), but the values of activated instruments was only 2.106 million. Such an amount is lower than the total amount of negotiations on MEPA for the same year (see Table 2.12 below).

Obviously, the activities of Consip are not limited to those covered in Table 2.11. According to Presidenza del Consiglio dei Ministri-MEF (2017; p.11), the value of the Consip tenders published in 2016 has been equal to 17.3 billion euros (13.4 billion in 2014). Based on the special methodology developed with ISTAT, the estimated savings for 2016 should be equal to 3.5 billion euros (3.1 billion in 2014).

MEPA

Because of this, and since MEPA is the instrument which strongly simplifies the procedures for many public bodies, we focus the analysis on the use of MEPA, addressing the issues of the diffusion and effectiveness of such an e-tool and, more specifically, that of negotiated procedures. The electronic market for Public Administration (Mercato Elettronico per la Pubblica Amministrazione, MEPA) is a digital marketplace. Registered authorities can make purchases for values below the European threshold of the goods and services offered by authorised suppliers. Consip authorises suppliers through calls for tender. Registered authorities could directly purchase online through product catalogues, or they may negotiate the conditions with providers using traditional procedure of requesting an offer (RDO), or the simplified one, which permits selecting a reduced number of suppliers and negotiating directly with them. Thus, we describe the diffusion of the simplified procedures of negotiation (direct negotiation, TD), which should provide a flexible, less bureaucratic and easy-to-use instrument for Public Administration; in this way, it should better fulfil the requirements of public entities. Moreover, we analyse the effective competitiveness of such tools measuring if the auction produces a price lower than the bidding one. Finally, we measure how such electronic market place incentives have shaped the access to the market of the procured firms.

From the point of view of reform, the only relevant change in MEPA is the introduction of direct negotiations, which are an instrument sharing several characteristics of direct award and of negotiated award without publication. It is worth noting that, for the coinciding events of the increasing participation to MEPA and that of small PAs without capabilities to manage a tender, MEPA becomes a good solution for the provision of goods and services, especially for purchasing that could be divided in single units of small amounts. Because of its ease of use, the absence of litigation and higher flexibility, MEPA greatly reduces transaction costs.

Table 2.12 - Economic amount of negotiated and not negotiated procedures on MEPA

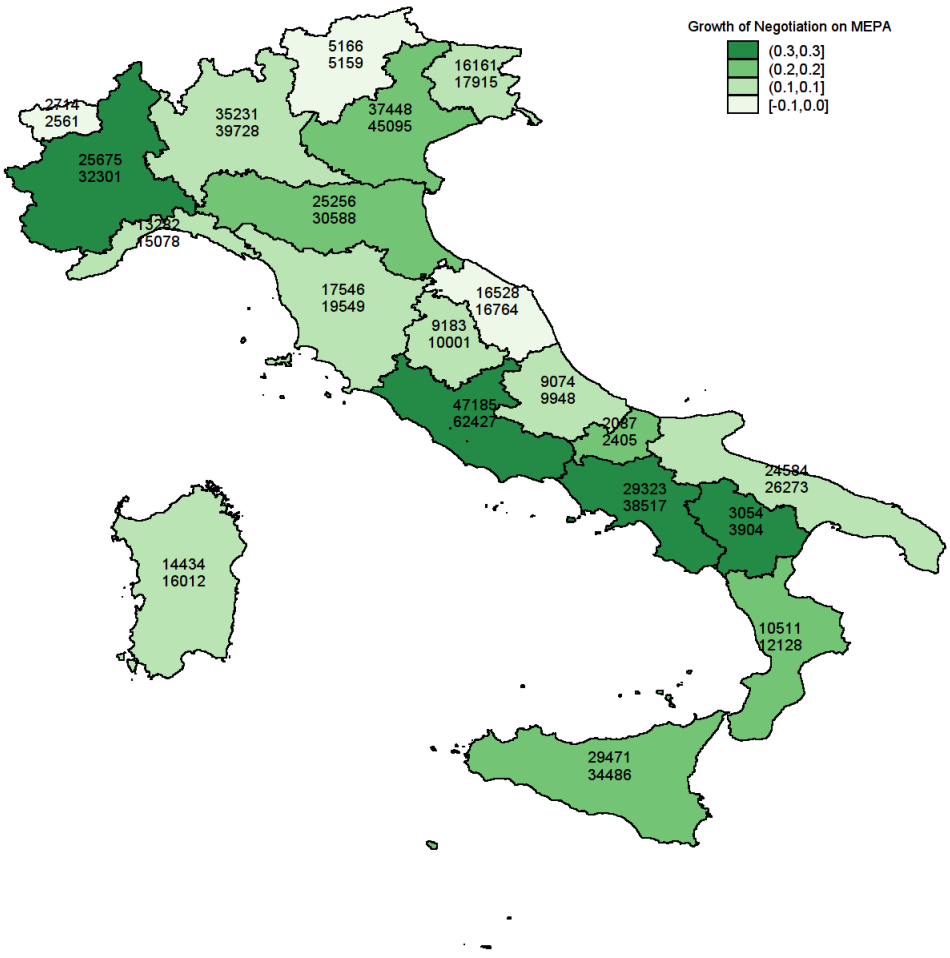
		RDO	TD	NO NEG	TOTAL
Values (million €)	2016	1,026	737	700	2,463
	2017	1,735	804	664	3,203
Share (%)	2016	42	30	28	100
	2017	54	25	21	100

Source: Our elaborations on CONSIP Opendata.

Table 2.12 shows that the total value of purchasing on MEPA increases because of the increase in negotiated procedures (request for proposal, RDO, and direct negotiation, TD). Meanwhile, purchases without negotiation (NO NEG) decrease. Note that almost the totality of the increase in the absolute value of purchasing through MEPA depends on the increase in the value of the more traditional tool (RDO), while the value of purchases made through the more flexible and easy-to-use tool (TD) increases less and only in absolute terms: in fact, in relative terms, the share of TD decreases from 30% to 25%. This is a very positive outcome since it highlights that, even for below-threshold PP and small amounts, buyers are increasingly using procedures requiring competition between suppliers.

Figure 2.2 provides a geographical breakdown of these facts. Increases in MEPA due to negotiated procedures are also confirmed if we check the number of negotiations by region. This number increases in all regions, with the partial exception of two regions with special statutes – Trentino Alto Adige and Valle d'Aosta.

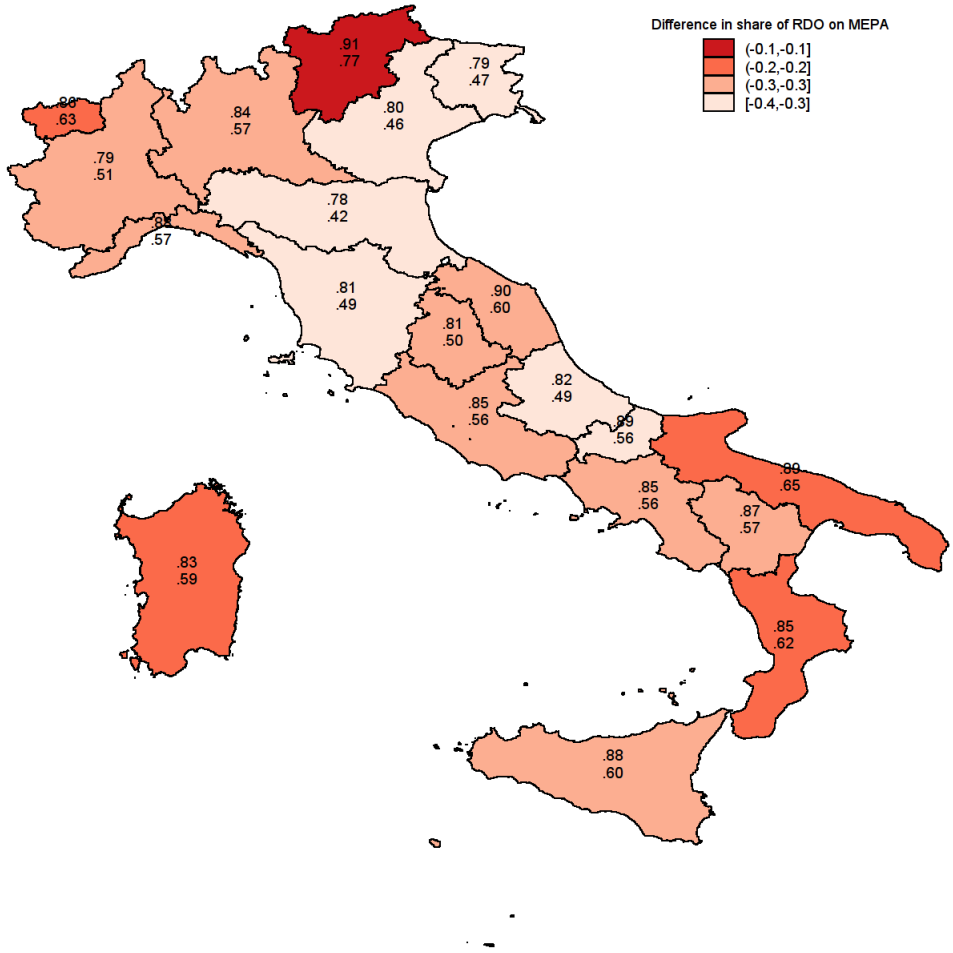
Figure 2.2 – Rate of growth of the number of negotiations on MEPA, 2017-2016



Legend: Figures within regions are the number of negotiations (TD+RDO) on MEPA in 2016 and 2017; colours reflect growth rates, going from higher (darker) to lower (clearer) rates.
Source: Our elaborations on CONSIP Opendata.

It is worth noting that if RDO increases in monetary value (recall Table 2.12), the proportion of the number of RDO negotiations with respect to the number of TD negotiations decreases. This is demonstrated by Figure 2.3, which shows the regional differences in the share of RDO on MEPA in the biennium. In other words, the number of RDO negotiations grows less than that of RD.

Figure 2.3 – Difference in the share of RDO on MEPA, 2017-2016

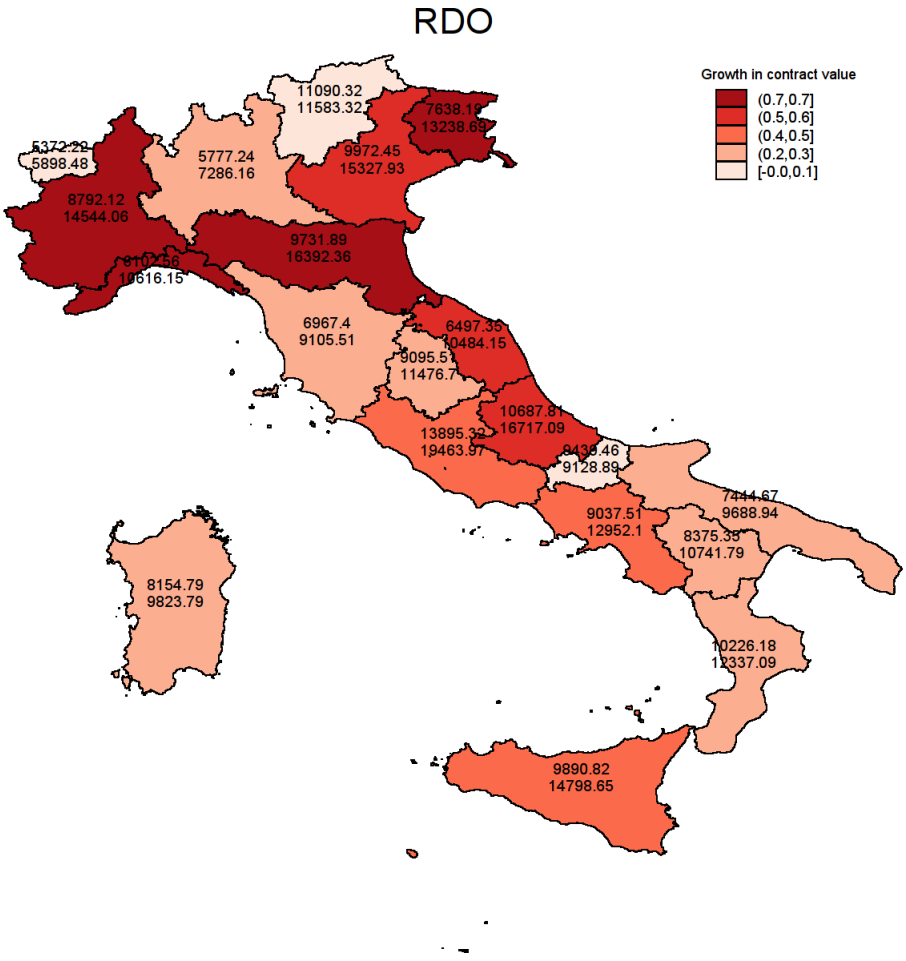


Legend: Figures within regions are the share of RDO on MEPA negotiations in 2016 and 2017; colours reflect differences in the share of RDO, going from lower (darker) to higher (clearer) differences.
Source: Our elaborations on CONSIP Opendata.

Therefore, this result implies that the average value of the procedure "request for proposal" (RDO) increases, while the simpler procedure of direct negotiation (TD) is used for smaller

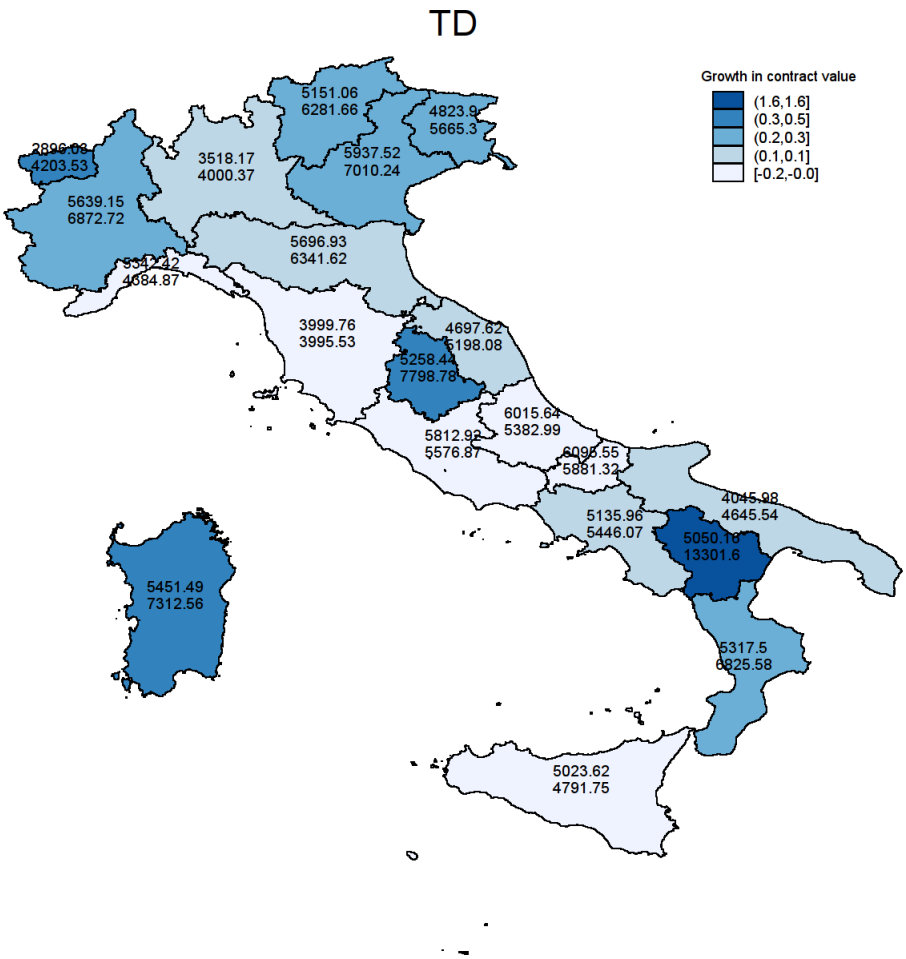
amounts. Figures 2.4a and 2.4b support this view. The average value of an RDO negotiation increases (Figure 2.4a), and it increases significantly in regions where there was a sharper decrease in the number of RDO negotiations. Concerning Figure 2.4b, mostly the average value of TD increases. Moreover, in all regions except Basilicata in 2017 the average amount of an RDO is greater than the one of TD (compare Figures 2.4a and 2.4.b). This makes perfect sense, because the RDO is conceived as a larger batch purchasing instrument, while TD is a more flexible and "ad hoc" procuring instrument tailored to specific needs.

Figure 2.4a – Rate of growth of the average value of a negotiation, RDO, 2017-2016



Legend: Figures within regions are the average value of a negotiation in 2016 and 2017; colours reflect growth rates, going from higher (darker) to lower (clearer) rates.
Source: Our elaborations on CONSIP Opendata.

Figure 2.4b – Rate of growth of the average value of a negotiation, TD, 2017-2016



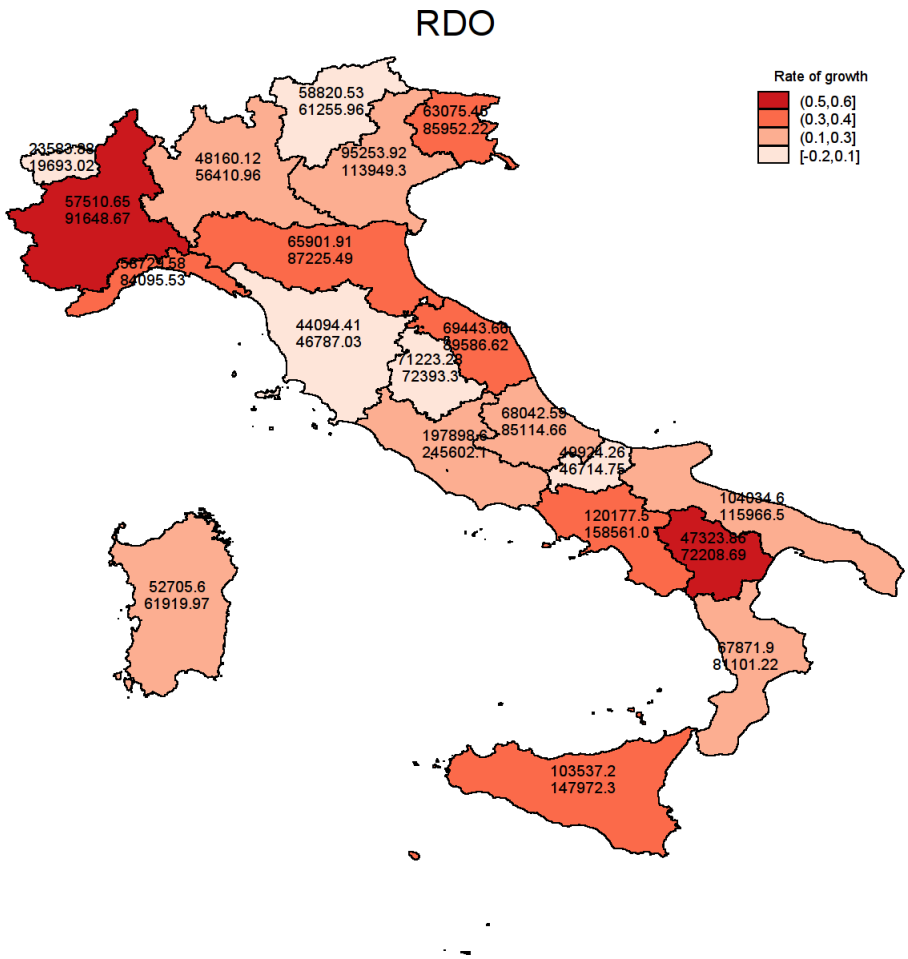
Legend: Figures within regions are the average value of a negotiation in 2016 and 2017; colours reflect growth rates, going from higher (darker) to lower (clearer) rates.
Source: Our elaborations on CONSIP Opendata.

Finally, Figures 2.5a and 2.5b depict the trend of a close but larger aggregate: that of the average value of the PA expenditures on MEPA (aggregating the single negotiations). They show that the average expenditures of a PA in negotiated procedures (RDO and TD) on MEPA generally increase despite the higher participation of PA in all regions. Hence, in the observed period (2016-17), MEPA is effectively attracting a larger share of procurement activities, both in terms of the number of subjects involved, and in terms of contractual monetary amounts of this e-procurement activity.

From this point of view, MEPA data are almost unique in Europe: the MEPA system allows full traceability and monitoring of below-threshold public purchasing, and sheds light on a

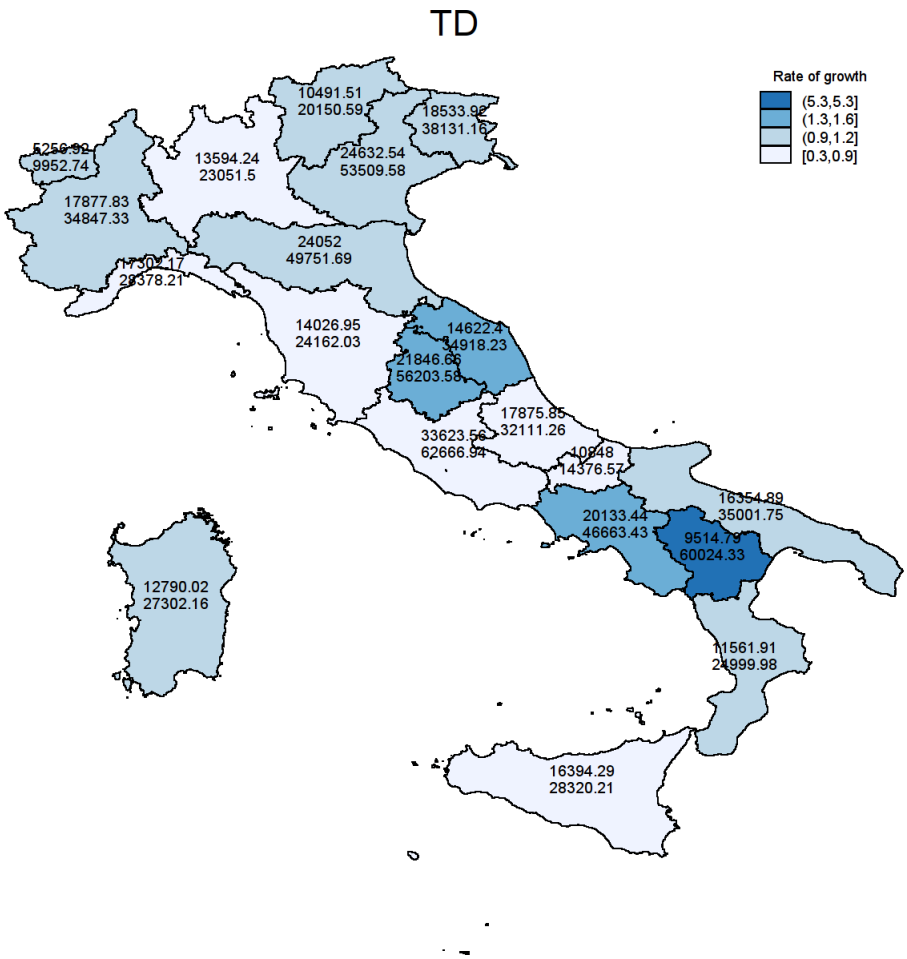
significant part of public procurement that is otherwise obscure (being outside the EU focus and harmonisation efforts).

Figure 2.5a – Growth of the average value of PA expenditures on MEPA, RDO, 2017-2016



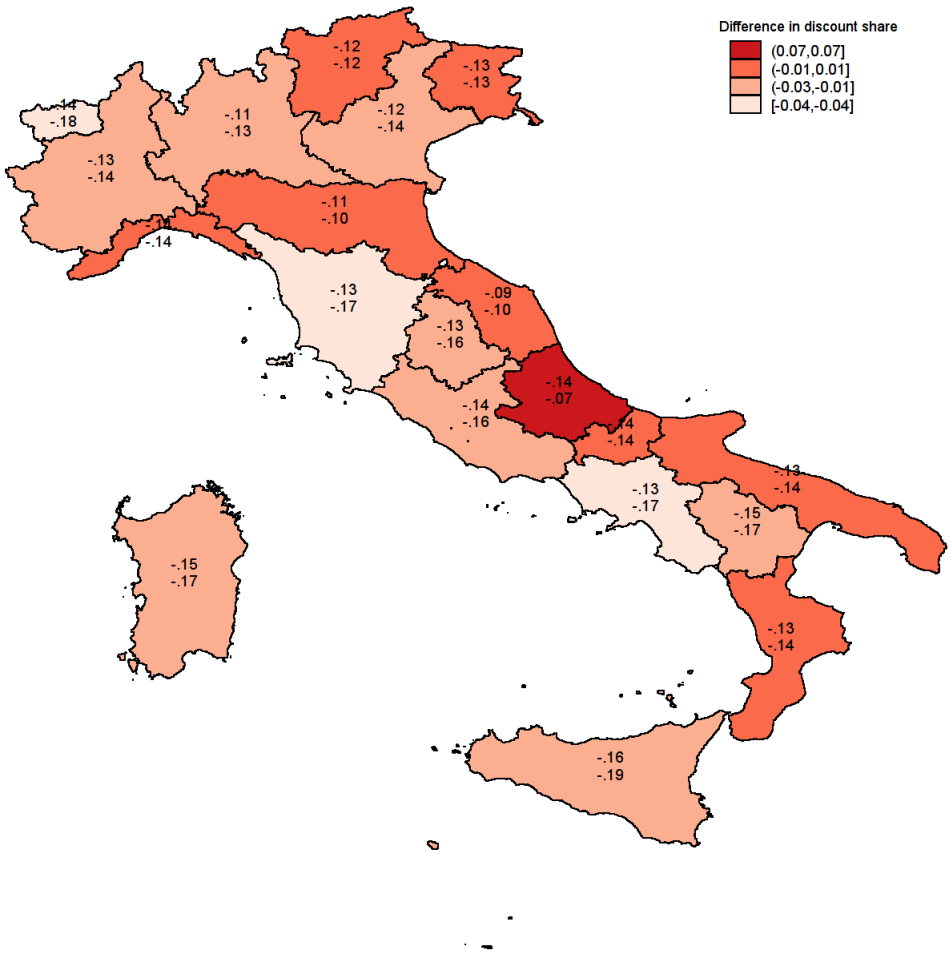
Legend: Figures within regions are the average value of a negotiation in 2016 and 2017; colours reflect growth rates, going from higher (darker) to lower (clearer) rates.
Source: Our elaborations on CONSIP Opendata.

Figure 2.5b – Growth of the average value of PA expenditures on MEPA, TD, 2017-2016



Legend: Figures within regions are the average value of a negotiation in 2016 and 2017; colours reflect growth rates, going from higher (darker) to lower (clearer) rates.
Source: Our elaborations on CONSIP Opendata.

Figure 2.6 – Difference in the discount rate on the catalogue prices using RDO, 2017 - 2016



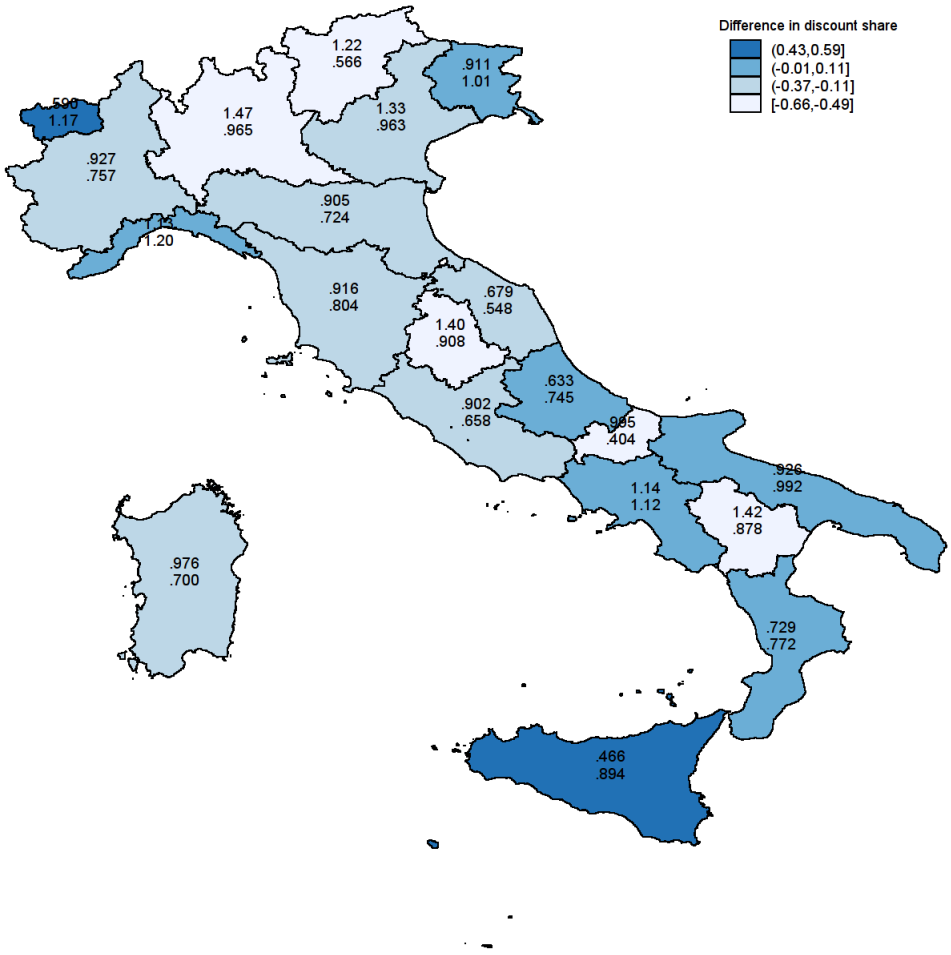
Legend: Figures within regions are the discount rates on RDO in 2016 and 2017; colours reflect differences in discount rates, going from lower (darker) to higher (clearer) differences.
Source: Our elaborations on CONSIP Opendata.

Furthermore, the analysis of MEPA could provide useful indications on discounts offered on the catalogue price (Figures 2.6 and 2.7), and on the time needed for negotiating a contract on MEPA. Note that the discount rate in RDO generally increases; only in Molise and Emilia Romagna does it decrease. Hence, the aggregate picture from Figure 2.6 confirms that the RDO activity generates an aggregate saving for the Italian PA. Based on the authors'

calculations, this saving (computed as the initial listed auction price minus the awarding price) amounts to 227 million euro (104 million in 2016 plus 123 million in 2017)[14].

Figure 2.7 presents evidence on the mark-up between the price paid after negotiations in TD and the reference prices in the online catalogues. It shows that the value of the mark-ups is generally positive. This should be the result of the functioning of a direct negotiation instrument (TD): in this case, the PA and the firms directly negotiate different attributes of the contract. Thus, it is possible that, in order to provide more tailored goods and services to the PA, the price tends to be higher than the one listed in the catalogues.

Figure 2.7 Difference in mark-up rates over catalogue price using TD, 2017-2016

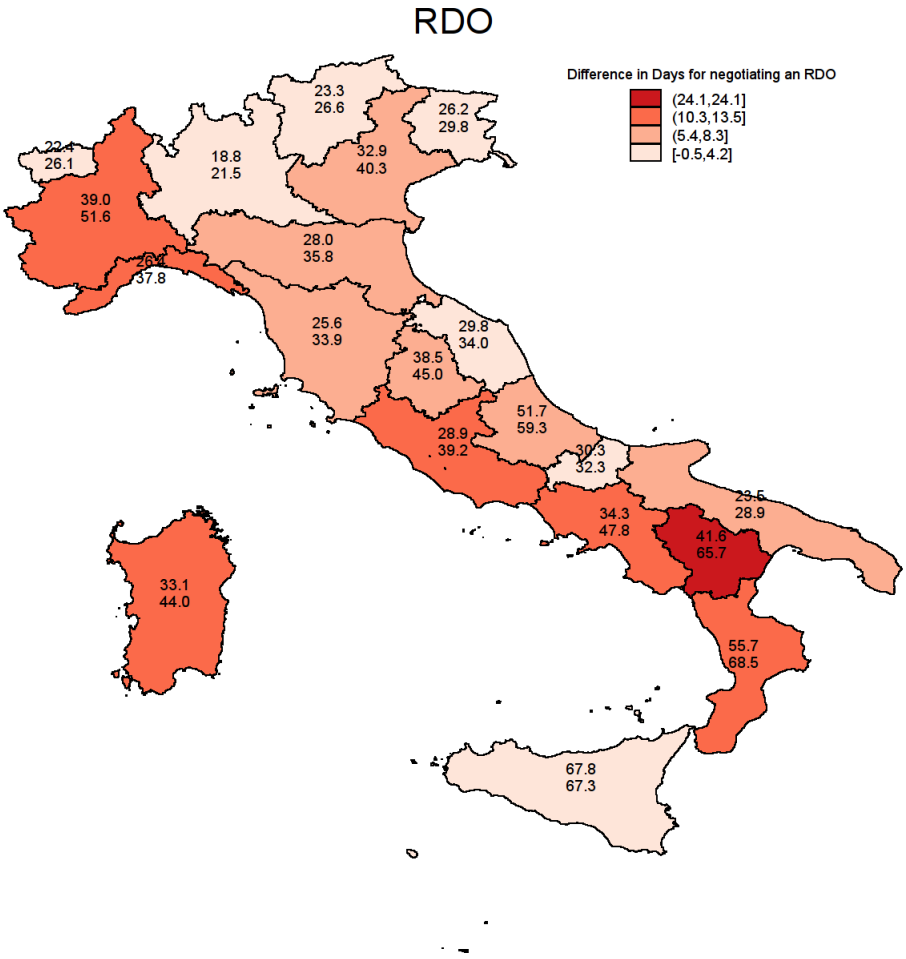


Note: Figures within regions are the mark-up rates over catalogue prices in TD in 2016 and 2017; colours reflect differences in mark-up rates, going from lower (darker) to higher (clearer) differences.
Source: Our elaborations on CONSIP Opendata.

[14] Respectively, absolute volumes are (1,130-1,026) for 2016 and (1,858-1,735) for 2017.

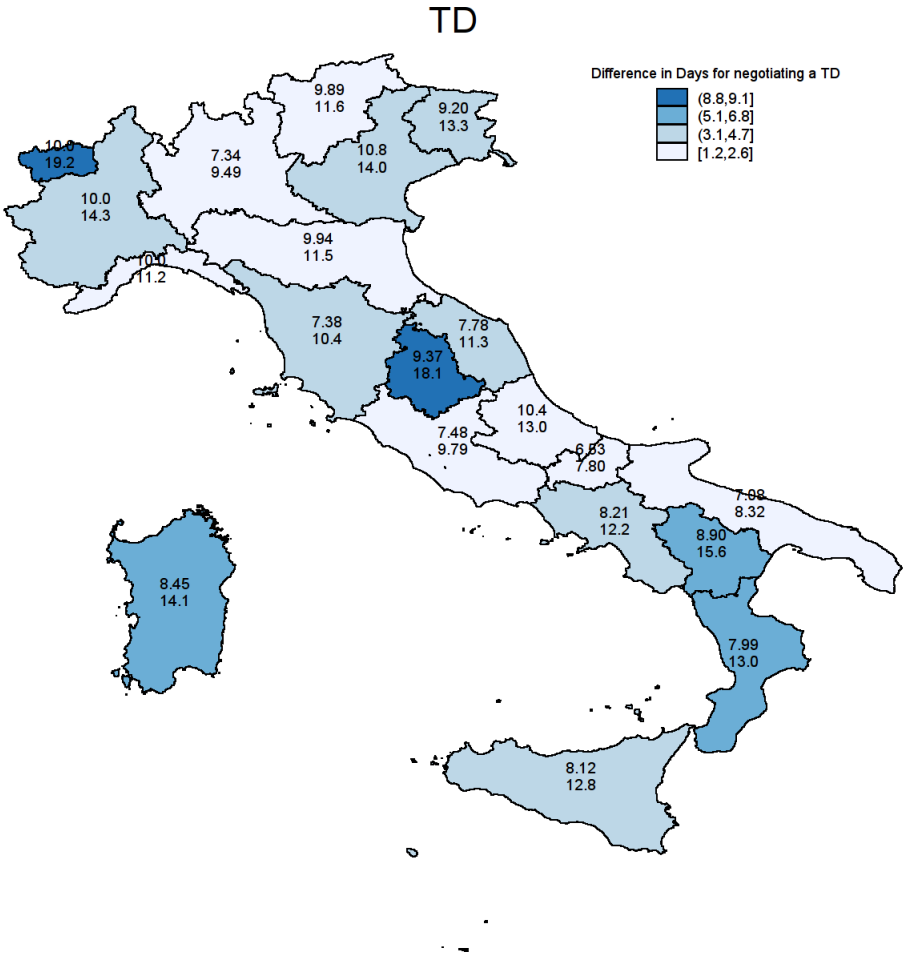
Note that such mark-up rates, although positive, generally decrease over time: thus, TD performance in granting more competitions seems to increase. Figures 2.8a and 2.8b present evidence on the time span between the publication of the notice of auction and the signing date of the contract during 2016-17.

Figure 2.8a Difference in the number of days for stipulating a contract, RDO, 2017-2016



Note: Figures within regions are days for stipulating a contract in 2016 and 2017; colours reflect differences in numbers of days, going from higher (darker) to lower (clearer) differences.
Source: Our elaborations on CONSIP Opendata.

Figure 2.8b Difference in the number of days for stipulating a contract, TD, 2017-2016



Note: Figures within regions are days for stipulating a contract in 2016 and 2017; colours reflect differences in numbers of days, going from higher (darker) to lower (clearer) differences.
Source: Our elaborations on CONSIP Opendata.

The results are quite robust across territories and show a growing generalised delay effect of the negotiated procedures: in 2017 the time for negotiation is higher than in 2016. In particular, during 2017, RDO takes up to 24 days longer than 2016 (darker colour, Figure 2.8a), while TD takes up to 9 days longer (darker colour, Figure 2.8b). As could be expected, TD takes less time than RDO.

Table 2.13 presents very robust and systematic evidence in the territorial distribution of MEPA purchases, valid for all the Italian Regions. It shows that the PAs of a region purchase nearly 50% or more of goods and services in their own region, and a residual share of 5-18% in Lombardia, which then appears as a sort of national reference market – at least for MEPA types of transactions. Finally, a large part of the residual shares, for most of the regions, tend to be concentrated in the neighbouring regions, with respect to that of the purchasing PA. Figures A.2.1-3 in the Appendix provide examples for a visual inspection of the third

phenomenon, which reinforces the idea that territorial proximity and closeness factors (possibly, also driven by transport costs), seem to have an impact on the shape of the spatial MEPA network of digital transactions.

Table 2.13 – Territorial distribution of MEPA PA RDO purchases by selling region - 2016

Region	Purchases from the same region (%)	Purchases from Lombardia (%)	Purchases from the rest (%)
Abruzzo	50.1	13.5	36.4
Basilicata	48.1	13.6	38.3
Calabria	59.3	10.2	30.5
Campania	70.0	9.7	20.3
Emilia-Romagna	59.6	16.0	24.4
Friuli Venezia Giulia	57.2	12.5	30.2
Lazio	60.3	13.0	26.8
Liguria	53.8	10.7	35.6
Lombardia	70.4	70.4	-40.8
Marche	49.1	16.7	34.3
Molise	57.7	8.3	34.0
Piemonte	55.4	18.2	26.4
Puglia	77.1	5.4	17.5
Sardegna	60.7	11.0	28.3
Sicilia	61.3	10.8	27.9
Toscana	50.9	15.2	33.9
Trentino-Alto Adige	43.0	15.8	41.2
Umbria	49.4	16.0	34.5
Valle D'Aosta	58.5	10.7	30.8
Veneto	59.4	16.9	23.7
Abruzzo	50.1	13.5	36.4
Basilicata	48.1	13.6	38.3
Calabria	59.3	10.2	30.5
Campania	70.0	9.7	20.3

Source: Our elaborations on CONSIP Opendata.

2.5 The views of experts and stakeholders on the reform of public procurement

Research proposed by the Bank of Italy (Peta, 2017) underlines three main problems of the Italian reform.

The first critical issue is that the timetable derived from the reform of public procurement is not synchronised with the budgeting period of public bodies. For instance, D.Lgs. 50/2016 describes the phases of programming public works in detail, from inception and selection of the best firm to the execution of the project, but the single phases are not explicitly linked to procedures and timetables public entities have to respect in order to prepare their budget. This could have a negative impact on the effectiveness and timeliness of public works.

A second critical issue is the effect of the power ANAC has to monitor and sanction the public procurement activities of contracting entities. As this power is conveyed without simultaneously imposing time limits on ANAC to become active and express sanctions, the risk that the legitimacy of administrative decisions will be questioned after a long time leads to hold ups and delays in administrative processes. This effectively hinders the realisation of the works.

The last critical issue is due to some uncertainties in the application of the law and delays in the publication of guidelines from ministries (MIT, 2017); this critical point, actually, could discourage the use of award criteria based on the best quality/price ratio, or cost/effectiveness ratio, which are the criteria promoted by the European Union to select the best companies.

A questionnaire that was addressed to a set of officials of highly qualified procuring bodies and other experts will be used to empirically verify the existence of such critical issues and to analyse the effect of the process of aggregation of procurement, the effect on accountability and corruption, and the effect on professionalisation of authorities. The questionnaire (see Appendix) is mainly conceived and addressed to officials of the regional agency for health care: in fact, in Italy the latter accounts for the overwhelming majority of the Regions' budget and their procuring activity. In particular, we select officials from the leading centralised authorities (of different types), including the so-called aggregators, defined by D.L. 66/2014; the latter are responsible for the procurement of certain goods and services – in particular those devoted to health care – within their own regions, and they define Framework Contracts and Framework Agreements at the regional level (see Table 2.14). While doing so, these subjects typically provide the technical platform of aggregation and

manage the final electronic market, in ways that closely match what CONSIP Spa[15] does, providing for the rest of the public procurement activity.

We uncovered that, so far, during a de facto transition period, in certain regions such aggregators have existed only formally, while this role is effectively assigned to different public bodies. In this case, to have a meaningful sample we addressed the questionnaire to the officials of such alternative public bodies. The officials addressed typically worked in audit departments, and they were directors of such departments or close assistants to the directors.

The original questionnaire we created has two sections: one for public procurement, one for e-procurement (see Chapter 3). The questions of the first section are specifically focused on appreciative comparisons between the activities pre-D.Lgs. 50/2016, and those afterwards, choosing between a pre-structured list of potential effects occurring because of the normative reform. The main effects surveyed are those on: A) procurement simplification (both for the awarding procedures for PA and for the accessing procedure for sellers; B) participation of small and medium-sized firms in auctions, and their likelihood to win; C) tender transparency; D) tender bureaucratic simplification; E) professionalisation of the purchasing activity; F) judicial litigation likelihood. For any response, the subject is requested to motivate explicitly the raisons/evidence for chosen answer. Finally, the e-procurement section of the questionnaire permits us to evaluate the advantages and disadvantages of electronic markets for PA (for this, see Section 3.5).

The draft questionnaire was subject to pilot testing and revisions, based on the feedback of the selected pilot expert. After collection of the questionnaires, further experts were selected or resampled, having a particular expertise in some of the domains covered by the questionnaires (see list: n. 1, 10, 12, 16). Hence, the discussion of a few qualitative results arising from the questionnaires has benefited from their contributions.

[15] CONSIP Spa is the other centralised national purchasing body, having a nationwide competence.

Table 2.14 - List of bodies contacted for interviews – Public procurement and e-government

Number	Name of Organization	Typology of organisation	Role
Pilot interview			
1	ESTAR Toscana	Regional Aggregator	UOC Audit and Compliance
Interviews			
2	SCR Piemonte	Regional Aggregator	
3*	CRA Liguria	Regional Aggregator	
4*	ARCA Lombardia	Regional Aggregator	
5	SORESA Campania	Regional Aggregator	
6	Municipality of Mantova	Provincial capital	
7	Azienda Zero - CRas veneto	Regional Aggregator	Organisational unit Purchasing at Azienda Zero
8	INTERCENTER Emilia Romagna	Regional Aggregator	Direction
9	ASUR Marche	Centralised contracting authority	Executive responsible for public procurement of supplies and services (health care)
10	Municipality of Grottaferrata (Rm)	Medium municipality (20411 inab.) which adheres to a CUC (unified centralised contracting authority)	Medium municipality (20411 inab.) which adheres to a CUC (centralised purchasing body), finance and purchasing department
11	Municipality of Sezze (Lt)	Medium municipality (24848 inab.) which adheres to a CUC (unified centralised contracting authority), formerly assigned officer at ANAC	Medium municipality (24848 inab.) which adheres to a CUC (centralised purchasing body)
12	CONSIP	National Aggregator	Strategies and Services Management Area - Directorate for the Rationalisation of Purchasing PA Program
13	CONSIP	National Aggregator	Legal department
14	AgID	Agency for the national digital Agenda	Technical expert
15	Corte dei Conti	Judicial system	Officer
16		Administrative law expert	PhD, studio partner, expert in administrative law, adjunct professor in various universities. Member of the technical table on procurement reform of CONSIP public

Legend: interviews n. 3 and 4 were not possible, for later unavailability of the respondents.
Note: The contacts from regional "aggregators" refer to bodies accounting for about 80% of the total volumes managed regionally (id est, excluding CONSIP, which is national).
Source: Our compilation.

Table 2.15 – Effects of the D.Lgs. 50/2016: interview responses			
	YES	NO	N.
	%	%	Total
A1 – Simplification of awarding procedures	9.1	90.9	11
A2 – Simplification of accessing procedures for firms	27.3	72.7	11
B1 – Easy access of SMEs	27.3	72.7	11
B2 - Greater probability of awarding SMSs	9.1	90.9	11
C – Greater transparency	81.8	18.2	11
D – Simplification of tender procedures	0	100	11
E – Greater professionalization	81.8	18.2	11
F – Lower litigation	9.1	90.9	11

Legend: The structure of the questions is identical; we ask the respondent whether or not the expected effect has unfolded, comparing the situation after Dlgs 50/2016 with that before.
Source: Elaborations on our survey.

Respondents have confirmed most of the findings arising from previous sections and have shed some additional light on them.

Since 2014, reforms have increasingly focused on "aggregators," both national (CONSIP) and regional. With them, the new Code enables substantial reductions of transaction costs. This is confirmed by the increase in the number and in the value of tenders managed by centralised authorities.

For small Municipalities and small bodies of PA, the level of competencies requested is too high since they are not adequately equipped for such tasks. As a consequence, they are driven to use the e-government platforms provided by aggregators: national platform of MEPA, managed by CONSIP, and the increasing number of regional portals and platforms (such as MEER, one of the first structured regional platforms that has been established in Emilia Romagna). Analysing the answers of our privileged witnesses[16], Municipalities complain about having few and inadequate instruments for purchasing. Moreover, they question the savings deriving from CONSIP instruments (Framework Contracts - Convenzioni and Framework Agreements - Accordi quadro).

[16] In particular, the ones suggested by ANCI (Associazione Nazionale dei Comuni Italiani) as representative of the situation and problems of Italian Municipalities.

In effect, if a Municipality is not a provincial capital, it is compelled to adhere to a CUC ("Centrale Unica di Committenza"), that is a unified centralised contracting authority[17] which manages tender on behalf of small Municipalities. In principle, a CUC can purchase, with a unique tender, the same good or service for all its associated Municipalities or it can launch different public tenders on request of its associates.

However, at present, most of the CUCs are not able to collect the requests of associated Municipalities to launch a single tender. Moreover, Municipalities complain that CUCs are not really effective, so that the ultimate responsibility of managing the tenders remains with them. These problems especially emerge for public works which, because of their high specificity, are difficult for aggregators to manage. Procedures for big public works, and also for the ones below the EU thresholds but above 40,000 euros, are considered too complex, especially for small and medium PA.

Only MEPA seems to be generally appreciated by Municipalities. It should be stressed that in the Stability Law for 2016, Art. 1. c. 504, the CONSIP procedures are extended to public works and the extension also regards MEPA; hence, simple public works (basically ordinary and extraordinary maintenance below 40,000 euro) can be purchased online. This possibility greatly reduces the problems described above.

In any case, even considering the criticality for "medium-sized" tenders, the reform seems to have achieved the goal of professionalisation (E).

The second objective that our privileged witnesses indicate is transparency (C). Respondents and experts underline that transparency should not be confused with simplification. In fact, to enable transparency, higher data requirements and managing instruments need to be created, posing new burdens on both PAs and procured firms. According to some respondents, without appropriate instruments of data management, higher amounts of data do not immediately translate to higher transparency. In effect, the majority of the respondents underline low or null gains in procedural simplification (see Table 2.11: A1, A2, D). Considering the experts' opinion as well, these findings suggest the possible occurrence of cases of "gold-plating" implementation of the EU Directives.

[17] It is not possible to univocally define a CUC according to the classification of Table 2.4. In fact, Municipalities could create a "Unione di Comuni" delegating to it the administrative tasks of defining tenders. In this case, the CUC is classified as "Municipalities". Alternatively, they can delegate this task to Provinces or Regions (in this case CUCs are considered Provinces or Regions). Finally, they could adhere to regional aggregators, in this case CUCs are considered centralised authorities. The lack of ANAC guidelines defining the hierarchy of certified authorities complicates the problem of identifying the tasks of different CUCs.

Also, the goal of opening the market to SMEs (B1 and B2) does not seem to have been achieved. According to the experts interviewed, and consistently with the findings of the previous section, only MEPA has effectively increased the SMEs' participation in PP markets.

The respondents have reported other unclear aspects or possible inconsistencies of the recent reforms. For example, the division of labour between the different aggregators has not been that clear, so that some uncertainty arises as to whether local PAs have to buy from central or local aggregators. Recently, Regional laws and decisions by State's Council have clarified that the order priority is regional and then, if unavailable, national. Another problematic issue refers to the joint possibility of CONSIP and regional aggregators to operate in the health care sector (which, in 2016, represented a big share of the CONSIP SDA instrument), generating potential rivalry or inconsistent behaviour between two bodies doing the same job.

We can summarise the critical comments of our respondents in three major bottlenecks possessed by the D.Lgs. 50/2016 reform. The first is that the new Code introduces another degree of litigation (Art. 29 c. 1): the previous Code confined the only possibility of litigation to the awarding phase, while now the litigation is also possible in the phase of the admission to the tender. Such possibility incentivises futile and formalistic litigation and, because of this, it is now questioned by the State's Council.

The second one depends on the fact that the reform is designed by making strong use of soft law (ANAC guidelines, ministerial decrees). Indeed, the delay in issuing the ANAC implementation guidelines is causing problems. Another source of problems is the production of contrasting guidelines by different subjects (ANAC, Technical roundtables, Ministries).

The third bottleneck is that ANAC could control the activity of contracting bodies without any limit of time after the tender, as underlined by Peta (2017). This increases the uncertainty regarding the regularity of contracts and, as a consequence, the entire procedures can take long time.

2.6 Firms involved in public procurement contracts

With regard to the Italian firms involved in public procurement, Consip data do not provide information on firms' characteristics and behaviour. Specific administrative or statistical data for research purposes are not available in Italy. However, the Community Innovation Survey (CIS) provides detailed information on firms having public procurement contracts, and can therefore be used as an alternative representative source with which to study the economic characteristics of companies involved in public procurement activities. In Italy, the CIS is conducted by Istat (Italian National Institute of Statistics). The analysis in this section relies on the CIS 2012, which was the most recent wave of the CIS survey available in Istat's safe centre at the time this study was conducted[18].

In a first step, this section provides a broad characterisation of the Italian firms involved in public procurement. In the second part it will examine the determinants of their propensity to innovate when innovation is required as a part of the public procurement contract. According to a recent OECD study (Appelt and Galindo-Rueda, 2016) mostly based on CIS data (at least for European countries), between 9% and 34% of firms operating in countries for which data are available have delivered goods or services to public authorities during the three-year period of reference 2010-2012. Not surprisingly, public procurement turns out to be more common in large firms than in SMEs; moreover, it is far more likely in innovative firms than in non-innovative ones.

Table 2.16 - Italian firms involved in public procurement in 2012: number, percentage and average turnover by size class

	SMEs (with less than 250 employees)	Large firms (with more than 249 employees)	Total
Number of firms with Public Procurement (PP) contracts	4569	568	5137
Percentage of firms with PP	27.06	31.29	27.47
Average turnover of firms with PP (thousands Euro)	18,167	522,000	73,900
Average turnover of firms without PP (thousands Euro)	15,655	463,000	56,800

Source: Own computations on CIS 2012 Italian micro-data.

[18] Italian micro-data from CIS 2014 or the more recent CIS 2016 wave were not available at Istat's safe centre. Despite this limitation, it is likely that the structural and behavioural characteristics of the firms with PP contracts did not change very much from 2012 to 2014 or more recent periods. The 2015 Innobarometer survey (EC, 2015) provides more recent data on the firms' involvement in public procurement and also covers the role that innovation plays in this process (cf. Ghisetti, 2017). However, while the full sample concerned with EU countries, Switzerland and the US includes 14,118 firms, just around 500 observations refer to Italy.

CIS micro-data evidence for Italy confirms these findings. As shown in Table 2.16, out of the 18,700 firms taking part in the survey, 27.5% have procurement contracts. The share is bigger for large firms (31%) as opposed to SMEs (27%). Most importantly, the table clearly indicates that the firms with public procurement contracts have, on average, a greater turnover than those not involved: this finding arises for both SMEs and large firms.

Table 2.17 – Innovation indicators for firms with and without PP contracts

	Firms with PP contracts (5,137)	Firms without PP contracts (13,560)
Percentage of firms with product innovations	28.95	23.85
Percentage of firms with process innovations	29.82	24.27
Percentage of firms with products new to the market	16.61	13.64
Average percentage of turnover due to products new to the market	3.52	2.84

Source: Own computations on CIS 2012 Italian micro-data.

Table 2.17 illustrates the CIS indicators for innovation among firms with and without PP contracts. In general, the former exhibit a higher degree of innovativeness, especially when the generic introduction of products or process innovations are taken into account. The advantage of firms with PP contracts is less remarkable when the introduction of products new to the market and, especially, the percentage of turnover due to these new products are considered.

Table 2.18 reports the results of Tobit regressions carried out to estimate the determinants of the share of turnover due to products new to the market. The Tobit model is in fact required when the dependent variable is left-censored, i.e. includes a lot of zeros (4,370 for firms with and 11,857 for those without PP contracts). Among the explanatory variables we include the log of turnover in 2012 as a proxy for the firm size and five dummies for the sectors the firms belong to (the reference sector is that of wholesale and retail trade)[19]. Aside from the share

[19] To get more meaningful information from our estimates, we prefer to employ few aggregate sectors rather than a very high number of two-digit industries. For the definition and aggregation of sectors, see Table A2.1 in the Appendix of Section 2.

of employees with a university degree, which is an ordinal variable ranging from 0 to 6[20], all the remaining determinants are dummy variables.

Table 2.18 - Tobit regressions: dependent variable = percentage of turnover due to products new to the market		
	Firms with PP contracts	Firms without PP contracts
Constant	-0.6612***	-0.6739***
	(0.0897)	(0.0571)
Turnover in 2012 (logs)	0.0005	0.0007
	(0.0054)	(0.0036)
Knowledge from universities important	0.0697**	0.0522**
	(0.0318)	(0.0236)
Knowledge from scientific journals important	0.1714***	0.1962***
	(0.0274)	(0.0190)
Cooperation with universities most valuable	0.0091	0.0015
	(0.0514)	(0.0376)
Overall importance of external sources of knowledge	0.0730	0.1736**
	(0.0762)	(0.0747)
Share of employees with a degree (ordinal var. 0 to 6)	0.0423***	0.0217***
	(0.0062)	(0.0039)
R&D performing firms	0.3276***	0.4105***
	(0.0259)	(0.0177)
High-tech industries	0.0682*	0.1120***
	(0.0379)	(0.0208)
Low-tech industries	0.0507	0.0468***
	(0.0339)	(0.0167)
Knowledge-intensive business services	0.0018	0.0022
	(0.0323)	(0.0226)
Other services	-0.0697**	-0.0479**
	(0.0314)	(0.0221)
Construction	-0.1263***	-0.1008***
	(0.0281)	(0.0223)
Pseudo R^2	0.2488	0.2494
Observations	5,134	13,556
Left-censored obs. (% of turnover=0)	4,370	11,857

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, *p<0.1.

[20] The classes are the following: 0 stands for no graduated employee; 1 for less than 5%, 2 for 5-9%, 3 for 10-24%, 4 for 25-49%, 5 for 50-74% and 6 for 75% and more.

The main differences between the two groups of firms refer to the different role played by some sectoral characteristics: in fact, only among firms without PP contracts do industrial firms, both high- and low-tech, record positive and higher shares of turnover due to new products. However, for both groups the positive role played by many other important variables is consistent: this is the case of the dummy for firms conducting R&D activities, the share of graduate employees and the high importance ascribed to universities and scientific journals as sources of knowledge for innovation. Finally, in both cases, the size of firms does not significantly affect innovative turnover.

Table 2.19 - Probit regressions: dependent variable = introduction of innovations (new products and/or new processes)

	Firms with PP contracts	Firms without PP contracts
Constant	-2.0916***	-2.7614***
	(0.2350)	(0.1366)
Turnover in 2012 (logs)	0.0824***	0.1095***
	(0.0150)	(0.0090)
Knowledge from universities important	0.7961***	0.6317***
	(0.1771)	(0.1458)
Knowledge from scientific journals important	1.8189***	1.7236***
	(0.1257)	(0.0855)
Cooperation with universities most valuable	0.0216	0.2426
	(0.4500)	(0.3370)
Overall importance of external sources of knowledge	-0.6180	0.3410
	(0.6244)	(0.4770)
Share of employees with a degree (ordinal var. 0 to 6)	0.0668***	0.0448***
	(0.0144)	(0.0087)
R&D performing firms	1.6193***	1.8797***
	(0.0945)	(0.0617)
High-tech industries	0.1165	0.2555***
	(0.1657)	(0.0369)
Low-tech industries	0.0987	0.3578***
	(0.0877)	(0.0369)
Knowledge-intensive business services	0.1053	0.1489***
	(0.0845)	(0.0502)
Other services	0.0151	0.0666
	(0.0678)	(0.0416)
Construction	-0.3391***	-0.2006***
	(0.0575)	(0.0424)
Pseudo R^2	0.3501	0.3384
Observations	5,137	13,560

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, *p<0.1.

The firms' turnover, instead, positively affects the probability of introducing either product or process innovation or both. This emerges from the probit regressions separately performed for firms with and without PP contracts (Table 2.19). While for the latter firms industry characteristics are important to identify those more likely to innovate, for the former they are not significant. Consistently with the Tobit regression, positive impacts on the likelihood of innovation are exerted by the importance of universities and scientific journals as knowledge sources, and especially by the share of graduate employees and the presence of R&D activities. The probit regression for firms with public procurement can be used as a benchmark for the subsequent analysis.

Innovation required by public procurement contracts

With respect to the issue of innovation it is important to focus on the innovations induced by public procurement contracts, along with those autonomously performed by the firms. In this regard, the modernisation of EU public procurement rules in 2014 has marked a renewed interest in using this instrument to stimulate innovation. Additional support for innovation via PP can be found in many documents and initiatives of the European Commission. Among other documents, we can recall the guide "Public procurement as a driver of innovation in SMEs and public services" (EC, 2014). Furthermore, relevant EC initiatives have been directed at closely monitoring national policy frameworks and spending on innovation procurement across Europe, as well as quantifying its impact compared to other procurement approaches (cf. EC, 2016a). Finally, increased evidence that PP for innovation is still underexploited, especially in supporting innovative start-ups and SMEs, has led the Commission to express the need for a new guidance document (EC, 2016b). Then, on May 2018 the Commission has published a "Guidance on innovation procurement" to encourage public buyers of goods and services to use public procurement as a means to stimulate innovation (EC, 2018).

Table 2.20 - CIS 2012 questionnaire: section on public procurement
10.1 During the three years 2010 to 2012, did your enterprise have any procurement contracts to provide goods or services for:
(a) Domestic public sector organisations
(b) Foreign public sector organisations
10.2 Did your enterprise undertake any innovation activities as part of a procurement contract to provide goods or services to a public sector organisation?
- Yes and innovation required as part of the contract
- Yes but innovation *not* required as part of the contract

- No

Source: Eurostat.

Accordingly, given the increasing relevance assigned to innovation as a strategic objective that can be pursued by public authorities when making public procurement decisions, we carry out a micro-econometric analysis with a particular focus on innovative PP by using CIS data, i.e. by exploiting the information regarding innovations required as parts of PP contracts (see Table 2.20). In this respect, it must be stressed that the number of firms that have introduced innovations specifically required by PP contracts is much lower than those involved in PP which have introduced unspecified innovations (see the previous analysis): considering the latter, about 2,000 introduced an innovation (either a product or a process innovation or both) while only 500 have declared that innovations were induced by PP contracts.

From a methodological point of view, the above analysis is performed by estimating a Heckman probit model with sample selection. Such a model is composed of two probit equations: an outcome equation for the probability of introducing innovation required by PP contracts (*Innov*) and a selection equation for the probability of being involved in PP (*Procur*). Formally:

$$Innov_i = 1(\boldsymbol{X}_i'\beta + \epsilon_i > 0) \;\; if \; Procur_i = 1, \; missing \; otherwise \qquad [2.1]$$

$$Procur_i = 1(\boldsymbol{Z}_i'\alpha + u_i > 0) \qquad [2.2]$$

where the suffix i identifies firms.

Thus, the firm characteristics that increase the involvement in PP contracts are used to correct the estimation of the probability of introducing innovations as parts of the same contracts. Despite the parameters of the model being identified even when the same set of regressors enters the equations for $Innov_i$ and $Procur_i$ (i.e. $\boldsymbol{X_i}$ and $\boldsymbol{Z_i}$ include the same variables), to improve identification it is standard practice to use different covariates in the second (selection) equation which must be unrelated to the innovation probability. The model can then be estimated with Maximum Likelihood (ML) either simultaneously or with a two-step procedure.

As shown in Table 2.21 (top part of the first column), among the control variables that are used in both the selection and innovation equations we consider the firm size, measured by the log of turnover recorded in 2012, and five dummy variables for the firms' sectors (as for the previous regression analysis). Then, there is a set of variables affecting only the

probability to innovate (central part of the first column) and another set that only impacts on the probability to be involved in PP (bottom part). Aside from the share of employees with university degree (see above) all the remaining determinants are dummy variables.

Table 2.21 - Heckman probit model with sample selection: one step estimation

	Innovation (outcome equation)	Public procurement (selection equation)
Constant	0.1598	-2.2444***
	(0.4216)	(0.1184)
Log of turnover (2012)	-0.0208	0.0707***
	(0.0155)	(0.0071)
High-tech industries	0.2165**	-0.0547
	(0.1046)	(0.0483)
Low-tech industries	0.2443***	-0.1856***
	(0.0895)	(0.0347)
Knowledge-intensive business services	0.2143**	0.3217***
	(0.1053)	(0.0360)
Other services	0.0802	0.2838***
	(0.0914)	(0.0335)
Construction	-0.3404***	0.7452***
	(0.1101)	(0.0289)
Knowledge from universities important	0.1661**	
	(0.0749)	
Knowledge from scientific journals important	-0.0665	
	(0.0599)	
Cooperation with universities most valuable	0.2743**	
	(0.1207)	
Overall importance of external sources of knowledge	0.3190*	
	(0.1892)	
Share of employees with a degree (ordinal var. 0 to 6)	0.0206	
	(0.0149)	
R&D performing firms	0.0918	
	(0.0592)	
Firms belonging to a group		0.0422*
		(0.0243)
Firms operating in domestic market only		0.0832***
		(0.0241)
Alliances with other enterprises or institutions important		0.2957***
		(0.0218)
Strong price competition important		0.0936***
		(0.0269)
High cost of meeting government regulations important		0.1002***
		(0.0229)
Wald test of independent equations (rho=0)	17.07***	
athrho	-0.7392***	
Observations	18,697	
Censored obs. (firms without PP contracts)	13,560	
Uncensored obs. (firms with PP) contracts)	5,137	

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, *p<0.1.

As the bottom lines of Table 2.21 indicate, the hypothesis of independent equations is refused (cf. the Wald test) so that they should not be estimated separately[21]. Moreover, the negative and significant athrho (i.e. the negative correlation of the residuals of equations 2.1 and 2.2) suggests that there are some unobservable firm characteristics that increase the probability of PP participation while reducing the likelihood of innovation.

Starting from the selection equation (simultaneously estimated with the innovation equation), the firm size exerts a very significant and positive impact on the PP participation along with the firm sector: in this regard, a mounting role is played by the construction industry followed by knowledge-intensive services and other services, while to be an industrial low-tech firm significantly decreases the probability of being involved in PP contracts. With respect to the specific determinants of PP, all of them positively and significantly affect the participation in PP. The strategic importance ascribed to the alliances to other enterprises and institutions has a quite strong impact. This finding cannot be taken as a signal of collusive behaviour because often, and especially for SMEs, to participate in a public tender involving big amounts of money and/or different competencies (i.e. the provision of great public works or large sets of complementary services) it is necessary to set up a temporary association (or grouping) of companies.

Another variable that significantly discriminates between firms involved in PP or not are the costs of complying with government regulations since such an obstacle turns out to be important for the first group of firms. Thus, to simplify and speed up PP procedures (by reducing the burden of regulatory requirements that are less crucial to select the firms that are adequate to fulfil PP contracts) would facilitate the access to the PP market by the firms, and especially those of small and medium size. The other firm characteristics that increase the likelihood of PP participation are the higher reliance on internal market and price competition. The latter variable suggests that in the Italian PP system probably too much importance is ascribed to the "lowest price" criterion.

Moving now to the innovation equation, the first thing to stress is that the firm size is not more significant while belonging to industrial sectors and knowledge-intensive business services increases the probability of innovating; instead, the impact of the construction sector is negative and statistically significant. So, when innovation is required as part of the PP

[21] Running the Heckmann probit model with sample selection for the probability to introduce product and/or process innovations we found that such probability is independent from that of having a PP contract. Accordingly, the likelihood of innovation (no matter whether required or not by PP contracts) can be estimated separately, as we have previously done (cf. Table 2.14).

contract, the selected firms are different from those with general PP contracts: their size does not matter and, together with those providing advanced services, also industrial firms (including those belonging to low-tech industries) have a higher probability of being involved in innovative PP contracts. Firms ascribing a greater importance to universities in terms of knowledge transfer and as partners of cooperative projects, have a higher probability to innovate because of PP. The most striking difference with respect to the firms introducing innovations in an autonomous way (cf. Table 2.19) is that for the firms with innovations induced by PP contracts performing R&D activities or having a high level of human capital do not play a significant role[22].

All in all, the above findings suggest that the innovations required as parts of PP contracts are not particularly relevant or too complex. In fact, these innovations are also implemented by firms belonging to low-tech industries of a small size, without R&D activities, and with a low share of graduate employees. This is not to say that innovations induced by PP contracts are not important from a social point of view. Moreover, by increasing the awareness that they are also relevant in the PP markets, publicly induced innovations could push a broader set of firms, especially those of smaller size, to invest more resources in innovative activities and human capital.

2.7 Summary and concluding remarks

The main weaknesses of the Italian Public Procurement system before D.Lgs 56/2016 (i.e. the reform of the Code) have been effectively stressed by the Italian Court of Auditors (cf. section 2.2). The most relevant one refers to the significant delays both in the planning and execution of public works and in the completion of tender procedures. These are due to bureaucratic complications, an excessive recourse to litigation, and a lack of competences in Public Administrations. Another important issue is concerned with the high rate of projects that experienced difficulties or were aborted. Finally, both problems are exacerbated by the frequent emergence of remarkable extra-costs with respect to those initially scheduled for the projects.

The empirical analysis carried out suggests that the results of the reform of public procurement by D.Lgs. 50/2016 (and following modifications) appear in line with some of its basic objectives. In particular, **transparency** seems to increase: as our sample of

[22] As reported in the Appendix of Section 2 (cf. Table A2.2), almost identical findings are achieved by estimating equations 2.1 and 2.2 with a two-step procedure: first, the selection equation and, then, the innovation equation including, as an additional explanatory variable, the inverse Mills ratio. In our case the inverse Mills ratio is negative and statistically significant, confirming the negative correlation between the residuals of the two equations (see above). The results highlight only minor differences in the size (and standard errors) of some estimated parameters.

interviewed experts and privileged witnesses suggests, this is due to the process of digitisation and to the increasing role of ANAC as control authority. Another signal of increasing transparency may be considered to be the reduction of direct awards (the most discretionary type of purchasing procedures) in ordinary sectors: however, such reduction is counterbalanced by an increase in restricted negotiations without publication (sometimes as opaque as a direct award): thus, the overall effect of awarding procedures on transparency cannot be fully investigated with the data available to the research team[23].

With the same caveat, the reduction in direct awards suggests a decrease in procedures which avoid competition for the market, and by this way it could suggest an increase in **competitive procedures**. The same signal could be derived from the trend of negotiations below threshold in MEPA.

However, transparency should not be confused with **simplification**, as frequently remarked by the interviews. In fact the respondents remarked that, to enable transparency, higher data obligations and digital instruments should be created, posing new requirements on both PAs and procured firms.

At the same time, **aggregation** of procuring activities towards centralised contracting authorities continues to increase, both in terms of numbers and aggregate values. The results presented in this chapter point towards a process of division of labour and specialisation in the performed activities: centralised authorities increase the average amount of the tenders they manage, while, oppositely, local bodies (Municipalities, Provinces and Regions) specialise in managing smaller amount tenders. This evidence supports the idea that, beside specialisation, a process of **professionalisation** is also taking place in Italian public procurement. Finally, a similar trend can be observed for the purchasing activities of the providers of public utilities.

Going into detail, other evidence suggests that the incidence of **innovative tools** has increased, but only in the ordinary sectors. Another fact characterising special sectors (as defined by special laws and national authorities) is that they have increased the value of the direct award procedures, contrary to ordinary ones. Consequently, it is necessary to consider how the general reform of public procurement is interacting with the special national regulations, how such interactions cater for the transparency, competitiveness and user-friendliness of contracting tools, and to what extent incompatibilities may emerge.

[23] Detailed data on each tender (CIG) are collected by ANAC, but are not available. Moreover, ANAC has data on in-house awards.

The analysis of ANAC data also points to **potential shortcomings** generated after the public procurement reform. A main question mark concerns the fact that, following D.Lgs. 50/2016, ordinary sectors have reduced both the number and the aggregate value of the tenders for public works. Considering that such tenders are generally more complex and lasting to complete, we need to evaluate whether this fact is an unintended effect of the reform. As a matter of fact, there are reasons to believe it; in the same vein, we recall the hypotheses put forward by Peta (2017) that, among others, mention two potential critical features of the new public procurement system: a) the lack of coordination between the timetable of the procuring activities introduced by the reform and that of the planning and budgeting rules that public entities have to respect, b) the risk of producing indeterminate administrative decisions, whose legitimacy could be questioned by ANAC after a long time, hindering the realisation of the works. Increased uncertainty in the application of the new norms could discourage the use of the most innovative criteria for awarding the contracts (the best quality/price ratio, or cost/effectiveness ratio, promoted by the European Commission (2014)). If this explanation holds, it is clear that a main policy recommendation is that of synchronising the timetable and bureaucratic procedure of the reformed public works with the norms governing the public budget preparation. At the same time, a more defined and better delimitation (in time) of controls by ANAC could increase the rate of implementation of tenders for public works, fostering normative certainty and reverting the slow-down evidence detected.

Analysing the normative text of Art. 36 of D.Lgs. 50/2016 (coupled with Linee Guida ANAC n. 4), we noted the imposition of additional administrative duties and bureaucratic burdens, since the 'bigger' below-threshold (not in the MEPA) tenders are modelled with similar requirements and procedures with respect to above-threshold ones: this may configure a case of "gold plating" of EU Directives.

Moreover, as the results of the survey underline, the reform introduces another degree of litigation: the previous Code assigned the possibility of litigation only to the awarding phase, while now the litigation is also possible in the phase of the admissions to the tender.

The analysis of Consip data yields a few interesting facts. First, over time the overall Consip activity shows a steady progression in terms of both numbers and monetary values while, at the same time, that of the other aggregators is also growing, constituting with Consip the national public procurement network. Moreover, according to the MEF estimates, overall, substantial savings should be associated with the new purchasing procedures: sticking to the Consip activity, in 2016 the estimated savings were equal to 3.5 billion euros.

The focus on Consip-MEPA open data was also very informative. Over the 2016-17 period, there was both the growing diffusion of the MEPA platform, and that of its negotiated procedures (RDO and TD), which jointly contribute to a general increase in competition. This conclusion is based on the following evidence: public bodies have increased the absolute value of the more traditional negotiated procedure (RDO), and not so much that of the new simplified instrument (TD); at the same time, the share of traditional negotiations over the total number of negotiations has decreased. This implies that the goal of providing a more flexible and friendly digital tool was achieved: as in the intention of the legislator, the traditional procedure is increasingly used, but for higher value purchases, while the new and simplified one grew in numbers, and is being used for the lower value purchases. Concerning the efficiency performance of MEPA, the results point in the same direction across the different types of negotiations. In fact, RDO discounts over catalogues prices have generally increased, and led us to estimate an aggregate saving for Italy of about 227 million euros, over the biennium 2016-17. For TD, the mark-up over catalogue prices has generally decreased.

On the contrary, we observe that the enacted procurement reforms appear not to have improved the **speed of the bureaucratic procedures**. For example, also in MEPA, the time needed for stipulating a contract increased in both types of negotiated procedures (RDO and TD). On this point, our results may confirm the criticism advanced by Peta (2017) concerning the uncertainty in the application of the new norms and resulting in the augmentation of the average time needed for stipulating a negotiation.

A final consideration is due to **firms involved in public procurement contracts**. Not surprisingly, public procurement turns out to be more common among large firms than SMEs. According to the stakeholders interviewed, the 2016 reform has not specifically improved the participation of small and medium-sized firms. On the other hand, by looking specifically at MEPA, our results seem to confirm that the current reform has not depressed the SMEs' ability to compete and participate in the MEPA procurement activities. In fact, we observed that MEPA negotiations that occur within each region are the majority share of the volumes, and this in principle can be a demonstration of the ability of SME to participate to it. Moreover, Stability Law for 2016, Art. 1. c. 504, states that simple public works can be purchased on MEPA. This increases the possibility of SMEs participating and reduces the difficulty of small PAs providing public works.

Firms involved in Public Procurement (PP) ascribe a high importance to the alliances with other enterprises and institutions, as well as to the costs of complying with government regulation. Thus, reducing the burden of regulatory requirements that are less crucial to

select the firms that are adequate to fulfil PP contracts would facilitate the access to the PP market by the firms, and especially those of small and medium size. Another firm characteristic that increases the likelihood of PP participation is the higher reliance on price competition, suggesting that, before the 2016 reform, the Italian PP system ascribed too much importance to the "lowest price" criterion.

Firms involved in PP exhibit a degree of innovativeness slightly higher than others. However, this does not mean that they are more innovative because of PP contracts. In effect, the firms that declare that innovations were required as parts of PP contracts are only 500 out of 2,000 with both innovations and PP contracts. Moreover, they are smaller, do not perform R&D activities and hire few graduate employees. In spite of these features, they are able to implement the innovations required by PP contracts. As a consequence, the innovations induced by PP do not seem particularly relevant or complex. This is not to say that they are not important, in so far as they stimulate a broader set of firms to start investing more resources in innovative activities and human capital.

3. E-GOVERNMENT: AVAILABILITY, USAGE AND IMPACT ON THE CONDITIONS FOR DOING BUSINESS

3.1 Introduction

Electronic or digital Government (henceforth, e-government) can be a major factor in enhancing economic competitiveness and social inclusion in a country, in addition to being a main instrument for increasing the quality of the Public Administration (henceforth, PA), that of the overall institutional sphere, and the daily life of the citizens, communities and interested businesses. From Governments (at all levels) to specific administrative bodies, and from the national system of statistics to public agencies, digital technologies promise to have a positive impact on legislative, government and bureaucratic activities, and to transform existing public services by supplying radically new versions with enhanced effectiveness and efficiency to the benefit of the public, private and business sectors. As a matter of fact, a large body of literature and empirical exercises on e-government has been guided by the idea that ICTs have a high potential to rationalise and reduce the role of bureaucracy in Governments and Public Administrations, thereby achieving efficiency gains[24]. This efficiency can materialise either as improved output/input ratios (better public services holding constant the Government budget, or vice versa), or as transaction cost savings for the many stakeholders involved.

Well before the launch of focussed programmes such as the Digital Agenda for Europe (European Commission 2010) or the last e-Government Action Plan[25], e-government was featured as one of the policy cornerstones in the European institutions' and single Member States' policy agendas. The first structured international exercises of benchmarking started in the early 2000s, and over time the field has grown and expanded considerably, evolving toward more complexity and disciplinary specialisation, and shifting the emphasis from technology (ICT) to 'softer' factors, such as institutions, organisation and governance (for a recent review, see Janowski 2015). Recently, the policy agenda has converged towards ensuring the uniform diffusion of e-government services across EU Member States, and user-centric (i.e. friendly) functions (European Commission, 2016b; 2017).

For countries like Italy, there is a compelling need to promote the 'softer' drivers of e-government as tools with which to increase the transparency of Public Administration and

[24] This view is close to the New Public Management, and other approaches predicating that private sector and business' incentive systems and organizational forms are successfully transferable to the governance of the public sector (for a recent discussion, Cordella and Tempini 2015).
[25] The current one concerns the period 2016-2020 (European Commission 2016a); the first was the 2006-2010 edition.

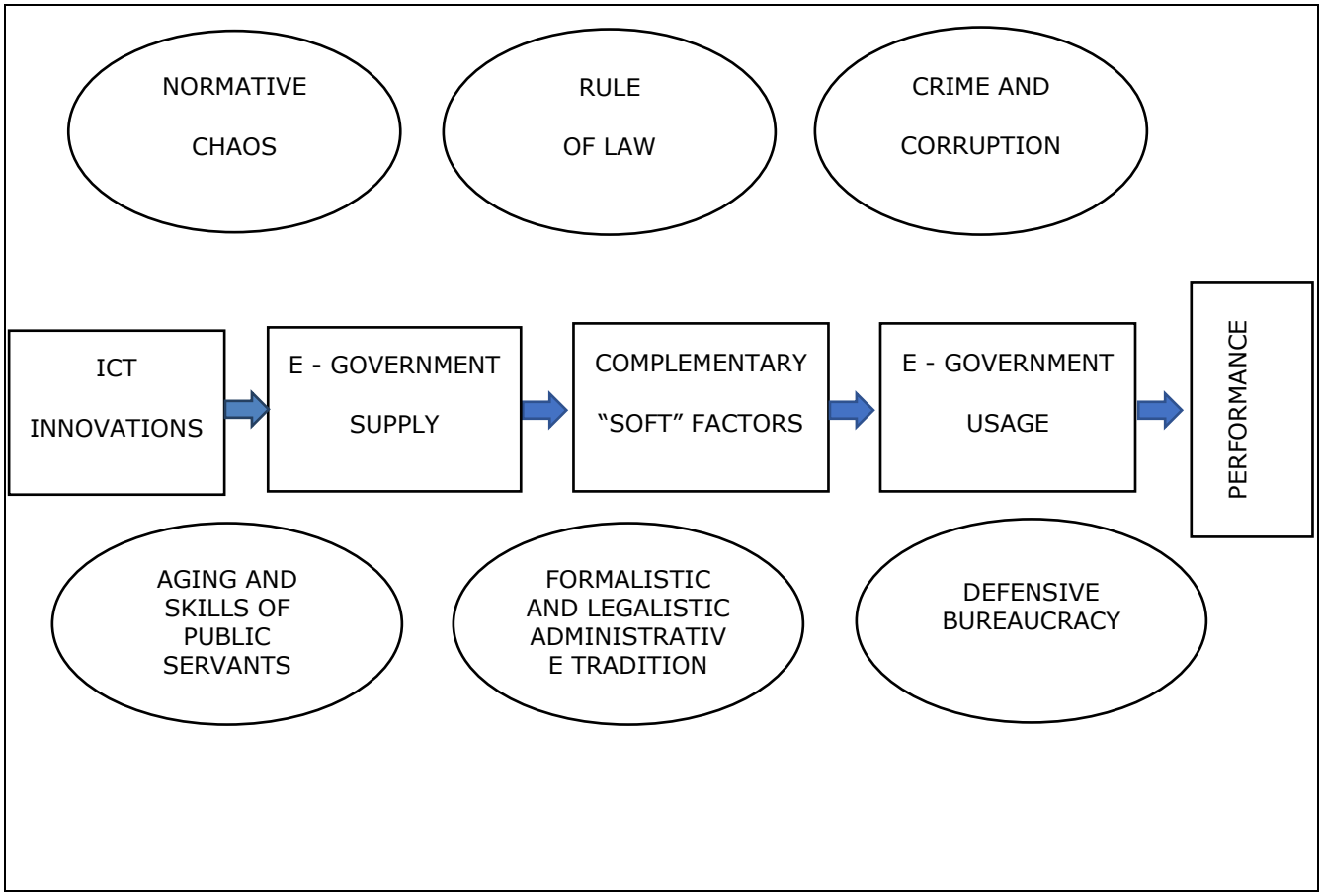
simplify procedures for citizens and businesses. All in all, in Italy the rule of law is generally low, corruption is not negligible, and some of its regions are particularly plagued by organised crime, which does influence the institutions, the economy and society. Moreover, normative proliferation, stratification and fragmentation are large, chronic issues dampening effective knowledge, enforcement and control of the law across the entire country. Further, concerning the system of administrative law, the PA follows a very formalistic and legalistic tradition – a systemic character that, together with its institutional correlates, is frequently believed to originate the so-called phenomenon of "defensive bureaucracy"[26].

Concerning skills and capabilities, the phenomenon of political patronage of PA servants persists, while the selection mechanisms of top officers and managers are frequently believed not to ensure the needed skills. Further, the post-2007 crisis is believed to have exacerbated these problems, since the enacted public budget cuts have blocked the personnel turnover within the PA and, more generally, any intensive programme of requalification of public servants.

Box 3.1 synthesises the interpretative framework underlying this chapter. Contextual factors (circled items) represent the external drivers impacting e-government diffusion and effective usage. For example, the type of normative system and its historical character, together with the prevailing quality of institutions (rates of crime, corruption) do influence the policy efforts towards ICT and e-government. At the same time, the implementation of these policies is influenced by the skills, organisational routines and behavioural patterns prevailing among public servants. Rectangular items distinguish the main inputs and outputs of the ICT and e-government policies. While technological opportunities and policy initiatives are the necessary inputs providing the supply-side availability of e-government, complementary "soft" factors stimulate the users' acceptance and effective usage. The resulting degree of e-government usage determines the final performance in terms of conditions for doing business.

[26] This term conventionally defines a formalistic and passive behaviour of the PA bureaucrats, including: imposing many superfluous procedural and documental requirements on the entity requesting the service; avoiding taking action and assuming direct responsibility for delivering a prompt administrative decision, unless forced by law; calling into question other layers and PA bodies before issuing an act, especially when the exercise of administrative discretionality is requested. For a recent survey carried out on a not-representative sample of PA employees, see FPA (2017).

Box 3.1 - Conceptual framework: e–government diffusion and performance in Italy



Legend: Circled items are contextual factors. Rectangular items are inputs and outputs.
Source: Our synthesis from the literature.

All in all, the preliminary overall picture seems to be not conducive to effective structural reforms and a fast transition to digital Government, which instead requires transparency, impartiality, reward for merits and a preliminary rationalisation of existing (analogue) procedures. At the same time, even structural reforms – if badly designed – might increase (rather than solve) existing problems, especially when they do not first rationalise existing norms, but only add newer ones, thereby accentuating the normative chaos and indeterminacy of the applicable law. Hence, a careful examination of the recent reforms and diffusion progress of e-government in Italy is needed, together with a preliminary assessment of their rationales and impact on the conditions for doing business.

The structure of this chapter is as follows. Section 3.2 illustrates the main methodological issues on e-government research by selecting a few main Italian policies. Section 3.3 extracts the main research questions and explores some descriptive evidence on e-government diffusion in Italy; moreover, it illustrates the finding of a qualitative analysis, based on

interviews with qualified regional officers dealing with e-procurement. Section 3.4 presents the econometric analysis. Section 3.5 concludes this chapter.

3.2 Methodology and policy review

E-government policy is rather complex to define and delimit, since it cannot be reduced to one main domain of application (like most policies covered in the other chapters of this study – for example, incentives for R&D activities and start-ups). Rather, it involves many areas of intervention, layers of policy-making and institutions: from digital identity management to cross-country e-procurement transactions, from normative simplification and rationalisation to administrative arrangements to deliver businesses services at "one-stop-shop" points (OSS). Moreover, all these dimensions possess unavoidable country and time specificities for a series of idiosyncratic factors: because of the different administrative traditions and varying political orientations of Governments, or for the fluid technological basis of e-government solutions, which is prone to rapid technological obsolescence. All this has an impact on its statistical measurement[27].

As a matter of fact, the most credited international exercises of e-government mapping and benchmarking demonstrate the complexity of synthesising through single quantitative indicators the multifaceted dimensions of the Government and Public Administration's actions, and typically use composite indexes. Among the most credited exercises, we mention the United Nations E-Government Survey (United Nations 2016) and its composite indicator EGDI (E-Government Development Index); and the OECD indicators on digital Government, from the older ones (like the 'traditional' percentage of citizens and firms interacting online with the PA) to the newer – like Open Data Government (OECD, 2017). More comprehensively, the DESI (Digital Economy and Society Index) of the European Commission's Digital Scoreboard measures the main dimensions expressing a digital economy and society[28]; in particular, within the sub-component "Digital Public Services" it includes supply and demand-side indicators of e-government availability and usage.

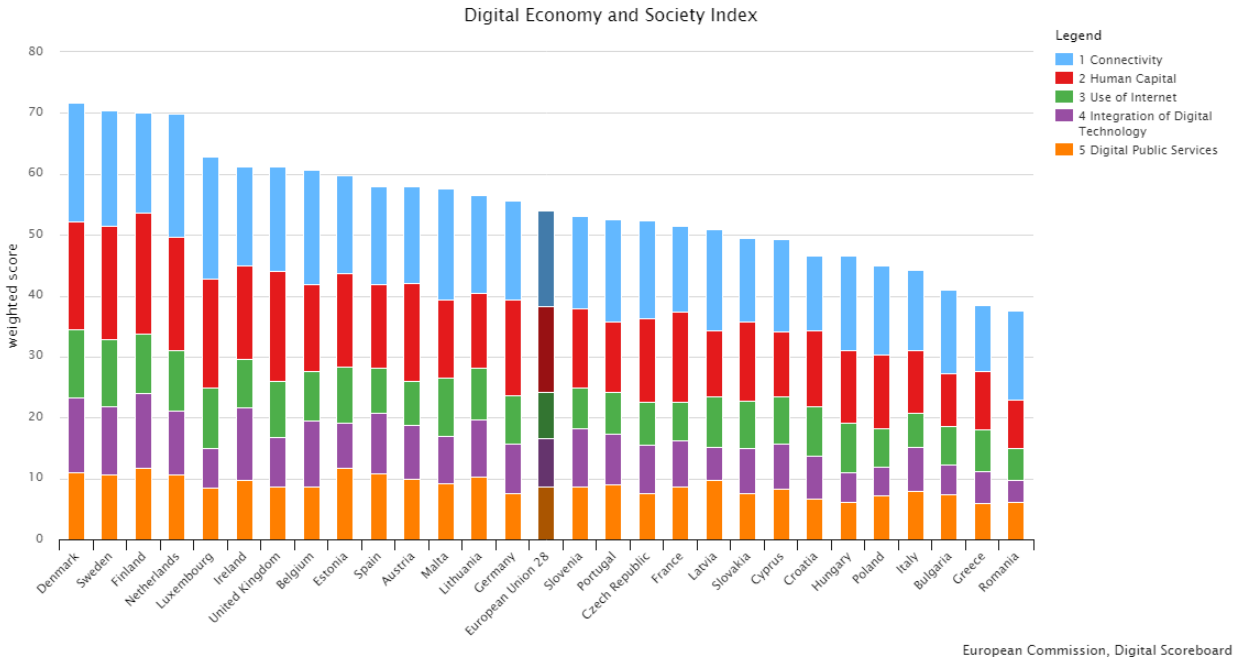
Despite the sampling and methodological differences of these studies, a robust consensus emerges on the fact that Italy continues to stand as a laggard country among the most industrialised countries for e-government availability and usage. For example, concerning the

[27] Matteucci (2013; 2015) reviews the methodologies for monitoring Digital Agenda policies in EU and Italy. He argues that several issues of insufficient statistics collection and biased measurement may arise, likely to affect any policy-impact assessment or evaluation. This is true even for bigger EU member States, with more mature national statistics practices.

[28] The DESI index is calculated as the weighted average of five basic domains: Connectivity (25% weight), Human Capital (25%), Use of Internet (15%), Integration of Digital Technology (20%) and Digital Public Services (15%).

DESI index, Figure 3.1 shows that in 2018 Italy ranks among the lowest positions (fifth from last) in the EU for the aggregate (weighted) score – that is, the average of fairly different positions obtained in the sub-components. It is interesting to know that Italy now registers its highest rank (19th over 28 positions) in the digital public services sub-component (bottom orange histogram), which particularly benefitted from the improvement in the release of open Government data (OGD), where Italy jumped to 8th position; unfortunately, concerning e-government usage (% of citizens submitting forms to the PA), Italy remains the last Member State (28th).

Figure 3.1 - DESI Index, 2018, EU countries



Source: EC Digital Scoreboard, https://digital-agenda-data.eu/datasets/desi/visualizations.

In the following, we will make frequent reference to the level of analysis of Local Public Administrations (henceforth, LPA), since this is the most numerous and pervasive policy layer with respect to the upper Government levels (such as ministries and related institutions). Moreover, bearing in mind the specific goals of this study – to investigate the contribution of e-government to the business productivity and competitiveness, seen through the internal efficiency of the PA and the improved services supply – the local level of analysis of the PA is the most informative and crucial.

At the same time, often (according to the type of federalism in place), progress at the local level may depend on the preliminary set-up of adequate enabling conditions, to be achieved at the national (central) levels. We meet this instance in Italy further below, when

commenting on the state of diffusion and usage of e-health at the regional level, which has long been hampered by the lack of binding central norms and policies addressing technological standardisation, organisational coordination and control.

From a bird's eye view of the literature on diffusion of innovations (eg. Geroski 2000), two other issues emerge. First, the level of aggregation of the analysis matters. Applied to Italy, a central question is whether its lower ranking is a matter of a uniform nationwide status of backwardness, or whether it simply reflects the averaging of champions and laggards, while the underlying distribution displays wide territorial and/or size-level dispersion. Here, e-government policy meets cohesion policy.

Second, the temporal framing of the analysis of any diffusion phenomenon is crucial: simpler technologies tend to diffuse sooner and rapidly become universally available, while more complex, systemic, disruptive and efficiency-enhancing procedures typically take longer. Consequently, the stylised facts on e-government diffusion in the EU and its country rankings are likely to change according to the type of technology and public e-service punctually considered.

Third, a further complexity is added to the research due to the specific institutional set-up in Italy that has a history of normative proliferation, stratification and excessive formalism (Melis 1996; Sotiropoulos 2004), which contributes to raising transaction costs and producing informative rents. The first two characters reduce the degree of certainty of the law and produce judicial litigation; the third, by stimulating an administrative culture focussed on the mere formal respect of the law, incentivise public servants to refrain from problem-solving and respond effectively to the requests posed to the PA. These structural characteristics tend to collide with the needs posed by the digital transition, since they do not facilitate a prompt implementation of the policy measures envisaged by e-government, where the simplification and substantive effectiveness of administrative practice should prevail on a formalistic interpretation of the applicable norms.

These issues are highly relevant for Italy, and the prevailing normative proliferation and stratification also have an impact on our policy analysis. In fact, coming to the policy design and implementation, several key structural reforms for the digital transformation of the Government and the PA have been framed through a large number of heterogeneous and overlapping normative acts extending over a long period; and most commentators feel that this normative overkill is a main factor explaining the lower-than-expected impact of the enacted reforms (FPA 2016).

A main consequence is that, for most of the structural reforms on e-government, a crude policy impact analysis based on the chronological order of their legislative introduction may as a result be misleading, and fails to measure their real effects for several reasons. First, the normative introduction was gradual (e.g., because of normative stratification, or for the inconsistent changes between the different Governments' agendas). Second, it remained partly ineffective (for the low standard of law and the "defensive bureaucracy"). Third, even when finally implemented, other factors delayed the appearance of the reform's benefits, leading to instances of the famous "Solow paradox" (e.g. for insufficient network effects and a lack of complementary innovations[29]).

Selected e-government reforms[30]

A main instance of the previous delayed dynamics is the Code for Digital Administration (CDA), a very important piece of law that constitutes a sort of Magna Carta setting the fundamental principles for the digitisation of the Public Administration. The initial normative act dates back to Legislative Decree n. 82 of 7 March 2005, but its implementation was insufficient and delayed. After a number of revisions and intermediate reforms, another major update was planned under the so-called "Madia Reform" of the PA (Law n. 124/2015), and then realised with Legislative Decree n. 179 of 26 August 2016; eventually, it has undergone a new revision in December 2017[31] (the sixth). Basically, the CDA reforms have passed through a long series of normative acts, which over time produced diverging technological implementations and incompatibilities among Public Administrations located at different levels and regions. The topics covered by CDA are important, since they have concerned, among others, digital identity and domicile, which have a deep impact on the PA mechanisms and the supply of services to the final users.

In the last modification of CDA (December 2017), the recent approach of relying more on soft law for mandating the technical aspects has been strengthened: while the latest CAD text focuses on broad principles, the regulation of technical aspects is delegated to other bodies, such as AgID. This in principle can avoid rapid normative obsolescence and the need for frequent amendments of e-government reforms.

Despite not being specifically focused on e-government issues, several provisions of the Law 124/2015 are related to them: particularly, the changes to be introduced for normative and

[29] There is a huge literature on demand side effects and missing complementary factors retarding the take-off of ICT: for a long run overview of ICT diffusion and its impeding factors, see the landmark paper of David (1990).
[30] This section benefited from discussions with selected experts (see Table 2.10).
[31] http://www.funzionepubblica.gov.it/articolo/riforma-della-pa/04-02-2016/codicedell%E2%80%99amministrazione-digitale

administrative simplifications do rely on the introduction of new ICT technologies and complementary organisational changes. Due to the complexity of the reform initiative and its targets, the Madia Reform has been structured as a framework law delegating the Government to issue Legislative Decrees implementing its main principles in detail. The Government decided to prioritise the implementation of the norms of the reform concerning citizens and businesses, postponing those referring to the internal organisation and the new job discipline of the PA, where new investment in personnel and training is urgently needed.

Further, beside Law 124/2015, the Italian Digital Agenda[32] – the other main digital reform introduced during 2014-15 – also incrementally added to and updated existing norms and provisions dating back to the early 2000s, when the first national plans for e-government and e-procurement were put forward. Particularly, the Italian strategy for ultra-broadband (2014) builds on the earlier national broadband plan (formalised in 2009, but finally notified to the EU Commission only in 2011); in turn, the national broadband plan was anticipated by similar regional measures notified after 2006, and mostly financed by EU structural and investment funds. However, most of these state aid measures accumulated substantial delays, and only produced the first tangible effects in improved connectivity after the early 2010s (Corte dei Conti 2007; 2016; Matteucci 2016). Unfortunately, the Italian strategy for ultra-broadband also appears to face the same implementation problem, and until now (summer 2018) has been significantly delayed with respect to its targets nominally set for the end of 2020.

Further, the governance of the Italian e–government transition was often divided among competing and different central Government subjects, which did not appear to exert any binding role of strategic coordination over the ICT choices of the lower layers (for e.g., Regions). As a result, until the new national Agency AgID ("Agenzia per l'Italia digitale") was finally created (in 2012) and took full control of the Italian Digital Agenda[33] – and this only happened after 2014-5, when the Government presented the first two implementing strategies[34] – most realisations ended up in conflicting and non-interoperable e-government solutions.

Main cases of difficulty are: 1) the regional implementations of the e-identity projects ("Carta Nazionale Servizi"[35] and "Carta di Identità elettronica"), experiencing a high rate of technical failures and low usage rates; 2) e-health projects, with topical applications for health data

[32] Its two main parts are the Italian strategy for ultra-broadband, and the Italian strategy for digital growth. See http://www.agid.gov.it/agenda-digitale/agenda-digitale-italiana.
[33] On the discontinuity of the Italian Digital Agenda and its institutional dynamics, see Sorrentino et al. (2017).
[34] Composed of the Italian strategy for ultra-broadband and the Italian strategy for digital growth (both presented in November 2014). For a policy analysis of the first strategy, see Matteucci (2014; 2015).
[35] http://www.progettocns.it/ The CNS was normatively foreseen by DPR 2 March 2004, n. 117.

management being the "Ricetta elettronica"[36] (digital prescription of medicines and exams) and "Fascicolo sanitario" (personal health data record). In the e-health case, failures were typically due first to the lack of a centralised strategy and a resulting interoperability deficit among the different regional implementations: these factors undermined the development of the using network size – hence the network effects (scale economies and user benefits) needed to fuel adoption and usage of ICT. For example, in the case of "Ricetta elettronica", originally introduced by DPCM on 26 March 2008, a credible diffusion strategy was only framed after DL 18 October 2012, n.179, which mandated a tight plan of sunset dates that were periodically updated. Although the diffusion rate is by now almost completed, practitioners doubt the user-side benefits, since a paper-based document (hence an analogue duplication of the digital process), similar to the older prescription, continues to be necessary for the patient to access the prescribed health care services.[37]

At the same time, there have been other e-government initiatives where the new norms were more easily applicable, or at least where central pushes managed to foster local implementation and compliance sooner than elsewhere – although with delays and exceptions. A main case is that of e-procurement, already introduced in Chapter 2, in which there was a mounting normative and jurisdictional pressure to speed up implementation after 2012. Here, implementation was mainly obtained by reducing the number of the cases in which the usage of e-procurement tools was optional – most of the time anticipating the EU deadlines and pushing for the use of e-procurement, also for procedures below the EU thresholds.

Similarly, in Italy there was a strong emphasis on fostering the diffusion of digital invoicing as a way to rationalise public spending and, in the following stages, prevent fiscal frauds. Basically, the enacted policies recognised the driving role of public procurement, and focused on enforcing a unique standard (FatturaPA, based on the XML format), due to the clear network effects present in the sector; the e-invoice system is built on a central system of exchange, SDI, managed by the fiscal Agency (Agenzia delle Entrate).

Concerning invoices directed at the PA, the system entered into force in June 2014 and the migration was rapidly completed, reaching 93 million documents by March 2018: basically, despite only being compulsory for invoicing the PA, this policy placed Italy among the EU leaders (30% of using firms daily, against an EU average of 18%, in 2017). Since 2017 the system was updated for enabling e-invoices among private companies, and Italy is now

[36] http://www.salute.gov.it/portale/temi/p2_6.jsp?id=2514&area=eHealth&menu=vuoto.
[37] https://www.agendadigitale.eu/sanita/ricetta-elettronica-il-promemoria-cartaceo-la-sta-uccidendo-ecco-perche/

anticipating the EU sunset dates. In addition to the better monitoring of public expenses, so far the estimated direct savings are around 1.5 billion euro[38].

Likewise, in the case of the 2010 reform of the "one-stop shop" (OSS, in Italian "SUAP") for doing business (originally launched in 1998), significant progress in its implementation occurred during 2011-12, following increased pressure from the central Government (with stricter obligations and sunset dates). As a consequence, the formal availability of the new system interested 89% of Italian Municipalities by 2012, to reach 100% by the end of 2014 (Amici et al. 2016)[39].

3.3 Research questions and descriptive evidence

A main issue in the economics literature is whether the laggard positions registered by countries in several domains of ICT and e-government diffusion are mainly attributable to the lower diffusion of computers, broadband and other enabling types of technological 'hardware', or whether the principal cause is to be found in inferior 'software' and institutional endowments, such as insufficient ICT skills of the population, inappropriate norms or inadequate organisation and implementation of the digital services – the latter cases being more relevant in what concerns the lower diffusion of e-government (Savoldelli et al. 2014).

In fact, existing cross-country longitudinal studies (for the EU, Seri et al. 2014) have confirmed that, while digital hardware infrastructure certainly matters as a prerequisite, e-service deployment (supply side) and, above all, usage (demand side) do not immediately follow the technological enablers, especially when public e-services (e-government) are concerned. As a matter of fact, they need the complementary development of training and usage skills, and an appropriate organisational change of the former analogue bureaucratic processes (Seri and Zanfei, 2013). For Italy, ceteris paribus, while the inferior internet access rates registered in the population may certainly be a driving factor of the inferior rate of the citizens' online interaction with PA, the same point does not automatically extend to firms that register a much lower gap with respect to the European counterparts, and in what concerns the ICT endowments.

All in all, the possibility that other factors (mostly of 'software' and institutional type) may explain the inferior Italian e-government supply, and also cause a lower rate of effective

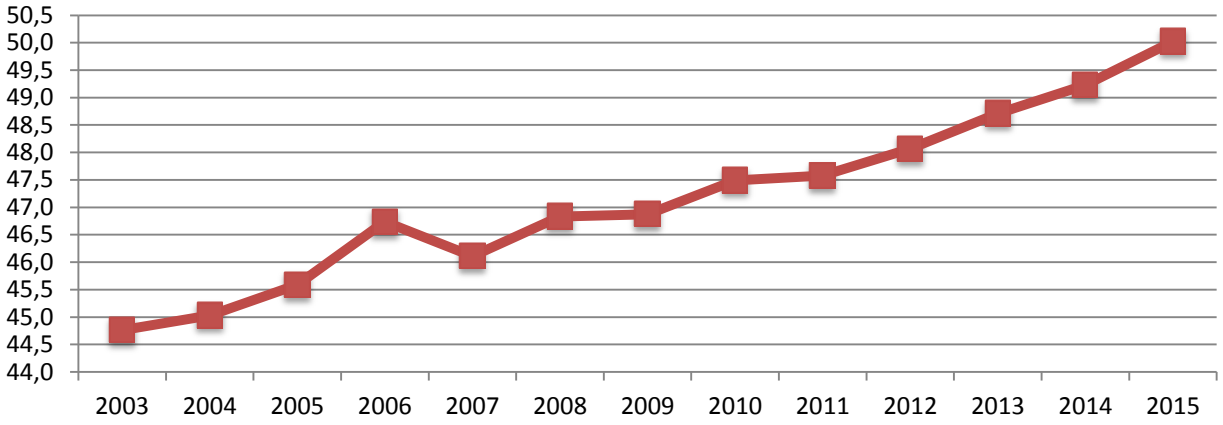
[38] Based on a per invoice saving of 17 euro. https://www.agid.gov.it/it/argomenti/fatturazione-elettronica
[39] On the legislative overkill of the normative simplification process that features at the centre of the OSS reform, and the need for appropriate contextual adaptation and organizational change, see Castelnovo et al. (2016) and Castelnovo e Sorrentino (2017).

usage (as last confirmed by the 2018 DESI index) should be considered; all this, in turn, may reduce business performance.

Accommodating the new phase of e-government requires a stronger focus on the human factor, especially in what concerns the less prepared PA personnel, citizens and businesses (such as SMEs). In other words, while approaching a higher quasi-saturation level of diffusion of e-government within the socio-economic system, the core challenges for implementation and usage shift towards inducing complementary organisational innovations, life-long training and new digital skills, which address the less competent users.

Figure 3.2 shows the trend of the average age of the PA personnel over the long period, which passes from 44.8 to 50 years old. According to ARAN[40] (2013), the Italian PA personnel is older than that of many other EU Member States – particularly that of the EU "big-5" countries. Further evidence from ARAN demonstrates that the ageing trend is generalised for all PA branches.

Figure 3.2 – Average age (years) of the Italian PA personnel, 2003-15



Legend: "Stable" and "other personnel" types of employees are included (excluding flexible and socially useful personnel). Source: ARAN elaborations on Ragioneria Generale dello Stato data, updated to 21/03/2017.

Moreover, Table 3.1 shows the share of PA personnel that attended ICT training courses from 2009 to 2015. We observe a few remarkable facts. First, the share of the PA workforce having been interested in ICT training is low in size: only 6-8% of the total, on average. Then, this share does not grow as expected, especially over the 2012-15 period, which was characterised by an unprecedented wave of frequent and intensive digital transformations of the PA and Italian institutions; this wave, in turn, has provoked a high rate of skill obsolescence. Obviously, some best practices emerge: in 2015, Emilia Romagna, Bolzano,

[40] It is a compulsory public body, working as the agency negotiating with trade unions on behalf of the Italian PA.

Veneto and Piemonte stood out for their higher training efforts. It is not the case that these same regions appear more involved in several e-government projects (e-procurement, e-health, etc., see below).

Table 3.1 – Share of PA personnel who attended ICT training courses

NUTS2	Region	2009	2012	2015
ITC1	Piemonte	7.0	8.6	10.1
ITC2	Valle d'Aosta	1.4	8.1	6.2
ITC3	Liguria	8.5	10.7	9.3
ITC4	Lombardia	8.3	6.5	8.1
ITH1	Bolzano	12.9	20.7	15.5
ITH2	Trento	12.2	14.3	8.2
ITH3	Veneto	14.0	11.5	13.5
ITH4	Friuli-Venezia Giulia	11.9	8.0	7.9
ITH5	Emilia-Romagna	11.5	8.5	18.7
ITI1	Toscana	7.7	9.8	5.3
ITI2	Umbria	9.3	5.0	6.6
ITI3	Marche	7.1	2.3	6.3
ITI4	Lazio	5.1	5.2	2.3
ITF1	Abruzzo	6.2	3.7	3.1
ITF2	Molise	1.5	0.8	5.0
ITF3	Campania	3.1	2.2	2.0
ITF4	Puglia	8.6	3.2	5.6
ITF5	Basilicata	2.4	2.4	3.7
ITF6	Calabria	3.0	9.7	2.5
ITG1	Sicilia	7.1	1.6	2.7
ITG2	Sardegna	6.5	3.5	6.5
IT	Italia	7.7	6.3	7.0

Source: ISTAT (2017), Survey on ICT in LPA.

This evidence on ageing and training is worrying, since the underlying phenomena may delay an effective transition to digital Government: in fact, innovation, ICT usage and proficiency are typically connected to the younger age classes of the workforce, and require appropriate re-skilling.

In a broader perspective, a large literature (since North 1989; Easterly and Levine 2003) has verified that institutions have a deep impact on business activities and the country's overall competitiveness and potential for growth, and this point is a key one to be tested in the

current study, which primarily aims at assessing the impact of structural reforms in the Italian economy. At the same time, while the importance of national institutions for economic growth has received strong confirmation in the literature, that of sub-national ones remains more controversial (eg. Mitton, 2016) or is verified for other socio-economic outcomes (for its link with the migration of graduates, Nifo and Vecchione 2014). For this reason, in the following econometric analysis, the role of sub-national (provincial) institutions and their quality will be tested as a direct factor influencing business demography.

The following analysis is divided into two parts. A first part presents descriptive statistics, and is devoted to mapping the availability and usage of major ICT and e-government solutions in Italy, with a fine-grained analysis of the territorial dimension; unfortunately, most statistics stop at 2015. The second part covers the most recent period (starting from 2014-5) and focuses on e-procurement: due to the paucity of relevant data, it builds on a specific survey that we designed and carried out, targeting selected PA officials.

E-procurement and e-government diffusion: descriptive evidence for Italy

The focus of the first part rests on the technologies enabling e-government availability and usage in the PA and the business sector. This part is also linked to Chapter 2 (particularly to its introduction on e-procurement), since the latter is a main example of e-government with significant spillovers and effects on downstream sectors. In this respect, Chapter 2 has presented the main stylised facts of e-procurement developments in Italy, based on the most recent data released by ANAC and Consip (referring to the period 2015-17); instead, this section examines its national incidence of usage over a longer and earlier period (2009-15).

To this end, we use two focussed surveys carried out by ISTAT: that on ICT in the local PA, and a second on ICT usage in enterprises (with more than 10 employees)[41]. Hence, these surveys could be complementarily employed to analyse the supply and demand sides of the diffusion of ICT and e-government services in Italy, and enable the study of their effects, together with that of institutions, on the business environment.

Unfortunately, both surveys are less than perfect. First, they have a sampling structure that does not allow ISTAT to release data at a level of territorial disaggregation lower than the region (NUTS2). Second, even when available at the regional level, the time series of most indicators on e-services (e-government) appear problematic: in addition to pointing to a pessimistic interpretation of diffusion (due to declining aggregate rates), several series may

[41] Further information is available, respectively, at these links: https://www.istat.it/en/archivio/91815 and https://www.istat.it/en/archivio/5687

be partly incomparable or broken (for diverging questionnaire definitions, inconsistent responding samples, etc.)[42]. Consequently, we are prevented from using the e-government variables in the longitudinal dimension for the econometric analysis[43].

Finally, ISTAT does not publicly release micro-data for the first survey (ICT in PAL)[44], and its most recent wave refers to 2015: due to the progress of e-government unfolding in the latest years, these figures cannot be taken as a good representation of the present situation, but rather as a measure of the recent status of the backwardness of Italy.

Figures 3.3 and 3.4 present the relative share of Italian LPA having implemented e-procurement purchases, disaggregated by territory and demographic class of municipality. Two stylised facts stand out.

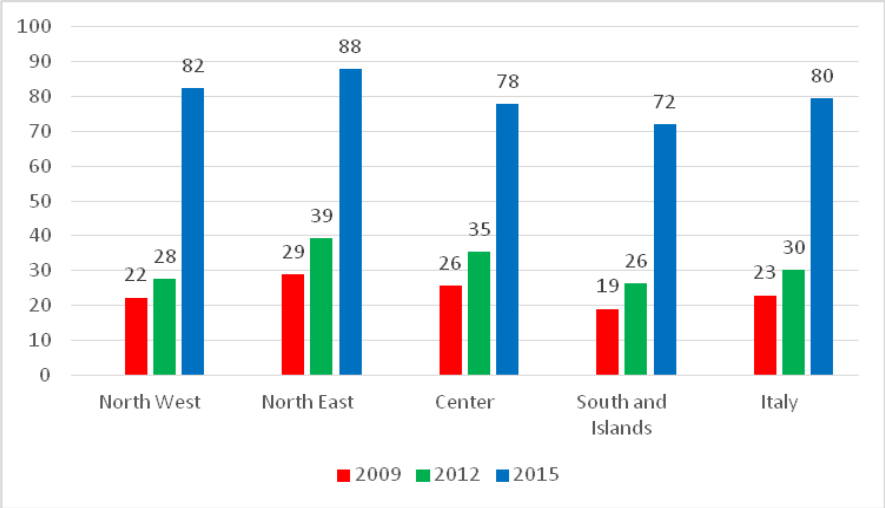
First, both figures uncover that, while the situation was fairly inertial during 2009-12 (with small growth of only 7 percent points across Italy), relevant progress in e-procurement usage by LPA unfolded between 2012 and 2015, going from 30.3% to 79.5% of the total LPA; this progress occurred quite evenly at the territorial level (Figure 3.3) – although with a smaller intensity in the Centre and South-Islands macro-regions, with respect to the Northern ones.

Second, the e-procurement diffusion shows a positive correlation with the demographic size of the municipalities involved (Figure 3.4), especially in the first two waves of observation (2009 and 2012), while in 2015 the diffusion tends to be levelled across the different size classes. The quasi-universal diffusion gradually reached by e-procurement in LPA after 2012 is mostly attributable to a series of reforms enacted by the Italian Governments (mentioned in chapter 2), anticipating for Italy the sunset deadlines of e-procurement set by the EU norms. In other words, Public Administrations have been gradually forced into the compulsory usage of an electronic system for placing the purchases of goods and services. In the case of public procurement enacted via "centralised authorities," the usage of the electronic platform was soon made compulsory when carried out at the central (Consip) and regional level (through the other "centralised authorities"). In the case of the electronic markets used for purchases below the EU threshold (EU Regulation n.1336/2013) (such as "MEPA" or other regional alternatives like MEER in the Emilia Romagna Region[45]), exceptions and exemptions have been progressively reduced and subjected to stricter rules[46]. After 2015, new reforms

[42] A backlog of our correspondence with ISTAT officers is available from the team members.
[43] The panel analysis will only exploit the ICT variables, at the regional level.
[44] Concerning the second survey (ICT usage in enterprises), it is only available for the waves commencing with 2014.
[45] https://piattaformaintercenter.regione.emilia-romagna.it/portale/
[46] For example, the provision set for purchases below the 1000 euro threshold (Law 296/2006), or that allowing the usage of non electronic markeplaces, when more convenient (see Consiglio di Stato jurisprudence).

(such as D.Lgs. 50/2016) extended the same trend to other domains of public procurement. Hence, by now (2018) the set of purchases made outside electronic channels has further shrunk, mainly remaining relevant for the items not available online.

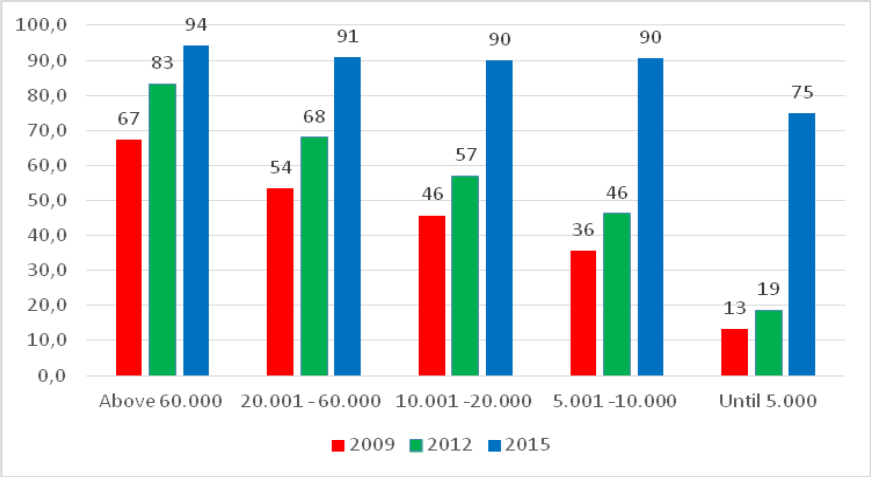
Figure 3.3 - Share of LPA with e-procurement purchases by geographical distribution



Legend: Percentage values on the total LPA.

Source: ISTAT (various years), *Survey on ICT in LPA.*

Figure 3.4 - Share of LPA with e-procurement purchases by demographic size of Municipalities



Legend: Percentage values on the total LPA.

Source: ISTAT (various years), *Survey on ICT in LPA.*

Concurrently, over time the technological infrastructure of the Italian PA has developed and enabled the supply of other e-services. Table 3.2 presents the temporal evolution of the e-services offered by Italian Local Public Administrations (henceforth, LPAs). Diffusion rates differ widely according to the simplicity and maturity of technologies: for example, the mere supply of the institutional websites had already reached near-saturation levels in 2012, while the supply of fully digital public services, only interested only one LPA out of three in 2015.

Table 3.2 - E-government services offered by LPAs (% of total LPAs)

Types of services	2009	2012	2015
LPAs with websites	91.3	99.4	-
Visualisation and/or acquisition of information	89.8	90.5	93.5
Acquisition (download) of forms	67.8	75.9	85
Online forwarding of forms	15.6	36.7	58.3
Service supply fully digitised	7.6	19.1	33.8
LPAs using mobile technology with users	10.2	15.5	22.4
LPAs using social media	-	16.6	30.9
LPAs providing free wi-fi "access points"	-	27.4	51.8

Source: ISTAT (2017), Survey on ICT in LPAs.

As a second step, the analysis explores whether there has been an analogous trend of growth in demand over the same period. In doing this, an attempt is made to uncover evidence that may depict the existence of adoption or usage obstacles.

Table 3.3 - Share of total firms that use e-services (get information) by geographical distribution.

NUTS2	Region	2009	2010	2011	2012	2013
ITC1	Piemonte	77.0	82.1	66.1	78.6	76.6
ITC2	Valle d'Aosta	77.9	80.2	66.4	73.9	78.0
ITC3	Liguria	74.9	76.3	65.3	76.3	83.5
ITC4	Lombardia	79.1	78.5	69.6	79.3	75.0
ITH1	Bolzano	78.6	89.3	76.6	86.7	79.4
ITH2	Trento	88.0	84.4	73.0	84.1	88.2
ITH3	Veneto	75.9	78.3	65.6	75.2	83.9
ITH4	Friuli-Venezia Giulia	79.8	80.7	68.6	78.6	78.3
ITH5	Emilia-Romagna	73.1	75.8	60.7	74.3	75.7
ITI1	Toscana	72.8	69.9	63.0	75.2	79.2
ITI2	Umbria	72.6	73.0	69.8	68.6	75.6
ITI3	Marche	67.4	67.2	55.7	65.7	70.2
ITI4	Lazio	66.8	75.6	65.3	73.9	79.5
ITF1	Abruzzo	73.6	71.7	68.2	79.1	77.5
ITF2	Molise	70.9	75.5	67.9	70.6	79.5
ITF3	Campania	71.6	71.3	61.5	71.9	77.6
ITF4	Puglia	65.1	64.8	53.4	66.9	70.1
ITF5	Basilicata	81.6	78.6	66.4	71.0	83.7
ITF6	Calabria	73.4	70.0	68.8	74.5	79.3
ITG1	Sicilia	74.5	70.2	65.6	72.2	71.5
ITG2	Sardegna	73.2	77.6	68.1	79.9	83.7
	Italy	72.3	75.7	65.2	75.5	77.7
	CV	7.1	7.7	7.8	6.8	5.8

Legend: Percentage values on total firms. CV= coefficient of variation.
Source: ISTAT (various years), Survey on ICT usage in enterprises.

Table 3.3 presents the usage levels by enterprises of simple e-services (merely informative). Figures show that, along the longitudinal dimension, there may be a structural break of the series from 2011, when cumulative levels drop with respect to the previous year. Hence, we

focus on the cross-sectional levels of the last years (2011-13)[47]. We observe that more than three quarters (78%) of Italian firms use this type of e-government, and that its geographical distribution does not uncover any significant divide between the North, Centre and South regions: further, the coefficient of variation diminishes, pointing to a maturity of the diffusion process. Given the simplicity of the e-government technologies involved from PA (basically, web sites), this evidence matches the ex ante expectations.

Table 3.4 instead refers to the usage of e-services embedding the highest level of digital transformation (when the public service is supplied entirely online). Also in this case, the break in the series appears from 2011 and leads to an anomalous evidence of a decrease in the usage rate; once again, we concentrate on the latest years. The first evidence is that during 2011-13 only a tiny minority of Italian firms (around 31%) is enabled – at least for some e-services – to do the procedure entirely online. However, differently from before, in this case a small gap exists between firms of the Northwest and Northeast of the country, and most of those from the Centre (excluding the capital region Lazio) and the South, registering lower usage levels.

Finally, Table 3.5 presents the usage of e-procurement tools (in all forms). Also in this case, there may be two breaks in the series, one in 2010 and the other in 2011, so we continue to concentrate on the latest years. A main point of evidence is that e-procurement, differently from other e-services, remains confined to a very small fraction of the total demography (between 7-9%, the Italy average). However, there is a high geographical variability of the usage rate across regions (CV equal to 38.5%), with leaders and followers equally distributed across the main macro-areas. This fact, apparently puzzling, may be explained recalling that firms dealing with the PA have special characteristics, and that the apparently inferior performance of leading 'entrepreneurial' regions like Piemonte, Lombardia and Emilia-Romagna might be the simple consequence of their higher per capita rates of firms, with respect to the remaining regions. In any case, the years available to us do not register well the boom of e-procurement, which was developed after 2014 (see Chapter 2).

[47] We recall that ISTAT has not released the values of these variables for the most recent years. Hence Tables 3.3-3.5 depict a situation that may be different from the current one.

Table 3.4 – Share of firms that use e-services (procedures managed entirely on the network) by geographical distribution.

NUTS2	Region	2009	2010	2011	2012	2013
ITC1	Piemonte	52.9	47.9	27.0	35.0	31.1
ITC2	Valle d'Aosta	50.3	42.2	27.9	33.2	36.7
ITC3	Liguria	53.4	42.9	28.5	29.1	37.9
ITC4	Lombardia	51.9	51.1	34.2	36.2	30.8
ITH1	Bolzano	44.3	45.6	30.6	24.0	32.8
ITH2	Trento	68.3	43.2	26.5	32.6	34.7
ITH3	Veneto	46.6	48.8	27.7	28.9	32.7
ITH4	Friuli-Venezia Giulia	45.3	51.5	35.8	33.9	30.3
ITH5	Emilia-Romagna	45.9	46.0	25.7	27.0	29.0
ITI1	Toscana	36.6	43.1	26.6	27.2	28.9
ITI2	Umbria	48.8	49.5	27.9	32.8	26.9
ITI3	Marche	34.8	43.4	33.1	26.7	20.2
ITI4	Lazio	42.8	50.2	30.6	34.6	38.6
ITF1	Abruzzo	46.8	40.8	27.1	38.0	26.8
ITF2	Molise	47.2	49.8	32.4	40.6	40.7
ITF3	Campania	46.6	41.1	27.8	34.8	29.3
ITF4	Puglia	35.8	32.9	28.8	29.2	27.6
ITF5	Basilicata	51.5	48.5	24.0	37.7	37.3
ITF6	Calabria	46.4	48.2	28.9	27.1	25.8
ITG1	Sicilia	44.6	38.5	27.8	31.7	23.5
ITG2	Sardegna	46.7	45.0	35.2	38.3	37.3
	Italy	47.0	46.4	29.7	32.2	30.9
	CV	14.7	9.9	10.6	13.9	17.1

Legend: Percentage values on total firms. CV= coefficient of variation.
Source: ISTAT (various years), Survey on ICT usage in enterprises.

Table 3.5 - Share of firms that use e-services (offers for tenders) by geographical distribution.

NUTS2	Region	2009	2010	2011	2012	2013
ITC1	Piemonte	43.3	9.6	6.8	5.1	6.3
ITC2	Valle d'Aosta	44.6	5.7	5.7	3.9	11.3
ITC3	Liguria	40.6	10.7	4.9	7.9	10.4
ITC4	Lombardia	46.3	9.3	5.6	7.0	6.1
ITH1	Bolzano	40.1	15.5	6.7	6.5	7.9
ITH2	Trento	47.7	11.2	7.9	11.4	14.2
ITH3	Veneto	40.4	10.2	7.3	5.9	16.5
ITH4	Friuli-Venezia Giulia	42.7	6.0	5.7	7.2	7.1
ITH5	Emilia-Romagna	42.8	9.8	4.1	8.3	8.3
ITI1	Toscana	35.4	13.7	7.0	7.2	7.6
ITI2	Umbria	44.3	9.1	5.9	10.4	7.8
ITI3	Marche	37.3	4.9	6.3	3.5	5.2
ITI4	Lazio	44.4	14.2	11.0	11.0	13.1
ITF1	Abruzzo	47.6	6.3	4.2	12.9	10.7
ITF2	Molise	40.8	6.7	9.5	9.7	16.7
ITF3	Campania	39.5	13.5	10.1	6.5	15.2
ITF4	Puglia	36.1	7.2	8.4	8.8	9.1
ITF5	Basilicata	49.7	14.3	6.8	12.1	9.8
ITF6	Calabria	40.4	13.3	9.3	15.3	10.0
ITG1	Sicilia	43.4	11.2	10.5	12.2	7.5
ITG2	Sardegna	44.5	7.9	3.9	9.0	14.5
	Italy	42.5	10.3	7.0	7.8	8.9
	CV	8.7	30.2	29.6	38.5	38.5

Legend: Percentage values on total firms. CV= coefficient of variation.
Source: ISTAT (various years), Survey on ICT usage in enterprises.

All in all, despite the data shortcomings, the available statistics signal that a problem of limited usage of e-government services may still exist for Italy: the last position achieved on the 2018 DESI ranking further corroborates our hypothesis.

Interviews on e-procurement

As in section 2.5 of the previous chapter, this part builds on a specific questionnaire addressed to officials belonging to a selection of centralised authorities, both central and regional (including the most important aggregators, as defined by D.L. 66/2014), local PA and other representative experts (cf. Table 2.14). The regional agencies mainly deal with health care purchases, which represent the overwhelming part of the Region's procurement activity; instrumentally, they define Framework Contracts and Framework Agreements at the regional level. To this end, these subjects organise and set up the technical platform of aggregation and the final electronic market, similarly to what Consip Spa[48] does when negotiating its statutory public procurement activity at the national level. Also in this case, it was uncovered that, for the time being, in some regions such aggregators exist only formally, while their role is carried out de facto by other public bodies. Further, in this case, to gain a meaningful sample, the questionnaire was proposed to the officials of such alterative public bodies.

The questionnaire (see Appendix) has two sections: one for public procurement (discussed in Chapter 2), and one for e-procurement. The questions of the second section were specifically focussed on distinct aspects of the procurement carried out with digital technologies. First, advantages and disadvantages connected to the usage of the electronic platforms (not only those like MEPA and regional equivalents, but also the portals and platforms set up for carrying out above-threshold tenders) were assessed: typical examples are effectiveness, efficiency, transparency, litigation and innovations. Every item was evaluated according to a 5-point Likert-scale, and respondents were free to add other elements. The same happens for disadvantages.

Then, the main effects stemming from the usage of electronic platforms on the PA, with respect to the traditional channels, were surveyed and ranked for importance: here, no predefined structure was put on the respondents. Finally, the criticism on platform usage by the procuring PA was monitored and ranked for importance.

Most of the interviewed persons do not manage or use a specific regional fully structured platform for e-procurement such as MEPA[49]. Consequently, many relevant questions were not answered or considered applicable.

[48] Consip Spa is the other centralized national purchasing body, having a nationwide competence.
[49] Introduced in the early 2000's, although the compulsory usage was gradually mandated later.

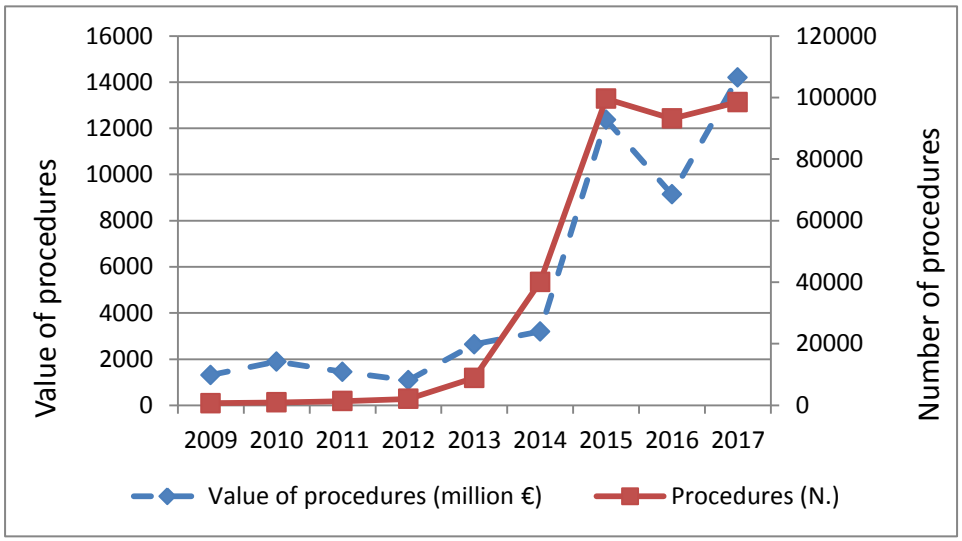
A main exception detected and directly surveyed was the electronic marketplace "MEER" (Mercato elettronico Emilia Romagna[50]), set up by the Emilia Romagna Region, which is intensively and increasingly used by the regional PAs: this mirrors the growing usage trend of MEPA. Another main example of a regional e-procurement platform is Sintel, managed by ARCA (Azienda Regionale Centrale Acquisti S.p.A) Lombardia[51], on which we could gather only indirect evidence[52], being mentioned by the regional centralised authority of the Veneto Region (Azienda Zero) as used by Veneto PAs: this is a recent operative possibility, enabled by Arca since 2016.

We need to stress that the few examples of regional electronic platforms encountered share broad operative similarities, but also highlight differences, explainable with their specific foundations and paths. For example, MEER was historically focused on purchases below the Community threshold, while Arca-Sintel is a global platform now managing all types of tendering and purchasing operations[53].

From the interviews it emerged that, for the few electronic marketplaces detected, a main usage stimulus was D.L. 52/2012, which forced all the regional PAs to use the regional electronic market (whenever present) or that of Consip (MEPA) for their purchases of goods and services below the Community threshold. As a matter of fact, robust post-2012 growth is clearly demonstrated by the evidence collected, and also confirmed by the Arca numbers (see Figure 3.5 below).

[50] https://intercenter.regione.emilia-romagna.it/servizi-pa/mercato-elettronico
[51] http://www.arca.regione.lombardia.it/wps/portal/ARCA/Home/chi-siamo/azienda
[52] Unfortunately, the planned interview with ARCA was not feasible since Arca eventually withdrew its initial offer of availability.
[53] In the case of Emilia Romagna, beside MEER there is another platform, called SATER (Sistema per gli Acquisti Telematici dell'Emilia-Romagna), for the management of the other types of calls for tenders (above threshold).

Figure 3.5 – Main usage indicators of the Sintel – ARCA Lombardia platform.



Source: Sintel data from: http://www.arca.regione.lombardia.it.

In any case, the majority of the respondents (those being a "centrale di committenza" or "aggregator") do have lighter B2G portals specifically tailored to manage tender participation and further administrative procedures. According to the cases, these portals have been present since the late 2000s, when most of these regional aggregators were created (by the 2007 Budget Law).

As a main effect of the usage of e-procurement, the respondents mostly stressed "transparency" (intrinsic to the digital channel, and to the pre-defined rules constraining the purchasing routines of the procuring and procured subjects). In some cases, the possibility to simplify the procedure of the calls for tender was also mentioned, applicable for below-threshold purchases (similarly to the RDO and TD procedures of MEPA).

Coming to the main problems encountered, informative congestion was registered, motivated by the expanding variety of goods and services available both on MEPA and other platforms. In various cases, respondents underlined the urgent need to retrain the PA personnel which, due to ageing, is increasingly un-prepared to use these ICT-based purchasing instruments.

Despite some shortcomings, most of the respondents share the idea that, because of its anticipation with respect to the incoming EU deadlines for the compulsory digitisation of e-procurement (2018), the Italian PA is now in a leading position in the EU – at least in terms of the supply of e-procurement solutions.

3.4 Link between ICT diffusion, institutional quality and business environment

This section is devoted to an econometric analysis of the impact of ICT and e-government diffusion, as well as that of institutional quality, on the business environment and its dynamics. Unfortunately, for the above-mentioned problems on data availability, consistent e-government indicators are not available for Italy in the longitudinal and disaggregated dimensions: hence, we are forced to use only ICT variables (potential usage of e-government).

With respect to the quality of institutions, the analysis is centered on a new recent index of institutional and regulatory quality called the IQI index, which was developed for the Italian provinces. Although it is built as a time series, the currently available panel ends with 2012[54]. The IQI index (and its sub-components), developed and used by Nifo and Vecchione (2014), borrows the basic methodology from the Worldwide Governance Indicators project (Kraay et al. 2010), a worldwide initiative promoted by the World Bank.

In its Italian version, the index is structured into five dimensions, which capture the major quality characteristics of the local government system: corruption, government effectiveness, regulatory quality, rule of law, voice and accountability. Hence, with the usage of the IQI index and its components, we are able to detect most of the drivers and the effects of the reforms of the Public Administration and Governments occurring in Italy at a very disaggregated level until the 2012 period (last year of release of the indicator).

We believe that the IQI index is strategic for the chosen econometric strategy (panel data), and de facto does not have alternatives: at the moment no other indicator of institutional quality possesses a similar level of territorial disaggregation (NUTS 3). In fact, the main alternative, the more known EQI index (developed by Charron et al 2014), is only available at the NUTS 2 level (corresponding to Italian regions). Further, EQI mostly builds on self-assessed (perception) survey data (rather than objective institutional indicators, as in the case of IQI), and is only available for the years 2010, 2013 and 2017 (three repeated cross-sections); finally, the latter wave of EQI introduces some new elements of personal experience, which limit the backward comparability of the index with the first two waves.

Due to these design and methodological differences, the two indicators are not strictly comparable. For illustrative purposes, we present synoptic tabulations for the closest IQI and EQI waves (2010, 2013 and 2017) at the regional level (Table 3.6, and Table A.3.1 in the Appendix). Table 3.6, taking the original index values from Table A.3.1, calculates the ratio of the regional index (IQI and EQI) in a given year to the respective national average, so that

[54] The 2013-2015 extension is expected to be available soon – probably after summer 2018.

we can study whether the two alternatives classify a given region consistently. Broadly speaking, both indexes for 2010 and 2013 produce a similar ordering of the regions with respect to the own national average (that is, "above" or "below the national mean", with only three exceptions[55]). However, the size of the regional deviations from the national means differs between the two indexes.

Table 3.6 – EQI and IQI (ratios to the national average).

NUTS2	Region	IQI 2010	EQI 2010	IQI 2012	EQI 2013	EQI 2017
ITC1	Piemonte	1.14	1.43	1.18	1.17	0.95
ITC2	Valle d'Aosta	1.25	1.84	1.24	1.91	1.40
ITC3	Liguria	0.91	1.23	0.91	1.06	0.89
ITC4	Lombardia	1.24	1.17	1.18	1.23	1.57
ITH1	Bolzano	1,41	1,91	1,42	2,11	1.67
ITH2	Trento	1,42	1,77	1,45	2,14	1.67
ITH3	Veneto	1.18	1.26	1.22	1.44	1.59
ITH4	Friuli-Venezia Giulia	1.22	1.59	1.21	1.76	1.56
ITH5	Emilia-Romagna	1.21	1.32	1.21	1.42	1.59
ITI1	Toscana	1.47	1.21	1.47	1.24	1.25
ITI2	Umbria	1.20	1.39	1.25	1.26	0.66
ITI3	Marche	1.15	1.26	1.22	1.24	0.78
ITI4	Lazio	1.10	0.85	1.13	0.69	0.65
ITF1	Abruzzo	1.14	1.03	1.21	0.92	0.25
ITF2	Molise	0.45	0.87	0.43	0.60	0.95
ITF3	Campania	0.59	0.31	0.60	0.27	0.34
ITF4	Puglia	0.77	0.61	0.70	0.63	0.63
ITF5	Basilicata	0.76	0.85	0.69	0.73	0.53
ITF6	Calabria	0.21	0.38	0.15	0.59	0.07
ITG1	Sicilia	0.43	0.57	0.38	0.64	0.63
ITG2	Sardegna	0.77	1.04	0.75	0.80	0.91
IT	Italy	1.00	1.00	1.00	1.00	1.00

Legend: IQI national index computed averaging regional indexes. Every index (first normalised on a 0-100 scale) has been divided by the respective national average.
Source: Our elaborations on the datasets available at:https://sites.google.com/site/institutionalqualityindex/dataset (IQI) and https://qog.pol.gu.se/data/datadownloads/qog-eqi-data (EQI).

In particular, Table 3.6 confirms the well-known stylised facts on the higher institutional quality available in the regions of the North and the Centre (especially when using IQI, and for the first years), with respect to the South/Islands. We can conclude that, despite the

[55] Exceptions are, in 2010: Liguria, Lazio, Sardegna; in 2012-13: Liguria, Lazio, Abruzzo.

different basic indicators and methodologies used by the two indexes, these tend to produce similar regional classifications in the ordinal (albeit not in the cardinal) sense.

Data and methodology for the econometric analysis

The econometric methodology builds on panel data techniques and, for the choice of the dependent variables (BD, business dynamics), is similar to that proposed by Amici et al. (2016) for estimating the business effects of the introduction of the reform of the OSS in Italy. To do this, we first built a longitudinal matched dataset using provincial-level variables (that for Italy meant 103 cross-sectional observations), collected for the overall time-span 2008-2013 (including the lags), covering a significant period with respect to the implementation of the main e-government policies described before.

The general equation foresees the following structure:

$$\mathrm{BD}_{p,y} = \alpha + \beta_1 \mathrm{ICT\ index}_{r,y} + \beta_2 \mathrm{Institutional\ Quality\ Index}_{p,y} + \beta_3 \mathrm{Controls}_{p,y} + \rho_p + \varepsilon_{p,y}$$

where ρ_p are the unobserved time-invariant fixed effects; $\varepsilon_{p,y}$ is the error term.

To explore the provincial-level business dynamics (BD) and shed light on whether a more intense use of ICT and quality of the institutional environment contribute to improving the conditions for doing business, making the environment more fertile for new enterprises and/or improving the resilience of existing enterprises, we considered three indicators widely used in the industrial organisation literature:

- rate of newly born enterprises, calculated as: (newly registered firms/population)*1000: (Entry)
- rate of dead enterprises, calculated as: (cancellations/population)*1000: (Exit)
- rate of Netentry, calculated as the difference between the newly born and dead enterprise rates. The weighting by the population (instead of the number of existing firms) ensures that the entry rates of the laggard areas (like the South of Italy, registering an inferior presence of firms) are not artificially over-estimated.

Unfortunately, disaggregated data on ICT from the Italian SISTAN (national system of official statistics, including ISTAT) are only available at the regional level; and this could somehow limit the insights that the econometrical analysis can derive on the relations between ICT and business dynamics. At the same time, even at the regional level, the actual availability of ICT indicators to be employed in a longitudinal regression analysis is much more reduced than a preliminary inspection of the ISTAT datasets would allow us to assume. To cope with these

data constraints, we elaborated a specific estimation strategy, with alternative choices and fixes. First, considering that most ICT outcomes for firms arise directly from usage (rather than simple potential availability), we gave priority to demand-side (usage) indicators. Second, we considered ICT explanatory variables that, despite being regional averages, register the territorial capillarity of the diffusion process of ICT: the share of firms having a broadband subscription (extensive measure of ICT diffusion), and the share of firm employees using a PC (connected to the internet) – an intensive measure; it also happens that these demand-side variables have longer series.

For the reasons previously illustrated, to analyse the institutional and regulatory quality of the local government in Italy we employ the IQI index (and its sub-components), developed by Nifo and Vecchione (2014), based on objective secondary data collected from institutional sources, research institutes and professional registers: its latest release is available for the period 2004-2012[56].

As covariates to control for the socio-economic context and for specific factors, and as suggested by the literature on business demography, we use: the share of the 15-64-year-old population in the total (which represents the size of the potential work force); the population size (in logs), as a measure of urban agglomeration and attraction effects; and, finally, we control for the annual rate of growth of the provincial GDP per capita, and for regional and year dummies. Moreover, when using the FE panel model the provincial, time-invariant characteristics are absorbed by the fixed effects introduced in the regression.

Table 3.7 presents the main descriptive statistics of our panel dataset. The Netentry variable uncovers that, over the period, in Italy there was an aggregate negative rate of net entry: we believe that this dynamic is linked to the harsh macro-economic conditions prevalent in 2010-13. Further, the averages of ICT variables allow us to appreciate the heterogeneity of technological diffusion processes, with some already completed (Broadband), and others (% empl_PC_Int) still at an early stage of completion. The IQI indicator and its sub-components vary between 0-1 (not-rescaled), with the usual interpretation (higher value, better institutional quality).

[56] Hence, the value of 2013 has been extrapolated.

Table 3.7 – Descriptive statistics of the employed variables

Variable	Observations	Mean	Std.Dev	Minimum	Maximum	Source
Business demography variables						
Entry	440	6.48	1.24	3.83	14.3	Camera di commercio
Netentry	440	-0.46	1.20	-7.66	2.4	Camera di commercio
ICT variables						
Broadband	440	89.4	5.2	73.57	98.9	Istat
% empl_PC_Int	440	31.82	6.92	17.98	51.41	Istat
IQI variables						
IQI	309	0.59	0.22	0	1	Nifo and Vecchione
Corruption	309	0.83	0.16	0	1	Nifo and Vecchione
Government	309	0.40	0.18	0	1	Nifo and Vecchione
Regulation	309	0.48	0.20	0	1	Nifo and Vecchione
RuleLaw	309	0.59	0.20	0	1	Nifo and Vecchione
Voice	309	0.43	0.18	0	1	Nifo and Vecchione
Control variables						
% pop_15-64	440	64.7	1.8	59.2	69.1	Istat
ln_pop	440	12.9	0.7	11.0	15.2	Istat
% GDP	440	1.0	4.1	-13.3	19.2	Istat

Legend: Descriptive statistics refer to the DB period (2010-2013); hence, the IQI variables are missing for the final year.
Source: Our elaborations on the dataset.

Results

In this sub-section, we present the econometric estimates on the provincial-level drivers of business dynamics (BD) in Italy, focussing on variables of ICT usage and quality of institutions. To do this, we exploit the full information richness of the dataset of Infocamere[57]: this register covers all the NACE sectors across the different firm size classes, and includes all types of "for profit" enterprises, however organised or associated with the different trade entities.

[57] Infocamere is the ICT technical harm of the system of the Italian Chambers of Commerce, managing the official administrative register where firms need to enrol to operate on a profit basis in Italy.

As expected, the digital connectivity effect on firms entry is positive (albeit small in size) when significant, if measured extensively (Broadband); for Netentry, its significance is limited to the contemporary specification – and this is probably due to the fast-changing rate of digital connectivity, experienced in the observed period (a likely effect of the implementation progresses of the national broadband plan registered during those years). Concerning the intensive measure of regional ICT endowment (% empl_PC_Int), the estimated coefficients are generally negative: in this case, the inter-sectoral composition of our dataset (not controlled for) and the regional aggregation of the covariate may be the main explanatory factors, since industries and regions differ in terms of intensity of employees' usage of PC: ceteris paribus, the primary and secondary sectors do use connected PC less intensively, with respect to the tertiary sector; moreover, differences are also present across the tertiary sub-sectors (for example, going from the less knowledge-intensive to the more).

We decided to run three separate sets of regressions for the same model specifications (I-III): with the key covariates expressed with two years' lag[58] with respect to the depended variable (2y), with one year lag (1y) and in the same year (Cont). Coherently with the literature review presented in the previous section, we understand that the lagged versions provide a more adequate timeframe for gauging the effects of the institutional conditions for doing business, that mature well after the formal entry into the market. We also recognise that, if the longitudinal dimension of the panel would have been bigger, the test of longer delays (>2y) would have been advisable.

We analysed our data using fixed effects (FE) and random effects (RE) panel data models (Table 3.8): we systematically used the Hausman test to select the best model for each specification, choosing between RE and FE[59]. Estimates report robust standard errors, clustered at the provincial level.

[58] Only the institutional variables are lagged, for economic reasons. ICT variables, being already expressed as cumulative covariates, are not. The %GDP is lagged to avoid potential endogeneity problems.
[59] When the Hausman test has a p-value close to the critical level (5%), we present both.

Table 3.8 – Panel FE/RE estimations. Dependent variables: Entry & Netentry, different lags

	ENTRY			NETENTRY		
	2y	1y	Cont	2y	1y	Cont
	FE	FE	RE	FE	RE	FE
	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t
Const.	1.837	-56.389	-44.405	49.262	-8.130	-24.025
	(4.635)	(68.851)	(68.856)	(163.747)	(5.218)	(68.641)
Broadband	0.012	0.017**	0.016**	-0.018	-0.021	0.016**
	(0.008)	(0.008)	(0.008)	(0.024)	(0.021)	(0.008)
% empl_PC_Int	-0.039***	-0.035***	-0.030**	0.000	0.012	-0.028**
	(0.014)	(0.013)	(0.013)	(0.041)	(0.038)	(0.013)
Corruption	0.855	0.564	-0.510	-1.813	0.379	0.839
	(0.651)	(0.739)	(0.507)	(3.065)	(0.852)	(0.637)
Government	-0.830	-1.057	-0.518	-1.831	0.099	-0.013
	(0.583)	(0.645)	(0.410)	(2.010)	(0.767)	(1.006)
Regulation	1.998***	0.443	0.217	-0.880	0.250	1.458*
	(0.696)	(0.703)	(0.394)	(1.502)	(0.619)	(0.737)
RuleLaw	-2.365***	-0.582	-0.855	-7.257**	-0.595	0.434
	(0.721)	(1.077)	(1.204)	(2.842)	(0.862)	(0.682)
% pop_1564	0.105	0.021	0.005	-0.331	0.084	0.032
	(0.087)	(0.094)	(0.089)	(0.227)	(0.077)	(0.090)
ln_pop	-0.085	4.763	3.991	-1.483	0.293**	2.064
	(0.147)	(5.158)	(5.171)	(12.484)	(0.125)	(5.145)
% GDP	-0.008	-0.008*	0.006	-0.012	0.022**	-0.015***
	(0.475)	(0.437)	(0.372)	(1.018)	(1.050)	(0.539)
Regional dummies	yes	-	-	-	yes	-
Year dummies	yes	yes	yes	yes	yes	Yes
N.	412	412	412	412	412	412
Within R^2	0.557	0.574	0.573	0.301	0.277	0.582
Between R^2	0.646	0.000	0.000	0.126	0.358	0.012

Number of observations=412 (103 provinces, 4 time periods). Robust standard errors, clustered at the provincial level, in parentheses. *p=0.10; **p=0.05; ***p=0.01. RE: random effects model; FE: fixed effects model
Source: Our elaborations on the dataset.

The institutional variables present a very composite situation, and we focus directly on its main subcomponents: as a matter of fact, diverse dimensions have a different impact on the business dynamics.

First, we study the variables Corruption, Government (effectiveness) and Regulation (quality). Sticking to the significant coefficients, results confirm that the quality of Regulation positively matters for gross entry (after 2 lags with FE/RE)[60]; we need to remember that the regulatory quality, in the IQI sub-index, refers to local decisions and policy outcomes particularly conducive to business activities. Instead, the puzzling non-significance of Government effectiveness[61] could be explained by the fact that this IQI sub-index tends to reflect the local living conditions more, starting with the endowments of social and economic facilities, which should be less directly correlated with business activities; a similar logic could apply to Corruption, mutatis mutandis. More generally, the interplay between national and local drivers of institutional quality cannot be overlooked: for example, the main norms to fight corruption are national, not local.

Second come the other two sub-components of IQI: RuleLaw and Voice. The latter is the IQI component most correlated with the others, and with a few covariates, at levels around 60%: hence, we drop it from the specifications, to avoid multi-collinearity.

RuleLaw[62] reports negative impacts on Entry, which become fully significant with 2 lags. In this case, we need to consider its composition, as applied to the prevailing business conditions existing in Italy. In fact, the transposition of the World Bank methodology (country-level) to the provincial level poses some challenges in terms of index components and labelling, which we can synthetically summarise saying the following. Once transposed at the provincial level, the indicator RuleLaw mostly reflects the local conditions of law enforcement, as measured by the levels of crimes, the operative performance of justice and, to a significant extent, the levels of tax evasion and submerged economy (with the last two accumulating a total sub-weight of more than 40% of the RuleLaw indicator). Hence, bearing in mind the literature on Italian districts and the high incidence of the informal economy (characterised by low fiscal compliance) existing in a substantial share of the most vibrant Italian business agglomerations, it does not come as a big surprise that in all the three specifications (cont and with lags), the marginal effects associated to RuleLaw turn to be negative and fully significant with respect to Entry. Further, the so-called buffer (or

[60] In the case of net entry (specification "cont"), the positive coefficient is only barely significant.
[61] Government effectiveness brings the second largest weight in the construction of the synthetic IQI index, equal to roughly 0.31.
[62] The RuleLaw subcomponent is associated to the first largest weight in the construction of the synthetic IQI index, equal to roughly 0.35.

defensive) function of individual entrepreneurship – particularly important for the South of Italy and periods of negative macro-economic cycle – may further support our explanation.

In other words, while other dimensions of institutional quality are characterised by most prominent "public good" effects (mostly positive), in this case the RuleLaw indicator seems to register that high compliance levels in taxation and social security costs do continue to displace entrepreneurial 'animal' spirits and a vibrant business dynamic demography in Italy. We believe that this explanation is also rooted in the mature production specialisation of many Italian business locations, which suffer from intense foreign competition and strong exchange rate levels of the euro, thereby looking for alternative sources of cost reduction and competitiveness.

For the controls, the expected (positive) sign is confirmed for the size effect of provincial population (ln_pop) (in other words, entrepreneurship tends to cluster and agglomerates in more populated areas – at least in the short run), while the GDP growth control provides a less clear picture, presenting alternative signs.

While the present estimates need to be interpreted with caution (for the shortness of the panel, for the critical period examined, for the informative limits of some covariates, etc.), we believe that the whole picture is enough clear to confirm the hypothesis that ICT benefits local business dynamics, and that institutional quality does incentivise new business ventures, especially when measured as better regulation. This does not mean that other institutional dimensions are not relevant for entrepreneurship (such as corruption or Government effectiveness): as pointed out in the reviewed literature, the question here is rather how much the local level of Government can intervene to modify the national framework, deeply shaped by the central authorities.

3.6 Summary and concluding remarks

E-government reforms in Italy are one of the most complex domains of analysis of structural reforms, where it is more difficult to identify and monitor the last period interventions and their additional impact on the PA and the business environment with respect to the previous reforms enacted since the early 2000s. As a matter of fact, the normative overproduction and stratification typical of Italian policies tend to mix up the real (actual) content of the digital reforms, which cannot be identified with their mere formal introduction. Moreover, a further obstacle to our analysis is that the bulk of the available official statistics arrives to cover 2013, while the most relevant progresses of e-Government in Italy have occurred since 2014.

A main finding is that, in the last 18-20 years, the e-government and ICT domains have attracted **many efforts and initiatives of reform** in Italy, although in terms of actual results most commentators tend to believe that **many of them have remained "on paper,"** or have led to orphan **pilots** that did not significantly change the way the Governments and the Public Administration operate; according to the most critical observers, many reforms have even made things worse, accentuating the normative chaos and stratification that significantly hamper institutional quality in Italy.

A main issue in the literature is whether e-government is a matter of ICT (technology) diffusion, or whether complementary 'soft' innovations are urgently needed to reap the ICT promises. A further question is how – and how rapidly – these changes translate into better environmental conditions for doing business.

Despite the paucity of adequate data, our analyses uncovered significant **progresses taking place in the supply side of ICT and e-government** technologies during the 2008-2013 period: broadband diffusion was increasingly supported, and many services became digital. Unfortunately, when we go to examine how far these e-services effectively transformed the PA mechanisms (by overcoming the shortage of digital skills and the ageing trend of civil servants), or have become widely used by firms, the situation appears much less innovative and conducive to enhanced entrepreneurial activities. In this respect, Italy may be an exemplary case of robust technological innovation with **insufficient organisational change** (locally) and unstable central planning: the cases of the 'never ending story' of the CDA reform, or that of the long delays of OSS implementation, are patent and signal that most digital reforms in Italy were badly designed and implemented late. All in all, these reforms did not appear to solve the long-run institutional and organisational deficits of the public sector.

On the contrary, **other less-systemic and modular reforms** were based on the enactment of sunset dates and, once coupled with political commitment and moral suasion, were **successful**. Leading examples are from the e-procurement domain (including 'satellite' reforms such as e-invoicing), in which Italy is now an EU leader.

Most of the previous remarks could apply to the "Madia reform", which introduced relevant normative and institutional changes, often connected to e-government diffusion. Although it is too early to conduct an ex post impact evaluation, the provisional evidence seems to point to some systemic difficulties of implementation, rooted on soft factors. For sure, the tight budget constraints (in primis the block of the personnel turnover) may have deprived the

Italian PA of the critical mass of skills and training needed to accelerate the transition, and push the organisational refitting.

Turning to the econometric analysis concerning the **impact on business environment**, our preliminary results confirm the importance of broadband diffusion for entrepreneurial activities, and that of the quality of institutions. Concerning the latter, thanks to the disaggregated indexes we exploited, we were able to uncover that different institutional profiles matter differently, especially at the local level: for example, although good regulation is associated with entry rates, rule of law is not – probably for the notorious fiscal and social security costs that have become a big burden for the competitiveness of Italian enterprises in face of external low-cost competitors. Although more research and a longer panel are needed, we believe that these results point to the right direction to take.

A more positive and clear-cut judgment concerns the **e-procurement reforms** (from Consip to the most recent changes introduced by D.Lgs. 50/2016). Differently from other domains, the e-procurement figures tend to suggest that, in this case, a robust injection of new technology exerted an effective push on the transformation of existing procurement procedures and, when combined with binding sunset dates, purchasing activities and volumes have effectively migrated online. Yet, it is too early to gauge whether the intended benefits of the digitisation of public procurement are being achieved, and where the digital tools are compatible with ensuring fairness and respect of other public goals (such as the respect of quality and sustainability, or the control of corruption). Nevertheless, based on the available evidence gathered from official data and confirmed by interviews with experts, we can conclude that this reform appears to be one of the most advanced ones – within e-government – in terms of its degree of implementation and usage by firms.

4. SMES ACCESS TO FINANCE

A distinctive feature of the Italian economic system is the prevalence of SMEs (See Table 4.1). They represent 99.9% of Italian firms and account for 80% of the industrial and service labour force (Eurostat, 2011). The share of micro-enterprises is also strongly significant, thus making the Italian productive system a very special framework to analyse. A large recourse to short-term debt and a relatively little amount of equity are the most common features of Italian SMEs. This makes their financial profile rather weak and too reliant upon the banking system, thus compromising their ability to compete and constraining their financial choices.

Table 4.1 - Distribution of firms in Italy by firm size (2011)

Firm size (employees)	Number	Percentage
All firms	4,460,891	100.0
SMEs (up to 249)	4,457,205	99.9
Micro (up to 9)	4,279,176	95.9
Small (10-49)	156,996	3.5
Medium (50-249)	21,033	0.5
Large (250+)	3,686	0.1

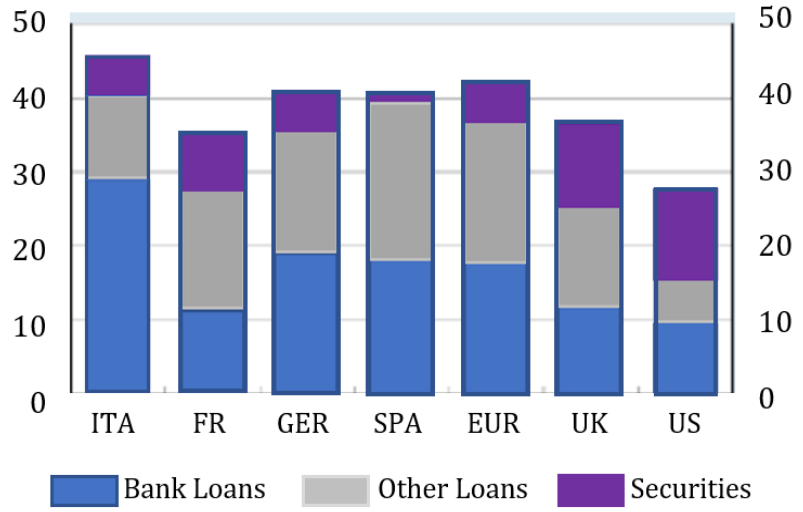
Notes: Data include all market activities in Sections B, C, D, E, F, G, H, I, J, L, M, N, of the common statistical classification of economic activities in the European Community, as established by Regulation (EC) No 1893/2006 (Nace Rev. 2). Source: ISTAT, Statistical Business Register.

The financial condition of Italian SMEs is significantly different from that observed in other European and non-European countries having a similar relevant share of manufacturing industries on total national employment and value added (Figure 4.1). The high reliance on bank debt and the low equity capital make the SME system highly sensitive to external business shocks, as well as to the tightening of credit conditions. In the aftermath of the financial crisis, the banks' strongly selective policies have led to an increase in loan rejection rates, especially for those companies with high levels of indebtedness (Figure 4.2).

Company-level data, which offer an insight into differences in the behavior of manufacturing firms, have confirmed that investment (as a ratio to the stock of capital) has been lower, other conditions being equal, in firms' founding, making it harder to gain access to credit. According to some studies (Cingano et al., 2013; Gaiotti, 2013), the increase in the share of

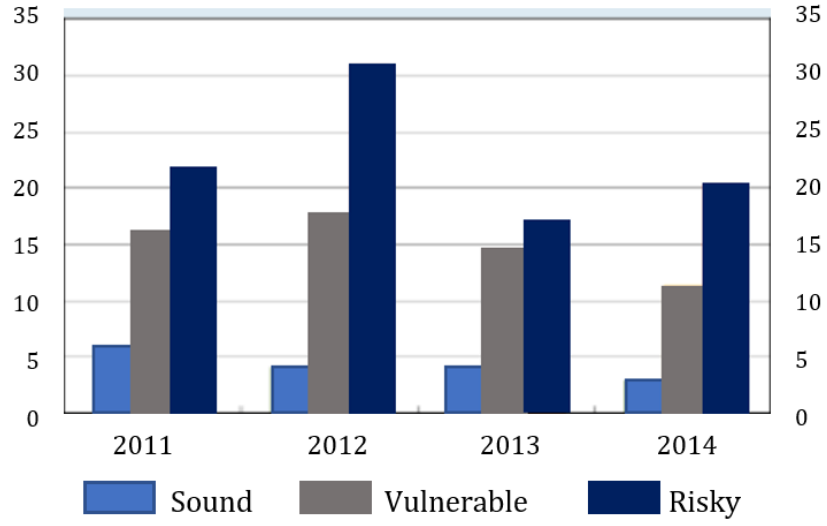
firms experiencing difficulties accessing credit (from 2 percent on average in 2003-07 to 10 per cent in 2008-13) took 0.3 percentage points off the overall investment rate.

Figure 4.1 - Leverage and composition of financial debt in 2014



Notes: Leverage (given by level of each histogram) is the ratio of financial debt to the sum of financial debt and shareholders' equity at market prices. Source: Bank of Italy Annual Report 2014.

Figure 4.2 - Firms' access to credit by degree of riskiness



Notes: Percentage of firms reporting that they had received none or only some of the credit requested. Source: Bank of Italy Annual Report 2014.

In the light of these problems, the Italian Government has recently initiated a number of policy measures aimed at mitigating the potential risks associated with the peculiar financial structure of the productive system. Among these are:

- the Allowances for Corporate Equity (ACE), introduced by the Italian Government in December 2011, which has decreased the fiscal distortion between the costs of equity and debt by introducing the deductibility from taxable income of a notional return on capital increases;
- the Minibonds, medium-to-long-term debt instruments, which were launched on the Italian bond market in 2012, in reaction to restraints in traditional bank financing and with the aim to provide SMEs with an alternative source of capital;
- the Individual Investment Plans ("Piani di risparmio Individuali", PIR), a new class of tax-exempt investment plans created in 2017, which channels private savings towards equity and debt instruments issued by Italian firms, especially SMEs.

In this chapter we investigate the impact of these measures on SMEs' access to finance, both through descriptive statistics and econometric analyses. Moreover, we provide updated information on the use of the Central Credit Guarantee Fund, which is the main government measure that, since 2009, facilitates the access of Italian SMEs to bank loans[63].

4.1 Allowances for Corporate Equity

The Allowances for Corporate Equity, introduced by the Italian government in December 2011 with Decree Law n. 201[64], has decreased the fiscal distortion between the costs of equity and debt by introducing the deductibility from taxable income of a notional return on capital increases. The notional return was initially set by the Ministry of Economy and Finance at 3 percent, and subsequently increased up to 4.75% in 2016. However, in 2017 the Decree Law 50/2017 established that the notional return for ACE is diminished to 1.6% in 2017 and 1.5% in 2018.

[63] This chapter focuses on public support for SMEs access to finance based upon tax or other financial incentives. Other programmes of non-pecuniary support are not examined. For instance, the ELITE programme (created in 2012 by Borsa Italiana in collaboration with Confindustria) supports SMEs in exploiting long-term financing opportunities by offering a platform of services specifically designed to connect fast-growing companies with professional investors (mainly by means of training and networking activities). As of May 2018, the ELITE programme involves 550 Italian SMEs.

[64] Actually, in the Decree Law 201/2011 as well as in the subsequent Ministerial decrees, the acronym ACE has been used for "Aiuto alla Crescita Economica" (Support to Economic Growth). However, in this Chapter, it will be used for Allowances for Corporate Equity, i.e. the specific content of the policy measure.

According to some estimates of the Italian statistical office (ISTAT), in 2016 more than 36 percent of firms benefited from ACE relief and their actual corporate income tax (IRES) diminished to 22.2 percent from 28.5 percent in 2011. According to the Survey of Industrial and Service Firms performed by the Bank of Italy, the ACE measure allowance benefitted more than 10 percent of the firms that decided to increase their equity capital in the 2012-2014 period, and the percentage was even higher among large firms.

In this section, we use the introduction of the ACE at the end of 2011 and the years of its application (2012-2016) to analyse the firm-level effects of such a legal measure aimed at incentivising the build-up of additional equity and the reduction of firm indebtedness. More specifically, we test the following hypotheses:

H1: During the period of its application, the ACE led to an increase in equity for firms.
H2: The above increase was higher in relatively smaller firms characterised by a low level of equity capital.
H3: During the period of ACE application, the distribution of firms' profits decreased.

Data

To empirically test the above hypotheses, we collect data on Italian firms from Bureau van Dijk-Amadeus database over the 2008-2016 period. After accounting for missing information about firm equity and total assets, we end up with a final sample of 3,386 Italian SMEs for the year 2008-2016. Table 4.2 shows the related summary statistics.

On average, the firms in our sample show an equity ratio of 35.9%. The majority of firms have experienced an increase in both the absolute value of equity (68.7%) and the equity ratio (56%), and the average profit distribution ratio amounts to 37.1% (by definition it varies between 0 and 1). The average size of the firms in the sample is 16 employees and more than 3 million euros of total assets. On average, sample firms have more than 4 million euros of total sales and a positive return on sales (ROS) over the period equal to 2.6%.

Table 4.2 – Summary Statistics: 2008-2016

Variable Name	Obs.	Mean	Std. Dev.
Equity Ratio	61,144	0.359	0.252
Incr. Equity	53,346	0.687	0.464
Incr. Equity Ratio	53,340	0.560	0.496
Dividends	54,228	0.371	0.428
Employees	57,615	16.529	20.686
Total Assets	61,155	3,624.031	5,218.055
Sales	60,896	4,069.809	5,473.072
ROS	60,308	0.026	0.179

The table reports summary statistics for the sample of 3,386 Italian SMEs for the years 2008-2016.
Source: elaborations for Bureau van Dijk.

We use four different measures to capture the effect of the introduction of the ACE on a firm's equity structure and profit distribution: (i) the equity ratio of the firm (ER), calculated as total equity divided by total assets; (ii) an indicator variable taking the value 1 if the total equity of the firm has increased compared to the year before and 0 otherwise ($IncrEq$); (iii) an indicator variable taking the value 1 if the equity ratio of the firm has increased compared to the year before and 0 otherwise ($IncrER$); (iv) the dividends of the firms (Div).

Table 4.3 reports the distributions of these measures over the period 2008-2016. As can be noted, we find an overall increase in our main measures of equity in the period following the introduction of ACE, and a strong decrease in profit distributions between 2012 and 2016. The amount of dividends equal to 85.5% in 2008 dropped to 15.1% in 2016.

Table 4.3 - Distribution of Equity and Profits: 2008-2016

Year	Obs.	Equity Ratio	Increased Equity	Increased Equity Ratio	Dividends
2008	3,386	0.253	-	-	0.855
2009	3,386	0.279	0.722	0.614	0.157
2010	3,386	0.281	0.692	0.506	0.186
2011	3,386	0.275	0.694	0.495	0.172
2012	3,386	0.277	0.669	0.516	0.171
2013	3,386	0.278	0.693	0.552	0.172
2014	3,386	0.279	0.691	0.540	0.169
2015	3,386	0.285	0.716	0.562	0.146
2016	3,386	0.296	0.744	0.577	0.151

Source: Elaborations for Bureau van Dijk.

Empirical Methodology

In order to test the effect of the introduction of the ACE on the equity capital of Italian firms (Hypotheses H1 and H2), we run the following regression models:

$$ER_{i,t} \text{ or } \Delta Eq_{i,t} = \alpha + \beta_1 \cdot Reform_t + \beta_x \cdot X_{i,t} + \beta_y \cdot Y_t + \delta_i + \varepsilon_{i,t} \quad [4.1]$$

$$Pr(IncrEq)_{i,t} \text{ or } Pro(IncrER)_{i,t} = \alpha + \beta_1 \cdot Reform_t + \beta_x \cdot X_{i,t} + \beta_y \cdot Y_t + \delta_i + \varepsilon_{i,t} \quad [4.2]$$

We estimate a first set of regressions (4.1) by OLS and fixed effects, and a second set (4.2) using a probit model. Since we are interested in the effects of the introduction of the ACE, the variable $Reform$ is the main variable of interest. It is a categorical variable taking the value 1 for the years 2012-2016, and 0 otherwise.

Our control variables (included in vector X) are taken from prior research (Bowen et al., 1982; Titman and Wessels, 1988; Rajan and Zingales, 1995; Dewenter and Malatesta, 2001; MacKay and Phillips, 2005): firm size, in terms of number of employees and total assets, firm revenues, profits, and sector of activity. We also include regional dummies (at the NUTS 2 level), in order to account for local socio-economic conditions.

For the purpose of testing the effect of the ACE on profit distributions (Hypothesis H3), we further run the following regression model:

$$Div_{i,t} = \alpha + \beta_1 \cdot Reform_t + \beta_x \cdot X_{i,t} + \beta_y \cdot Y_t + \delta_i + \varepsilon_{i,t} \quad [4.3]$$

where firms' dividends are computed as follows (Haring et al., 2016; Petutschnig and Runger, 2017) [65]:

$$Div_{i,t} = \begin{cases} 0 \; if \; Profit_{i,t} < 0 \\ 1 \; if \; Profit_{i,t} > 0 \; and \; Eq_{i,t} - Eq_{i,t-1} < 0 \\ 0 \; if \; 0 < Profit_{i,t} < Eq_{i,t} - Eq_{i,t-1} \\ otherwise \; \frac{Profit_{i,t} - (Eq_{i,t} - Eq_{i,t-1})}{Profit_{i,t}} \end{cases} \quad [4.4]$$

As a further robustness check, to separate the effect of time trend from that due to the introduction of the ACE, we add a control group to our analysis and perform a difference-in-difference (*DiD*) regression. Since all Italian firms could make use of the notional interest deduction, forming a control group within the same country is not possible. However, as in

[65] As we have mainly non-listed firms, we cannot directly observe profit distributions.

Sweden, there have been no changes in tax rates relevant for our analysis or changes with respect to interest deduction over the whole observation period. We create a matched sample of Italian and Swedish SMEs. Table A.4.1 in the Appendix of Chapter 4 provides summary statistics for the firms of the two countries included in the sample.

Results

Table 4.4 reports the estimation results for the effect of ACE on corporate equity over the years 2008-2016. Columns (1)-(4) present the results of pooled OLS and fixed effects regressions on the impact of ACE on firms' equity ratio (Equity Ratio), whereas columns (5)-(8) report probit estimations about the effect of ACE on the probability of firms increasing equity and equity ratios (Incr. Equity and Incr. Equity Ratio).

Estimation results highlight a positive and statistically significant impact of the introduction of ACE on corporate equity. Firms' equity ratios increase by 0.6% in the specification of column (1), by 1.4% in the specification of column (2), and by almost 3% in the specifications of columns (3) and (4). Less significant results are found in relation to probit estimations. Although there is not a significant impact of ACE on the probability of observing an increase of firms' equity (columns 5-6), the introduction of the allowances for corporate equity is associated with 1.5% growth in the probability of observing an increasing equity ratio (column 8). Among the control variables, larger (both in terms of number of employees and total assets) and more profitable companies (in terms of ROS) show higher equity ratios and a greater probability of increasing their equity capital.

Overall, regression results confirm Hypothesis 1. The effect of ACE on corporate equity is positive and statistically significant.

Table 4.4 – Effects of ACE on Equity (2008-2018)

	OLS Equity Ratio	OLS Equity Ratio	FE Equity Ratio	FE Equity Ratio	PROBIT Incr. Equity	PROBIT Incr. Equity	PROBIT Incr. Equity Ratio	PROBIT Incr. Equity Ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Reform	0.006*	0.014***	0.029***	0.028***	0.006	-0.000	0.007	0.015**
	(0.003)	(0.003)	(0.002)	(0.002)	(0.007)	(0.006)	(0.007)	(0.007)
ROS	0.000	0.000**	0.000	0.000	0.027**	0.023**	0.008*	0.007*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.012)	(0.009)	(0.004)	(0.004)
Sales	0.012***	0.050***	0.004	0.010***	0.050***	0.053***	0.020***	0.033***
	(0.004)	(0.005)	(0.002)	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)
Ln(Employees)	0.016***		0.005*		0.040***		0.009	
	(0.004)		(0.003)		(0.005)		(0.004)	
Ln(Total Assets)		0.075***		0.020***		0.039***		0.023***
		(0.008)		(0.004)		(0.005)		(0.004)
Constant	0.532***	0.352***	0.240***	0.170***				
	(0.044)	(0.046)	(0.019)	(0.024)				
Region Dummies	Yes	Yes	No	No	Yes	Yes	No	No
Industry Dummies	Yes	Yes	No	No	Yes	Yes	Yes	Yes
R^2	0.100	0.130			0.110	0.110	0.032	0.032
Within R^2			0.009	0.007				
Between R^2			0.024	0.119				
Observations	24,667	27,708	24,667	27,708	22,209	24,217	22,232	24,244

Notes: The table reports coefficient estimates in column (1)-(4) and probit marginal effects in columns (5)-(8). Standard errors are clustered at the firm level in OLS and PROBIT regressions. *** p<0.01, ** p<0.05, * p<0.10.

In order to test whether the introduction of ACE was particularly effective for smaller firms with low equity capital (Hypothesis 2), in Table 4.5 we perform our main regressions on different subsamples of firms, based on the quartile distribution of equity ratios in the years prior to the reform (2008-2011). As the aim of the Allowance for Corporate Equity was to sustain the increase of equity and the reduction of firm indebtedness, we would expect a stronger and more significant impact of this policy measure on firms characterised by lower equity ratios.

Although our Reform dummy is not statistically significant in the lowest quartile of Panel A (i.e. the fixed effects estimation of Equity Ratio), estimation results provide support to Hypothesis 2 when the increase in equity and equity ratio are used as dependent variables.

Specifically, the influence of the ACE reform on capital structure decisions turns out to be positive and statistically significant in the first quartile of both Panel B (i.e. the probit estimation of increasing equity) and Panel C (i.e. the probit estimation of increasing equity ratios). More specifically, the introduction of ACE increases by 3.4% and 2.8% the probability of smaller firms to augment their equity capital and equity ratio. In support of this finding, estimation results also indicate that ACE significantly reduces the probability of Incr. Equity and Incr. Equity Ratio for the subsample of firms belonging to the fourth quartile of the distribution of equity ratio (Panels B and C).

Table 4.5 – Effects of ACE on equity (2008-2018) by quartiles of equity ratios

Panel A	Dep. Var. = Equity Ratio FE estimates			
Quartile	I	II	III	IV
Reform	0.007	0.008***	0.009***	0.015***
	(0.005)	(0.001)	(0.002)	(0.002)
Control variables	Yes	Yes	Yes	Yes
Observations	9,140	6,728	4,823	3,976
Panel B	Dep. Var. = Incr. Equity PROBIT estimates			
Quartile	I	II	III	IV
Reform	0.034***	0.001	-0.015	-0.035*
	(0.012)	(0.013)	(0.017)	(0.018)
Control variables	Yes	Yes	Yes	Yes
Observations	8,106	6,029	4,339	3,640
Panel C	Dep. Var. = Incr. Equity Ratio PROBIT estimates			
Quartile	I	II	III	IV
Reform	0.028**	0.022*	-0.023	-0.036**
	(0.012)	(0.014)	(0.016)	(0.018)
Control variables	Yes	Yes	Yes	Yes
Observations	8,120	6,038	4,381	3,671

Notes: The table reports coefficient estimates in Panel A and probit marginal effects in Panels B and C. Standard errors are clustered at the firm level in Probit estimations. *** p<0.01, ** p<0.05, * p<0.10.

We then analyse the effects of the introduction of ACE, also on firms' profit distributions. According to Hypothesis 3, we expect a reduction in the distribution of profit after the introduction of ACE in 2012-2016. In order to test this hypothesis, we estimate equation (4.3) using Div as a proxy for the firm's profit distribution ratio as dependent variable.

The results of our estimations are reported in Table 4.6. Regression coefficients indicate that there is a significant negative impact of the Reform dummy on dividends distribution. After the introduction of ACE the dividend ratio results to be reduced by more than 14% in all our specifications (columns 1-4). As for the control variables, firm size, sales and profitability significantly and positively affect dividends distribution in Italian SMEs between 2008-2016.

Hence, we find support for Hypothesis 3: the introduction of ACE significantly reduces profit distributions in favour of increasing equity capital.

Table 4.6 – Effects of ACE on Profit Distributions (2008-2016). OLS and Fixed Effects Estimations.

	OLS Dividends	OLS Dividends	FE Dividends	FE Dividends
	(1)	(2)	(3)	(4)
Reform	-0.147***	-0.152***	-0.140***	-0.148***
	(0.005)	(0.004)	(0.005)	(0.004)
ROS	0.113***	0.127***	0.032	0.062***
	(0.028)	(0.027)	(0.023)	(0.023)
Sales	0.004	0.017***	0.001	0.012***
	(0.004)	(0.004)	(0.003)	(0.004)
Ln(Employees)	0.011***		0.006*	
	(0.004)		(0.003)	
Ln(Total Assets)		0.016***		0.023***
		(0.004)		(0.004)
Constant	0.813***	0.805***	0.282***	0.404***
	(0.038)	(0.032)	(0.025)	(0.025)
Region Dummies	Yes	Yes	No	No
Industry Dummies	Yes	Yes	No	No
R^2	0.062	0.065		
Within R^2			0.039	0.051
Between R^2			0.032	0.009
Observations	22,386	24,974	22,386	24,974

Notes: *** p<0.01, ** p<0.05, * p<0.10.

In order to eliminate time trend effects, we match our sample of Italian SMEs with data of Swedish firms that serve as a control group in a difference-in-difference analysis.[66] Estimation results are reported in Table 4.7. Overall, we confirm our previous findings. The introduction of ACE in 2012 significantly and positively affects firm equity when it is measured by increments in equity capital and equity ratio (column 2 and 3). Moreover, the introduction of the reform significantly reduces profit distributions (column 4). We do not find support for a positive effect of ACE on firms' equity ratio, as the interaction term Italy*Reform is negative and statistically significant (column 1).

Table 4.7 – Effects of ACE on Equity and Profit Distributions (2008-2016). DiD Estimations.

	FE Equity Ratio	PROBIT Incr. Equity	PROBIT Incr. Equity Ratio	FE Dividends
	(1)	(2)	(3)	(4)
Reform	0.044***	-0.069***	-0.023**	0.018**
	(0.003)	(0.009)	(0.010)	(0.008)
Italy * Reform	-0.011**	0.066***	0.029**	-0.150***
	(0.005)	(0.013)	(0.014)	(0.012)
Control variables	Yes	Yes	Yes	Yes
Observations	24,984	22,398	22,415	22,484

Notes: The table reports coefficient estimates in columns (1) and (4), and probit marginal effects in columns (2)-(3). Standard errors are clustered at the firm level in probit regressions. *** p<0.01, ** p<0.05, * p<0.10.

4.2 Minibonds

Minibonds are medium-long term debt instruments which were launched on the Italian market in 2012 in reaction to restraints in traditional bank financing and in order to provide SMEs with an alternative source of capital to sustain competitiveness. They may be issued by Italian companies with more than 10 employees and an annual turnover and/or assets greater than 2 million euros. Minibonds may only be subscribed by professional investors, and subscribers may not hold, directly or indirectly, more than 2 percent in the equity capital of the issuer. There are no minimum requirements to the main terms and conditions

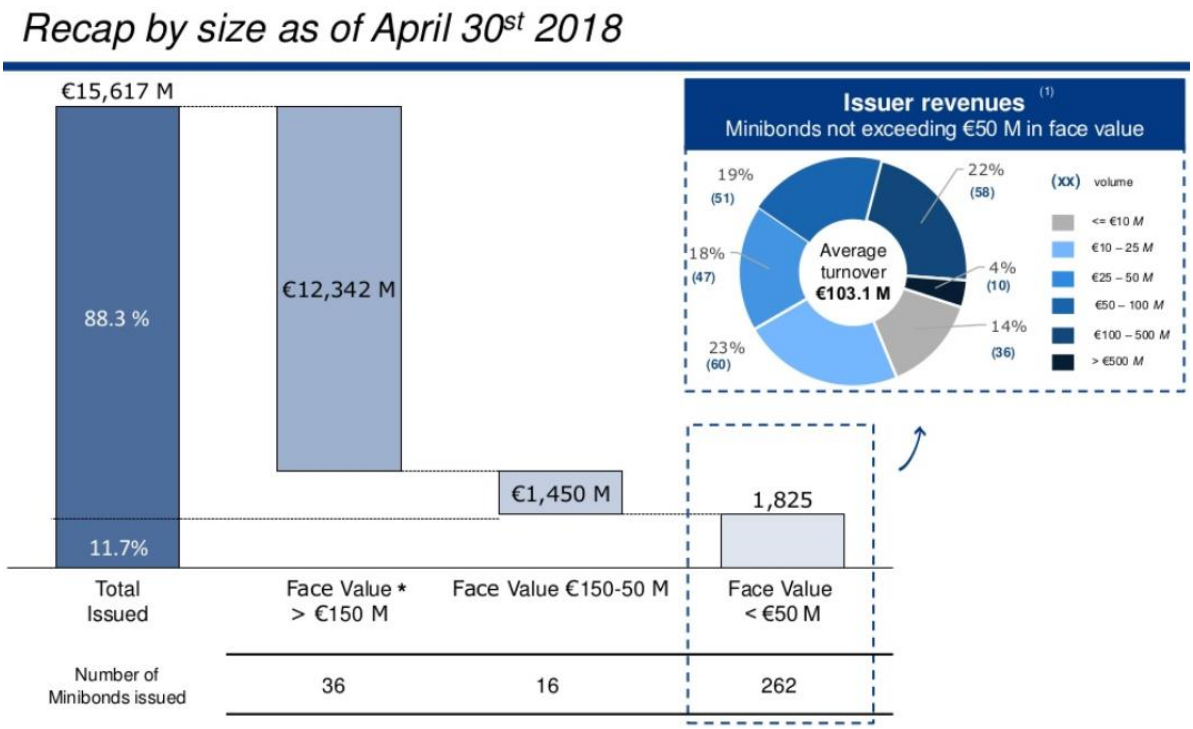
[66] Matched firms were selected with a one-to one Nearest Neighbour Matching without replacement using all the firms within a predetermined Propensity Score distance (caliper; δ = 0.0001. The (probit) estimation of Propensity Scores has been based on firm size (number of employees and total assets), firm sales, profitability, and sector.

of minibonds, including face value, maturity date, interest rate and repayment. Minibonds may be traded on the ExtraMOT Pro market, a segment active from February 2013 and dedicated to the listing of bonds.

As of April 2018, 314 issuances of minibonds were listed on the ExtraMOT Pro dedicated market segment, with a total value of approximately 15.6 billion euros (cf. Figure 4.3). About 65% of issued bonds have a face value lower than 5 million euros and only 16% have face value ranging from 5 to 10 million euros. In total, issues above 10 million euros account for less than 20% of total minibonds.

With regard to the financial characteristics of minibonds' issuers with face value lower than 50 million euros, about 14% has a turnover lower or equal to 10 million euros, and 41% a turnover ranging between 10 and 50 million euros.

Figure 4.3 – Total minibonds issues listed on the ExtraMOT PRO.

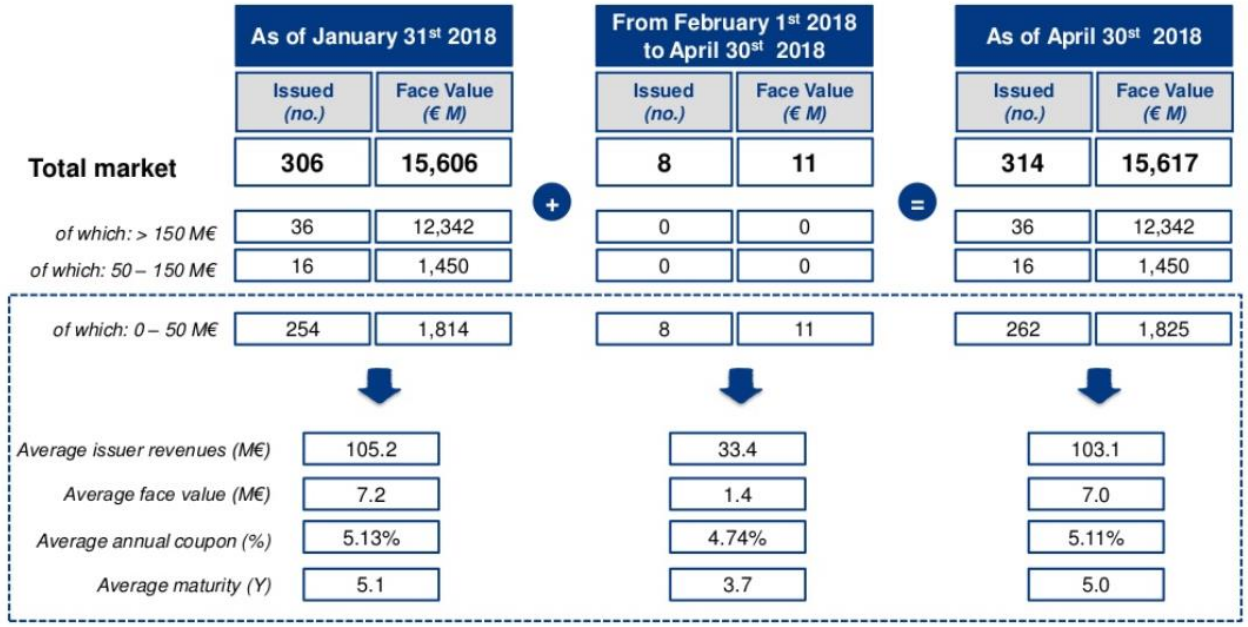


Source: Minibond Italy.

Between 2017 and 2018, there has been a decrease of minibonds issuance below 50 milion euros (see Figure 4.4): in February-April 2018 they sum-up to 11 million euros, while one year before they amounted to 38 million euros. As of April 2018, issues with face value

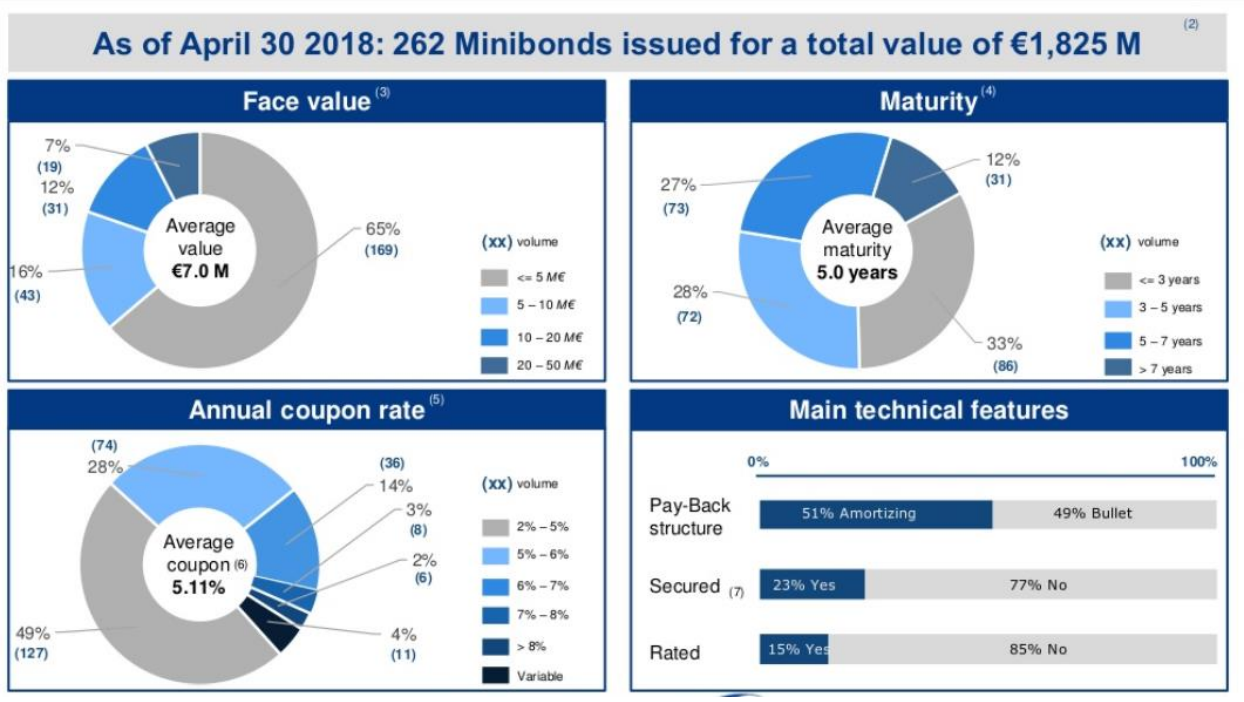
below 50 million euros represents 11.7% of the total value, while minibonds ranging from 50 to 150 million euros account for 9.2%; the majority of the value originates from a handful (36) of issues characterised by large face values (more than 150 million euros).

Figure 4.4 – Evolution of the minibonds market (January – April 2018)



Source: Minibond Italy.

Figure 4.5 – Main indicators as of April 2018



Source: Minibond Italy.

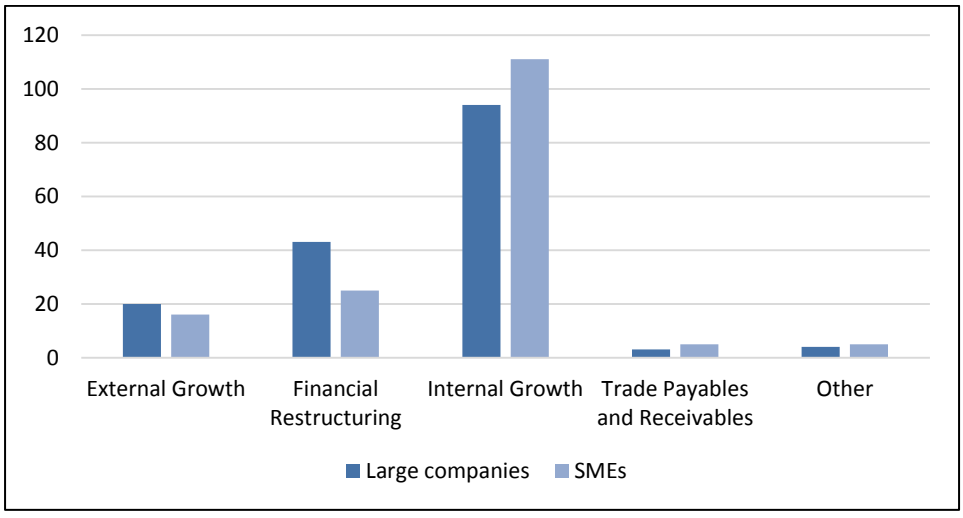
Almost half of the issues have a nominal coupon rate lower than 5%, whereas the remaining 51% provides a nominal face coupon rate higher than 5%, thus confirming the high cost implied in the use of this source of external finance. Finally, as for the repayment type, 51% of issued bonds present an amortising structure, whereas 49% are bullet-type with a fixed repayment structure. Average maturity is about 5 years, and only 15% of bonds are rated (Figure 4.5).

By relying on publicly available documents, such as loan regulation plans and specialized press, the Mini-Bond Observatory of Milan Polytechnic analysed the motivations that pushed companies to issue minibonds. In particular, four main reasons were identified:

- the financing of "internal" growth, through investments in R&D, product innovations, and internationalisation activities;
- the financing of "external" growth, through mergers and acquisitions;
- the restructuring of firms' liabilities, through the reshaping of the financing sources (in this case, the liquidity obtained through the emission of minibonds has been used to repay other financial debts);
- the equilibrium between trade payables and receivables.

Figure 4.6 reports the distribution of firms issuing minibonds between 2013-2017 on the basis of the motivation behind their emissions, distinguishing between large firms and SMEs. As can be noted, the majority of both SMEs and large companies issued minibonds in order to foster their internal growth (63%). The second reason that promoted minibond emission was financial restructuring (21%), and the third was the financing of external growth (11%).

Figure 4.6 – The reasons behind minibond emissions (full sample of 326 emissions between 2013-2017)



Source: Osservatorio Mini-Bond – Politecnico di Milano: 4° Report italiano sui Mini-Bond.

Descriptive analysis

In this subsection we perform a descriptive analysis of the use of minibonds by small and medium-sized enterprises in Italy.[67] By merging information taken from Borsa Italiana (the names of companies issuing minibonds) and BvD-Amadeus (firm balance sheets) we were able to identify about 191 issuing companies and, then, we have examined their distribution by sector (at the NACE 2-digit level), geographical location (at the regional, NUTS-2 level; data for 186 firms), and size class in terms of number of employees (data for 183 firms).

As shown in Table A.4.2 in the appendix, almost 40% of the companies operate in the manufacturing sector, with concentrations in food products (5.2%), machinery and equipment (6.8%), and fabricated metal products (4.2%). In addition to this, the overall distribution of firms by sector results to be quite heterogeneous. It is also interesting to note that more than 5 percent of companies issuing minibonds belong to the construction sector. This supports the beneficial impact of this policy measure on the recovery of the sector, whose competitive position has been strongly compromised by the financial crisis.

Table 4.8 – Distribution of firms issuing minibonds by Italian regions (NUTS-2 Level). Years 2013-2016.

Region NUTS-2 LEVEL	Number of Observations	Percentage
ABRUZZO	1	0.54
BASILICATA	1	0.54
CALABRIA	3	1.61
CAMPANIA	7	3.76
EMILIA ROMAGNA	15	8.06
FRIULI VENEZIA GIULIA	5	2.69
LAZIO	10	5.38
LIGURIA	3	1.61
LOMBARDIA	62	33.33
MARCHE	5	2.69
MOLISE	1	0.54
PIEMONTE	13	6.99
PUGLIA	2	1.08
SARDEGNA	1	0.54
SICILIA	3	1.61
TOSCANA	7	3.76
TRENTINO ALTO ADIGE	21	11.29
UMBRIA	3	1.61
VENETO	23	12.37

Source: Our elaborations from BvD-Amadeus.

[67] The Appendix (Chapter 4) reports the list of companies issuing minibonds between 2013 and 2016.

As for the distribution of companies by geographical location, Table 4.8 shows that one third of firms issuing minibonds are located in Lombardia, 12.4% in Veneto, and 11.3% in Trentino Alto Adige. Overall, 68% of the companies are located in the North of Italy, 22% in the Centre, and only 10% in the South.

Table 4.9 – Distribution of firms issuing minibonds by size class (Number of Employees). Years 2013-2016.

SIZE CLASS (Number of employees)	Number of Observations	Percentage
10-49 Employees	32	17.49
50-99 Employees	32	17.49
100-249 Employees	42	22.95
250-499 Employees	26	14.21
More than 500 Employees	51	27.87
TOTAL	183	100.00

Source: Our elaborations from BvD-Amadeus.

With respect to the distribution of firms by size class, Table 4.9 documents that minibonds have been particularly useful for large companies (almost certainly, those which have issued bonds with the greatest face values; see above). In fact, 42% percent of firms issuing minibonds have more than 250 employees, as opposed to 35% with fewer than 100 employees. Hence, so far, this policy measure seems to have only partially reached the target of promoting SMEs' access to external financing, as only a small portion of micro and small firms have been involved in the issuance of this type of bonds.

In order to get additional insights about the use of minibonds by Italian firms, in Table 4.10 we report a set of summary statistics. On average, firms issuing minibonds have 813 employees, 211 million euros of total assets and 117 million euros of total sales, which confirm the relevance of minibonds for relatively large companies. Moreover, firms issuing minibonds have an average return on sales of 3.24%, a ratio between total debt and total assets of 77% and a liquidity indicator equal to 1.39. Hence, the firms in our sample are relatively large, profitable and with a significant share of debt to finance total assets.

Table 4.10 – Summary statistics for firms issuing minibonds. Years 2013-2016.

Variable	Number of Observations	Mean	Std. Dev.
Number of employees	183	813.28	1707.84
Total assets (M€)	166	211.33	272.44
Sales (M€)	166	117.57	151.80
Return on sales (ROS)	166	3.24	79.20
Debt ratio	163	0.77	0.13
Liquidity ratio	163	1.39	1.28

Source: Our elaborations from BvD-Amadeus.

Performance of the companies before and after the issuance of minibonds

To evaluate the relative performance of the companies issuing minibonds, we have compared the group of issuing companies with groups of similar companies using a set of financial and economic indicators. To avoid results to be influenced by aggregation bias, we have first calculated the median values of performance indicators for each sector (NACE 5-digit), year (2007 to 2016) and size class (see Table 4.8) of the entire firm distribution. Then, we have computed the differences between individual firm indicators and the median value of the indicator by sector/year/size class. The difference with the median value provides a comparative measure of the individual firm performance with respect to its pairs included in the same sector, year and size class: a positive value indicates that the focal firms (the group of issuers) outperform the comparison group, whereas a negative value signals underperformance. Table 4.11 summarises the most relevant features of the issuing companies, before and after the issuance of minibonds.

Overall, issuing firms overperform the comparison group before the introduction of the regulation on minibonds, especially in the years just before the financial crisis. Both ROS and the growth of sales were positive in the period 2007-09 and 2010-12, showing that issuing firms recorded good economic outcomes before issuing minibonds. However, both indexes revert to the median level in the subsequent period (2013-16), with a growth of sales almost similar to the median values of the comparison group and a barely positive differential for the profitability.

Table 4.11 – Summary statistics for firms issuing minibonds. Years 2007-2016. Differences from the sectoral (5-digit) median values computed in each year and size class.

Time interval	ROS	Sales growth	Bank debt on sales	NFP* on equity	NFP on Ebitda**	Equity on total assets
2007-09	0.186	.009	17.38	0.399	1.215	-0.026
2010-12	0.262	.007	23.61	0.486	2.834	-0.028
2013-16	0.004	.000	16.63	0.397	1.887	-0.038

*= Net Financial Position (financial debt minus cash and other liquid securities); **= EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization).
Source: Our elaborations from BvD-Amadeus.

As for the financial indicators, all measures indicate a worsening of the financial conditions of the issuing firms from 2007 to 2012. Then, the improvement of the indicators in the period 2013-16 confirms the financial benefits provided by the use of minibonds, especially in terms of the reduction of the reliance on bank debt and the decrease of financial liabilities on equity and Ebitda. However, and probably as a consequence of the issuance of bonds coupled with a substantial investment activity, issuing firms still present a scarcity of equity capital: the ratio of equity on total assets has constantly deteriorated since 2007, and it has even worsened during the "minibond period" (2013-2016). To summarise, issuing firms are good (economic) performers but with a fragile financial status, probably due to a significant investment activity not supported by an adequate amount of equity financing. The introduction of minibonds helped companies to restore safer financial conditions, but at the cost of deteriorating the financial structure towards an even lower weight of equity capital. Besides, return to sales and sales growth flattered in the period of bond issuance (2013-16), thus stopping to provide the additional cash flow generation produced in the past, which is needed to repay the minibond financial obligations in future years.

4.3 Individual Investment Plans (PIR)

In order to channel private savings towards equity and debt instruments issued by Italian firms (especially SMEs), in 2017 the Italian government introduced a new class of tax exempt investment plans for individual retail investors called "Piani Individuali di Risparmio" (PIR). Returns from PIRs are exempt from both capital gains (26%) and inheritance tax as long as the investment meets a few criteria, among which are a minimum holding period of

5 years and a maximum contribution of 30,000 euros per year. Individual saving plans are a step forward for the evolution of Italian capital markets in two directions. On the one hand, they assist in the capitalisation of small and medium enterprises, which suffer from a chronic lack of capital. On the other hand, they reduce the excessive dependence of those companies on bank credit, thus tempering the long-lasting fragility of a market with few financial operators.

As their introduction dates to 2016, no detailed information is available about this policy measure. However, Assogestioni has provided some data about their emission[68]. The sum mobilised in 2017 amounts to almost 11 billion euros, and the largest portion of it has been due to the launch of new PIR (Table 4.12).

Table 4.12 - Summary statistics for emissions of PIR. Year 2017

	IV quarter	IV quarter	III quarter	IV quarter	2017
Emissions (billions)	1.1	4.3	2.2	3.4	10.9
New PIR (2017)	0.4	3.0	1.8	2.7	7.9
Existing PIR	0.7	1.2	0.4	0.7	3.0

Source: Assogestioni.

Considering the cumulative figures from the latest months of 2016 to the first quarter of 2018, the funds collected via PIR have been 15,769 billion euros. Table 4.13 disaggregates this figure between different types of Italian companies that have issued the shares or bonds included in the investment plans. Non FTSE MIB Italian firms – i.e. listed SMEs with small and medium capitalisation – account for only 43% of total funds and 47% of those concerned with equity. Hence, according to the initial record, it cannot be said that the PIR instrument has been particularly effective in raising the access to equity finance by Italian SMEs.

In 2017, the Italian individual investment plans have involved almost 800 thousands investors with an average investment of 13,670 euros and a median investment of 10,000 euros. As Figure 4.7 illustrates, about 17% of investors subscribed the maximum available amount of 30,000 euros per year, whereas the modal class for the investment (accounting

[68] Rota, A. (2018) Un anno di PIR: offerta, portafogli, clientela (A year of PIR: supply, portfolios, clients), Assogestioni. Presentation made at the conference on "Il successo dei PIR: numeri e investimenti ai raggi x", Milano, Salone del Risparmio, April 11, 2018.

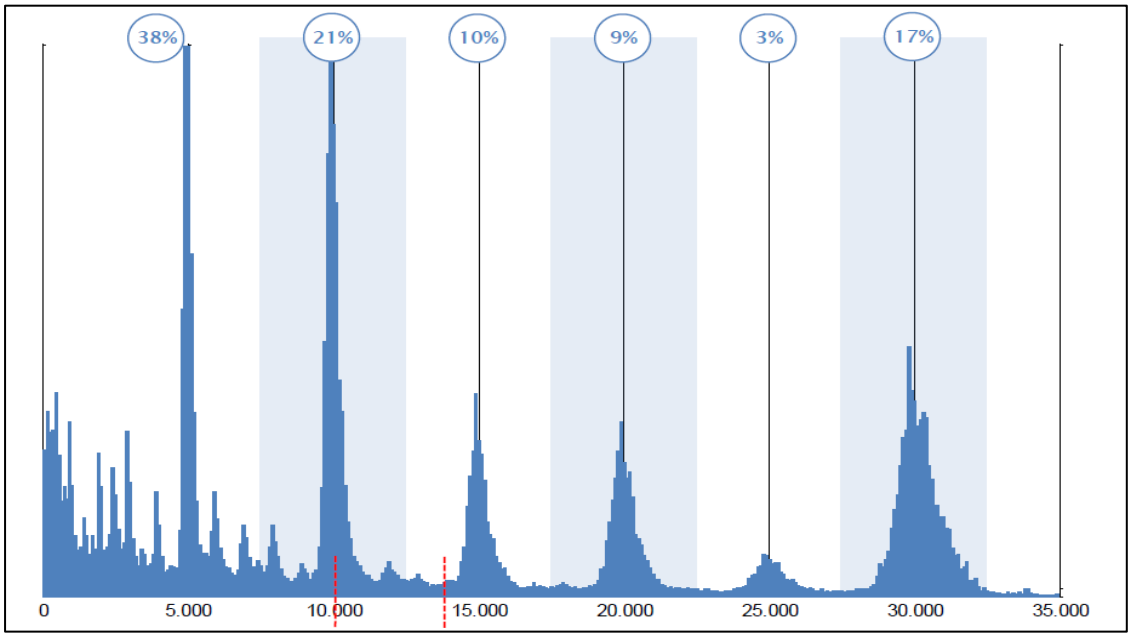
for 38% of investor) was about 5,000 euros. The figure shows frequency peaks corresponding to round amounts of investment (in € thousands).

Table 4.13: Emissions of PIR by issuing company: cumulative figures up to the 1st quarter of 2018

			Issuing company (percentages)							
			Italian Non FTSE MIB					Italian FTSE MIB	Total Italian	Non resident
Type of PIR	Number of PIR	Invested capital	FTSE Italy Mid	FTSE Italy Sm	FTSE Italy AIM	Other non FTSE	Total			
Equity	27	5.376	41.	3.2	1.5	1.2	47.3	40.5	87.8	12.2
Balanced	24	6.1	23.	1.6	1.4	12.2	38.4	37.8	76.2	23.8
Bond	3	0.191	10.	9.3	3.3	13.4	36.6	33.5	70.1	29.9
Flexible	10	4.102	23.	4.9	2.3	15.1	45.8	42.3	88.1	11.9
Total	64	15.769	29.	3.1	2.1	8.9	43.3	39.3	82.6	17.4

Source: Assogestioni.

Figure 4.7 – Distribution of total collected savings by PIR. Stock at December 2017. *



* Estimates on a large sample of 41 PIR with a total invested capital of 9.5 billion (about 87% of total collected savings). Source: Assogestioni.

4.4 The Central Credit Guarantee Fund

In an evaluation study on the effectiveness of Financial Instruments (FIs) in the EU programming period 2007-13 (T33 et al., 2015), Italy came up as the country with the larger use of credit guarantees, in addition to loans, grants and equity capital. Funds allocated to guarantees represented almost 72% of total funds by FIs – vis-à-vis an average share of 32.9% for the other countries, and Italian funds targeted to guarantees accounted for 39.7% of the total European allocation in the period. This evidence explains the role of the guarantee in the definition of the Italian SME capital structure and the complementary role played by this instrument in the credit markets.

In this context, the Central Credit Guarantee Fund (CCGF), managed by MISE (Italian Ministry of Economic Development), represents the main government instrument to support SME finance. Starting in 2009, the CCGF has been strengthened over the subsequent years by increasing its endowment, expanding eligibility criteria and relieving banks from capital charges for loans covered by the Fund.

Table 4.14 - Central Credit Guarantee Fund: loans, guarantees and operations

	2015	2016	2017	2018 (1st quarter)
Loans (K€)	14,988,869	16,647,740	17,461,573	4,596,407
Guarantees allowed (K€)	10,164,722	11,532,680	12,259,852	3,266,829
Guarantees/Loans (%)	67.82	69.27	70.21	71.07
Number of operations	102,596	114,487	119,935	31,473
Mean loans (K€)	146.1	145.4	145.6	146.0

Source: MISE - Annual Reports (2016 and 2017), First Quarter Report (2018) on CCGF.

Along with the growing amount of total guarantees and underlying loans as well as number of operations, Table 4.14 shows that the guarantees provided by the CCGF have covered an increasing share of bank loans: from 67.8% in 2015 to 71.1% in the first quarter of 2018. Considering the number of operations, it emerges that the average size of loans is rather stable over time and equal to about 146 thousand €.

In the following tables we have used the latest data concerned with single operations which, at present, are available for the period 1st January – 15th February 2018. They refer to 14,520 interventions of the Fund in support of firms requiring direct guarantees (9,432 operations), counter-guarantees to back operations originated by other guarantee funds

(5,023 operations) and co-guarantees in partnership with other funds (4 operations). As for the total guarantees that have been allowed and the underlying loans, the amounts are 1.5 and 2.1 billion euros respectively.

Table 4.15 – Central Credit Guarantee Fund. Data from 1st January to 15th February 2018: n. of operations 14,520

Stats	Guarantees allowed (€ thousand)	Loans (€ thousand)
Min	1	1
Max	2,500	4,200
Mean	105.5	148.2
Median	44	70
Total amount	1,533,106	2,152,553

Source: Elaborations on CCGF data downloaded from the MISE web site.

As Table 4.15 illustrates, the size of operations varies from 1 € thousands for both the loan size and the guarantee, up to 2.5 € millions for guarantees (which is the maximum allowed by the extant regulation) and 4.2 million euros for the corresponding loans. Despite the average amounts per operation are relatively high (and in line with those arising from the previous table), the median values turn out to be significantly smaller (44 thousand euros for guarantees and 70 thousand euros for loans) and this indicates that the whole distribution is markedly skewed towards smaller values (and smaller companies).

Table 4.15 - Distribution of CCGF operations by loan size. Data from 1st January to 15th February 2018

Loan size classes (€ thousand)	Number of loans Freq.	Number of guarantees Freq.	Number of loans Cum. Freq.	Number of guarantees Cum. Freq.
1-9	6.16	13.29	6.16	13.29
10-19	9.41	16.50	15.57	29.79
20-49	28.05	23.16	43.62	52.95
50-99	21.08	18.09	64.70	71.04
100-199	16.27	15.32	80.97	86.36
200-499	14.36	10.40	95.33	96.76
500-999	3.73	2.74	99.06	99.50
1,000-2,499	0.89	0.50	99.95	100.00
2,500-4,200	0.05		100.00	-

Source: Elaborations on CCGF data downloaded from the MISE web site.

When the loan size is used to describe the distribution of interventions, data in Table 4.16 show that the modal class is 20-49 thousand euros for both the number of loans and the number of allowed guarantees, whereas the amount of loans larger than 500 thousand euros is negligible and it only includes 4% to 5% of total number of operations. Actually, 64% of loans are below 100 thousand euros, whereas the share of guarantees below that amount rises up to 71%. The cumulative frequency reaches 80% of the total distribution for a loan size equal to 200 thousand euros or lower, after which it rapidly approaches 95% of the distribution for larger loans and guarantee sizes. This evidence clearly highlights that the activity of the CCGF is mostly targeted towards quite small firms, far and beyond the maximum amount of guarantees formally set at 2.5 million euros.

4.5 Summary and concluding remarks

The evidence on the capital structure of Italian SMEs provides a picture where, in aggregate, small and medium-sized enterprises in Italy do not suffer from a general shortage of capital: the leverage of Italian SMEs is about 45%, whereas the major EU countries are mostly below 40% and the US is below 30%.

The problem is that bank financing accounts for a large proportion of the leverage. This **over-reliance on bank debt** is a feature of the Italian economy and is reflected in the structure of the national bank-centered financial system, where the relevance of alternative financial markets and intermediaries is extremely low with respect to the major European countries.

Although bank financing represents a cheap funding source in terms of interest rates, the over-reliance on (short-term) bank debt leaves Italian SMEs heavily exposed to changes in the banks' lending behaviour and the European Central Bank policy. The latter, to prevent domino-effects in case of financial crises, is aiming at consolidating the banking system, especially via more stringent capital requirements.

This situation, coupled with the necessity of using equity capital to finance risky activities such as R&D, innovation and expansion to foreign markets, has pushed Italian financial authorities to tackle **two overlapping problems**. On the one hand, the need to secure and stabilise the overall financial scenario by allowing bank-dependent SMEs to continue to operate within a safe set of conditions. On the other, the need to push the system towards a larger reliance on equity financing. In both cases, the size of the exposure of SMEs with the financial market has required a careful approach targeted to the progressive

reorientation of consolidated financial debt practices, and the introduction of new financial instruments to fill the gap in equity funding.

Despite the effort made by Italian lawmakers to facilitate and support the SMEs' access to capital markets, also from a fiscal perspective, the capital structures of Italian companies still remain heavily over-weighted towards bank funding. However, we believe that the policy initiatives examined in this chapter have been targeted towards the right direction, and are generally consistent with the ex ante status of the economy in which they operate.

New forms of debt financing have been developed over the last few years, even if their effect is still small: Minibonds and private debt funds have been introduced in order to back SMEs' investments and long-term development strategies that cannot be supported by short-term bank loans. Besides, the improved design and functioning of CCGF in terms of type and size of operations is helping SMEs to transition towards a scenario of stricter financial regulation, where many (financially weak) SMEs will risk exiting the market because of stricter bank minimum capital requirements.

On the **equity side**, the Allowance for Corporate Equity (ACE) has been an effective instrument to increase the equity financing in the SMEs capital structure and allow them to sustain risky investments in internationalisation, innovation and R&D. Instead, PIR do not have channeled an adequate amount of funds toward equity financing direct to SMEs. In the same vein, the issuance of minibonds has been more intense among relatively large firms as opposed to those of small size. Finally, the development of a larger market for venture capital and private equity is still an open option. In fact, the efforts targeted to a stronger development are likely to be frustrated by the fact that IPO exit strategies are difficult to implement in the Italian stock exchange (Borsa Italiana), as well as in the still young and small – despite successful - AIM market. In this context, the recent strong development of SPACs (Special Purpose Acquisition Company) represents an interesting alternative to providing equity, even for non-institutional investors.

Overall, the structure and recent development of fiscal and legislative interventions seem consistent with the status of the SMEs-banks financial relationship, as they aim at helping SMEs to transition towards a more market-based financial system and equity financing. In this scenario, corrections to the existing course of actions – in terms of strengthening existing measures and targeting them in a more effective way – can be coupled with other more significant interventions in areas where the Italian financial system still shows some relevant gaps.

5. RESEARCH AND INNOVATION

Investment in research and innovation (and the policies aimed at supporting it) represents a crucial enabling factor for the competitiveness of Italian businesses. The policy measures providing the motivation to perform, in this chapter, a set of detailed empirical analyses are the introduction, by the Italian Government, of an incremental R&D tax credit and a Patent Box (both in 2015), and a "Support of innovative start-ups" (established in 2012). In the first section, after illustrating the recent trends in business R&D and stressing the main reasons of the Italian backwardness, a detailed analysis is performed to highlight the role that R&D tax incentives could play to foster firms' R&D investment. The second section describes recent Italian performance in terms of patent, trademarks and designs applications with a view to examine how it can be related to the introduction of a Patent Box measure. The third section is devoted to an analysis of the innovative start-ups in Italy: although the main focus is upon the local (provincial) factors affecting the birth and performance of these firms, the section provides other descriptive analyses, including one devoted to their recourse to external finance. A final section summarises the results and, in their light, the main policy challenges faced by the Italian Government.

5.1 Business R&D in Italy and the role of tax incentives

Table 5.1 reports basic data on the intensity of R&D expenditures on GDP in the EU and in some of its major Member States from 2009 to 2015 (the latest year in which official statistics are currently available). The gap recorded by Italy with respect to the EU is remarkable in terms of total research expenses but becomes wider when business (or private) R&D is considered. France and, especially, Germany, where the business sector gets the lion's share of total research expenses, are characterised by a higher (total) R&D intensity.

Table 5.1 – Total and business R&D expenditures on GDP

	Total R&D/GDP			Business R&D/GDP		
	2009	2012	2015	2009	2012	2015
EU (28)	1.93	2.01	2.03	1.19	1.27	1.31
Germany	2.74	2.87	2.92	1.84	1.95	2.00
France	2.22	2.23	2.22*	1.36	1.44	1.44*
Italy	1.22	1.27	1.34	0.65	0.69	0.78

*Provisional data. Source: Eurostat

During the latest years, the Italian private sector has registered a slight increase in R&D expenditures. However, as documented in Table 5.2, the annual growth rate of business R&D (at constant prices) over the period 2009-2015 is lower than that experienced in Germany and the EU as a whole and also lower compared to that recorded in previous years (2002-2008).

Table 5.2 - Annual average rates of change of R&D expenditures*

	2002-2008		2009-2015	
	Total	Business	Total	Business
EU (28)	3.07	2.94	2.32	3.08
Germany	2.76	2.76	3.23	3.50
France	0.82	0.68	1.19	2.10
Italy	2.03	3.80	1.39	2.88

* Million euros purchasing power standards (PPS) at 2005 prices.
Source: Own computations from Eurostat data.

According to these data, the Italian gap with respect to the EU in terms of business R&D remains substantial. A comparison with the past and recent performance of Germany and France indicates that the Italian backwardness should be ascribed not only to a low presence, but also to a declining contribution of large R&D spenders. If the Italian performance has not declined in the last years this is due to an increasing number of SMEs that started to perform and report R&D expenditures and to the investment of a group of not too large companies, having between 250 and 499 employees (Sterlacchini, 2017). These positive trends need to be maintained and possibly reinforced by means of an adequate mix of policies. The latter, however, should also be aimed at inducing more R&D efforts by the largest companies, including the foreign ones, which already have (or could decide to locate) research facilities in Italy. In this connection, R&D tax incentives could play an important role in achieving both goals.

With respect to the effectiveness of R&D tax provisions, recent surveys of empirical studies suggest that they tend to generate additional research expenditures (Becker, 2015; Castellacci and Mee Lie, 2015; Appelt et al., 2016), although not always bigger than the

amount of foregone tax revenues. Moreover, the evidence suggests that R&D tax policies seem more effective than direct public funding[69].

With respect to the Italian case, recent empirical analyses indicate that fiscal incentives have exerted a positive effect on business R&D (Cantabene and Nascia, 2014), though particularly on sectors with a higher R&D orientation (Bodas Freitas et al., 2017) and SMEs (Sterlacchini and Venturini, 2018). For the purpose of the present study, particular attention should be placed on the evidence concerned with the 2007-2009 period, because only in those years were Italian firms able to take advantage of a 10% tax credit on the volume of R&D expenditures. Testing the effectiveness of such a tax credit, Cantabene and Nascia (2014) estimate that 1 euro of foregone tax revenues induced an increase in R&D expenditure of 1.6 euros. Performing a similar exercise, though limited to manufacturing firms, Sterlacchini and Venturini (2018) find consistent values (ranging from 1.41 to 1.65) of an R&D fiscal multiplier.

In spite of its remarkable effectiveness (at least, according to the above-mentioned studies), the volume-based R&D tax credit was abandoned in the subsequent years. Only in 2015, the Italian government introduced a new tax credit of 50%, but exclusively based on the increment of R&D expenses. In light of the ongoing international practice, this scheme is unusual: in fact, almost all the developed countries have volume-based R&D tax incentives that are provided either alone (like in France, but also in the UK, Austria and the Netherlands, among many others) or in combination with an incremental-based scheme (e.g. US, Japan and Spain). Italy is the only European country that adopts an incremental scheme only (cf. CPB et al. 2014, p. 54).

For an evaluation of the new tax credit for R&D, micro-economic data concerned with the years 2015-2017 are not available. Aggregate data on business R&D expenditures released by Istat, published in 2017, refer to the year 2015 and also report the firms' forecasted expenditures in the two subsequent years.

[69] Aristei et al. (2017) show that, during the economic crisis of 2008-2009, R&D subsidies have allowed EU manufacturing firms (including the Italian ones) to maintain, but not to augment, the intensity of research expenditures on total sales

Table 5.3 – Distribution of Italian business R&D and percentage of funds by size class

	Share on total performed R&D	Percentage of business funds	Percentage of public funds	Percentage of foreign funds
2012				
0-49 employees	8.93	81.86	10.80	6.38
50-249	13.94	89.49	3.74	6.54
250-499	11.73	81.25	7.39	11.12
500 and more	65.40	76.81	7.19	15.62
Total	100.00	79.55	7.05	13.00
2015				
0-49 employees	10.40	86.70	7.65	5.25
50-249	17.93	87.09	5.05	7.74
250-499	11.64	90.11	6.54	3.29
500 and more	60.03	81.73	5.05	12.77
Total	100.00	84.18	5.49	9.98

Source: Istat.

In 2015 the Italian business sector has performed R&D activities for 12.9 € billion against 11.1 in 2012. As documented in Table 5.3, this increase was mainly due to SMEs and firms with fewer than 500 employees. In fact, with respect to the distribution of expenditures by size class, the latest years confirm the trend already emphasised in commenting Table 5.2: firms larger than 499 employees show a declining contribution to the R&D performed by the business sector (from 65% in 2012 to 60% in 2015).

An important change has occurred in the source of finance: in fact, while in 2012 business companies funded about 80% of their R&D, in 2015 this share increased to 84%, signalling a reduction of external sources. The funds coming from foreign firms and organisations diminished from 13 to 10% (from 1.44 to 1.29 € billions) and such a decrease has especially hit the firms having between 250 and 499 employees. On the other hand, the share of public funds for business R&D decreased from 7% in 2012 to 5.5% in 2015 (from 783 to 708 million euros in absolute values), and the reduction has been more severe for small firms. Compared to the EU countries providing both direct and indirect incentives (i.e. subsidies and fiscal provisions), the Italian percentage of public support for business R&D in GDP is among the lowest (cf. European Commission, 2018; Chapter I.3).

Micro-economic analysis

For a micro-economic analysis of the effects of public support to business R&D provided at the national level by means of direct funding and tax incentives, the CIS data referring to the years 2008, 2010 and 2012 have been used. The first wave of CIS is of particular interest, because only in 2008 was a tax credit based on the level of R&D expenditures at work. So, it will be possible to test whether in that year the recourse to national public support and, especially, its impact on innovative activities was higher than in the subsequent years. Unfortunately, because in the CIS direct subsidies cannot be distinguished from tax incentives, it is difficult to relate the cost of the tax credit to the change in firms' R&D spending.

From a methodological point of view, the impact of R&D tax incentives is evaluated by means of the non-parametric method of Propensity Score Matching (cf. Caliendo and Kopeing, 2008). This procedure matches each (treated) firm benefiting from public support with the most similar firm belonging to the (control) group of non-supported companies (untreated). Each pair is identified on the basis of the propensity scores yielded by a probit regression, which predicts the probability of exploiting public support for R&D with a set of observable characteristics ($\mathbf{Z}_i$). Formally:

$$P(\mathbf{Z}_i) = 1(\mathbf{Z}_i'\alpha + \varepsilon_i > 0) \qquad [5.1]$$

After the matching, the statistical significance of the difference in the level of R&D expenditure or their average intensity on total sales can be tested, $E(\mathrm{RD})$,between treated (with S_i=1, indexed by 1) and untreated firms (with S_i=0, indexed by 0). This difference represents the Average Treatment Effect on the Treated (ATET), which can be formalised as:

$$ATET = E(\mathrm{RD}_{i1} \mid S_i = 1, P(\mathbf{Z}_i) = p_i) - E(\mathrm{RD}_{i0} \mid S_i = 0, P(\mathbf{Z}_i) = p_i) \qquad [5.2]$$

Along with the outcome in terms of R&D intensity or level, the same procedure can be used to test whether there are significant differences between treated and untreated companies with respect to the propensity to introduce process and product innovations and the share of turnover due to new products.

The empirical application employs data from three subsequent waves of the CIS, namely CIS 2008, 2010 and 2012. These data are provided by Istat[70] and involved representative samples, for both Italian manufacturing and service sectors, including 19,904, 18,328, and 18,697 firms, respectively.

Table 5.4 – Firms doing R&D and receiving public support

	CIS 2008	CIS 2010	CIS 2012
Number of firms	19,904	18,328	18,697
Firms doing R&D	3,123	3,130	2,564
Firms with national support only (treated group)	568	341	274
Firms without any kind of support (control group I)	1,659	1,987	1,549
Firms with regional and/or EU support only (control group II)	655	582	524
Firms with both national and regional or EU support (excluded)	241	220	217

Source: Our computations from CIS micro-data for Italy.

In order to provide a proper evaluation of the policy intervention (i.e. R&D tax incentives provided at national level), we have restricted the analysis to the firms reporting R&D expenses in the reference years (see the second row of Table 5.4). For each firm, the CIS provides information on whether a firm has received any public support for innovation from different levels of government: national, regional or European Union. Drawing on firms' answers, we have first selected the firms that obtained public support from the central government only. For the purpose of our analysis, this is the group of "treated" firms because R&D tax credits, by definition, are provided at the national level only. These firms can be opposed to those which did not receive any kind of public support (control group I) and to those benefitting from regional and/or EU support only (control group II). In the latter case, the aim is that of evaluating whether national support was more effective than that provided by other levels of government. Obviously, to do so, the firms that exploited

[70] The elaboration on micro-data from CIS 2012 (Indagine statistica sull'innovazione nelle imprese - 2012) have been carried out in the Istat safe centre (Laboratorio per l'Analisi dei Dati ELEmentari - ADELE) in compliance with the norms on statistical confidentiality and protection of personal data. The results and opinions expressed are the sole responsibility of the authors and do not constitute official statistics.

both national and regional or EU support are excluded from the analysis (see the last row of Table 5.4).

After having identified the different groups of treated and control firms, we have run probit regressions for estimating the probability of receiving national support, i.e. the Propensity Scores that will be used for matching the supported and unsupported (or differently supported) firms with similar observable characteristics. With regard to the set of covariates to be included in the probit estimation, several factors have been considered. These are identified drawing on (and extending) recent empirical studies using a similar methodology (see among others Cerulli and Potì, 2012; Marzucchi and Montresor, 2015).

First of all a set of size and sectorial dummies have been included. Firm size is clearly a leading aspect that needs to be taken into account in explaining firms' ability to attract external funding. In particular, SIZE_S, SIZE_M and SIZE_L respectively account for the small, medium and large size of the firms, measured in terms of employees[71]. Six sectorial dummies are defined following an aggregation of the manufacturing industry according to technological intensity (OECD, 2011) and based on the two-digit NACE (statistical classification of economic activities) that has helped create the following typology: i. High-tech industry (High-tech_IND); ii. Low-tech industry (Low-tech_IND); iii. Knowledge Intensive Business Services (KIBS); iv. Other services (Other_SERV); v. Construction (CONSTR); vi. Retail and distribution (RET_DISTR)[72].

Next, we considered whether a firm belongs to an enterprise group with its headquarters in Italy (GROUP) or if it is affiliated with a multinational corporation (MULTINAT_CORP). In principle, firms belonging to a group might be more likely to receive public funding because they presumably have better access to governmental policy initiatives due to their network linkages. Nevertheless, the nationality of the mother-firm could be determinant in this respect: indeed, firms belonging to a multinational corporation might be not qualified for national technology programs or more prone to file applications in their home country.
Another group of dummies provide information about the relevance of external information sources for firms' innovation activities. More specifically, SGMT_1, SGMT_2 and SGMT_3 indicate the relevance ("nil or low", "medium", "high") that firms attribute to governmental

[71] In CIS 2008 small, medium and large firm size correspond to firms with not less than 10 to 49 employees, from 50 to 249 employees and with 250 or more employees, respectively. In CIS 2010 there are also data on firms with less than 10 employees, which have been thus included in the "small" class size.
[72] For the sectoral composition see the Appendix of Section 2. In CIS 2008, Italian firms belonging to NACE 53 and to NACE 45, 65, 66, 68, 72, 77 and B have been dropped from the working sample because for these sectors the anonymization process carried out by ISTAT has resulted in the aggregation of the small, medium and large firms into a unique dimensional class. In CIS 2010, for the same reason, firms belonging to NACE 37 have been selected out.

sources of information. Likewise, SPRO_1, SPRO_2, SPRO_3 indicate the importance of information coming from professional and industry associations. The importance of information coming from outside is obvious: in the case of a tax credit for R&D, firms may still not be aware of its existence as well as of its potential advantages. Therefore, firms with better access to external sources of knowledge (especially from governmental institutions or from other firms in the same sector) might be more likely to be successful applicants. Since relevant knowledge and information can be transmitted, not only through informal interaction, but also via formal cooperation, we have also included: COOPGOV, which equals 1 if a firm has cooperation agreements for R&D and innovation with government and public research labs (0 otherwise); and COOPCOMP, equal to 1 if a firm cooperates with competitors (0 otherwise).

Then, an EXPORT dummy has been introduced to identify firms selling their products or services abroad. In theory, these firms should be more innovative than those oriented towards domestic markets and thus also more likely to apply and receive public support. Finally, we have considered that, especially for SMEs, the exploitation of public support depends upon the presence of qualified personnel able to predispose an adequate and successful application. Accordingly, we have included a further binary indicator of whether a firm has adopted organisational innovations, ORG_INN, considering this as proxy of "managerial quality"[73].

Table 5.5 reports the results of the probit estimations arising from the three waves of CIS, when the treated firms (with national support; 568 in 2008, 341 in 2010 and 274 in 2012) are grouped together with those without any kind of support (1,659, 1,987 and 1,549, respectively). The probit regressions using data for the second control groups are reported in the appendix (Table A5.1).

As expected, firms supported by national schemes (R&D subsidies, tax incentives or both) are mostly of medium and large size. Also, they seem concentrated in manufacturing sectors, both high-tech and low-tech. These findings are fully consistent among the CIS waves. As far as the relevance of external sources of information is concerned, a positive role of information coming from governmental institutions emerges in CIS 2008 and 2012. Data from the last wave indicate that the R&D cooperation with governmental organisations also exerts a positive impact. Instead, other channels of knowledge and information do not increase the probability of getting public incentives from the national government. Only with CIS 2010 and 2012 data, exporting firms are more likely to obtain public support from central government (though the estimated coefficient is barely significant in the last wave).

[73] For the quality of personnel a better proxy would be the share of graduate employees. Unfortunately, this variable is not available for CIS 2008.

Table 5.5 – Probit estimation for the probability of receiving national public support (control groups I)

	CIS 2008		CIS 2010		CIS 2012	
	COEFF.	S.E.	COEFF.	S.E.	COEFF.	S.E.
Size_M	0.5224***	(0.0775)	0.4182***	(0.0875)	0.3834***	(0.1091)
Size_L	0.6060***	(0.0942)	0.4692***	(0.0990)	0.6523***	(0.1168)
High-tech_IND	0.5646***	(0.1423)	0.5353***	(0.1355)	0.3326**	(0.1487)
Low-tech_IND	0.4581***	(0.1365)	0.3929***	(0.1267)	0.3177**	(0.1431)
KIBS	0.1057	(0.1505)	0.0280	(0.1470)	0.2135	(0.1567)
Other_SERV	-0.1935	(0.1805)	-0.0868	(0.2124)	0.0354	(0.2008)
CONSTR	0.0559	(0.2064)	0.1791	(0.1947)	-0.3046	(0.2357)
GROUP	0.0820	(0.0804)	0.1388	(0.0864)	0.0153	(0.1026)
MULTINAT_CORP	-0.1095	(0.1025)	0.0461	(0.1082)	-0.2712*	(0.1394)
SGMT_2	0.3006**	(0.1253)	0.1460	(0.1339)	0.2256**	(0.1130)
SGMT_3	0.2837	(0.2004)	0.0740	(0.2385)	-0.0547	(0.2084)
SPRO_2	-0.1034	(0.0769)	-0.1019	(0.0889)	-0.1930**	(0.0976)
SPRO_3	-0.0326	(0.1371)	0.0415	(0.1470)	-0.0001	(0.1605)
COOP_GOV	0.2454	(0.1509)	0.1905	(0.1759)	0.6368***	(0.1578)
COOP_COMP	0.1578	(0.1144)	0.0494	(0.1414)	-0.0612	(0.1509)
EXPORT	0.1105	(0.0778)	0.3460***	(0.0924)	0.1870*	(0.1062)
ORG_INN	0.0062	(0.0656)	-0.0997	(0.0731)	0.0088	(0.0861)
Constant	-1.4897***	(0.1438)	-1.8738***	(0.1421)	-1.7749***	(0.1676)
Observations	2,227 (568+1,659)		2,328 (341+1,987)		1823 (274+1549)	
Pseudo R^2	0.0871		0.0992		0.0884	

*** p<0.01, ** p<0.05, * p<0.10 . Robust standard errors in parentheses. Size_S, RET_DISTR, SGMT_1 and SPRO_1 used as reference terms.

Having obtained the propensity scores from the above regressions, the treated and untreated (or differently treated) firms have been matched according to the one-to-one Nearest Neighbour matching procedure (NN1) with replacement and also imposing the common support and a 0.1 caliper. Most importantly, an exact matching for firms belonging to the same sector and the same size class has been imposed. A test for the balancing property before and after the matching indicates that our matching procedure performs quite well (see examples in the appendix).

The last group of variables of interest for our analysis is the set of outcome variables which should capture the effects of public incentives in terms of innovative inputs and outputs. *Input effects* refer to the level (or intensity) of R&D expenses that firms would not have

allocated to the innovation process without public support. It is important to stress that with our analysis an evaluation of the so-called *input additionality* cannot be performed because we do not know the amount of public subsidies or tax incentives received by the companies. Thus, we can only provide a test for the presence of full-crowding out (i.e. whether supported firms have reduced their own R&D efforts thanks to public incentives). *Output effects* concern the innovative outcomes that firms would not have achieved without public support.

As far as *input effects* are concerned, the following indicators have been considered: the overall expenditure (both intra and extra-muros) in R&D (RD_exp; variable in level); the same variable winsorized at 1% (0.5% from each side) to limit the effects of outliers (RDexp_win); the intensity of the overall R&D expenditure on firm turnover (RD_int; variable in ratio). Turning to *output effects*, we have included two dummies for the introduction of product innovation (PRODinn) and process innovation (PROCinn) and the share of turnover due to innovative products that were new to the market (TURNmar).

Table 5.6 – Average treatment effects on the treated (ATET)

	CIS 2008		CIS 2010		CIS 2012	
Treated	568	568	341	341	274	274
(matched)	(562)	(558)	(287)	(336)	(274)	(269)
Controls I	1659		1987		1549	
Controls II		655		582		524
RDexp(K€)	2934*	2959*	2419**	1422	245	455
RDexp_win (K€)	328**	297*	237	215	169	441
RDint (%)	1.33**	1.12	1.77**	1.00	1.40*	-1.53
PRODinn (%)	18.51***	13.26***	0.59	-1.19	5.11	3.35
PROCinn (%)	4.98	3.76	0.59	-8.33	-1.82	4.83
TURNmar (%)	4.82	3.35	5.16	0.88	1.16	-0.87

n.a.= not available. *** p<0.01, **p<0.05, *p<0.10. R&D expenses in thousands of euros and the shares of turnover due to products new to the market refer to the years 2008, 2010 and 2012. The introduction of innovations is meant over the three-year periods 2006-2008 and 2008-2010 and 2010-2012.

For the above effects, Table 5.6 shows the estimated ATET (i.e. the mean differences between treated and untreated firms after the matching). Starting from CIS 2008, we can

say that the national support for innovation has significant input effects. Indeed, in the case of R&D activities, full crowding-out can be rejected in most cases. With respect to unsupported firms (controls I), the mean equality can be rejected for both R&D expenditure and R&D intensity; in terms of R&D expenditures, the average effect on the supported firms is +328 thousand euros, when the data are winsorized (i.e. extreme values or outliers are excluded) which is also reflected in an increased intensity of firms' R&D investment (+1%). With respect to firms receiving other types of public funds (controls II), except for R&D intensity, where the t-test is not significant, the mean equality between treated and untreated firms can also be rejected for R&D expenditure variables. Hence, it turns out that firms receiving public national funding for their innovation projects would have invested significantly less without public support. Another important result is that higher investments in R&D induced by policy intervention seem to translate into an increased capacity to introduce product innovations. No significant effect is instead found for the other output additionality indicators considered.

Moving to the subsequent waves of CIS, it is worth recalling here that our purpose is to test whether in 2010 and 2012 – when an R&D tax credit was not more in force – the impact of national support on firms' innovative activities has been lower than in 2008. The results of the propensity score matching analysis support the above hypothesis. Indeed, compared to previous estimates, the positive effect of government financial support appears much more limited in 2010 and, especially, in 2012 where no significant impacts are detected. With CIS 2010 data, a positive impact on the treated firms only emerges when R&D investments (RD_exp) and R&D intensity (RD_int) are compared with similar untreated firms (controls I). Moreover, the positive result concerned with the level of R&D expenditures seems to be driven by the presence of extreme values in the distribution: in fact, when RDexp_win is used the mean differences are not more significant. Finally, unlike in 2008, output effects are always insignificant.

According to the above analysis, it can be said that the presence of a measure allowing fiscal incentives for business R&D represents an important stimulus to firms' R&D efforts. Obviously, because such a finding refers to the past experience, we cannot infer from it that the current R&D tax incentive to Italian firms will also be equally effective. First of all, the 10% R&D tax credit in force in 2008 was on the level of R&D expenditures while the current one, introduced in 2005, allows a 50% tax credit but only on the increment of R&D expenses (with respect to the previous three years). Second, firm-level data on R&D outlays in 2016 and 2017 are not available so that it is difficult to assess the impact of the "new" R&D tax credit.

In spite of the latter limitation, a preliminary evaluation of the effect of the current R&D tax credit allowed to Italian firms is contained in the latest Istat report on the competitiveness of Italian sectors (Istat, 2018). The authors use firm-level data for the variation of R&D expenditures in 2015 with respect to the average recorded in the years 2012-2014. Moreover, having access to fiscal information, they are able to identify the firms that already benefitted from the R&D tax credit in 2015. Then, they employ a Propensity Score Matching approach to estimate the differences in terms of R&D expenditures and R&D employees between the firms that exploited the research tax credit and those that did not although they were eligible to it. The results show that the treated firms, as opposed to the untreated companies with similar characteristics, recorded a significant increase of R&D employees but not of R&D expenditures. Hence, it remains doubtful whether a tax credit exclusively based on R&D increments would be effective in raising the R&D investment of Italian firms.

5.2 Investment in IPRs and the Patent Box

The aim of Patent Box measures is to reduce the corporate tax rates to the revenues derived from the exploitation of Intellectual Property Rights (IPRs). Thus, in principle, patent boxes should directly and particularly incentivise patented inventions and, indirectly, also the R&D activities undertaken to achieve such outcomes. However, it is not clear why, once a patent has been obtained and, then, the invention protected from imitation, the patent owner should receive further tax incentives (see the study by CPB et al., 2014, carried out on behalf of the European Commission). This doubt finds support from the empirical analyses so far provided, which suggest that patent box policies do not stimulate substantial revenues and innovations.

Up to 2014, numerous countries have adopted patent boxes: among them the US, the UK, Belgium, Spain, Portugal, France, Ireland, the Netherlands, Luxembourg, Malta and Hungary. Griffith et al. (2014), have carried out a simulation of the effects of patent boxes in Benelux countries and the United Kingdom. The results show that these countries, and the UK in particular, are able to attract more new patents (especially those owned by the subsidiaries of transnational companies), but that such a positive effect is outweighed by the negative one due to lower tax rates. Accordingly, patent boxes seem particularly effective in relocating corporate income among countries (CPB et al., 2014): the latter, as a consequence, are induced to undertake aggressive fiscal competition resulting, ultimately, in a "race to the bottom" in terms of fiscal revenues. Similar concerns are stressed by Evers et al. (2015): while IPR box regimes seem particularly effective in reducing the tax burden of multinational firms able to relocate their intangible assets among countries, there is little or no evidence that such measures incentivise domestic firms to increase investment in innovative activities.

In 2015, Italy introduced its first Patent Box regime also with a view to follow the European trend. Thus, among the explicit purposes of the policy measure, there were the transfer to and the keeping in Italy of IPRs held abroad by Italian and foreign companies. In the Italian system, differently from that adopted in most of the above-mentioned countries, a wider set of intangible assets are entitled for the Patent Box: not only patents but also software, trademarks and design models that are legally protected[74].

[74] However, to comply with the OECD guidelines, in 2017 the Italian government has amended the Patent Box regime by excluding trademarks.

Table 5.7 – Patent applications to the EPO

	2013	2014	2015	2016	2017
Number					
Germany	26,645	25,621	24,820	25,086	25,490
France	9,754	10,557	10,761	10,486	10,559
Italy	3,704	3,613	3,979	4,166	4,352
Annual rate of change					
Germany		-3.84	-3.13	1.07	1.61
France		8.23	1.93	-2.56	0.70
Italy		-2.46	10.13	4.70	4.46
Ratio per million inhabitants					
Germany	328	316	307	311	316
France	148	159	162	157	157
Italy	60	59	64	67	70

Source: Annual reports of the EPO.

Table 5.7 compares for recent years the number, variation and intensity of patent applications to the EPO between some of the EU major countries. From 2015 to 2017 the number of applications coming from Italy increased remarkably, much more than in France and Germany. In spite of this, the gap in terms of patent intensity (ratio of patent applications over population) with respect to France and, especially, Germany remains huge. Moreover, looking at Italian performance in previous years, it can be seen that the number of patent applications to the EPO reached a peak of 4,343 in 2008 (cf. the EPO annual reports) and then declined to 3,613 in 2014: thus, the recovery experienced in the latest years, though important, should not be emphasised too much, because it has simply restored the situation recorded before the economic crisis.

Because the Italian Patent Box also refers to other IPRs along with patents, the following tables illustrate similar data for EU Trademarks and Community Designs. Trademarks are an essential part of the identity or image of goods and services in the eyes of consumers: although they do not reflect technological innovations, trademarks can provide a link between innovations and markets. The EU Trademarks are protected throughout the European Union and the European Union Intellectual Property Office (EUIPO) is the official office for the registration of EU Trademarks and Community Designs. The latter refer to the external appearance of products or their parts. Thus, also in this case, they mainly refer to

non-technological innovations. Nevertheless, it should be noticed that, in some sectors, new product designs are closely associated with their technological attributes.

Table 5.8 – EU trademarks applications

	2012	2013	2014	2015	2016
Number					
EU(28)	76,526	80,181	82,602	89,412	92,813
Italy	8,089	8,756	9,246	9,930	11,350
Annual rate of change					
EU(28)		4.78	3.02	8.24	3.80
Italy		8.25	5.60	7.40	14.30
Ratio per million inhabitants					
EU	152	159	163	176	182
Italy	136	147	152	163	183

Sources: Eurostat and EUIPO (Annual Report 2017).

Table 5.9 – Community designs applications

	2012	2013	2014	2015	2016
Number					
EU(28)	59,173	60,157	60,957	59,818	n.a.
Germany	18,636	18,184	18,819	16,951	18,660
Italy	8,805	8,441	8,903	9,798	11,790
Annual rate of change					
EU(28)		1.66	1.33	-1.87	n.a.
Germany		-2.43	3.49	-9.93	10.08
Italy		-4.13	5.47	10.05	20.33
Ratio per million inhabitants					
EU(28)	117	119	120	118	n.a.
Germany	232	226	233	209	228
Italy	148	141	146	161	193

n.a.= not available
Sources: Eurostat and EUIPO (Annual Report 2017).

Table 5.8 documents that, in terms of intensity of EU Trademarks over population, Italy has been able, over the period 2012 to 2015, to significantly reduce the gap with respect to the whole EU while in 2016 (the last year with available data) the gap disappears thanks to a remarkable increase in Italian applications (+14% with respect to the previous year).

When Community Designs are taken into account (cf. Table 5.9), the intensity over population was higher in Italy than in the EU, while lower than that of Germany. However, during the latest available years Italy has been able to substantially reduce the gap with Germany thanks to a surge of applications, especially in 2016 (+20 with respect to 2015).

Table 5.10 – Shares of intangibles on total assets: Italian companies

		2012	2013	2014	2015	2016
Patents>0 and Trademarks>0		14.50	14.20	13.64	13.90	14.32
Firms	5,335					
Patents	82,713					
Trademarks	39,699					
Patents>49		18.02	17.61	16.86	16.03	17.39
Firms (% on total)	284 (5.3)					
Patents (% on total)	45,231 (54.7)					
Trademarks (% on total)	9,715 (24.5)					
Trademarks>49		20.45	19.40	18.60	18.74	20.84
Firms (% on total)	110 (2.1)					
Patents (% on total)	16,493 (19.9)					
Trademarks (% on total)	12,683 (32.0)					

Source: Our elaborations from the Amadeus-Bureau van Dijk database.

Although data for 2017 would help for a more reliable conclusion, the above evidence suggests that the introduction of a Patent Box in 2015 has probably provided, in the following year, a further impulse to the already experienced increase in Italian applications for EU Trademarks and Community Designs. Instead, the same impulse is less evident when patent applications to the EPO are taken into account. In fact, the highest increase in Italian patent applications was recorded before rather than after the introduction of Patent Box (i.e. between 2014 and 2015; cf. Table 5.7).

An inspection to the Amadeus-Bureau van Dijk database has allowed us to add further pieces of evidence to the above analysis. We have selected the Italian companies that in 2016 have at least one patent and one trademark in their portfolio: 5,335 firms possess the above characteristics for a total of 82,713 patents (15.5 per firm) and 39,699 trademarks (7.4). For these firms, the first row in the top part of Table 5.10 reports the shares of intangible assets on total assets (as they emerge from the balance sheet data of the companies): no remarkable changes can be observed moving from 2012 to 2016 (last year with available data). Then, the firms with a high propensity to patent have been identified as those possessing a portfolio composed of more than 49 patents. In this way 288 firms are selected, representing 5.3% of the original population but possessing 54.7% of total patents and 24.5% of total trademarks.

These firms record a share of intangibles over total assets higher than that of the original population. However, such a share is slightly decreasing moving from 2012 and 2016. Finally, the last group includes firms with a high propensity to register trademarks as those with more than 49 trademarks in their portfolio. Only 110 firms have the above feature, accounting for a mere 2.1% of the original population but possessing 32% of total trademarks and about 20% of total patents. The shares of intangibles over total assets are the biggest[75] and, after some reductions between 2013 and 2015, in the last year they recover the value recorded in 2012.

Coupled with the previous evidence, these findings suggest that if the introduction of a Patent Box in 2015 has exerted an impact on Italian companies, such an effect seems to be limited to IPRs having weak linkages with inventions and technological innovations in a strict sense. A recent article[76], documents the remarkable fiscal benefits allowed to eight largest Italian companies that exploited the Patent Box in the fiscal year 2017: the tax reductions, based on IPR revenues and expenses recorded in 2015-2017, ranged from 6 to 100 million euros. For the purpose of our analysis, it is important to stress that almost all the mentioned companies own large portfolios of trademarks while having few patents. Moreover, because trademarks are no more eligible to the Italian Patent Box regime, most of the fiscal advantages exploited in 2017 by these companies will not be available in the future.

[75] This finding could be due to the greater propensity of Italian companies to account as assets trademarks rather than patents.

[76] "Luxottica, Campari, Moncler & Co. La grande corsa al patent box" (Luxottica, Campari, Moncler & Co. The great race to the patent box"). La Repubblica, Affari & Finanza, March 19, 2018. The article documents that the amount of tax reductions allowed to these companies thanks to the Patent Box is very high, ranging from 6 to 100 M€.

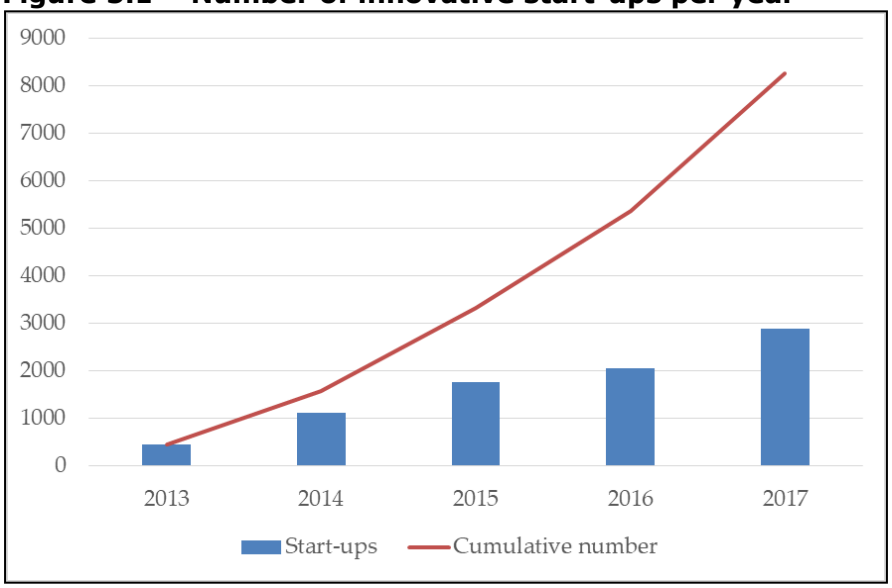
5.3 Innovative start-ups

In 2012 the Italian Government promulgated a decree intended to promote the start-up and growth of new innovative enterprises with a high technological value (Legislative Decree 179/2012 on "Further urgent measures for Italy's economic growth"). The decree was converted into the Law 221/2012, usually referred to as the "Italy Start-up Act".
This law has introduced into the Italian legal system the definition of a new type of enterprise: the so-called "innovative start-up." This kind of enterprise should comply with the following requirements: a) to be newly incorporated; b) to have its operations in Italy; c) to have a yearly turnover lower than 5 million euros; d) to have no distribution of profits; e) to have as an objective the production, development and commercialisation of innovative goods or services of high technological value[77]. Innovative start-ups are registered in a special section of the Business Register created and administrated by the Italian Chambers of Commerce. Innovative start-ups registered in this special section can benefit from a series of advantages defined in the Start-up Act and subsequent legislations. These advantages refer to the following areas: simplification of the incorporation procedure; reduction of administrative costs for starting a new company; more flexible governance (possibility of creating shares with different rights; extension of terms for covering losses); tax benefits for the investors financing the start-up; higher flexibility in employees' remuneration (work-for-equity, stock options). Henceforth, in this section we will refer to these start-ups with the acronym YIF, i.e. "Young Innovative Firms".

A large body of empirical literature has demonstrated that the growth of innovative start-ups is influenced by the local context. This is especially true for new companies operating in knowledge-intensive sectors. Indeed, much of the policy debate about these start-ups is concerned with the creation and development of the so-called 'innovative' or 'entrepreneurial' ecosystems. These ecosystems are generally associated with rather narrow territorial areas, often centred around a city. Cities play a key role in innovative ecosystems given the presence of universities and research centres, the supply of professional and knowledge-intensive services, the presence of financial institutions and the availability of highly educated people. This means that a national law, such as the Start-up Act, may have a heterogeneous impact depending on the presence of large urban areas and the characteristics of the innovative ecosystem.

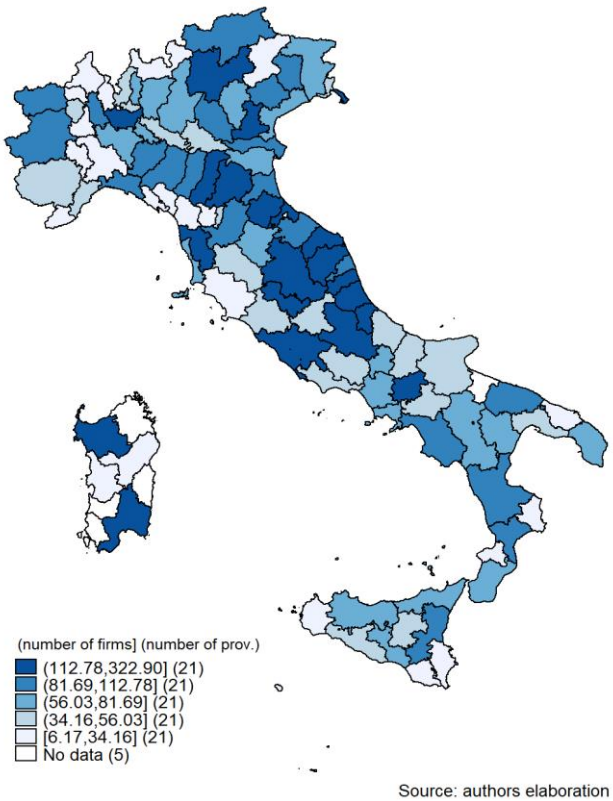
[77] In order to guarantee the latter characteristic, the start-up has to fulfil at least one of the following criteria: 1. at least 15% of the company's expenses can be attributed to R&D activities; 2. at least 1/3 of the total workforce are PhD students, the holders of a PhD or, alternatively, 2/3 of the total workforce must hold a Master's degree; 3. the enterprise is the holder, depositary or licensee of a registered patent (industrial property), or the owner and author of a registered software.

Figure 5.1 – Number of innovative start-ups per year



Source: MISE (Annual reports on start-ups).

Figure 5.2 – Innovative start-ups per million of residents in NUTS3 (total start-ups in 2017)



Source: authors elaboration

Province	Number per million inhabitants
Ascoli Piceno	322.901
Milano	302.800
Trieste	208.605
Rimini	202.861
Modena	182.712
Trento	173.049
Bologna	170.190
Macerata	162.184
Ancona	159.494
L'Aquila	148.110
Cagliari	146.320
Padova	146.297
Pescara	140.215
Perugia	123.729
Roma	122.668
Teramo	122.471
Terni	122.046
Forlì-Cesena	121.473
Pisa	118.791
Sassari	113.874

The differences may also depend on the presence of complementary policy at local level to create a favourable environment for the innovative start-ups. Of course, it is possible to consider a reverse causality effect, as the creation of start-ups may foster the development of private and public services to support them. However, in the short term, we hypothesise that the main causal relation is the one previously stated.

As a result, the main aim of our empirical analysis is to study the factors responsible for the performance of innovative start-ups at the territorial level, by looking at the number of start-ups and their growth. This analysis is of relevant policy interest at both the national and regional level. In the former case, it will help the ex-ante prediction of the territories that are more likely to benefit from the policy and consider possible compensation measures. At the regional level, it will allow policymakers to know the factors on which it is worthwhile concentrating investment and public support, so as to maximise the benefits that the territory may get from the national measure.

Data and methodology

One of the novelties of the "Start-up Act" is the ongoing monitoring of its results, jointly performed by the Ministry of Economic Development, the Italian Chamber of Commerce and ISTAT. Updated statistics about innovative start-ups are regularly released through a dedicated website managed by the Chamber of Commerce. Moreover, the Ministry of Economic Development has to present a detailed report to the Italian Parliament (see MISE, 2017).

At the end of 2017, there were more than 8,000 innovative start-ups registered in the special section of the Business Register (see Figure 5.1). They had about 10,000 employees and involved more than 30,000 shareholders. Figure 5.2 shows the territorial distribution of innovative start-ups per million of residents. As expected, there is large territorial variability.

Tables 5.11a-5-11c shows the distribution of innovative start-up firms by foundation year, sector, and NUTS2 regions, respectively, using the dataset up to 23 of April 2018, with a number of start-ups equal to 9008. The number of innovative start-ups has steadily increased throughout the years. Most of them, around 55%, are located in four regions (Lombardia, Emilia Romagna, Lazio, and Veneto), while about 44% are in the ICT industry.
Italy has 110 provinces (NUTS3) with an average size of about 600,000 people. Our empirical analysis is carried out at the provincial level (NUTS3) on 105 provinces for which data are available. The provincial level has been chosen instead of the narrower territorial level represented by the local labour system (LLS). Though the latter is defined on the basis

of an economic criterion (the commuting of people) rather than for administrative purposes, the former is more appropriate for capturing the availability of private and public services that may influence the creation and performance of innovative start-ups. Moreover, most data are available at the provincial level rather than at the LLS level.

Table 5.11a - Young Innovative Firms by foundation year

Year	Abs. Value	Percentage
2011	8	0.09
2012	16	0.18
2013	721	8.00
2014	1,387	15.40
2015	1,703	18.91
2016	1,941	21.55
2017	2,470	27.42
2018	762	8.46
Total	9,008	100.00

Source: MISE (Annual reports on start-ups).

Table 5.11b - Young Innovative Firms by sector

NACE macro-sector	Abs. Value	Percentage
A+B - Agriculture and mining	60	0.67
C - Manufacturing	1,561	17.33
D+E - Gas and water supply	152	1.69
F - Construction	100	1.11
G - Trade	366	4.06
H+I – Transportation and accommodation services	86	0.95
J - ICT services	4,018	44.60
K - Financial services	14	0.16
L - Real estate services	9	0.10
M - Scientific activities	2,116	23.49
N - Support activities	308	3.42
O+P - Public services and education	75	0.83
Q - Health activities	67	0.74
R+S - Other services	76	0.84
Total	9,008	100.00

Source: MISE (Annual reports on start-ups).

Table 5.11c - Young Innovative Firms by region		
Region (NUTS2)	Abs. Value	Percentage
Abruzzo	211	2.34
Basilicata	90	1.00
Calabria	192	2.13
Campania	660	7.33
Emilia-Romagna	886	9.84
Friuli-Venezia Giulia	209	2.32
Lazio	921	10.22
Liguria	165	1.83
Lombardia	2,165	24.03
Marche	370	4.11
Molise	40	0.44
Piemonte	482	5.35
Puglia	340	3.77
Sardegna	167	1.85
Sicilia	469	5.21
Toscana	402	4.46
Trentino-Alto Adige	233	2.59
Umbria	155	1.72
Valle d'Aosta	19	0.21
Veneto	832	9.24
Total	9,008	100.00

Source: MISE (Annual reports on start-ups).

Data about the performance of innovative start-ups are taken from the Italian Chamber of Commerce (Innovative Start-up Database). Data at the provincial level are taken from the Bank of Italy and ISTAT, which offer a large number of statistics at the provincial level by collecting and homogenising data from different sources. Data on the university system (students, research, etc.) are taken from the Ministry of Education and Research (MIUR), while data on firms' patenting activities are extracted from the OECD REGPAT database. Variable descriptions and data sources are reported in Table 5.12.

Table 5.12 - Variable descriptions and data sources

Variable	Definition	Unit of measure	Source	Time period
Dependent variables				
Number of YIF	Start-ups registered in the Special Section of the Business Register of the Chamber of Commerce	number per million inhabitants	Innovative start-ups database and Istat (population)	2013-2016
Number of YIF in manufacturing sector	Start-ups in the manufacturing sector (Nace Rev.2 code: 10-33)	number per million inhabitants	Innovative start-ups database and Istat (population)	2013-2016
Number of YIF in high-tech manuf. sector	Start-ups in the High-technology knowledge-intensive manufacturing sector (Nace Rev.2 code: 21 26 303)	number per million inhabitants	Innovative start-ups database and Istat (population)	2013-2016
Number of YIF in services	Start-ups in the service sector (Nace Rev.2 code: G H I J K M N O)	number per million inhabitants	Innovative start-ups database and Istat (population)	2013-2016
Number of YIF in high-tech KIS	Start-ups in the High-tech knowledge-intensive services (Nace Rev.2 code: 59 60 61 62 63 72)	number per million inhabitants	Innovative start-ups database and Istat (population)	2013-2016
Employees	Firm employees (mid points of the employee class intervals)	number	Innovative start-ups database	2016
Share capital	Firm share capital (mid points of the share capital class intervals)	euro	Innovative start-ups database	2016
Sales over 1M€	Firm sales over 1M€	thousands of euro	Innovative start-ups database	2016
Employees over 20	Firm employees over 20	number	Innovative start-ups database	2016
Share capital over 50k€	Firm share capital over 50k€	thousands of euro	Innovative start-ups database	2016
Independent variables				
Age	Age of the innovative start-up in 2016		Innovative start-ups database	
Female majority	Start up with woman presence computed as: (% of shareholder amount + % of presence in the shareholder body)/2 >50%	per million of inhabitant	Innovative start-ups database	2013-2016
Young majority	Start up with young (under-35) presence computed as: (% of shareholder amount + % of presence in the shareholder body)/2 >50%	per million of inhabitant	Innovative start-ups database	2013-2016
Foreign majority	Start up with foreigner presence computed as: (% of shareholder amount + % of presence in the shareholder body)/2 >50%	per million of inhabitant	Innovative start-ups database	2013-2016
Value added (over pop.)	Per-capita Value Added at current prices	millions of euros per million of inhabitants	ISTAT	2012-2015
Number of new firms (over pop.)	Number of new-born firms registered at the Chamber of Commerce in the Business Register	per 100,000 inhabitants	Chamber of Commerce	2012-2015
Number of graduates (over pop.)	Number of graduates (Laurea + Laurea Magistrale)	per 100,000 inhabitants	MIUR	2012-2015

Industry heterogeneity	Inverse of the Herfindal Index computed using the share of firms in each 2-digits NACE sector		Chamber of Commerce	2012-2015
Number of patent applications (over pop.)	Number of patents applications to the EPO (European Patent Office)	per inhabitant	OECD REGPAT database	2012-2015
Number of bank branches (over pop.)	Number of bank branches	per 100,000 inhabitants	Bank of Italy	2012-2015
Trade openness	Degree of openness to external trade measured as (total export + total import)/Value Added		ISTAT	2012-2015
Number of murders (over pop.)	Number of homicide	per 100,000 inhabitants	ISTAT	2012-2015
Local university	Dummy University: equals 1 if a university is present in the province		MIUR	
Unemployment rate	Unemployment rate	%	ISTAT	2012-2015

Determinants of birth

First, our analysis investigates the determinants of the birth of innovative start-ups at the provincial level (Fritsch and Mueller, 2007; Andersson and Koster, 2011; Iacobucci and Micozzi, 2015). To this aim, we estimate the following specification:

$$S_{k,t} = \alpha_0 + \alpha_1 X_{k,t-1} + \alpha_t d_t + \varepsilon_{it} \qquad [5.3]$$

where $S_{k,t}$ is the number of YIF per million inhabitants born in province *k* and registered at time *t*; $X_{k,t-1}$ is a vector of local determinants of start-up formation. We take into account the birth of start-ups from 2013 to 2016; therefore, lagged independent variables refer to the years 2012-2015. We estimate a panel random-effect[78] linear model.

[78] In all our models (but for the one on the number of high-tech manufacturing firms), the Hausman test would favour fixed-effects. However, most of the variance of our variables is on the cross-sectional dimension since measures at the provincial-level tend to be very persistent over time. Moreover, variations in the dependent variables are largely unresponsive to 1 year lagged differences of the independent provincial variables. Please note that using a fixed effect model (equivalent to a within-effect/first-difference model) would estimate the relation between the difference in the number of start-ups (between year t and t-1) and the difference of the independent variables (e.g. value added, between year t-1 and t-2). Although in random effect models endogeneity concerns are higher with respect to fixed effect models, we are forced to use the RE and interpret the coefficients as associations instead of giving them a strict causal interpretation. As robustness check, we performed between-effect estimations. They largely confirm our results, pointing to the fact that they are largely driven by differences between provinces instead of differences over time. Conversely, using fixed effect models we find negligible effects of the provincial-level variables on start-ups birth.

Determinants of performances

In order to study the performance of start-ups (Fritsch and Schroeter, 2011), we use the following cross-sectional[79] specification:

$$P_{i,2016} = \alpha_0 + \alpha_1 X_i + \alpha_2 X_{k,t-1} + \varepsilon_i \qquad [5.4]$$

In equation (5.4), P_i is the measure of performance (sales, number of employees, and share capital as to latest available balance sheet, i.e. 2016) of YIF *i* in province *k*; X_i is a vector of performance determinants at the firm level (e.g. age, type of start-up, sector) while $X_{k,t-1}$ is a vector of territorial characteristics at the provincial level (e.g. GDP and number of patents per capita).[80] We have estimated an OLS model for continuous dependent variables and a probit model for binary dependent variables, clustering standard errors at the provincial level.

Estimation results

Table 5.13 reports the estimation results of the model in equation [5.3]. The dependent variable in Column (1) is the number of innovative start-up firms registered in the Special Section of the Business Register at the Chamber of Commerce (Number of YIF). In columns (2)-(5) we have carried out a similar estimation by sector of economic of activities. More specifically, in column (2) the dependent variable is the number of innovative start-up firms in manufacturing sectors, in column (3) the number of innovative start-up firms in high-tech manufacturing sectors, in column (4) the number of innovative start-up firms in service sectors, and finally in column (5) the number of innovative start-up firms in the high-technology, knowledge-intensive service sectors.[81]

[79] Because of data limitations, it has been not possible to perform a panel estimation at the firm-level (e.g. with an augmented Gibrat law specification). In fact, the Amadeus-Bureau van Dijk database does not provide accounting data, related to our dependent variables, for a sufficient number of years and firms. However, for many YIF (ranging from about 2,300 to 4,400 according to the different performance indicator) we have collected information about variables like sales, number of employees and share capital in 2016 from public information diffused by the Italian Chambers of Commerce. Thus, since using panel data techniques would have been not possible due to few firms with accounting information for few years only, we have opted for a cross-sectional model that allows us to have a better representation (less partial and biased) of the population of innovative start-ups.

[80] Since the model is cross sectional but our local-level independent variables varies over time, we have to make them time invariant. We have decided to compute for each independent variable the average in the time period from the year in which the company was founded and 2015, i.e. the year before the one in which our dependent variable is measured. In this way, we aim to capture the average local condition in each firm lifetime.

[81] For a description of these sectors see Table 5.12.

Table 5.13 - Determinants of firms' birth at NUTS3 level (2013-2016)

	1	2	3	4	5
	Number of YIF	Number of YIF in manufacturing sector	Number of YIF in high-tech manuf. sectors	Number of YIF in services	Number of YIF in high-tech KIS
Number of new firms (over pop.)	0.014	0.007**	0.002**	0.007	0.007
	(0.011)	(0.003)	(0.001)	(0.008)	(0.006)
Industry heterogeneity	69.087	6.594	0.084	57.918*	26.644
	(43.036)	(10.722)	(3.062)	(32.640)	(24.510)
Number of patent applications (over pop.)	2.009	16.099***	6.240***	-12.165	-10.817
	(14.486)	(4.304)	(1.310)	(10.817)	(8.251)
Local university	3.401	-0.077	0.214	3.369**	2.909**
	(2.225)	(0.555)	(0.159)	(1.688)	(1.267)
Number of graduates (over pop.)	7.276***	1.847***	0.339***	5.087***	3.343***
	(1.222)	(0.320)	(0.093)	(0.922)	(0.696)
Value added (over pop.)	1.427***	0.098	0.039	1.346***	1.063***
	(0.322)	(0.083)	(0.024)	(0.243)	(0.183)
Trade openness	211.474	60.474	4.587	162.191	221.039
	(266.136)	(69.040)	(19.946)	(200.995)	(151.575)
Number of bank branches (over pop.)	-0.025	0.055**	0.003	-0.072	-0.075
	(0.093)	(0.024)	(0.007)	(0.070)	(0.053)
Unemployment rate	0.032	-0.066	-0.015	0.150	0.111
	(0.303)	(0.087)	(0.026)	(0.226)	(0.172)
Number of murders (over pop.)	-10.225	-5.154	-1.877	-3.206	-1.492
	(57.900)	(20.506)	(6.941)	(42.775)	(32.982)
Constant	-134.22***	-23.90**	-3.66	-106.38***	-63.883***
	(39.712)	(10.099)	(2.907)	(30.067)	(22.617)
Year dummies	Yes	Yes	Yes	Yes	Yes
Number of observations	420	420	420	420	420
Number of provinces	105	105	105	105	105
R^2	0.456	0.340	0.183	0.462	0.438

*** p<0.01, ** p<0.05, * p<0.10 . Robust standard errors (clustered at NUTS3 level) in parentheses.

Column (1) shows that the "Number of graduates (over pop.)" and the level of provincial "Value Added (over pop.)" have a positive and statistically significant impact on the birth of innovative start-up firms. However, "Trade openness," the degree of access to financial services by households and firms proxied by the "Number of bank branches (over pop.)," the "unemployment rate," and the "number of murders," which can be seen as a measure of trust in institutions (OECD, 2017), do not have a statistically significant effect on the birth of innovative start-up firms.

The role played by human capital, as proxied by the number of graduates, is confirmed across industries. Column (2) and column (3) also reveal that in the manufacturing sector, which is characterised by significant entry barriers, the local economic system (as proxied by the number of new firms) and the local knowledge base seem to have an influence on the creation of innovative start-ups. Indeed, the estimated coefficients for the "Number of new firms (over pop.)" and the "Number of patent applications (over pop.)" are positive and statistically significant. Moreover, the level of development of the local banking system (Number of bank branches) is only relevant for the formation of YIF in manufacturing sectors, characterised by a relatively higher capital intensity. Interestingly, this is not true for start-ups in high-tech manufacturing sectors, probably because of the inadequacy of traditional capital providers such as banks in financing the birth of this type of venture.
In the case of YIF in the service sector (column 4) and in the high-tech knowledge-intensive service sector (column 5), the "Number of new firms (over pop.)" and the "Number of patent applications (over pop.)" do not exert a statistically significant impact. The formation of this type of YIF is positively related to the level of economic activity, proxied by provincial value added, as well as to the presence of a university. This evidence seems to suggest that barriers of entry are less relevant with respect to manufacturing firms, while the level of economic activity probably induces a demand for services and thus stimulates the creation of these start-ups.

In what concerns the determinants of YIF performance, the estimation results for model in equation [5.4] are reported in Tables 5.14 and 5.15. In Table 5.14 the dependent continuous variables are firms sales (column 1), number of employees (column 2), and share capital (column 3). In Table 5.15 we have used binary dependent variables instead of the continuous ones, i.e. "Sales over 1M€" (column 1), "Employees over 20" (column 2), and "Share capital over 50k€" (column 3).

Table 5.14 - Determinants of YIF performance at the NUTS3 level: OLS model			
	1	2	3
	Sales	Employees	Share capital
Age	0.050***	0.397**	0.016**
	(0.009)	(0.164)	(0.007)
Female majority	-0.024	-0.867*	-0.027***
	(0.021)	(0.495)	(0.005)
Young majority	-0.054***	-0.834***	-0.029***
	(0.020)	(0.294)	(0.006)
Foreign majority	0.018	-0.355	-0.011
	(0.039)	(0.359)	(0.015)
Number of new firms (over pop.)	0.009	0.038	0.001
	(0.010)	(0.204)	(0.004)
Industry heterogeneity	0.367	2.324	-0.136
	(0.355)	(7.041)	(0.160)
Number of patent applications (over pop.)	0.699***	3.150	0.118
	(0.202)	(4.329)	(0.080)
Local university	-0.013	0.122	-0.014*
	(0.022)	(0.443)	(0.008)
Number of graduates (over pop.)	0.013	0.332	0.014***
	(0.011)	(0.236)	(0.005)
Value added (over pop.)	0.001	0.052*	0.002***
	(0.001)	(0.026)	(0.000)
Commercial openness	-0.015	-0.529	-0.006
	(0.026)	(0.560)	(0.011)
Number of bank branches (over pop.)	0.009	-0.205	-0.026
	(0.074)	(1.810)	(0.030)
Unemployment rate	0.003	0.027	-0.001
	(0.003)	(0.074)	(0.001)
Number of murders (over pop.)	-3.007**	2.049	-0.727
	(1.475)	(40.133)	(0.806)
Constant	-0.515	-2.874	0.047
	(0.347)	(6.872)	(0.157)
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	4425	3229	5636

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors (clustered at NUTS3 level) in parentheses.

As expected, the "age" of the firm significantly affects the size of the start-up in 2016 and this evidence is consistent across all model specifications. Not surprisingly for start-up firms, in the first years of their lives their size increases over time. Other firms' characteristics, such as "Female majority", and "Young majority" (see Table 5.12 for the definition), play a relevant role for firm performances. More specifically, innovative start-ups with a majority of female stakeholders have significantly lower share capital, suggesting a potential under-capitalisation with respect to other start-ups. This interesting evidence may be related to

different factors like e.g. lower personal capital, difficulties in retrieving capital to start up or even less ambitious and/or growth-oriented business models. We can also note a lower performance in terms of number of employees, although it is less statistically significant. In what concerns innovative start-ups with a majority of young stakeholders, they seem to be smaller and have less share capital.

Table 5.15 - Determinants of YIF performance at NUTS3 level: probit model

	1	2	3
	Sales over 1M€	Employees over 20	Share capital over 50k€
Age	0.193***	0.112**	0.083***
	(0.031)	(0.050)	(0.023)
Female majority	-0.127	-0.181	-0.338***
	(0.096)	(0.196)	(0.060)
Young majority	-0.290**	-0.252*	-0.377***
	(0.120)	(0.143)	(0.082)
Foreign majority	0.052	-0.026	-0.149
	(0.153)	(0.292)	(0.122)
Number of new firms (over pop.)	-0.016	0.030	0.055
	(0.045)	(0.108)	(0.054)
Industry heterogeneity	3.363	3.030	-0.684
	(2.068)	(5.057)	(1.365)
Number of patent applications (over pop.)	1.435**	0.123	1.209
	(0.653)	(1.401)	(0.881)
Local university	-0.009	0.057	-0.046
	(0.091)	(0.190)	(0.079)
Number of graduates (over pop.)	0.031	0.061	0.030
	(0.050.)	(0.102)	(0.049)
Value added (over pop.)	0.011**	0.012	0.010**
	(0.005)	(0.009)	(0.005)
Commercial openness	0.029	-0.051	-0.061
	(0.156)	(0.273)	(0.126)
Number of bank branches (over pop.)	0.0321	0.693	0.110
	(0.292)	(0.637)	(0.297)
Unemployment rate	0.022	0.018	-0.003
	(0.015)	(0.031)	(0.018)
Number of murders (over pop.)	-23.182	-77.829	0.738
	(21.547)	(60.367)	(6.827)
Constant	-5.497***	-6.141	-1.825
	(2.034)	(4.887)	(1.410)
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	4279	2367	5566

*** p<0.01, ** p<0.05, * p<0.10 . Robust standard errors (clustered at NUTS3 level) in parentheses.

Interestingly, provincial determinants seem to be less relevant for firm performances than for their creation (and with respect to firm-level determinants as well). An exception is the local economic development, which is positively related to the sales, employees and share capital. The local knowledge base, as proxied by local patenting activity, is significant related to higher sales.

The results of our empirical analysis point to local education as an important determinant for innovative start-up birth, both in the service and the manufacturing sector. In manufacturing, YIF also benefits from a well-developed and dynamic local industrial system, with intense entry and greater knowledge/technology produced as well as a developed banking system. These factors seem to be less relevant for service YIF, more affected by local economic development, probably related to the potential demand for services. These findings suggest that local policies to foster the birth of YIF will have limited effects in the short run. In fact, local pre-existing conditions do affect the type and sector of innovative start-ups created in the area. Path dependency is particularly relevant in manufacturing.

Looking at the YIF performance, some firm-level characteristics, like a majority of female or young shareholders, significantly affect the level of sales. While female-majority YIF usually have lower share capital, young YIF are smaller in terms of sales, employees and share capital. As far as these results are due to difficulties in having access to financial resources and/or better managerial capabilities, some policy interventions targeted to these typologies of YIF are advisable.

Given that innovative start-ups are a recent phenomenon, in order to better understand their dynamics and prospects we should wait some more years in order to observe the patterns of M&As or IPOs involving these companies. Up to now, there is not enough information on these trends.

Access to finance by innovative start-ups (with a focus on equity crowdfunding)

As regard to the access to external finance, Giraudo et al. (2016) consider a sample of 2,526 Italian YIF (registered up to the end of 2014) and show that about 13% of them have used Government-guaranteed back loans while a similar percentage has received Venture Capital funds: 13.3%. The latter figure is remarkable but it must be reminded that YIF can benefit from quite generous tax relief on equity investment from legal entities (20% fiscal deduction up to a ceiling of 1.8 M€). Instead, YIF can take advantage of priority and simplified access to the Central Credit Guarantee Fund (CCGF; see Chapter 4, Section 4.4).

By means of a micro-econometric analysis, Giraudo et al. (2016) find that there are important differences among the YIF that have access to the two sources of finance. For

instance, as opposed to those using guaranteed bank loans, the YIF receiving Venture Capital funds are relatively younger, employ more people and especially more managers, and have a lower amount of total assets. Considering the impact of other characteristics, the above authors contend that the two policy measures support different typologies of YIF in a sort of "institutional division of labour".

Using the latest available statistics from the CCGF, it emerges that out of 9,008 YIF included in the database in April 2018, 2,280 of them (24%) have received at least one guaranteed loan and in 55% of the cases those loans were used to make an investment. On average, each firm received bank loans for about 428 thousand euros (of which 335 were guaranteed).

Along with the CCGF, an additional programme supporting innovative start-ups is *Smart&Start Italia* (funded by MISE and managed by Invitalia, the national agency for inward investment and economic development). The programme provides interest-free loans to small innovative start-ups (including branches of foreign companies) that have been established for less than 3 years. It is also possible to apply for funding and start the company subsequently. The loan can be up to 70% of the qualified investment and operating expenses. However, the share can be increased up to 80% if the start-up mainly consists of people under the age of 36 or women or if it includes at least one Italian Ph.D. returning to Italy from a foreign country. Innovative start-ups located in Basilicata, Calabria, Puglia and Sicilia (the so-called "less-developed regions") or in Abruzzo, Molise and Sardegna (the so-called "regions in transition") are also eligible for a non-repayable grant up to 20% of the expenses. Between February 2015 and June 2017, there have been 1,393 applications to *Smart&Start Italia*, mainly from Campania (16%) in the South and Lombardia (13%) in the North, with half of them from people who had not yet started a business. However, only 332 applications (24.6%) have been approved for a total of 143 million euros of interest-free loans and only 16 million euros of non-repayable grants (cf. MISE, 2017).

Recently, MISE and Istat (2018) have conducted a survey on Italian start-ups which, aside from the use of own funds, confirms a prevalence of YIF that have resorted to bank loans as opposed to equity capital. According to the survey, the preferential access to CCGF is the most positively evaluated measure, followed by the R&D tax credit (cf. Section 5.1 of this Chapter). Interestingly, 38% of the YIF interviewed intend to make use of the R&D tax incentive in the future: this is not surprising, being the tax credit based on the increment of R&D expenditures and, then, particularly suitable for young and relatively small innovative firms.

The third measure in terms of positive evaluation is the tax credit for the hiring of qualified research personnel, closely followed by the fiscal incentives for equity capital: in the latter case, 18.6% of Italian start-ups have declared that they have already exploited such a measure (a percentage higher than that recorded at the end of 2014; see above). On the other hand, the two measures that are less appreciated by the respondents to the MISE-Istat survey are the fiscal incentives for stock options and work for equity plans, and the possibility to collect equity capital with crowdfunding.

With respect to the latter measure, it should be kept in mind that Italy was the first country in the world to enact, in July 2013, a comprehensive regulation for equity crowdfunding. CONSOB (Commissione Nazionale per le Società e la Borsa, the Italian Securities and Exchange Commission) was in charge of authorising internet portals (or platforms) to launch equity crowdfunding campaigns (or offers) to potential investors. In 2015, the Decree-Law 3/2015 established that, along with YIF, innovative SMEs could also take advantage of this instrument. With a 2016 deliberation, CONSOB has updated the regulation for crowdfunding by introducing new procedural simplifications. Finally, the 2017 Budget Law has extended the applicability of the crowdfunding instrument to all Italian SMEs.

Table 5.16 illustrates the trend of equity crowdfunding in Italy, which has been monitored by the "CrowdInvesting Observatory" of Milan Polytechnic. Until June 2016, only 48 campaigns had been launched by 19 authorised portals. The rate of success was a bit lower than 40% and only 18 firms benefitted from equity crowdfunding. In spite of the generous tax incentives provided, the total amount raised was 5.6 million euros, a figure that pales in comparison to those of other European countries in 2015: 245 million pounds in the UK (excluding the real estate sector), 50 million euros in France and 37.3 million euros in Germany (data taken from the 2016 report of the Milan Polytechnic observatory).

Table 5.16 – Equity crowdfunding in Italy

Data from 2014 until:	June 15th 2016	June 20th 2017	May 13th 2018
Portals authorised by CONSOB	19	19	25
Campaigns: of which	48	109	205
Closed successfully (% on total)	19 (39.6)	53 (48.6)	114 (55.6)
Not successful	17	36	63
Sill on-going	12	20	28
Firms involved: of which	47	106	190
Innovative start-ups (% on total)	n.a	97 (91.5)	164 (86.3)
Funded firms	18	53	n.a.
Total equity capital raised up (K€)	5,565	12,417	27,391

n.a. = not available.
Sources: Osservatorio CrowdInvesting – Politecnico di Milano: 1° e 2° Report Italiano sul CrowdInvesting (June 2016 and July 2017). Latest data downloaded from http://www.osservatoriocrowdinvesting.it.

The performance slightly improved in the following years, especially in terms of the share of offers successfully closed, as witnessed by the cumulative percentage of 55.6 recorded until May 2018. In the end, a total of 114 successful campaigns have been launched involving a cumulative amount of equity capital equal to 12.4 million euros. Accordingly, in the latest years there has been a relevant improvement with respect to 2016, but the performance remains quite disappointing when compared to that of other European countries (see above). The overwhelming majority of the firms involved in the equity crowdfunding campaigns are innovative start-ups. From June 2017 to May 2018 their share decreased from 91 to 86%, due to the legislative changes that allowed other Italian SMEs to take advantage of these instruments[82].

Finally, according to the data up to June 2017, 40% of the involved firms are located in Lombardia and 12% in Lazio (i.e. the two regions hosting the largest metropolitan areas of Italy). With regard to the sectors, 26% of the firms provide services developed by means of social networks or sharing, 24% ICT and 13% professional services.

5.3 Summary and concluding remarks

The latest available data confirm that the Italian backwardness in terms of business R&D, as compared to the performance of the leading European countries, is mainly due to a **scarce presence and a declining contribution of large R&D investors**. If the Italian performance has not declined in the last years this is due to a growing number of SMEs that started to perform R&D activities and to the investment of a group of not too large companies, having between 240 and 499 employees. These positive trends need to be maintained and possibly reinforced by means of an adequate mix of policies that, however, should also be aimed at inducing more R&D efforts by largest companies, including the foreign ones, which already have located or could decide to locate research facilities in Italy. In this connection, R&D tax incentives could play an important role for achieving both goals.

By means of a micro-econometric analysis based on Propensity Score Matching, we have shown that **in 2008**, when in Italy **a 10% tax credit on the level of business R&D was in force**, the firms that took advantage of the national support for R&D were able to invest

[82] Up to May 2018, along with 164 innovative start-ups, there are 16 innovative SMEs (as defined by Decree Law 3/2015), 3 investment vehicles and 7 other SMEs.

in R&D and innovate more than those which did not exploit it. By replicating the analysis in 2010 and 2012, when the tax credit was no longer available, we found no significant differences between nationally supported firms, on the one hand, and totally unsupported or alternatively supported firms, on the other. Although in our analysis we were not able to perform a proper analysis of additionality, these findings are consistent with those of previous studies (Cantabene and Nascia, 2014; Sterlacchini and Venturini, 2018), which have shown that the Italian R&D tax credit available in 2008 exerted a multiplicative effect on business R&D (one euro of foregone tax revenue was able to stimulate more than one euro of R&D expenses).

Whether the **new R&D tax credit introduced in Italy in 2015** will have a similar positive impact remains doubtful. In effect, while that of 2008 was on the level of R&D expenditures, the current one allows a 50% tax credit but only on the increment of R&D. Provisional evidence included in a recent report (Istat, 2018) suggests that the incremental tax credit was not particularly effective in stimulating additional R&D investment in 2015. Obviously, the impact could be greater in the following years, and especially for small and medium-sized firms starting to perform R&D activities. In this connection, we have reported the findings of a recent MISE-Istat survey (2018), which shows that the Italian innovative start-ups very much appreciate this measure and intend to exploit it in the coming years. However, a pure incremental tax incentive does not seem an appropriate measure for achieving the other crucial goal for an effective R&D policy in Italy: that of maintaining and possibly increasing the presence of big R&D facilities owned by large national and foreign companies. In the concluding chapter of the report, we discuss in more detail how this policy challenge could be addressed.

With respect to the **investment in IPRs**, we have shown that Italian performance over the period 2012-2016 has been quite positive, but especially when looking at trademarks and industrial designs. Also, patent applications to the EPO significantly increased in 2017 but, due to the decline experienced after the big economic crisis, the numbers are the same as recorded in 2008. Looking at the shares of intangible assets over total assets we found an increase in 2016 but only for the firms having a large portfolio of trademarks rather than patents. Additional information on the exploitation of the **Italian Patent Box** measure, introduced in 2015, confirms that the largest companies investing more in trademarks than patents gained remarkable fiscal discounts in 2017. The above pieces of evidence suggest that if the Patent Box has exerted an impact on Italian companies, such an effect seems to be limited to IPRs having weak linkages with inventions and technological innovations in a strict sense. On the basis of further arguments, in the concluding chapter we shall contend that the Patent Box measure needs to be deeply revised, if not entirely reconsidered.

Along with R&D investment, the entry of new technology-based firms represents a very important factor for a continuous improvement of the competitiveness of the Italian business sector. At the end of 2017, the **Start-up Act** promulgated in 2012 had provided support for the birth of more than 8,000 innovative start-ups (9,000 up to the 23rd of April 2018), employing about 10,000 workers. The empirical analysis carried out across Italian provinces shows that the local level of education significantly affected the birth of innovative start-ups, both in services and manufacturing. Service start-ups are also affected by the economic growth of the provinces, while those belonging to manufacturing are affected by the level of technological knowledge (proxied by patents) and the presence of a well-developed banking system. Looking at the performance of innovative start-ups, a majority of female or young shareholders is correlated with a lower firm size (either in terms of sales, employees or share capital). As far as these results are due to difficulties in having access to financial resources, some policy interventions targeted at these typologies of innovative start-ups are advisable. In this connection, we show that, aside from the use of own funds, a prevalent amount of innovative start-ups have resorted to bank loans, while a lower share, though remarkable for the Italian context, have turned to equity capital. The more intense use of bank loans has been stimulated by the preferential access to the Central Credit Guarantee Fund allowed innovative start-ups. Instead, the instrument of equity crowdfunding is still scarcely utilised.

As a final remark, it should be stressed that, with innovative start-ups appearing as a recent phenomenon, it is hard to foresee their impact on the growth prospects of the Italian business sector. Further years are needed to observe, in particular, the patterns of M&As or IPOs involving these companies.

6. COMPETITION IN SERVICES

This chapter examines the extent and impact of the regulatory changes in service activities that have occurred in Italy during the last years. For the reasons explained in the first section, the study focusses on the effects exerted by the regulatory restrictiveness in professional services and retail trade. For the downstream effects of the regulation concerned with these service activities, an aggregate indicator of regulatory impact has been used and a sectoral analysis performed using data on total factor productivity growth. In addition to this, in a second section, a specific analysis on the recent trends in the Italian trade sector after the regulatory changes introduced by the 2011 reform has been carried out. Concluding remarks are contained in the final section.

6.1 Regulation in professional services and retail trade

Indicators of regulatory restrictiveness

According to the recent indicators for Product Market Regulation (PMR) released by the OECD (cf. Koske et al., 2015), since the early 2000s in Italy there have been remarkable improvements in most of the network sectors, such as energy, telecommunications, and air and rail transport.

Table 6.1 – Product Market Regulation in energy, transport and communications (composite indicator)

	1998	2003	2008	2013
France	4.48	3.37	2.77	2.51
Germany	2.50	1.87	1.33	1.27
Italy	4.73	2.97	2.45	2.01
Spain	3.69	2.27	1.65	1.59
UK	1.89	1.30	0.98	0.79

Source: OECD regulatory database.

Table 6.1 comparing Italy with the major EU countries) shows that the composite index for the Italian network sectors decreased dramatically between 1998 and 2003, and more slowly in the subsequent years.

As indicated by Tables 6.2 and 6.3.a, both in professional services and retail trade the reduction of PMR has been particularly intense between 2008 and 2013. Comparing the performance of the major EU countries in the last available year, it can be said that a more

restrictive regulation still characterises the Italian retail distribution, whilst for professional services Italy is scoring a bit better than other countries except the UK.

Table 6.2 – Product Market Regulation in retail trade

	1998	2003	2008	2013
France	4.50	3.76	3.80	2.64
Germany	3.40	3.38	2.88	2.71
Italy	4.35	3.85	4.06	3.15
Spain	4.20	3.67	3.48	2.88
UK	3.38	2.15	2.18	1.79

Source: OECD regulatory database.

Table 6.3.a - Product Market Regulation in professional services (composite indicator)

	1998	2003	2008	2013
France	2.19	2.20	2.45	2.34
Germany	4.28	3.03	2.71	2.54
Italy	3.91	3.55	3.02	2.10
Spain	3.85	2.92	2.74	2.43
UK	1.32	0.96	0.82	0.82

Source: OECD regulatory database.

Detailed indicators of PMR among different professional services are provided in Table 6.3.b. Considering the last available year (2013), in accounting and, especially, legal professions the level of regulatory restrictiveness in Italy is lower than that of other countries and the OECD weighted average. Instead, although the improvements with respect to the situation in 1998 have been remarkable, the degree of regulation concerned with architects and, especially, engineers remains higher than the OECD average.

Table 6.3.b – Product Market Regulation in professional services (detailed indicators)

	Accounting		Legal		Architects		Engineers	
	1998	2013	1998	2013	1998	2013	1998	2013
France	3.38	2.90	2.85	3.23	2.15	3.25	0.38	0.00
Germany	5.06	2.60	4.77	3.56	3.98	2.31	3.29	1.69
Italy	3.67	2.08	3.92	2.40	4.02	1.96	4.02	1.96
Spain	3.50	2.83	5.50	3.40	3.46	1.75	2.96	1.75
UK	2.94	1.75	1.63	0.79	0.73	0.73	0.00	0.00
OECD	n.a.	2.30	n.a.	3.00	n.a.	1.60	n.a.	1.30

Sources: OECD regulatory database and Koske et al. (2015) for the OECD weighted average.

The OCED PMR indices capture the "de jure" policy settings. While this makes the indicators more comparable across countries by insulating them from context-specific assessments, it also entails several limitations. For instance, informal regulatory practices such as administrative guidelines or self-disciplinary measures by professional associations are only captured to a very limited extent by the indicators. Also, the way in which regulations are applied by authorities is hardly reflected in indicators, even though enforcement can have a considerable impact on the level of competition.

Along with the PMR, the Services Trade Restrictiveness Index (STRI), also provided by the OECD, conveys additional insights. STRI indices (ranging from 0 to 1 according to the level of restrictiveness) capture the extent of restrictions on foreign entry and the movement of people, barriers to competition, regulatory transparency and other discriminatory measures affecting the ease of doing business (OECD, 2017). Launched in 2014, STRI only covers the years 2014-2017. As it is not available for previous years, it cannot be used for the same empirical analysis planned using the PMR index.

Table 6.4 – PMR and STRI in professional services and distribution*

	Accounting		Legal		Architects		Engineers		Distribution	
	2014	2017	2014	2017	2014	2017	2014	2017	2014	2017
France	0.42	0.63	0.61	0.61	0.47	0.47	0.14	0.12	0.18	0.17
Germany	0.25	0.25	0.25	0.25	0.22	0.20	0.22	0.21	0.11	0.11
Italy	0.34	0.34	0.20	0.20	0.27	0.27	0.20	0.20	0.18	0.18
Spain	0.32	0.32	0.35	0.35	0.23	0.23	0.23	0.23	0.14	0.14
UK	0.29	0.30	0.19	0.19	0.23	0.25	0.18	0.20	0.12	0.12
OECD	n.a.	0.33	n.a.	0.39	n.a.	0.27	n.a.	0.24	n.a.	0.19

Sources: OECD regulatory database and http://www.oecd.org/tad/services-trade/sector-notes-services-trade-restrictiveness-index.htm for the OECD average.

Looking at the major EU countries, for Italy and Spain the STRI indices for professional services and trade (distribution)[83] do not change between 2014 and 2017. Only for France does the index increase significantly for accountants, while in Germany and the UK there are very small changes. The STRI for Italy is below the OECD weighted average for legal professions, while it is in line for the other professions.

Recent changes in professional services

For more recent data on professional services, the new indicator of regulatory restrictiveness provided by the European Commission and available for the year 2016 (European Commission, 2017a and 2017b) has been taken into account. The EC indicator shares some similarities with respect to the PMR indicator of the OECD, but also differs from it in other respects. In particular, the EC indicator:

- also considers (along with accountants, lawyers, architects and engineers) patents, real estate agents and tourist guides;
- also accounts for requirements concerning education and training;
- is based on a weighted (rather than a simple) average of regulations; in particular, a higher weight is ascribed to the extent of exclusive or shared reserve activities which allow a sectoral monopoly for professional services;
- takes into consideration all the different types of professions and provides the mean level of restrictiveness (rather than picking the highest level);
- neglects some activities considered by the OECD (such as audit and notarial activities).

[83] The STRI for the distribution services sector covers general wholesale and retail sales of consumer goods (specific regulation of some distribution sectors such as pharmaceuticals and motor vehicles are not considered). The index also includes regulations relating to electronic commerce.

Table 6.5 – EC index of regulatory restrictiveness in professional services: 2016

	Accounting	Legal	Architects	Engineers
France	2.80	3.60	2.52	0.75
Germany	2.90	4.20	2.95	2.95
Italy	2.60	3.25	2.75	3.02
Spain	0.10	3.60	2.95	2.90
UK	1.90	3.80	1.90	1.85
EU (weighted average)	2.20	3.85	2.50	2.35

Source: European Commission (2017b).

Table 6.5 shows, among professional services and countries, the distribution of the EC index. The degree of regulatory restrictiveness applied to the legal profession is lower in Italy compared to that of the EU and the major European countries. For accountants and architects, a mixed picture emerges: in fact, the EC index is slightly higher than the EU average. Finally, the profession in which Italy records a level of regulation significantly more restrictive than in the EU is that of civil engineers. All in all, these findings are consistent with those arising from the analysis of PMR indices in 2013 (cf. Table 6.3.b).

For Italy and the entire EU, Table 6.6 compares, over the years 2011-2015, the annual rates of change in the number of active enterprises and employed persons in professional services. Looking at legal and accounting professions, the EU records positive growth rates which are significantly higher than those registered in Italy. With respect to architects, the negative variations are more severe in the Italian case, especially when employed persons are considered. The most divergent performance occurs when examining civil engineers: in the EU the annual growth rates are positive and significantly above 2% for both enterprises and workers, while Italy records a 1.2 and 1.5% reduction, respectively.

Although from the above data a cause-effect relationship cannot be detected, it can be said that, in comparative terms, the most unsatisfactory performance is recorded by the profession of engineer [84], which is still characterized by a high degree of regulation. Particularly in Italy, a broad range of activities can be exclusively carried out by civil engineers and, to a lower extent, by architects (cf. European Commission, 2017b). Accordingly, the European Commission (2017a) has recommended Italy to revise the training

[84] Over the period 2011-2015, according to Eurostat data, the annual rate of change of the employment in the construction sector was -1.8% in the EU and -4.9% in Italy. Hence, the negative economic performance of the construction sector does not seem to affect the number of engineering enterprises (and their employment). In fact, it has increased in the EU while diminishing in Italy (see Table 6.6).

courses required to exercise the professions of architect and civil engineer and, especially, to reduce the scope of reserved activities and competencies.

Table 6.6 – Enterprises and persons employed in professional services: annual average rates of change 2011-2015

	Enterprises		Persons employed	
	EU	Italy	EU	Italy
Accounting	3.84	1.65	0.97	0.50
Legal	2.26	0.72	2.60	0.32
Architects	-0.71	-1.66	-0.51	-2.13
Engineers	2.58	-1.24	2.23	-1.50

Source: Eurostat (Structural Business Statistics).

The Italian *Annual Law on Market and Competition* (Law n. 124/2017), approved on August 4, 2017, does not contain any regulatory change affecting architects and civil engineers. Instead, it includes some minor provisions regarding law-related professions (lawyer and notary public). For lawyers, there is now the possibility to exercise the profession in corporate form. However, in such companies, two thirds of the share capital must be held by attorneys at law, registered by the competent professional body. Law firms must fulfill the requirements set by the code of conduct for lawyers, and are subject to the disciplinary power of the competent professional body. As for notary publics, the number of professionals will increase from one per 7,000 to one per 5,000 inhabitants. Notaries may exercise their professional functions within a broader area and are allowed to advertise their services. However, the wide set of activities reserved for notaries has not changed. In particular, the originally proposed reduction of the acts for which a notary authentication is required was taken out of the final draft of the law.

The downstream impact of regulation

In spite of its inherent shortcomings, the OECD PMR indicator is the only one available for a sufficiently long period of time and, as such, it allows one to perform a sound empirical analysis on the effects of regulatory restrictiveness. The trends in PMR, described in Table 6.2 and 6.3, suggest that the regulatory changes in professional services and retail trade should have a more significant impact in recent years rather than in the late 1990s and early 2000s (in which, also according to previous studies, the deregulation in network services should have had a bigger effect).

A large body of empirical evidence has stressed that the lack of competition due to excessive regulation is detrimental to the productivity growth of industries and firms. At first, empirical studies focussed on the extent and impact of regulation within each industry (see, for instance, Nicoletti and Scarpetta, 2003). More recently, starting with the seminal paper by Conway et al. (2006), the inter-industry relationships have been considered by a number of recent contributions (see, among others, Arnold et al., 2011; Barone and Cingano, 2011; Bourlès et al., 2013; van der Marel et al., 2016; Lanau and Topalova, 2016, Papaioannou, 2017). These studies have examined how the level of competition in regulated service sectors affects the economic performance of downstream sectors, i.e. both manufacturing and service industries, that consume the intermediate inputs provided by regulated sectors. Thus, the downstream impact of competition in regulated services depends on both their distinct level of regulation and the amount of their outputs bought by downstream industries, a measure provided by input-output tables.

Most of the above-mentioned studies have used as a measure of regulatory restrictiveness the Product Market Regulation (PMR) indicator provided by the OECD. In some cases, a composite index of PMR for regulated service sectors has been employed, while in others sector-specific indicators for network sectors (post and telecommunications, energy and transport), trade and professional services have been considered. Then, the effect of service regulation in downstream sectors has been estimated after weighting the PMR index with the coefficients of input-output tables. In most of the studies, the impact of regulation is estimated on the growth of Total Factor Productivity (TFP) of the downstream industries or, in some cases, that of the firms belonging to such industries. In general, the econometric results indicate that the extent of regulation in service sectors exerts a negative effect on the TFP growth of downstream industries or firms.

Apart from Barone and Cigano (2011), the above-mentioned studies do not provide separate estimates for the downstream impact originating from specific regulated sectors. Moreover, specific estimates for Italy are not available[85]. Thus, with our work we plan to fill this gap by

[85] Schivardi and Viviano (2010) examine the impact of the 1998 Italian reform which, among other things, reduced the barriers to entry in the retail sector. By using data for retail firms they find that the extent of barriers to entry (evaluated at provincial level) increased profits and reduced productivity. Daveri et al. (2013) analyze the impact of barriers to entry (taken from the OECD PMR) on the mark-ups and productivity of Italian (and French) firms belonging to regulated service sectors (network services, professional services and retail trade). They show that entry barriers, by increasing mark-ups, reduce firms' productivity. Thus, in these studies, the impact of regulation is examined by looking at the firms belonging to the same regulated sectors. The only study focusing upon the impact of service regulation in downstream Italian industries is that of Lanau and Topalova (2016). Although with a quite limited number of firm-level control variables, they find that the extent of service regulation (approximated by the OCED PMR) negatively affects firms' value added and productivity in downstream sectors. However, the estimation results reported in the paper refer to the upstream regulation in network services only (energy, TCL and transports). In conclusion, to our knowledge, our empirical analysis is the first concerned with the downstream impact of regulation in Italian professional services and retail trade.

focusing on the Italian case and by providing separate estimates concerned with the impact of regulation in professional services and retail trade.

For such a purpose, we have carried out a sectorial analysis by using a recent extension of the OECD indicators of PMR in professional services and retail trade. In fact, using direct PMR indicators in sectorial analyses is not advisable, because it would imply that a given regulation has the same effect on all the examined sectors. With a view to overcoming such a drawback, and in line with the approach adopted in the latest empirical analyses (see above), the OECD has recently released new indicators called REGIMPACT (cf. Égert and Wanner, 2016), providing differentiated effects depending on the extent to which the output of regulated services is used as intermediate input in other sectors.

Formally, for each downstream sector *k*, the REGIMPACT indicator is calculated by summing up the products between the degree of regulation in the *j* service sector (REGSERV) and the input-output weight ($w_{j,k}$) which denotes the extent of the intermediate inputs of sector *k* from the service sector *j*:

$$REGIMPACT_{k,t} = \sum_{j=1}^{n} REGSERV_{j,t} * w_{j,k} \qquad [6.1]$$

It is to be observed that the downstream sectors also include the same regulated service sectors according to the within exchange of intermediate inputs ($w_{j,k}$ when $j=k$).

For the purpose of the present analysis, the synthetic REGIMPACT indicator concerned with professional services and retail trade has been used. The latter is computed as the difference between the overall REGIMPACT index of regulated services and that concerned with network services only (i.e. energy, transport and communications). It must be stressed that the REGIMPACT indicator for professional services and retail trade does not change between the years in which it has been measured (1998, 2003, 2008, 2013). As a consequence, the time dimension cannot be fully exploited in the empirical analysis.

When performing econometric estimations of the impact of regulatory restrictiveness, the use of country-specific input-output weights could generate problems of endogeneity, in so far as higher weights could be due to less restrictive regulation. In line with the approach of Rajan and Zingales (1998), the weights obtained for the US can be used, although this stratagem does not provide a fully convincing solution to the problem. For instance, the same sectoral classification used to build input-output tables may influence the results.

Table 6.7 – REGIMPACT of professional services and retail trade among Italian sectors

	Italian $w_{j,k}$		US $w_{j,k}$	
	1998	2013	1998	2013
Agriculture	0.045	0.030	0.048	0.031
Mining	0.070	0.045	0.049	0.028
Food, beverages and tobacco	0.103	0.069	0.101	0.064
Textiles, leather and footwear	0.113	0.075	0.078	0.051
Wood and paper	0.104	0.069	0.071	0.046
Chemicals	0.114	0.076	0.088	0.055
Rubber, plastic and non-metallic prods.	0.103	0.068	0.066	0.042
Iron and metal products	0.109	0.072	0.080	0.052
Machinery and equipment n.e.c.	0.109	0.072	0.090	0.058
Electrical and optical equipment	0.119	0.080	0.094	0.061
Transport equipment	0.133	0.088	0.094	0.061
Other manufacturing industries	0.110	0.074	0.081	0.053
Electricity, gas and water	0.034	0.032	0.006	0.007
Construction	0.084	0.054	0.073	0.049
Wholesale, retail trade, trade and repair of cars and motorcycles	0.470	0.331	0.569	0.406
Hotels and restaurants	0.071	0.047	0.044	0.027
Transport and storage	0.071	0.049	0.029	0.020
Post and communications	0.046	0.034	0.010	0.009
Financial and insurance activities	0.031	0.019	0.015	0.007
Real estate activities	0.016	0.009	0.019	0.011
Professional services	0.246	0.138	0.262	0.141
Public administration	0.036	0.023	0.024	0.014

Sources: Own computations on the OECD REGIMPACT database.

Table 6.7 shows, on the one hand, the 22 economic sectors considered in our analysis, and then the values of REGIMPCT with the Italian and the US weights in 1998 (starting year of our analysis ì) and 2013 (last year with available data). In principle, REGIMPACT is available

for more disaggregate sectors for which, however, the productivity performance variables (taken from EUKLEMS; see below) are not available[86]. The inclusion of some sectors like "public administration" and, to a lesser extent, "agriculture and mining" is debatable: however, when they are dropped out, the results of the following empirical analysis do not significantly change.

As already stressed, the REGIMPACT index of professional services and retail trade decreases over time and this occurs, with minor differences, in all the examined sectors. Aside from the time variations, it is interesting to look at the sectoral differences in the level of REGIMPACT which depend on the extent of input-output coefficients ($w_{j,k}$). Accordingly, we observe very high levels in the sector including "retail and wholesale trade" (together with "trade and repair of cars and motorcycles"), followed by "professional services" and, then, the manufacturing sectors (from Food to Other mfg.). In the remaining sectors, the impact is modest. Hence, by using input-output weights, it emerges that the regulatory impact is higher within the same regulated sectors. This is particularly the case of the aggregate "trade" sector which, by including different activities, is characterised by a high level of within-transactions. Although to a lesser extent this feature is shared by the sector of "professional services". Finally, the relative high impact recorded in manufacturing industries could be due to their significant use of professional services as intermediate inputs.

In line with the approach adopted in many empirical studies in this field (Nicoletti and Scarpetta, 2003; Conway et al., 2006; Bourlès et al., 2013), for the impact of regulatory restrictiveness the equation to be estimated has the following specification:

$$\Delta TFP_{k,t} = \alpha_0 + \alpha_1 \Delta TFP_{Fk,t} + \alpha_2 REGIMPST_{k,t} + \alpha_3 GAP_{k,t}$$

$$+ \alpha_3 REGIMPST_{k,t} * GAP_{k,t} + \varepsilon_{k,t} \qquad [6.2]$$

Where $\Delta TFP_{k,t}$ denotes the change of Total Factor Productivity in the 22 Italian sectors described in Table 6.7 (k=1,…, 22), while $\Delta TFP_{Fk,t}$ stands for the same variable obtained for a frontier country, in our case Germany. *REGIMPST* is the regulatory impact indicator for professional services and retail trade calculated according to equation [6.1] and reported in Table 6.6. As already said, *REGIMPST* does not change between the years in which it has been measured (1998, 2003, 2008, 2013). As a consequence, for the changes in sectoral TFP, rather than using annual data we employ average annual data for different time periods:

[86] The sectors that we had to aggregate are the following: Wood and paper, Rubber, plastics and non-metallic mineral products, Iron and metal products, Electrical and optical equipment, Transport equipment, and Professional services. For them, we used the mean or, when output indicators were available, the weighted average of REGIMPACT concerned with more disaggregated sectors.

1998-2002, 2003-2007, 2008-2012 and 2013-2104 (t=1,…, 4). $GAP_{k,t}$ denotes the log difference of the TFP levels between German and Italian sectors ($lnTFP_{Fkt}$-$lnTFP_{kt}$): to reduce the possible biases of using data for a particular year, the GAP variable is computed as the average arising from the years 1997-1999, 2002-2004, 2007-2009 and 2012-2013. Finally, the equation includes the interaction between *REGIMPST* and *GAP*: this variable serves to test whether the restrictiveness of regulation in upstream services has a higher impact on the TFP changes of Italian sectors that are closer to the productivity level of the frontier country.

The sectoral data for computing the TFP changes and levels in Italy and Germany are taken from the EU-KLEMS database and are available from 1996 to 2014 (this explains why the last period considered includes only two years). Following the growth accounting approach, for each sector TFP changes are computed as $\Delta TFP = \Delta VA - s_L \Delta L - (1 - s_L)\Delta K$, where *VA* is the value-added volume (at 2010 prices), *L* denotes the number of hours worked by engaged persons, *K* stands for the volume of total capital stock (at 2010 prices), and s_L is the share of labour costs on value added. For the *GAP* variable, the TFP log-levels are computed by applying the *Ln* in place of the *Δ* operator. To ensure the comparability across Italian and German sectors we have used common labour shares corresponding to those of Germany.

Table 6.8 – Panel fixed effects estimations: dependent variable $\Delta TFP_{k,t}$°

	1	2	3	4	5	6
Constant	0.049**	0.026*	0.028*	0.036**	0.017	0.022
	(0.017)	(0.015)	(0.016)	(0.014)	(0.012)	(0.014)
$\Delta TFP_{Fk.t}$	1.280***	1.244***	1.246***	1.285***	1.246***	1.248***
	(0.173)	(0.164)	(0.165)	(0.174)	(0.164)	(0.166)
REGIMPST_it	-0.617***	-0.420**	-0.444**			
	(0.182)	(0.158)	(0.269)			
GAP		0.054**	0.061**		0.057***	0.064***
		(0.019)	(0.024)		(0.018)	(0.021)
*REGIMPST_it*GAP*			-0.104			
			(0.177)			
REGIMPST_us				-0.564***	-0.389**	-0.434**
				(0.181)	(0.153)	(0.167)
*REGIMPST_us*GAP*						-0.128
						(0.121)
Within R^2	0.877	0.886	0.890	0.875	0.886	0.886
Between R^2	0.222	0.343	0.585	0.168	0.399	0.343

° Number of observations=88 (22 sectors, 4 time periods). Robust standard errors in parentheses. *p=0.10; **p=0.05; ***p=0.01.

Table 6.8 shows the results of panel fixed effect estimates of equation [6.2]: columns 1-3 report the results when the regulation impact is computed by means of Italian input-output coefficients (*REGIMPST_it*), while in columns 4-6 US weights are used (*REGIMPST_us*). In all

the regressions: a) the TFP changes in Italian sectors are strongly correlated with the German ones: all the estimated coefficients, which can be interpreted as elasticities, are around 1.2; b) the impact of regulation in professional services and trade is negative and statistically significant, no matter which weights are used, although the impact is higher when Italian input-output coefficients are employed and the GAP variable is not included. When included, the GAP variable gets a positive and significant coefficient indicating that the Italian sectors with a TFP level distant from that of the frontier country (Germany) record higher rates of TFP growth. Finally, the interaction with REGIMPST and GAP is negative but statistically insignificant (see columns 3 and 6), suggesting that the Italian sectors closer to the performance of the frontier country are not particularly affected by the extent of regulation in professional services and trade. In conclusion, the most significant results are those reported in columns 2 and 5 of Table 6.8.

As a first robustness check, we have controlled whether the results are sensitive to the exclusion of the same regulated service sectors: i.e. wholesale and retail trade and professional services. It should be stressed that, in what follows, the variable *REGIMPST* does not change since we simply remove, one at a time, the latter sectors from the regression analysis. By removing the sector of professional services the results are fully consistent with those reported in Table 6.8. Instead, the exclusion of wholesale and retail trade gives rise to different results reported in Table 6.9. In this case, the impact of regulation remains negative, but turns out to be statistically significant only when REGIMPST is inserted without the GAP variable and computed with Italian input-output weights (cf. column 1).

Table 6.9 – Panel fixed effects estimations: dependent variable $\Delta TFP_{k,t}$ – Wholesale and retail trade excluded°

	1	2	3	4	5	6
Constant	0.040*	0.016	0.017	0.028	0.009	0.011
	(0.021)	(0.018)	(0.017)	(0.020)	(0.016)	(0.015)
$\Delta TFP_{Fk,t}$	1.279***	1.246***	1.247***	1.283***	1.247***	1.249***
	(0.174)	(0.164)	(0.162)	(0.174)	(0.164)	(0.164)
REGIMPST_it	-0.627**	-0.371	-0.375			
	(0.275)	(0.229)	(0.219)			
GAP		0.056***	0.059		0.059***	0.067
		(0.019)	(0.050)		(0.019)	(0.044)
*REGIMPST_it*GAP*			-0.039			
			(0.726)			
REGIMPST_us				-0.620*	-0.374	-0.409
				(0.348)	(0.278)	(0.250)
*REGIMPST_us*GAP*						-0.191
						(0.834)
Within R^2	0.877	0.886	0.886	0.875	0.886	0.886
Between R^2	0.501	0.691	0.691	0.438	0.636	0.630

° Number of observations=84 (21 sectors, 4 time periods). Robust standard errors in parentheses. *p=0.10; **p=0.05; ***p=0.01.

In a further robustness check (cf. Table 6.10), we have included in the original regression an additional variable, approximating the level of knowledge capital of the Italian sectors: *RDK/Empl*, which stands for the ratio of R&D capital stock in total employed persons (both variables are taken form EUKLEMS, and the ratio is expressed in logs)[87]. Such a variable exerts a positive impact on the TFP changes of Italian sectors, while the effects of the other variables are confirmed (apart from a reduction of the size and significance of the GAP variable). Again, when the sector of wholesale and retail trade is excluded (cf. columns 3-4 of Table 6.10) the effect of regulation, though negative, becomes not statistically significant. It should be added that in this last set of regressions the exclusion of agriculture (characterised by a low level of RD capital stock) reduces the significance of the variable *RDK/Empl*.

[87] *RDK/Empl* is computed as the average over the following periods: 1996-2000, 2001-2005, 2006-2010, and 2011-2013. For the same periods, we have also used, in an alternative specification, the annual average rate of change of *RDK/Empl*. However, this variable has never been significant.

Table 6.10 – Panel fixed effects estimations: dependent variable $\Delta TFP_{k,t}$°

	1	2	3 (Trade excluded)	4 (Trade excluded)
Constant	-0.075**	-0.093*	-0.089**	-0.094**
	(0.037)	(0.035)	(0.039)	(0.037)
$\Delta TFP_{Fk.t}$	1.218***	1.219***	1.220***	1.220***
	(0.150)	(0.150)	(0.150)	(0.150)
REGIMPST_it	-0.332**		-0.255	
	(0.155)		(0.204)	
REGIMPST_us		-0.313**		-0.263
		(0.139)		(0.219)
GAP	0.033*	0.036*	0.036*	0.038*
	(0.019)	(0.019)	(0.018)	(0.019)
RDK/Empl	0.013***	0.013***	0.013***	0.013***
	(0.004)	(0.004)	(0.004	(0.004)
Observations	88	88	84	84
Within R^2	0.897	0.897	0.898	0.898
Between R^2	0.466	0.410	0.579	0.552

° standard errors in parentheses. *p=0.10; **p=0.05; ***p=0.01.

In conclusion, the sectoral analysis suggests that, by controlling for a set of relevant variables, the regulatory restrictiveness in professional services and retail trade has a negative impact on the productivity growth of Italian sectors. Thus, the reduction of regulation experienced between 1998 and 2013 has determined a positive effect on the sectoral efficiency measured by TFP.

However, the above finding must be taken with caution for a variety of reasons: among them, the limited number of observations over time, the use of aggregate and quite heterogeneous sectors, and the employment of input-output coefficients for weighting the impact of regulation. As we have shown, the results are sensitive to the exclusion of the wholesale and retail trade sector. In fact, when some sectors are too highly aggregated, input-output weights may overstate the within exchange of intermediate inputs. In our context, this is particularly the case for wholesale and retail trade (cf. Table 6.7). According to the empirical evidence (Pozzi and Schivardi, 2016), severe restrictions in retail trade negatively affect the productivity of the very sector for various motives, but the measure of regulatory impact that we have used in our econometric analysis probably overestimates the within-effect of regulation. This could partly explain why the overall impact of regulation among Italian sectors becomes less significant when wholesale and retail trade is excluded from the analysis.

6.2 Italian domestic trade after the Legislative Decree n. 201/2011

In Italy, a relevant national reform aimed at liberalising retail and wholesale trade was introduced in 2011 with Legislative Decree n. 201, which came into force on the 1st of January 2012. This regulation eliminates many bureaucratic and administrative constraints regarding the operations of trade companies, especially with respect to opening hours, which have been fully liberalised. In addition, more simplified and faster procedures for the opening of new businesses have been introduced.

Entry requirements, however, differ according to the size of the business: in Italy the threshold for distinguishing small and large retail outlets is set at 150 or 250 square meters (depending on the area or region). For small retailers it is sufficient that the entrepreneur communicates to the Municipality of interest the start date of the new activity, attaching a self-certification about the possession of moral and professional requirements, compliance with laws pertaining to the urban planning, construction, health and hygiene, the buildings environment and company equipment. Instead, for larger retailers (though not very large) the entry requirements are more numerous in terms of entities to be contacted (along with the municipality), impact assessments and, especially, the number of permits to be obtained. Thus, as is documented below, the liberalisation of the Italian trade sector has been mainly concerned with the operations of trade firms rather than their establishment.

The European Commission (2018a) has recently provided a new indicator for retail trade, called RRI – the Retail Restrictiveness Index. This is a composite measure (ranging from 0 to 6 according to the level of restrictiveness) including numerous indicators of regulatory requirements concerning both the establishment and the operations of retail companies. The "establishment pillar" encompasses entry restrictions such as size threshold, number of permits and length of procedures, while the "operations pillar" refers, for instance, to the regulation of opening hours and sales promotion. In building the overall RRI composite index, greater importance has been ascribed to entry restrictions (60%) as opposed to those affecting operations (40%). Compared with the OECD PMR for retail trade (see Table 6.2 in the previous section), the RRI of the EC tries to capture more elements of the complex and diverse regulatory frameworks existing in the EU countries.

Table 6.11 – Retail Restrictiveness Indicator: 2017

	Overall RRI	Establishment	Operations
France	2.44	1.80	3.41
Germany	2.74	3.53	1.56
Italy	3.24	4.53	1.30
Spain	3.08	3.28	2.78
UK	2.64	3.94	0.68

Source: European Commission (2018a).

As already anticipated, Table 6.11 shows that the overall degree of restrictiveness in the retail trade sector is higher in Italy than it is in the major European countries: actually, looking at the entire set of EU countries, only Luxembourg records a higher RRI. This finding is entirely due to the very high score achieved for entry or establishment restrictions: 4.53 which is the highest among the EU28 countries. Instead, in terms of restrictions of operations, the Italian index is among the lowest.

The afore-mentioned reform was dictated by the objectives of stimulating competition, fostering new employment and boosting consumption by increasing the opportunities for purchasing families. At the same time, the interventions in question have been the subject of heated debate. On the one hand, consumer associations and large distribution companies have recognised the advantages of the above measures by stressing, along with the impulse to modernise the sector, their consistency with consumers' needs. On the other hand, associations of small traders have complained about excess competition and the consequent reduction of profitability, while trade unions have emphasised the worsening of working conditions.

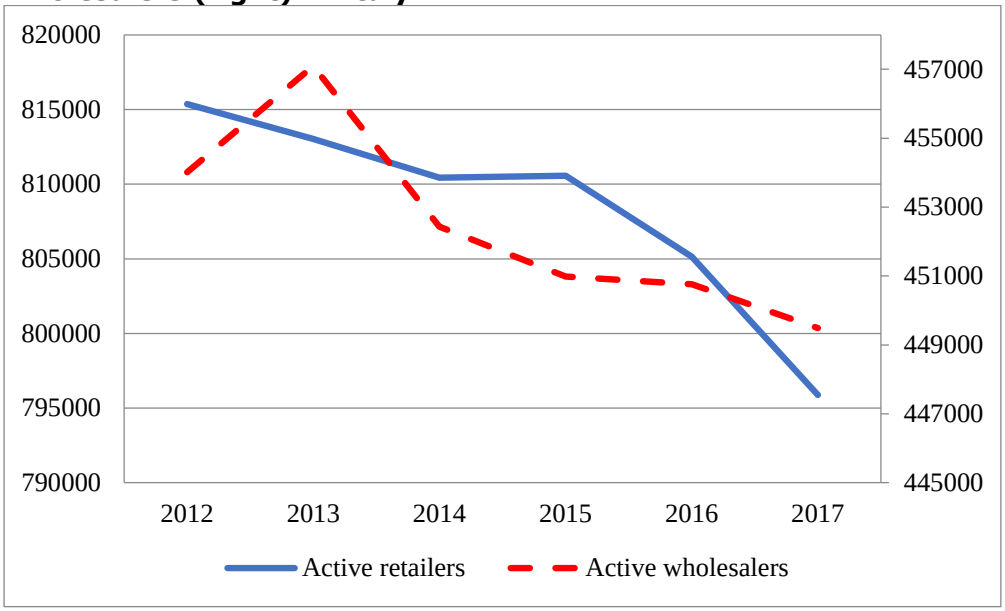
In particular, permission of Sunday opening hours has been strongly criticised. The position of small retailers, as highlighted by Temperini and Gregori (2015)[88], is that such initiatives have been more favourable to large-scale distribution enterprises (whose participation in Sunday opening hours has been extensive), because such companies can draw on greater organisational resources and higher levels of flexibility than can small shops and family-run businesses.

[88] With a survey on a sample of small Italian retailers, these authors show that the latter did not get substantial benefits from the liberalization of opening hours. The accession to Sunday openings, in particular, was difficult and costly for small businesses as opposed to large companies, which have a greater availability of personnel and make a wider use of temporary employment contracts. Furthermore, Sunday openings pose strong questions of a social and ethical nature. The question that arises is whether satisfying the wishes and needs of consumers justifies the lack of attention paid to certain principles and rights of storekeepers and retail workers.

Trend in active enterprises

Figure 6.1 shows that, from 2012 to 2017, the number of firms active in the retail sector decreased from 815 to 796 thousand units (-2.4%). The decline in the wholesale sector has been less pronounced: in fact, the number of active companies decreased by 1% (from 454 to 449 thousand).

Figure 6.1 - Number of active retailers (left scale) and wholesalers (right) in Italy



Source: Italian Chambers of Commerce.

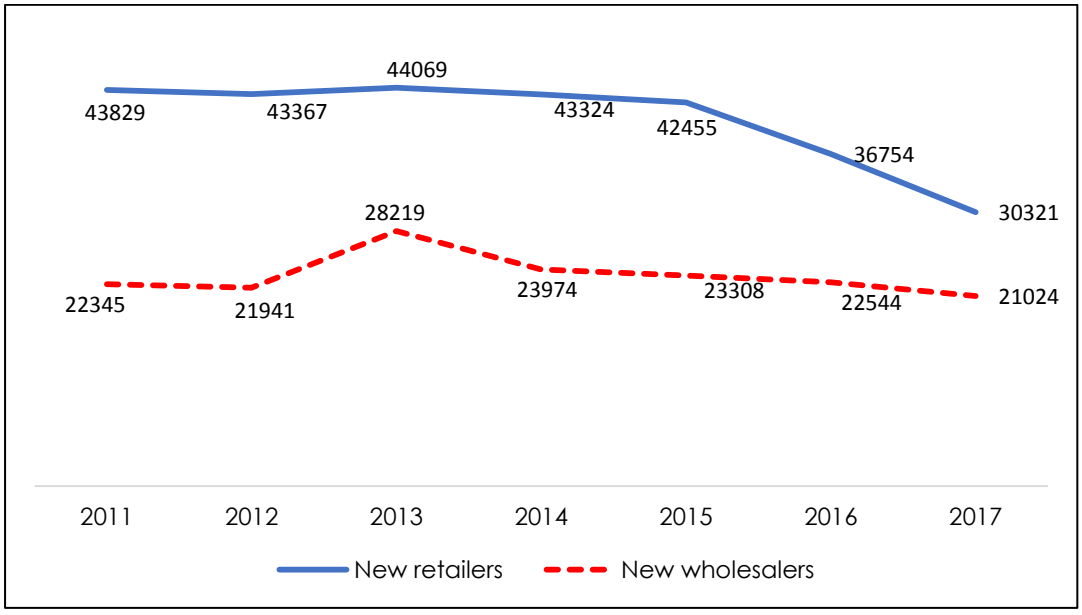
It should be stressed that the reduction of active retailers is concentrated in some product/trade categories. As Table 6.12 illustrates, the decline has been particularly intense in cultural and recreation goods, non-specialised retail businesses and other products for domestic use. Instead, stores specialised in food, beverage and tobacco have increased by 5% (from 123 to 129 thousand) and those selling ICT equipment by 8% (from 16 to 17 thousand). The table does not report the firms selling exclusively on-line. According to Eurostat Structural Business Statistics, Italian companies involved in "retail trade not in stores, stalls or markets" have increased from 1.8 thousand in 2012 to 2.1 thousand in 2015.

Table 6.12 – Number of retail firms by product and/or trade category: 2012-2017			
	2012	2016	% change 2016/2012
Non-specialised retail businesses	121,378	114,623	-5.57
Food, beverages and tobacco in specialised stores	122,738	128,850	4.98
ICT equipment in specialised stores	16,106	17,428	8.21
Other products for domestic use in spec. stores	111,774	103,907	-7.04
Cultural and recreation goods in spec. stores	64,914	59,420	-8.46
Other products in specialised stores	304,436	296,399	-2.64

Source: National Observatory of the Trade Sector – Ministry of Economic Development.

Although it was expected that the reform would boost the creation of new commercial enterprises, the data in Figure 6.2 show that the number of newly-registered trade companies in the Italian Chambers of Commerce has decreased in the period following the deregulation, and particularly in the retail sector.

Figure 6.2 - Number of new trade companies registered in Italy



Source: Italian Chambers of Commerce.

However, also in this case, there have been significant differences among product/trade categories: comparing the number of births between 2010-2012 and 2013-2015, the Eurostat Structural Business Statistics show a marked reduction in cultural and recreation

goods and other products for domestic use, while in food, beverage and tobacco the process of new firm formation has increased.

Table 6.13 – Number of retail shops by sales area (in square meters)

	2012	2013	2014	2015	2016	2017	% change 2017/2012
1-50	268,693	264,999	258,262	252,865	247,817	246,150	-8.4
51-150	195,312	191,168	186,777	183,177	180,050	178,809	-8.4
151-250	34,109	33,972	33,631	33,569	33,530	33,548	-1.6
251-400	11,892	11,768	11,558	11,482	11,470	11,369	-4.4
401-1500	17,564	18,119	18,125	18,505	18,997	19,099	8.7
1501-2500	1,903	2,012	2,069	2,125	2,193	2,233	17.3
2501-5000	951	1001	1,002	1,026	1,024	1,047	10.1
>5000	581	582	582	569	583	588	1.2

Source: National Observatory of the Trade Sector – Ministry of Economic Development.

As expected, relevant changes have also occurred with respect to the size of retail outlets. Table 6.13 shows that, over the 2012-2017 period, retail stores with surface areas lower than 150 square meters (henceforth, sqm) decreased by 8.4%. At the same time, the number of retail outlets with larger surface areas increased: this was particularly the case for those between 1,501 and 2,500 sqm (+17.3%) and those with surface areas ranging from 2,501 to 5,000 sqm (+10%). It should be emphasised that such an increase in very large retail companies occurred in spite of the relevant entry restrictions that they had to face (cf. Table 6.11). On the other hand, small retailers do not seem to have received substantial advantages, whether from the simplified procedures for establishing a new business or from the liberalisation of operations (see above).

Trend in employment

In terms of employment, the overall performance of the Italian trade sector provides a different picture than that arising from the analysis of the number of active or newly established firms.

Table 6.14 reports Labour Force Survey data taken from Eurostat, which allow us to obtain useful information up to 2017 by type of employment. In particular, the first three columns

permit distinguishing between the trend of employees and self-employed in the aggregate trade sector, which also includes the repair of motor vehicles and cycles. The overall negative performance of total employment is almost exclusively due to the negative trend in the number of self-employed persons: from 2008 to 2017, about 150 thousand jobs of this type were lost. On the other hand, the figures for employees exhibit both negative (2008-2012 and 2014-2015) and positive variations (2012-2013 and 2016-2017) so that, in the end, the number of employees in 2017 almost coincides with that recorded in 2008.

The negative trend of self-employment is consistent with the decline in the number of firms, which, as documented in the previous sub-section, has particularly affected small shops (where mainly self-employed people work).

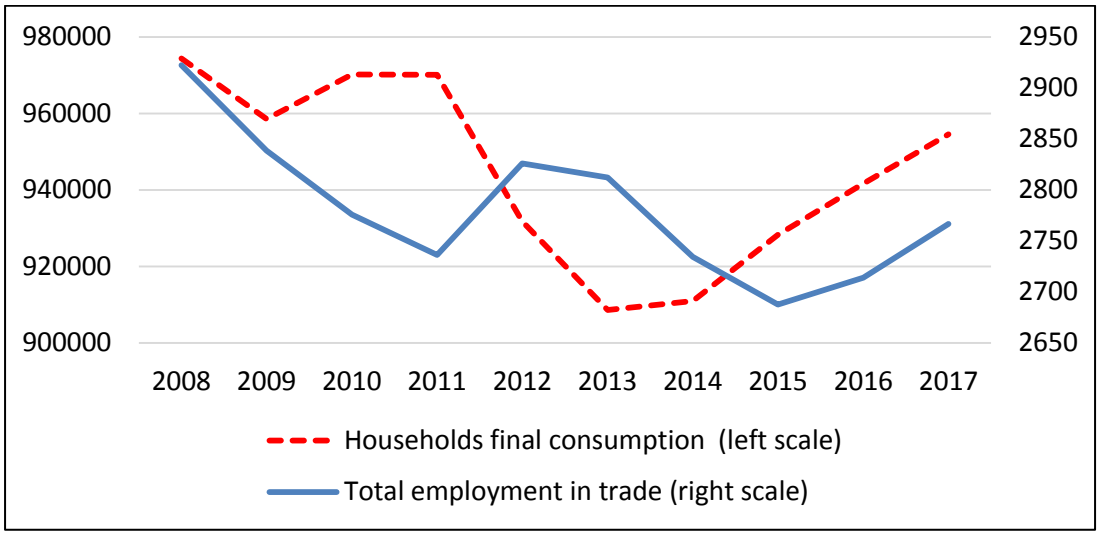
Table 6.14 – Employed persons in the Italian trade sector (thousands)

	Trade sector including motor vehicles and cycles			Trade sector excluded motor vehicles and cycles		
	Total	Employees	Self-employed	Total	Wholesale	Retail
2008	3,244	2,040	1,204	2,922	1,042	1,881
2009	3,178	1,997	1,182	2,839	981	1,857
2010	3,112	1,952	1,159	2,776	953	1,823
2011	3,060	1,908	1,152	2,736	845	1,891
2012	3,144	1,997	1,146	2,826	833	1,993
2013	3,105	1,969	1,136	2,812	817	1,996
2014	3,039	1,933	1,106	2,734	784	1,951
2015	3,000	1,909	1,091	2,688	763	1,925
2016	3,043	1,956	1,088	2,714	773	1,941
2017	3,095	2,040	1,054	2,767	776	1,991

Source: Eurostat – Labour Force Survey statistics.

The last three columns of Table 6.14 report the persons employed in wholesale and retail trade (with the exclusion of motor vehicles and cycles). Employment in wholesale trade records a continuous reduction from 2008 to 2015, and then a small recovery in the most recent years. In contrast, employment in retail trade increased in 2011-2013 and again in 2016-2017, so that in the last available year the number of employed persons is greater than that recorded in 2008 (1,991 versus 1,881 thousand units, i.e. around 110 thousand more jobs).

Figure 6.3 – Total employment in wholesale and retail trade (thousands) and households' final consumption (€ millions at 2010 prices)



Source: Eurostat.

In order to shed some light on the factors behind the employment changes recorded in the Italian trade sector, Figure 6.3 plots the number of total employed persons in wholesale and retail trade (i.e. the figures in the fifth column of Table 6.14) versus the final consumption of Italian households at constant prices. The two variables do not seem highly correlated over the 2009-20012 period. However, starting from 2012 it appears that employment in the trade sector follows the variation recorded in households' consumption with a year lag: a reduction from 2012 to 2015, and then a recovery in the most recent years.

To summarise, after 2012 employment variations in the Italian trade sectors are strongly correlated with changes in domestic consumption. Hence, the liberalisation of domestic trade does not seem to have had negative employment effects: in fact, in 2012 there was a remarkable increase in employed persons, while the reduction over 2013-2015 was mainly due to a drop in household consumption.

Trend in profitability

For the analysis of profitability, we first consider the gross operating rate, which corresponds with the share of gross operating surplus in turnover (where the former is the surplus generated by operating activities, calculated as the difference between value added and labour costs). Such an indicator is provided by Eurostat and allows us to compare the recent trend of profitability in the EU and Italian trade sectors.

Table 6.15– Gross operating surplus/turnover (gross operating rate) - percentage

	Wholesale trade *		Retail trade*	
	EU	Italy	EU	Italy
2010	4.5	5.7	6.2	7.0
2011	4.4	6.2	5.7	7.5
2012	3.7	5.1	5.2	5.6
2013	3.6	5.1	5.4	5.7
2014	4.4	5.5	5.7	5.8
2015	4.6	5.8	6.0	6.6

*= Excluding motor vehicles and motorcycles.
Source: Eurostat - Structural Business Statistics (annual enterprise statistics for special aggregates of activities).

As shown in Table 6.15, gross operating rates in the Italian wholesale and trade sectors have been always higher than those recorded in the EU. In both sectors, as well as in both Italy and the EU, there has been a reduction in 2012-2013 and a recovery in 2015, the most recent available year. It is to be observed that the reduction in profitability has been more intense in Italian retail trade, which, moreover, has not been able to recover the initial levels of gross operating rates.

Along with the previous analysis, we have also investigated the recent dynamics of profitability in the wholesale and retail sectors by using the Bureau van Dijk-Aida database for Italian business companies.

For each of the two sectors, we show the recent trend of the EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortisation), i.e. a standard measure of firm profitability. These data are distinguished between three groups of firms classified in terms of turnover size: the top 100 companies, the "medium range" 100 companies and the lowest 100 companies. The medium range represents an intermediate cluster composed by firms having a turnover between 50 and 100 million euros.

Table 6.16 – Turnover (M€) in Italian wholesale and retail trade sectors: 2016

	Total	Top 100 companies	Medium range companies	Lowest 100 companies
Wholesale trade	570,000	184,583	9,251	17
Retail trade	310,000	89,420	8,095	21

Source: Istat and BvD-Aida database.

Table 6.16 reports the total revenues of the wholesale and retail sectors in 2016 taken from Istat (570,000 and 310,000 million euros respectively) and, then, the total turnover of the three groups of firms. The top 100 wholesale companies extracted from the BvD-Aida database have covered roughly 30% of the total sectoral turnover. A similar percentage (29%) is accounted for the top 100 retail enterprises.

Table 6.17 – EBITDA 2011-2016 (K€): wholesale companies

	2011	2012	2013	2014	2015	2016
Top 100 companies	3,323,224	3,560,675	3,115,134	3,191,011	4,140,865	5,547,809
Medium range companies	319,751	276,826	279,993	299,999	326,667	366,808
Lowest 100 companies	769	-15,114	-22,557	-20,916	-6,507	40

Source: BvD-Aida database.

For wholesale companies, Table 6.17 illustrates the trend of the EBITDA over the period 2011-2016. The top 100 companies record a positive trend of profitability due, especially, to the staggering performance of the last two years: in nominal terms, their total EBITDA increased by 29.7% in 2015 and 34% in 2016. The medium range companies are characterized by smaller variations: in the last two years their EBITDA raised by 9 and 12%. Instead, the EBITDA of the lowest 100 was negative from 2012 and 2015 and recovered a positive though small value only in 2016.

Table 6.18 – EBITDA 2011-2016 (K€): retail companies

	2011	2012	2013	2014	2015	2016
Top 100 companies	3,800,581	3,441,188	3,570,229	3,241,373	3,691,947	3,877,498
Medium range companies	167,763	157,884	154,234	177,581	206,467	202,348
Lowest 100 companies	319	-1,186	-3,406	-18,704	-5,913	25

Source: BvD-Aida database.

In terms of profitability, the performance of retail companies is, in general, less satisfactory than that of wholesalers. Table 6.18 shows that in 2016 the top 100 companies recorded an amount of EBITDA almost equal to that of 2011: this is due to a reduction of profits both in 2012 and 2013 followed by a recovery in the most recent years. Instead, a more positive trend of profitability characterises the medium range companies: especially in 2015 their EBITDA increased by 16% in nominal terms while in 2016 there was a small reduction. Finally, the performance of the lowest 100 retail companies resembles that of wholesalers of the same group: they suffered substantial losses from 2012 to 2015 and only in 2016 regained a positive, although quite small, amount of profits.

To summarise, both in terms of gross operating rates and EBIDTA values, the Italian trade sector has registered a significant reduction in profitability in the years 2012-2013, i.e. in conjunction with the remarkable drop of domestic consumption (cf. Figure 6.3). In 2015, following the recovery of consumption, profitability began to grow again, though especially among the largest companies and particularly those belonging to the wholesale sector. On the other hand, small companies, both in the wholesale and retail sectors, have incurred remarkable losses and, even in 2016, were not able to recover the level of profitability recorded in 2011.

Interviews with stakeholders

For a better understanding of the changes that have affected the Italian trade sector after the 2011 reform, we carried out a qualitative investigation. Eight relevant and key actors were interviewed, namely: 2 trade associations of small retailers and wholesalers (Confcommercio, Confesercenti), 2 trade associations of small manufacturing companies and services (Confartigianato, CNA), 1 trade association of large-scale distribution (Federdistribuzione), 1 association for consumer protection (Adiconsum), and 2 large-scale retailers (Simply-SMA-Auchan Group, Gabrielli Group).

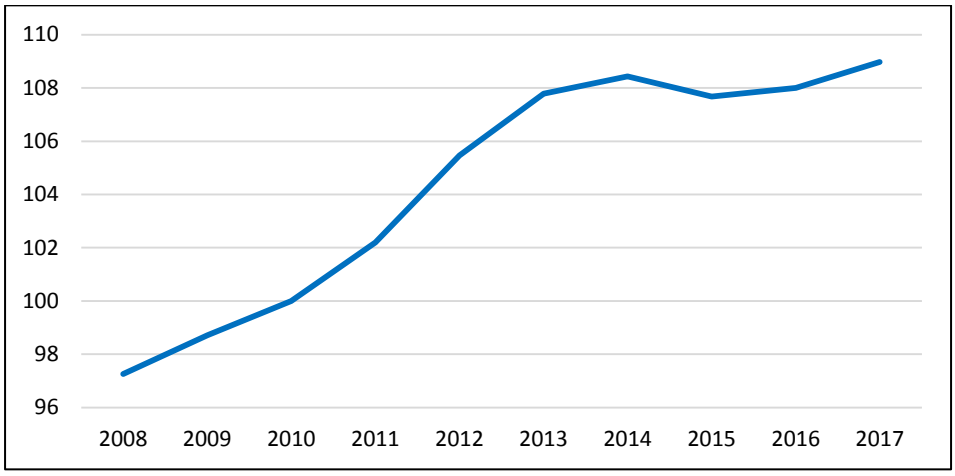
Table 6.19 illustrates the open questions the above stakeholders were asked. From the analysis of the results, several positive and negative aspects have emerged with regard to the impact of the reform on the Italian trade system.

In general, there is a certain convergence in believing that the reform has not given a significant impetus to the creation of new enterprises and employment; however, most of the respondents have recognised that these unsatisfactory outcomes have also been due to the negative economic situation, and the decline in domestic consumption experienced in Italy after 2012.

Table 6.19 - Open questions asked in the interviews
1. The elimination of restrictions for opening trade activities, as established by the 2012 reform, has given impulse to:
A. the creation of new enterprises
B. employment
C. household consumption
2. Which main changes or phenomena occurred in the trade sector as a result of the afore-mentioned reform?
3. Has the reform improved the trade sector's competitiveness (e.g. stimulating firms to increase efficiency, improve services, innovate, etc.)?
4. Have consumers benefited from this intervention? Has there been an improvement in the quality of trade services?
5. What was the impact of this reform on the revitalisation of urban/historical centres?
6. Has the reform altered the relationship between industrial and distribution companies?
7. Have there been changes in the relationship between wholesalers and retail companies?
9. What modifications or further measures should be implemented for the development and competitiveness of the trade sector?
10. Would you prefer to go back to the situation as it was before the reform? If so, could you indicate at least at least one reason for this?

With regard to the positive aspects of the reform, the stakeholders mainly highlighted the benefits for consumers: in particular, the increase in supply (greater breadth of product range), the containment of prices (see Figure 6.4) and the improvement of services, especially in terms of the extension of opening hours to Sundays. As stressed in the beginning of this section, Italy is among those European countries in which opening hours are completely unrestricted. Consumers can make purchases any day of the week with a broader time slot than before the reform; therefore, more accommodating and flexible service is provided to consumers, similar to that provided by e-commerce. Accordingly, it can be said that the reform has brought about important changes in consumer buying habits.

Figure 6.4 – Index of consumer prices in Italy: 2010=100



Source: Istat (Index of consumer prices for blue and white-collar worker households).

Another positive aspect is observed in the modernisation of the trade sector. In a phase of economic stagnation, the impulse to compete displaces the less efficient and less innovative firms. Hence, the reform has facilitated the turnover of businesses and selection of companies.

In particular, it has been pointed out that the extension of shop opening hours, and therefore the greater purchasing possibilities for consumers, has not had an important effect on the growth of consumption. At the same time, the liberalisation of opening hours has resulted in a shift in the share of consumer spending from small retailers to large-scale companies.

With respect to the reduction of the establishment restrictions for small businesses, some stakeholders, and especially the national associations of small retailers, have stressed that this has opened doors for the entry of unprepared entrepreneurs. Thus, the fact that several new trade activities have failed quickly after their start could be due, along with other factors, to a lack of adequate professional requirements, which are also considered necessary for the quality of customer service. These stakeholders have expressed their concern that the high frequency of shop settlements and closures has been coupled with an excessive recourse to closing discounts. However, it should be stressed that, as far as this implies the exit of inefficient firms and leads to price reductions, a high churn rate of shops does not have a negative impact on consumer welfare.

Expectations of the reform with respect to the revitalisation of urban and historical centres appear not to have been met. Among the causes of this are urban constraints, limited accessibility and viability problems. However, a relevant contribution to the impoverishment

of city centres, especially in small and medium-sized towns, should be ascribed to the decline and the excessive turnover of small retailers.

According to stakeholders, the growing market share of big and widespread distribution chains has increased the bargaining power of large distributors as opposed to producers of consumer goods. This represents a serious problem for Italy's small and medium-sized manufacturing enterprises, given the increasing difficulty they experience in placing their products at fair prices. Instead, according to the respondents no significant changes have occurred with respect to the relationship between wholesalers and retailers.

Almost all the stakeholders interviewed agree that a return to the pre-reform situation is not desirable. However, a full liberalisation is not positively evaluated by some of them, especially because it would reinforce the negative trend affecting small businesses: the associations of small retailers, for instance, contend that a minimum of regulation should be re-introduced, also with respect to operations (in particular with reference to Sunday opening hours).

As a final consideration, most respondents have stressed that, for a more competitive and, at the same time, more balanced trade sector between large and small companies, a cultural renewal should be encouraged, by fostering innovations, also in terms of managerial practices, organisational changes and firms' digitisation.

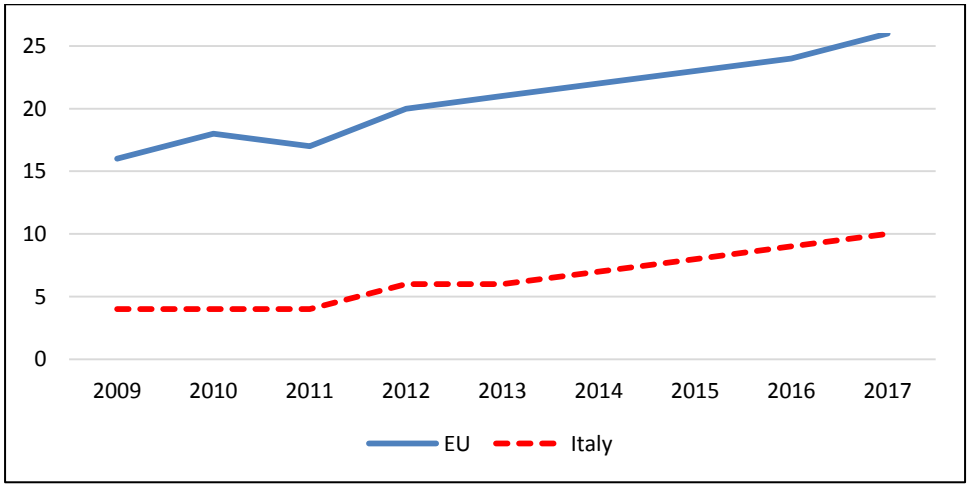
Use of e-commerce and social media

Thus, also according to the stakeholders interviewed, the increased diffusion of e-commerce, rather than being seen as a threat, should be exploited to integrate the services offered by traditional shops, which could become like showrooms for some product categories. Hence, to keep their growth prospects and maintain an adequate level of profitability, a non-negligible number of small retailers could increase their competitiveness by adopting these new hybrid business models. Another area that might produce interesting results is related to the use of new forms of web communication (e.g. social media marketing) to increase both the visibility of the firms and their capability to communicate and develop relations with customers.

With respect to the issue of e-commerce, it must be stressed that in 2017 only 10% of Italian trade companies sold online, versus a percentage of 26 recorded in the EU. Figure 6.5 illustrates that, in spite of the progress made since 2012, the gap with respect to the EU remains unchanged.

With respect to other measures of digitisation, Italian trade companies are in line with their European counterparts. For instance, in 2017 the share of retail and wholesale firms using social media was 54% in Italy and 53% in the whole EU, and in both cases the percentages are significantly higher than those arising in other economic sectors (data taken from the same source of Figure 6.5). However, by taking into account the firms' economic efforts to exploit the internet for commercial purposes, it emerges that only 23% of Italian trade companies advertised their products/services on the internet, while the share in the EU was 29%.

Figure 6.5 – Percentage of enterprises selling online (at least 1% of turnover): wholesale and retail trade (including motor vehicles and cycles)



Source: Eurostat (ICT usage in enterprises).

According to the above figures, it can be said that, in terms of digitisation, there is ample room for improvement in the Italian trade sector. Such a consideration is reinforced by the fact that the above performance refers to firms with at least 10 employees, so that it is very likely that the degree of digitisation of the overwhelming majority of small retailers is much lower.

With respect to measures that can be taken to foster the process of digitisation of small retailers, the European Commission (2018b) has recently published a practical guide, which is mainly targeted at local authorities (such as Municipalities and chambers of commerce). The latter, also by taking advantage of support measures provided by both national and regional Governments, can implement a variety of actions, according to the level of awareness and usage of digital technologies in the local small retail sector. Thus, the possible measures range from helping small retailers to increase their knowledge and digital skills (by means of

training and consultancy services) to assisting their marketing or promotion activities or even launching e-commerce platforms.

6.3 Summary and concluding remarks

This chapter has stressed that, over the last fifteen years, in most of the Italian service sectors the **regulatory burdens hampering competition have significantly declined**. The reduction of regulatory restrictiveness started in network services (and, especially, in energy and telecommunications) after the beginning of the new century, while that affecting professional services and retail trade has occurred since the late 2000s. Recent and new indicators of regulatory restrictiveness provided by the European Commission (2017 and 2018a) show that in the latest years the Italian scores are only a bit higher than those recorded in other EU countries for some professional services, especially in engineering. Instead, the regulatory burdens affecting retail trade are still evaluated as significantly higher, especially in terms of entry requirements, while the restrictions on operations are amongst the lowest in the EU.

So far, due to the more recent regulatory changes, the impact of regulation in professional services and retail trade has not been sufficiently analysed. This chapter has provided some evidence of this: first, by using aggregate indicators of regulatory restrictiveness, and then with a focussed analysis of the Italian domestic trade sector.

The first kind of analysis has been based on sectoral panel regressions in which the annual rates of change of Total Factor Productivity of the Italian sectors were explained, along with other factors highlighted by the relevant literature in this area, and by the impact of regulatory restrictiveness in professional services and trade (measured by the PMR OECD indicators weighted by input-output coefficients). We find that **lower regulatory restrictiveness in the examined services has a positive effect on the sectoral rate of TFP growth**. However, these results should be interpreted with caution due to the following: the strict assumptions underlying the adopted methodology, the limited number of observations that are available, and the level of sectoral aggregation of the input-output tables. In particular, the Italian trade sector emerges as the most aggregated one (including both retail and wholesale trade, as well as trade and repair of cars and motorcycles), so that the weighted impact of regulation is very high. In fact, when the trade sector is excluded from the analysis the sectoral impact of regulatory changes turns out to be less significant. With respect to professional services, the regulatory changes have had a positive impact on the productivity of the same service sector as well as on that of the manufacturing sectors having strong interlinkages with the former.

In any case, the fact that the impact of regulation in the examined services is more intense within the same regulated sectors is not surprising. This, together with the motives already mentioned, justifies the subsequent analysis focussed upon the domestic trade sector.

According to a comprehensive set of descriptive statistics, we show that, after the changes established by Legislative Decree 201/2011, the **Italian trade sector** has been affected by a **reduction of active firms** and newly established firms, especially in the retail sector. Such a reduction, however, has not been generalised, but particularly concentrated in some specific product/trade categories. The decline has been particularly severe for small outlets with a sales area lower than 151 m^2. This suggests that, in a context of declining consumer demand, the 2011 reform has accelerated the process of exit of the smaller and probably less efficient firms and increased the market shares of larger wholesale and retail companies.

At the same time, it should be stressed that in terms of **employed persons** the reform has not produced negative effects. Starting from 2012, the employment variations turn out to be strongly correlated with the changes in household consumption: negative from to 2012 to 2015, and positive in 2016-2017. In the final year, the total number of employed persons was not far from that recorded in 2008. Hence, the reduction of self-employed persons (concentrated in small retail companies) has been more than compensated by the increase in employees.

Furthermore, the trend in **profitability** of wholesale and retail companies, which was and remains above the EU average in overall terms, appears to be correlated with that of domestic consumption. In any case, small retailers and wholesalers, as opposed to large companies, have not been able to recover the profits achieved before the decline experienced in domestic consumption.

To summarise, small trade companies do not seem to have gained substantial advantages from the 2011 reform, which in principle made their entry easier. On the other hand, large trade companies have not been particularly affected by the entry restrictions, which are still more severe in Italy than in other EU countries for large outlets. Hence, the divergent performance recorded by small and large companies seems mainly due to the lower restrictions in operations (including the full liberalisation of opening hours) rather than those concerned with the establishment of trade companies.

Additional insights have emerged from a qualitative analysis based on interviews with relevant stakeholders (national associations of trade companies, small manufacturers, consumers, and large scale retailers). The **benefits for consumers** (in terms of price

containment, higher variety and improved services) and the modernisation of the trade sector are mentioned as the most positive aspects of the reform.

On the other hand, some stakeholders (especially the representatives of national associations of small retailers and small manufacturing companies) expressed concerns about:

- the lack of adequate professional requirements for new entrants, which has opened the doors to unprepared entrepreneurs and has increased the turnover rate of companies;
- the increase in the bargaining power of large distributors with respect to the producers of consumer goods;
- the total liberalisation of opening hours, especially on Sundays, which has generated a further negative impact on small retailers:
- the impoverishment of urban centres, especially in small and medium-sized towns.

However, at the same time, the above stakeholders have stressed that the declining performance of their associates cannot be exclusively attributed to the 2011 reform, since a remarkable role has also been played by the decline in domestic consumption.

In order for small companies to survive and possibly grow in the trade sector, the overwhelming majority of stakeholders agree that it is necessary to foster innovation, both in terms of organisational change and firms' digitisation. In this regard, a greater exploitation of e-commerce and web communication should be incentivised by specific policy measures targeted at small trade companies.

7. POLICY CONSIDERATIONS

This concluding chapter draws on the main policy challenges arising from our study and reported in the final sections of previous chapters. In what follows, we assess how the reforms recently introduced by the Italian Government have addressed the identified policy challenges. Some suggestions are proposed with a view to improve the potential impact of the current reforms and, if necessary, to introduce more effective policy measures.

7.1 Public procurement

The Legislative Decree 50/2016, recognising that the existing fragmentation of public procurement agencies was inefficient and expensive, implemented the basic principles contained in the European Directives 2014/23/EU, 24/EU and 25/EU, focusing on the aggregation, professionalisation and transparency of procuring authorities as a means to achieve a more competitive and developed Internal Market. Based on descriptive analyses, the evidence suggests that the efforts to aggregate and rationalise public procurement expenditures already initiated before the 2016-17 reform and reflected by the latter are bearing their fruits. In particular, the present study shows that the purchasing trends and outcomes of the PA have gone along these lines. Furthermore, data on more recent tenders seem to suggest, subject to some caveats, a trend towards an increase in transparency and thus in potential competition in the allocation of contracts.

At the same time, the analysis of the reform uncovers criticalities and bottlenecks that should be removed by a further step of reform.

A first critical issue refers to the significant delays in both the planning and execution of public works and in the completion of tender procedures. As stressed by the Italian Court of Auditors, these are mainly due to bureaucratic complications, an excessive recourse to litigation, and a lack of competencies in Public Administrations. A further explanation for the delay can be found in the lack of synchronisation between the procedures and the timetable that public entities have to respect in order to prepare their budget and the new tender procedures. Indeed, local bodies after Law 118/2011 faced a reform of their accounting system, but the interlinkages of this reform and that of the public procurement were largely neglected by the legislator.

A second relevant criticality is that, after the reform, ordinary sectors have reduced the number and value of tenders for public works which, albeit being more complex than other tenders, are urgently needed by local Governments for their statutory activities and for fostering the economic growth of their territories.

A third critical point is that the procurement reforms do not seem to have improved the speed of procedures, also for goods and services purchases. In line with the findings of other analyses, this study suggests that this outcome is mainly due to the rising degree of uncertainty in the new law application, which may also discourage the usage of the new criteria for awarding the contracts (best quality/price ratio, or cost/effectiveness ratio). The timely clarification of the new rules through guidelines and implementing provisions should allow overcoming the issue.

Finally, the last criticality refers to the introduction of another degree of litigation (art. 29 c. 1 Dlgs 50/2016): not just after the awarding phase, but also after the admission to the tender. Such a possibility incentivises legal disputes that are often poorly justified. For this reason, this specific provision of the new Code is, at present, questioned at the State's Council.

All in all, a refit of the reforms should define with more clarity and courage the roles and limits of the controlling authorities. In particular, a better-delimited role of ANAC should be established by simplifying the current administrative and legislative framework.

The firms involved in Public Procurement (PP) are generally larger than those without PP contracts. However, the 2016 reform has not depressed the SMEs' ability to compete and participate in PP activities. A more intense use of PP contracts to foster innovation is advisable. Even though the study has found that the innovations induced by PP do not seem particularly relevant or complex, they are important for stimulating more Italian firms to start investing in innovative activities and human capital.

7.2 E-government (including e-procurement): availability, usage and impact on the conditions for doing business

In Italy, digital policies stressing the roll-out of technology and digital infrastructure (broadband, e-procurement) have generally succeeded in ensuring the catching up with the EU partners, especially from the supply side. A different perspective emerges in terms of policies targeting the user side of the above technologies, which were generally overlooked: the descriptive analysis presented in this study points at usage rates that remain unsatisfactory.

On the other hand, the more complex and systemic reforms needing a preliminary normative rationalisation and a significant investment in human capital (whether in the form of new skills intake, or better organisational models) have been significantly delayed, and remained much more ineffective. In this respect, the austerity climate affecting the Member States' budgets and the block of the turnover of the personnel within the PA worsened the

unfavourable trend of the average ageing and skill obsolescence of Italian public servants. The cases of CDA and OSS are paradigmatic, among several other patent failures (like those on e-health).

However, the evidence suggests that, despite the existence of a clear mismatching of the right input mix needed for enhancing innovation in public e-services, economic factors were just one side of the coin. Another important blocking role was played by inadequate institutions. Starting with law, the chronic normative chaos was not preliminarily solved before introducing the digital revolution of the PA. As a result, analogue norms and administrative procedures were often duplicated in the new digital versions, which were simply added to the existing ones without any significant rationalisation or simplification.

Most of the digital reforms continuously introduced in the last 18 years merely increased the normative chaos rather than amending it, without bringing any clear advantage to the PA and the citizens. In these conditions, behavioural phenomena like "defensive bureaucracy" occur and thwart most of the benefits of the reforms. Moreover, due to political discontinuities and frequent government changes, there has been a lack of the policy commitment that market operators need to plan long-term investment.

Hence, future policies should prioritise normative simplification and rationalisation, rather than introduce new normative provisions.

7.3 SMEs' access to finance

The relevance of SMEs for the Italian economy and the heavy reliance of their capital structure on bank debt call for a further strengthening of the policy initiatives that have been adopted since 2010. Urgency in the adoption of equity-oriented measures is also pushed by other challenges that will influence the evolution of the Italian SMEs' financial structure, such as:

- global competition, which makes firm size a crucial issue. To face the increasing pressures of globalisation, Italian SMEs should promote an equity-based capital structure as a prerequisite for growing successfully;
- banking regulation – such as for capital adequacy – is tightening: a larger amount of equity capital is required for banks to offset the risk associated with issuing loans to risky SMEs; this is even more compelling when coupled with the drop of credit to SMEs observed in the last years;

- relative to other European countries, the size of the Italian stock exchange is small (except for the AIM segment) and does not help the exit strategies of venture capital and private equity companies.

Overall, the results of the study indicate that the structure and recent development of fiscal and legislative interventions in Italy is consistent with the status of the financial relationship between SMEs and banks. Allowance for Corporate Equity (ACE), Minibonds and Individual Investment Plans (PIR) aim at helping SMEs to shift towards a more market-based financial structure and equity financing. In this scenario, corrections to the existing course of action – in terms of strengthening existing measures and targeting them in a more effective way – can be coupled with other significant interventions in areas where the Italian financial system still shows some relevant gaps.

To support Italian SMEs in overcoming the equity shortage in their capital structure, the following policy initiatives should be considered:

- augment the notional rate of ACE, i.e. increase the amount of equity capital that can benefit from fiscal allowances. For the fiscal year 2018, the notional rate is set at 1.5% while, according to what can be inferred from the initial legislative act, it had to be fixed at around 3%. A higher notional return for ACE will reduce the opportunity cost of investing in equity capital for Italian entrepreneurs and, at the same time, will contrast their inherent aversion towards external equity finance;
- to face the issue of low equity capital in SMEs, other European countries have strengthened the role of specific financial intermediaries (banks) that only target SMEs in their business activity. This procedure could be extended to similar Italian banking intermediaries that might develop specific partnerships with SMEs, included lower requirements in terms of capital adequacy within the banking regulation framework. The reorganisation of the Italian cooperative banks system (BCC, Banche di Credito Cooperativo) provides an opportunity to address this issue by finalising their business towards a closer relationship with SMEs;
- as a complementary option to the Central Credit Guarantee Fund (CCGF), benefits for lenders using the CCGF could be increased by providing additional advantages to SMEs that adopt a mixed financing system for their investment projects, including not only debt but also a share of equity capital. This provision could stimulate SMEs to add equity in their capital structure by bundling their demand for loans with some contingent use of equity capital.

7.4 R&D and innovation

During the last decades a growing number of Italian SMEs have started to perform systematic R&D activities. To reinforce such a positive trend an adequate mix of policies is required. An effective R&D policy for Italy should also include measures aimed at inducing more R&D efforts by the largest national and foreign companies whose contribution to business R&D has declined.

R&D tax incentives could play an important role in achieving both goals. However, the current fiscal provision, allowing a generous tax credit but only on the increment of research expenses, is likely to be particularly effective for new R&D-performing firms, including the wide set of innovative start-ups born after 2012 (see below). Instead, a pure incremental tax incentive does not seem adequate for achieving the other crucial goal: that of fostering the presence of big R&D facilities owned by large national and foreign companies. In fact, almost all the developed countries have volume-based R&D tax incentives which are provided either alone or in combination with an increment-based scheme. Italy is the only European country that provides only an incremental scheme. Such a limited fiscal treatment also applies to the foreign companies performing R&D in Italy, which could be induced to re-locate their research facilities to other countries.

This study proposes adopting a mixed scheme of tax credits also based on the level of R&D investment. The volume-based tax credit rate does not need to be particularly high, in part because, contrary to that based on increments, it is not guaranteed that, in the short-run, the increase of R&D expenses will equate the foregone tax revenues. What is more important for firms willing to undertake long-term investment plans is that the fiscal incentives for R&D be stable over time, instead of being characterised by frequent and sudden changes, as has occurred in the past. Rather than their extent, the stability of fiscal incentives represents a necessary condition for having additional R&D expenditures in the medium and long run.

It must be stressed that, for a country that needs a significant increase of private R&D investment, tax incentives, though necessary, are far from sufficient. Direct and selective public incentives can be provided by both national and regional Governments. A system of coordinated and complementary policy measures, coupled with a concentration of public funds in a few research fields or technology clusters (as the EU Smart Specialisation Strategy requires), could be an effective means of also involving large firms, both national and foreign. Hence, the overall share of public support of business R&D should be increased in Italy with the aim of achieving, at least, the EU average.

With respect to the investment in IPRs and the role played by the Patent Box we found that such a measure has been particularly appreciated and exploited by the companies with large

portfolios of trademarks rather than patents. Starting from 2017, trademarks have been excluded from the benefits of the Italian Patent Box. In any case, and according to the international experience, it remains doubtful whether this instrument is really effective in enhancing a country knowledge base. However, it should be stressed that, in the presence of an increasing and harmful fiscal competition among countries, the need for a deep revision of the Patent Box measure should be addressed at the international level.

The birth of a conspicuous number of innovative start-ups, fostered by the Start-up Act promulgated in 2012, represents a very important and promising opportunity to rejuvenate the Italian business sector and recover or re-launch its competitiveness. At present, however, the evidence is not sufficient to establish whether these ambitious goals are close to being achieved. Some more years are needed to observe, in particular, the patterns of M&As or IPOs involving these companies.

The local level of education has significantly affected the formation of innovative start-ups, both in service and manufacturing. Those belonging to manufacturing have also benefited from an adequate knowledge base (approximated by the extent of patent applications). Thus, local policies should be mainly centered on these enabling conditions in order to attain a more diffuse presence of innovative start-ups in the Italian territory.

For the growth prospects of innovative start-ups the access to external finance is a crucial issue. These problems and challenges are not so different from those already discussed for Italian SMEs (see above), although innovative start-ups, by their very nature, are less reluctant to resort to equity or venture capital. In any case, the main bottleneck that should be removed refers to the limited opportunities for exit strategies of venture capital and private equity companies. In this regard, given the limited size of the Italian stock exchange, measures aimed at fostering the development of special purpose acquisitions companies could be introduced.

7.4 Competition in services

In most professional services the level of regulatory restrictiveness has significantly declined during the last decade and, at present, Italian performance is in line with that recorded in the major EU countries. These regulatory changes have had a positive impact on the productivity of the same service sectors as well as on that of the manufacturing industries having strong inter-linkages with the former.

The above findings suggest that Italy does not need to adopt a substantial and comprehensive reform in the field of professional services, but only undertake some focused

adjustments. The Italian Annual Law on Market and Competition, approved in 2017, introduces minor provisions regarding lawyers and notaries. Instead, it does not contain any regulatory changes affecting the professions of engineers or partly those of architects, which, as compared with the situation of other EU countries, are still characterised by a too-broad range of reserved activities. Accordingly, a legislative measure aimed at reducing the regulatory restrictions to exercise the above activities is advisable.

With respect to the Italian trade sector, the regulatory burden is still significantly higher than in other EU countries, especially in terms of entry requirements. The sectoral analysis has shown that lower regulatory restrictiveness in retail trade has a positive effect on productivity, although such an effect appears to be limited to the aggregate trade sector.

The Legislative Decree 201/2011 (which has liberalised the operations of trade companies and, to a lesser extent, the establishment of new companies) has accelerated the process of exit of the smaller and probably less efficient firms. Thus, even according to the opinions of relevant stakeholders, the most positive aspects of the above reform stand on the modernisation and greater productivity of the trade sector and the increased benefits for consumers (in terms of price containment, higher variety and improved services).

It should be stressed that, over the period 2011-2017, the performance of the trade sector was mainly affected by the trend of domestic consumption. In fact, when the latter has recovered, total employment and the level of profitability in the trade sector also started to grow after years of decline. Hence, the impact of the 2011 reform should not be overstated.

In any case, the increasing difficulties that small retailers have to face cannot be neglected, since their role is not only important in terms of employment but also for keeping Italian towns and city centres vital and for providing personalised services to customers. However, also according to the majority of interviewed stakeholders, for small companies to survive and possibly grow, it is necessary to foster innovations, both in terms of organisational changes and firms' digitisation.

In this regard, a greater exploitation of e-commerce and web communication should be incentivised by specific policy measures targeted at small trade companies. The latter should be implemented at the local level (e.g. by Municipalities and chambers of commerce) according to a national strategy and taking advantage of support measures also provided by regional Governments. In the Italian context, a national strategy can be found in the digital economy plan termed "Industria 4.0," while policy measures for firms' digitisation are included in the Regional Operational Programmes for EU Structural funds.

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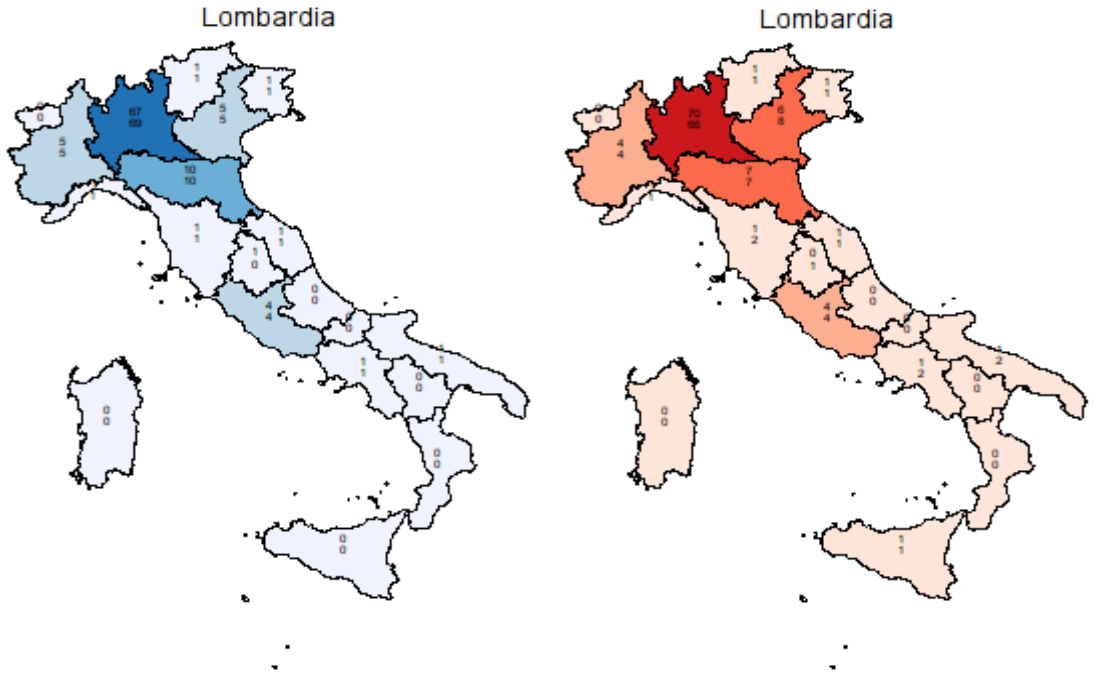
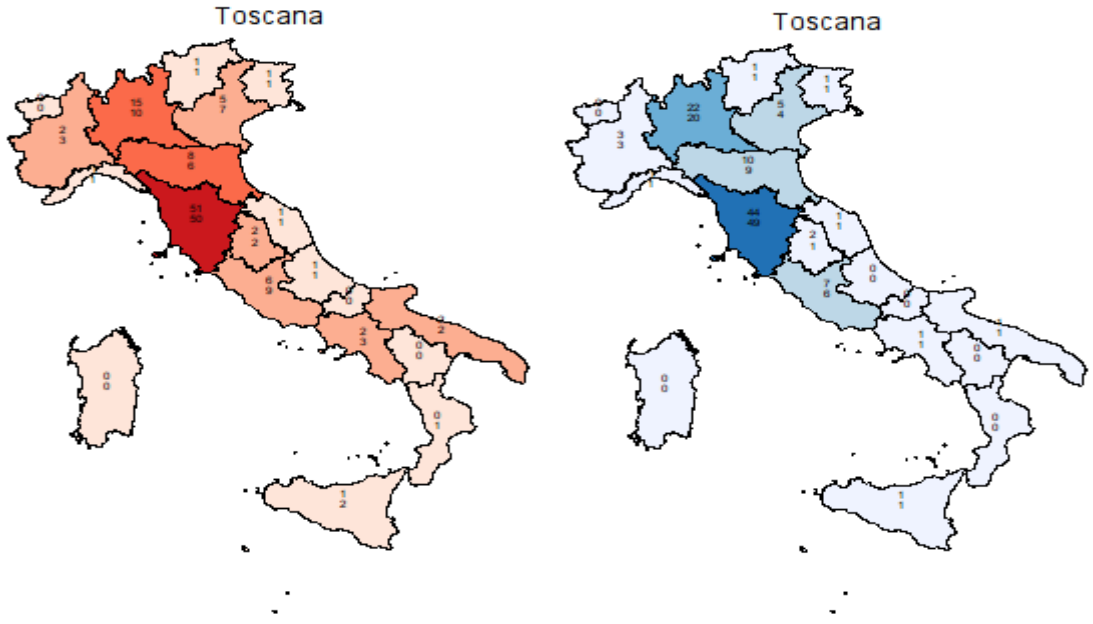
APPENDICES - Chapter 2

Figure A.2.1 – Territorial distribution of MEPA PA purchases of Lombardia, by selling region



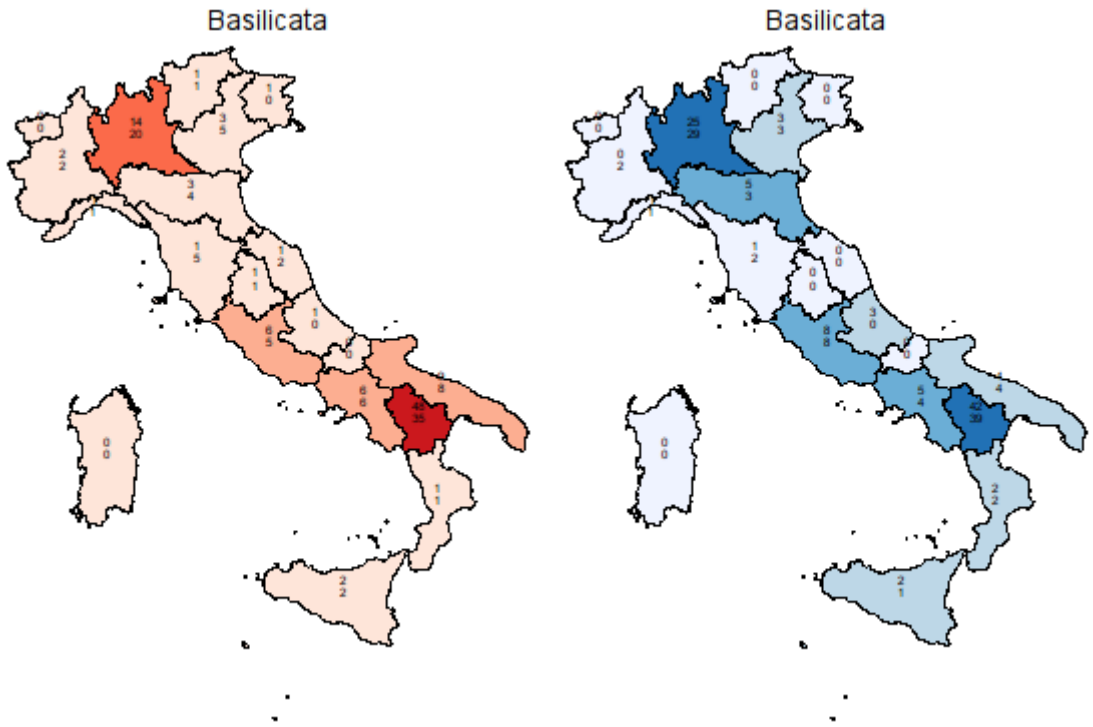
Source: our elaborations of CONSIP Opendata

Figure A.2.2 – Territorial distribution of MEPA PA purchases of Toscana, by selling region



Source: our elaborations of CONSIP Opendata

Figure A.2.3 – Territorial distribution of MEPA PA purchases of Basilicata, by selling region



Source: our elaborations of CONSIP Opendata

Table A2.1 shows how the sectors are aggregated starting from a two-digit level of classification (NACE rev.2). With respect to high- and low-tech industries, we have followed the OECD classification of manufacturing industries according to their technological intensity (see OECD, 2011). More specifically, we have grouped in high-tech firms in high- and medium-high technology industries; likewise, firms in low and medium-low technology industries have been grouped in low-tech. The high-tech industry group include firms in sectors such as aircraft and spacecraft, pharmaceuticals, medical, precision and optical instruments, etc.

Table A.2.1 – Sectoral aggregation*

	CIS 2012	CIS 2010	CIS 2008
High-tech industries	20, 21, 26, 27, 28, 29, 30	20, 21, 26, 27, 28, 29, 30	20, 21, 26, 27, 28, 29, 30
Low-tech industries	9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 31, 32, 33, 58	9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 31, 32, 33, 58	9, 10, 11-12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 31, 32, 33, 58, 59
Knowledge Intensive Business Services	53, 61, 62, 63, 64, 66, 70, 71, 72, 74	53, 61, 62, 63, 64, 66, 70, 71, 72, 74	53, 61, 62, 63, 64, 66, 71, 72
Other services	35, 36, 39, 49, 50, 51, 52, 65, 73	35, 36, 37, 38-39, 49, 50, 51, 52, 65, 73	35, 36, 37, 38-39, 49, 50, 51, 52, 55, 56, 65, 68, 77
Construction	41, 42, 43	41, 42, 43	41, 42, 43
Retail and distribution	45, 46, 47	45, 46, 47	45, 46, 47

*Two-digit level NACE classification (rev.2).

The high-tech group includes also the industries that the OECD (2011) classifies as medium-high in terms of technological intensity. Similarly, the low-tech group encompasses the industries classified as medium-low tech.

As for the definition of knowledge intensive business services (KIBS) and other (less knowledge intensive) services (Other_SERV), we have followed the Eurostat classification (see http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf). In particular, the group of KIBS is mainly made of firms involved in telecommunications, computer programming, consultancy and related activities, R&D, etc. The other aggregations, i.e. construction (CONSTR), retail and distribution (RET_DISTR), are residual categories.

Table A.2.2 - Heckman probit model with sample selection: two steps estimation

	Innovation (outcome equation)	Public procurement (selection equation)
Constant	0.2929	-2.2422***
	(0.5482)	(0.1193)
Log of turnover (2012)	-0.0253	0.0702***
	(0.0193)	(0.0072)
High-tech industries	0.2706**	-0.0579
	(0.1239)	(0.0483)
Low-tech industries	0.3026***	-0.1885***
	(0.1124)	(0.0347)
Knowledge intensive business services	0.2599**	0.3253***
	(0.1121)	(0.0361)
Other services	0.0982	0.2869***
	(0.1041)	(0.0335)
Construction	-0.4042***	0.7478***
	(0.1536)	(0.0290)
Knowledge from universities important	0.1975**	
	(0.0875)	
Knowledge from scientific journal important	-0.0794	
	(0.0723)	
Cooperation with university most valuable	0.3259**	
	(0.1425)	
Overall importance of external sources of knowledge	0.3816*	
	(0.2242)	
Share of employees with a degree (ordinal var. 0 to 6)	0.0245	
	(0.0179)	
R&D performing firms	(0.2242)	
	0.1116	
Firms belonging to a group		0.0449*
		(0.0247)
Firms operating in domestic market only		0.0722***
		(0.0246)
Alliances with other enterprises or institutions important		0.2903***
		(0.0223)
Strong price competition important		0.1033***
		(0.0268)
High cost of meeting government regulation important		0.1068***
		(0.0230)
Invers Mills ratio	-0.8321***	
	(0.2209)	
Pseudo R^2	0.1807	0.0689

Observations: cf. previous Table. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, *p<0.1

Interview questionnaire: "STRUCTURAL REFORMS AND COMPETITIVENESS"

*There are 23 questions within this survey. * indicates the obligatory nature of the answer to the question*

PUBLIC PROCUREMENT SECTION
Procurement and purchases in non-electronic mode

Q1. Name of the contracting entity where the person completing the questionnaire operates *

Write your answer here:

Q2. Type of subject where the person completing the questionnaire operates *

Choose **only one** of the following:

- ○ aggregator subjects
- ○ central purchasing bodies
- ○ aggregator subjects and central purchasing bodies
- ○ municipality capital of the province
- ○ municipality not provincial capital
- ○ single contracting station established in the provinces
- ○ other contracting stations (specify on the Other box)
- ○ Other

Q3. According to your impression, between the situation prior to the new law on public procurement (before Legislative decree 50/2016) and after it, the procedures for the choice of the contractor have been simplified for the Public Administrations? *

Choose **only one** of the following:

- ○ Yes
- ○ No

Q4. According to your impression, between the situation prior to the new law on public procurement (before Legislative decree 50/2016) and after it, the procedures for the choice of the contractor have been simplified for the economic operators? *

Choose **only one** of the following:

- ○ Yes
- ○ No

Q5. Payment policy - average effective payment time in days - prior to the new law on public procurement (before Legislative decree 50/2016) *

Write your answer here:

Q6. Payment policy - average effective payment time in days - following the new law on public procurement (after Legislative Decree 50/2016) *

Write your answer here:

Q7. According to your impression, between the situation prior to the new law on public procurement (before Legislative Decree 50/2016) and after it, the procedures for the choice of the contractor have facilitated the participation of SMEs and micro-firms? *

Choose **only one** of the following:

- ○ Yes
- ○ No

Q8. According to your impression, between the situation prior to the new law on public procurement (before Legislative decree 50/2016) and after it, the procedures for the choice of the contractor have made more likely awards to SMEs and micro-firms? *

Choose **only one** of the following:

- ○ Yes
- ○ No

Q9a. According to your impression, between the situation before the new law on public procurement (before Legislative decree 50/2016) and after it, the new procedures have led to greater transparency of the call for tenders? *

Choose **only one** of the following:

- ○ Yes
- ○ No

Q9b. Specify the motivation for yes or no: *

Write your answer here:

Q10a. According to your impression, between the situation prior to the new law on public procurement (before Legislative decree 50/2016) and after it, the new procedures have led to the simplification of the operations connected to the call for tenders? *

Choose **only one** of the following:

- ○ Yes
- ○ No

Q10b. Specify the motivation for yes or no: *

Write your answer here:

Q11a. According to your impression, between the situation before the new law on public procurement (before Legislative decree 50/2016) and after it, the new procedures have led to greater professionalization of the purchasing activity? *

Choose **only one** of the following:

- ○ Yes
- ○ No

Q11b. Specify the motivation for yes or no: *

Write your answer here:

Q12a. According to your impression, between the situation before the new law on public procurement (before Legislative decree 50/2016) and after it, the new procedures have led to a lower likelihood of litigation and appeals with respect to the call for tender/contract? *

Write your answer here:

Q12b. Specify the motivation for yes or no: *

Write your answer here:

E-PROCUREMENT SECTION
Procurement and purchases in electronic mode

Q13. According to your impression, what order of importance have the following advantages of the new electronic purchasing procedures (MePA, Consip), compared to the use of the traditional channel? *

Choose the appropriate answer for each item:

	1	2	3	4	5
EFFICIENCY (best terms of purchase: lower price and / or higher quality, etc.)	○	○	○	○	○
EFFECTIVENESS (faster and more efficient purchasing process)	○	○	○	○	○
TRANSPARENCY (higher)	○	○	○	○	○
LITIGIOUSNESS (lower)	○	○	○	○	○
PRODUCT INNOVATION (higher)	○	○	○	○	○

Number the order of importance from 1 (very important) to 5 (unimportant)

Q13b. Is there another advantage to report? *

Write your answer here:

Write an advantage not present in the question list 13

Q13c. What order of importance has the advantage reported? *

Only numeric values are allowed for this field

Write your answer here:

Enter the number indicating the order of importance of the advantage from 1 (very important) to 6 (unimportant)

Q14a. According to your impression, what order of importance have the following disadvantages of the new electronic purchasing procedures (MePA, Consip), compared to the use of the traditional channel? *

Choose the appropriate answer for each item:

	1	2	3	4	5
RIGIDITY OF THE CHOICE	○	○	○	○	○
COMPLEXITY OF THE PURCHASE PROCEDURE	○	○	○	○	○
NEGOTIATION DIFFICULTY	○	○	○	○	○
PRODUCT INNOVATION (little)	○	○	○	○	○
OTHER DISADVANTAGE	○	○	○	○	○

Number the order of importance from 1 (very important) to 5 (unimportant)

Q14b. What other disadvantage would you like to report? *

Write your answer here:

Indicate the disadvantage (other) not present in the question list 14a

Q15. According to your impression, what are the main <u>effects</u> that the new electronic purchasing procedures (MePA, Consip) exert on the functioning of the commissioning PA, compared to the use of the <u>traditional channel</u>? *

Write your answer here:

Indicate the three effects from the most important (1) to the least important (3)

Q16. According to the feedback received, what are the main <u>reasons for dissatisfaction</u> found by the commissioning PA regarding the use of the <u>new electronic purchasing procedures</u> (MePA, Consip)? *

Write your answer here:

Indicate the three reasons for dissatisfaction from the most important (1) to the least important (3)

Send the questionnaire.

Thank you for completing the questionnaire

Chapter 3

Table A.3.1 – EQI and IQI comparison.

NUTS2	Region	IQI 2010	EQI 2010	IQI 2012	EQI 2013	EQI 2017
ITC1	Piemonte	69.5	54.7	71.0	35.5	23.4
ITC2	Valle d'Aosta	76.5	70.5	74.7	58.1	34.6
ITC3	Liguria	55.4	47.2	54.7	32.2	22.1
ITC4	Lombardia	75.9	44.7	71.2	37.5	38.9
ITH1	Bolzano	86.5	73.1	86.4	64.2	41.4
ITH2	Trento	86.5	67.5	86.4	64.8	41.4
ITH3	Veneto	72.3	48.2	73.5	43.7	39.4
ITH4	Friuli-Venezia Giulia	74.6	60.9	72.7	53.3	38.7
ITH5	Emilia-Romagna	73.7	50.4	72.7	43.1	39.4
ITI1	Toscana	89.7	46.4	88.6	37.7	30.8
ITI2	Umbria	73.2	53.4	75.0	38.3	16.4
ITI3	Marche	70.1	48.1	73.3	37.7	19.2
ITI4	Lazio	67.2	32.6	67.9	20.9	16.0
ITF1	Abruzzo	69.8	39.5	72.5	28.0	6.2
ITF2	Molise	27.2	33.3	25.6	18.2	23.5
ITF3	Campania	35.8	12.0	36.2	8.2	8.4
ITF4	Puglia	47.0	23.5	42.0	19.2	15.7
ITF5	Basilicata	46.3	32.7	41.7	22.3	13.0
ITF6	Calabria	12.9	14.6	9.2	17.8	1.8
ITG1	Sicilia	26.2	21.6	22.9	19.6	15.7
ITG2	Sardegna	46.8	40.0	45.4	24.3	22.5
IT	Italia	61.1	38.3	60.2	30.4	24.8

Legend: IQI national index computed averaging regional indexes. Every index (normalised on a 0-100 scale) has been divided by the respective national average
Source: our elaborations on the datasets available at:https://sites.google.com/site/institutionalqualityindex/dataset (IQI) and https://qog.pol.gu.se/data/datadownloads/qog-eqi-data (EQI).

Chapter 4

Table A.4.1 – Summary Statistics for matched firms: 2008-2016

	Italy			Sweden		
Variable Name	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Equity Ratio	11,521	0.256	0.303	11,522	0.461	0.255
Incr. Equity	10,338	0.712	0.453	10,328	0.679	0.467
Incr. Equity Ratio	10,338	0.557	0.497	10,328	0.572	0.495
Dividends	10,532	0.221	0.383	10,163	0.503	0.417
Employees	11,522	17.64	25.59	11,522	16.90	21.14
Total Assets	11,522	3428.83	4749.02	11,522	3254.41	4334.44
Sales	11,522	4040.65	5349.64	11,522	4345.79	5808.61
Returns on Sales	11,522	0.003	0.943	11,522	0.090	7.451

Table A.4.1 reports the summary statistics for the sample of matched firms for the years 2008-2016. Matched firms have been selected on the basis of firm size (number of employees and total assets), firm sales, profitability, and sector. Overall, Italian and Swedish firms appear to be very similar in terms of Increasing Equity and Increasing Equity Ratio. Conversely, Italian firms show lower equity ratios and distribution of dividends.

List of companies issuing minibonds between 2013 and 2016

COMPANY NAME	ISSUING DATE
Zobele Holding S.p.A.	Jan 2013
IVS F. S.p.A.	Apr 2013
Buscaini Angelo S.r.l.	Apr 2013
Teamsystem Holding S.p.A.	May 2013
Sisal Group S.p.A.	May 2013
FIDE S.p.A.	June 2013
Consulting Automotive Aerospace Railway (CAAR) S.p.A.	June 2013
Prada S.p.A.	June 2013
Salini Costruttori S.p.A.	July 2013
Gamenet S.p.A.	July 2013
IFIR - Istituti Finanziari Riuniti S.p.A.	July 2013
IFIR - Istituti Finanziari Riuniti S.p.A.	July 2013
IFIR - Istituti Finanziari Riuniti S.p.A.	July 2013
Manutencoop Facility Management S.p.A.	July 2013
Primi sui motori S.p.A.	Aug 2013
Filca Cooperative Società Cooperativa	Sept 2013
Sudcommerci S.r.l.	Oct 2013
Rhino Bondco S.p.A.	Nov 2013
Grafiche Mazzucchelli S.p.A.	Nov 2013
Meridie S.p.A.	Nov 2013
Marcolin S.p.A.	Nov 2013
Mille Uno Bingo S.p.A.	Nov 2013
Rhino Bondco S.p.A.	Nov 2013
Fincantieri S.p.A.	Nov 2013
Alessandro Rosso Group S.p.A.	Dec 2013
Iacobucci HF Electronics S.p.A.	Dec 2013
GPI S.p.A.	Dec 2013
ETT S.p.A.	Dec 2013
Finanziaria Internazionale Holding S.p.A.	Jan 2014
Microcinema S.p.A.	Jan 2014
JSH Group S.p.A.	Jan 2014
Ternienergia S.p.A.	Feb 2014
Cogemat S.p.A.	Feb 2014
Energie S.p.A.	Mar 2014
Bomi Italia S.p.A.	Mar 2014
Ipi S.p.A.	Apr 2014
Tesmec S.p.A.	Apr 2014
Rsm Italy Audit & Assurance S.r.l.	Apr 2014
Primi sui motori S.p.A.	May 2014
Enna Energia S.r.l.	May 2014
ETT S.p.A.	May 2014
Dynamica Retail S.p.A.	May 2014
SEA S.p.A.	May 2014
IMI FABI S.p.A.	June 2014
Officine Maccaferri S.p.A.	June 2014
S.G.G. Holding S.p.A.	June 2014
Selle Royal S.p.A.	June 2014
Cipriani Profilati S.p.A.	June 2014
CMD Costruzioni Motori Diesel S.p.A.	June 2014
L'Isolante K-Flex S.p.A.	June 2014
FRI-EL Biogas Holding S.r.l.	July 2014
E.s.tr.a. S.p.A. Energia Servizi Territorio Ambiente	July 2014
Alto Garda Servizi S.p.A.	July 2014
TechnoAlpin Holding S.p.A.	July 2014
Rigoni di Asiago S.r.l.	July 2014
Cooperativa Muratori & Cementisti - C.M.C. di Ravenna Soc. Coop.	July 2014
Coswell S.p.A.	July 2014
Twin Set - Simona Barbieri S.p.A.	July 2014
Te Wind S.A.	July 2014
Trevi - Finanziaria Industriale S.p.A.	July 2014
Acque del Basso Livenza S.p.A.	July 2014
Acque del Chiampo S.p.A.	July 2014
Acque Vicentine S.p.A.	July 2014
Alto Vicentino Servizi S.p.A.	July 2014
Azienda Servizi Integrati S.p.A.	July 2014
Bim Gestione Servizi Pubblici S.p.A.	July 2014
Centro Veneto Servizi S.p.A.	July 2014
Energia Territorio Risorse Ambientali ETRA S.p.A.	July 2014
M.P.G. Manifattura Plastica S.p.A.	July 2014
Global System International S.p.A.	Aug 2014
ETT S.p.A.	Aug 2014
S.I.G.I.T - Società Italiana Gomma Industriale Torino S.p.A.	Aug 2014
Eurotranciatura S.p.A.	Aug 2014
Gruppo P.S.C. S.p.A.	Aug 2014
Tesi S.p.A.	Sept 2014
S.I.P.C.A.M. Società Italiana Prodotti Chimici e per l'Agricoltura Milano S.p.A.	Sept 2014
Coesia S.p.A.	Sept 2014
Molinari S.p.A.	Oct 2014
Inglass S.p.A.	Oct 2014
M.E.P. - Macchine Elettroniche Piegatrici S.p.A.	Oct 2014
Usco S.p.A.	Oct 2014
Geodata Engineering S.p.A.	Oct 2014
Enerventi S.p.A.	Oct 2014
American Coffee Company S.p.A.	Oct 2014
Exprivia Healthcare IT S.r.l.	Oct 2014
Innovatec S.p.A.	Oct 2014
ITAL TBS Telematic & Biomedical Services S.p.A.	Oct 2014
Finanziaria Internazionale Holding S.p.A.	Nov 2014
Waste Italia Holding S.p.A.	Nov 2014
Antin Solar Investments S.p.A.	Dec 2014
Antin Solar Investments S.p.A.	Dec 2014
Penelope S.p.A.	Dec 2014
Eco Eridania S.p.A.	Dec 2014
Dynamica Retail S.p.A.	Dec 2014
Olsa S.p.A.	Dec 2014
Dedagroup S.p.A.	Dec 2014
ETT S.p.A.	Dec 2014
Corvallis Holding S.p.A.	Dec 2014
Generalfinance S.p.A.	Dec 2014
Finanziaria Internazionale Holding S.p.A.	Jan 2015
Rapetti Foodservice S.r.l.	Jan 2015
Finanziaria Internazionale Holding S.p.A.	Jan 2015
Finanziaria Internazionale Holding S.p.A.	Feb 2015
Ama S.p.A.	Feb 2015
Ama S.p.A.	Feb 2015
Menz&Gasser S.p.A.	Feb 2015
Asja Ambiente S.p.A.	Mar 2015
Boni S.p.A.	Mar 2015
L.E.G.O. S.p.A.	Mar 2015
Coleman S.p.A.	Mar 2015

Pasta Zara S.p.A.	Mar 2015
EGEA S.p.A.	Mar 2015
Generalfinance S.p.A.	Apr 2015
Ferrarini S.p.A.	Apr 2015
Essepi Ingegneria S.r.l.	Apr 2015
Micoperi S.p.A.	Apr 2015
ITWay S.p.A.	Apr 2015
ETT S.p.A.	Apr 2015
Oxon Italia S.p.A.	Apr 2015
Diatex S.p.A.	Apr 2015
Mybest Group S.p.A.	May 2015
Landi Renzo S.p.A.	May 2015
Terre Cortesi-Moncaro soc. coop. agricola	May 2015
Cartiere Villa Lagarina S.p.A.	June 2015
Cartiere Villa Lagarina S.p.A.	June 2015
Capi Group S.r.l.	June 2015
Marangoni Meccanica S.p.A.	June 2015
WIIT S.p.A.	June 2015
FAB Group S.r.l.	July 2015
Settentrionale Trasporti S.p.A.	July 2015
Teethan S.p.A.	July 2015
Ferrovie Nord Milano Autoservizi S.p.A.	July 2015
Ligabue S.p.A.	July 2015
Finanziaria Internazionale Holding S.p.A.	July 2015
Finanziaria Internazionale Holding S.p.A.	July 2015
Isaia&Isaia S.p.A.	July 2015
Isaia&Isaia S.p.A.	July 2015
Nosio S.p.A.	July 2015
Finanziaria Internazionale Holding S.p.A.	July 2015
Alitalia S.p.A.	July 2015
Building Energy S.p.A.	July 2015
Generalfinance S.p.A.	July 2015
QS Group S.p.A.	July 2015
Expert System S.p.A.	July 2015
Aquafil S.p.A.	July 2015
Thermokey S.p.A.	July 2015
C.L.N. Coils Lamiere Nastri S.p.A.	July 2015
Beni Stabili S.p.A.	Aug 2015
Cartiere Villa Lagarina S.p.A.	Aug 2015
Industrial S.p.A.	Aug 2015
Industrial S.p.A.	Aug 2015
Industrial S.p.A.	Aug 2015
Sirio S.p.A.	Aug 2015
Renco Group S.p.A.	Aug 2015
Proma S.p.A.	Sept 2015
MEP S.p.A.	Sept 2015
ETT S.p.A.	Sept 2015
Pama S.p.A.	Oct 2015
IFIR - Istituti Finanziari Riuniti S.p.A.	Oct 2015
IFIR - Istituti Finanziari Riuniti S.p.A.	Oct 2015
Finanziaria Internazionale Holding S.p.A.	Oct 2015
Finanziaria Internazionale Holding S.p.A.	Nov 2015
Microspore S.p.A.	Nov 2015
Gino S.p.A.	Nov 2015
Matica System S.p.A.	Nov 2015
Tundo Vicenzo S.p.A.	Nov 2015
Noemalife S.p.A.	Nov 2015
Etrion S.p.A.	Dec 2015
SG Elettrica S.r.l.	Dec 2015
Mercedes Benz Financial Services S.p.A.	Dec 2015
Mercedes Benz Financial Services S.p.A.	Dec 2015
Sace BT S.p.A.	Dec 2015
Tecnocap S.p.A.	Dec 2015
GPI S.p.A.	Dec 2015
Frener&Reifer S.r.l.	Dec 2015
Iacobucci HF Aerospace S.p.A.	Dec 2015
SCM Group S.p.A.	Dec 2015
Torino Hotel Immobiliare S.p.A.	Dec 2015
San Basilio Property S.p.A.	Jan 2016
Finanziaria Internazionale Holding S.p.A.	Jan 2016
Acque Veronesi S.r.l.	Jan 2016
Alto Trevigiano Servizi S.r.l.	Jan 2016
Azienda Gardesana Servizi S.p.A.	Jan 2016
Bim - Gestione dei servizi pubblici S.p.A.	Jan 2016
Polesine Acque S.p.A	Jan 2016
Finanziaria Internazionale Holding S.p.A.	Jan 2016
4 Madonne Caseificio dell'Emilia Società Cooperativa Agricola	Jan 2016
Trefin S.p.A.	Jan 2016
Moby S.p.A.	Feb 2016
Finanziaria Internazionale Holding S.p.A.	Feb 2016
Essepi Ingegneria S.p.A.	Feb 2016
Wiva Group S.p.A.	Feb 2016
American Coffee Company S.p.A.	Feb 2016
Giplast Group S.p.A.	Mar 2016
Giglio Group S.p.A.	Mar 2016
Epta S.p.A.	Mar 2016
Global Display Solutions S.p.A.	Mar 2016
Finanziaria Internazionale Holding S.p.A.	Mar 2016
United Brands Company S.p.A.	Mar 2016
Renzini S.p.A.	Mar 2016
TeamSystem Holding S.p.A.	Mar 2016
Falkensteiner Hotelmanagement S.r.l.	Mar 2016
Boni S.p.A.	Apr 2016
LKQ Italia Bondco S.p.A	Apr 2016
Chili S.p.A.	Apr 2016
HDI Holding Dolciaria Italiana S.p.A.	Apr 2016
Faro Società Cooperativa Agricola	May 2016
Halley Consulting S.p.A.	May 2016
Mercedes-Benz Financial Services S.p.A.	May 2016
Pro.Gest S.p.A.	May 2016
Yachtline Arredomare 1618 S.p.A.	May 2016
Yachtline Arredomare 1618 S.p.A.	May 2016
Grandi Navi Veloci S.p.A.	May 2016
Gpi S.p.A.	June 2016
ETT S.p.A.	June 2016
Arti Grafiche Boccia S.p.A.	June 2016
DP Group S.p.A. (DentalPro)	June 2016
Salini Impregilo S.p.A.	June 2016
Banca Farmafactoring S.p.A.	June 2016
Cibus 1 S.p.A.	June 2016
Clabo S.p.A.	June 2016
Energetica S.r.l.	July 2016
Lucart Group S.p.A.	July 2016
Unionbau S.r.l.	July 2016
Aristoncavi S.p.A.	July 2016
O.s.a. S.p.A.	July 2016
Caronte & Tourist S.p.A.	July 2016
Tecno S.p.A.	July 2016
CRIF S.p.A.	July 2016
CAP Holding S.p.A.	July 2016
Gamenet Scommesse S.p.A.	July 2016

Boni S.p.A.	July 2016
Enertronica S.p.A.	July 2016
TS Energy Italy S.p.A.	July 2016
Energetica S.r.l.	Aug 2016
Your Voice S.p.A.	Aug 2016
Gestioni Piccini S.r.l.	Aug 2016
United Brands Company S.p.A.	Aug 2016
Condor S.p.A.	Aug 2016
Agrumaria Reggina S.r.l.	Aug 2016
Aero Sekur S.p.A.	Aug 2016
Acque Minerali d'Italia S.p.A.	Sept 2016
Gestioni Piccini S.r.l.	Sept 2016
Gestioni Piccini S.r.l.	Sept 2016
Soleto S.p.A.	Sept 2016
Net Insurance S.p.A.	Sept 2016
Datacol S.r.l.	Oct 2016
L'Isolante K-Flex S.p.A.	Oct 2016
N&W Global Vending S.p.A.	Oct 2016
ETT S.p.A.	Oct 2016
Fine Food & Pharmaceuticals N.T.M. S.p.A.	Oct 2016
Renovo Bioenergy S.p.A.	Oct 2016
Faro Società Cooperativa Agricola	Nov 2016
Estra S.p.A.	Nov 2016
ETT S.p.A.	Nov 2016
Ferrarini S.p.A.	Dec 2016
Bioera S.p.A.	Dec 2016
Sonnedix Italia S.p.A.	Dec 2016
Cristiano di Thiene S.p.A.	Dec 2016
Eco Eridania S.p.A.	Dec 2016
Saxa Gres S.p.A.	Dec 2016
BV Tech S.p.A.	Dec 2016
Osai S.p.A.	Dec 2016
Antonio Zamperla S.p.A.	Dec 2016
I.C.M. S.p.A.	Dec 2016
I.C.M. S.p.A.	Dec 2016
Azienda Solare italiana S.p.A.	Dec 2016
Azienda Solare italiana S.p.A.	Dec 2016
IMI Fabi S.p.A.	Dec 2016
IMI Fabi S.p.A.	Dec 2016
Fenicia S.p.A.	Dec 2016
Fenicia S.p.A. secured	Dec 2016
Boni S.p.A.	Dec 2016
Dedalus Holding S.p.A.	Dec 2016
HDM S.p.A.	Dec 2016
MM S.p.A.	Dec 2016
Wolftank Systems S.p.A.	Dec 2016
Space S.p.A.	Dec 2016
Gruppo PSC S.p.A.	Dec 2016
Gruppo PSC S.p.A.	Dec 2016
Niederstaetter S.p.A.	Dec 2016
Dedagroup S.p.A.	Dec 2016
Marvil Engineering S.r.l.	Dec 2016
Società Europea Industriale Porte S.r.l.	Dec 2016

Table A.4.2: Distribution of firms issuing minibonds by activity sector (NACE 2-digit). Years 2013-2016.

NACE 2-digit	NACE Description	Number of Obs.	Percentage
10	Manufacture of food products	10	5.24
11	Manufacture of beverages	2	1.05
13	Manufacture of textiles	1	0.52
14	Manufacture of wearing apparel	2	1.05
17	Manufacture of paper and paper products	2	1.05
18	Printing and reproduction of recorded media	2	1.05
20	Manufacture of chemicals and chemical products	5	2.62
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	1	0.52
22	Manufacture of rubber and plastic products	7	3.66
23	Manufacture of other non-metallic mineral products	2	1.05
24	Manufacture of basic metals	4	2.09
25	Manufacture of fabricated metal products, except machinery and equipment	8	4.19
26	Manufacture of computer, electronic and optical products	1	0.52
27	Manufacture of electrical equipment	5	2.62
28	Manufacture of machinery and equipment	13	6.81
29	Manufacture of motor vehicles, trailers and semi-trailers	1	0.52
30	Manufacture of other transport equipment	2	1.05
31	Manufacture of furniture	4	2.09
32	Other manufacturing	1	0.52
33	Repair and installation of machinery and equipment	2	1.05
35	Electricity, gas, steam and air conditioning supply	5	2.62
36	Water collection, treatment and supply	7	3.66
37	Sewerage	3	1.57
38	Waste collection, treatment and disposal activities	1	0.52
39	Remediation activities and other waste management services	1	0.52
41	Construction of buildings	4	2.09
42	Civil engineering	1	0.52
43	Specialized construction activities	6	3.14
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	1	0.52
46	Wholesale trade, except of motor vehicles and motorcycles	9	4.71
47	Retail trade, except of motor vehicles and motorcycles	4	2.09
49	Land transport and transport via pipelines	3	1.57
50	Water transport	3	1.57
51	Air transport	1	0.52
52	Warehousing and support activities for transportation	2	1.05
56	Food and beverage service activities	2	1.05
59	Motion picture, video and television programme production, sound recording and music publishing activities	2	1.05
60	Programming and broadcasting activities	1	0.52
62	Computer programming, consultancy and related activities	9	4.71
63	Information service activities	1	0.52
64	Financial service activities, except insurance and pension funding	12	6.28
66	Activities auxiliary to financial services and insurance activities	2	1.05
68	Real estate activities	7	3.66
70	Activities of head offices; management consultancy activities	13	6.81
71	Architectural and engineering activities; technical testing and analysis	5	2.62
77	Rental and leasing activities	1	0.52
79	Travel agency, tour operator reservation service and related activities	1	0.52
81	Services to buildings and landscape activities	2	1.05
82	Office administrative, office support and other business support activities	4	2.09
86	Human health activities	1	0.52
92	Gambling and betting activities	2	1.05

Source: our elaborations from BvD-Amadeus.

Chapter 5

Table A.5.1 – Probit estimation for the probability of receiving national public support (control groups II)

	CIS 2008		CIS 2010		CIS 2012	
	COEFF.	S.E.	COEFF.	S.E.	COEFF.	S.E.
Size_M	COEFF.	S.E.	COEFF.	S.E.	0.5460***	(0.1354)
Size_L	0.4267***	(0.0942)	0.4261***	(0.1142)	1.0603***	(0.1535)
High-tech_IND	0.7377***	(0.1177)	0.6603***	(0.1393)	0.0222	(0.1970)
Low-tech_IND	0.3264*	(0.1818)	0.0943	(0.1894)	0.0282	(0.1895)
KIBS	0.2398	(0.1729)	0.1452	(0.1845)	0.1872	(0.2035)
Other_SERV	-0.0526	(0.1975)	-0.2441	(0.2023)	-0.3567	(0.2708)
CONSTR	-0.3057	(0.2376)	-0.7442**	(0.2894)	-0.3769	(0.2983)
GROUP	-0.1470	(0.2565)	-0.2530	(0.2575)	0.0309	(0.1283)
MULTINAT_CORP	0.1700*	(0.0956)	0.3452***	(0.1103)	-0.1933	(0.1845)
SGMT_2	0.0235	(0.1275)	0.3232**	(0.1549)	-0.0281	(0.1366)
SGMT_3	-0.2033	(0.1367)	-0.0082	(0.1711)	-0.4290**	(0.2156)
SPRO_2	-0.1577	(0.2216)	-0.0079	(0.3120)	-0.2517**	(0.1198)
SPRO_3	-0.1969**	(0.0908)	-0.1060	(0.1124)	-0.0230	(0.2131)
COOP_GOV	-0.2091	(0.1648)	-0.0499	(0.1866)	0.0965	(0.1619)
COOP_COMP	0.0339	(0.1713)	-0.2738	(0.2032)	-0.3295**	(0.1617)
EXPORT	-0.1015	(0.1295)	-0.3427**	(0.1532)	0.0482	(0.1394)
ORG_INN	-0.0878	(0.0999)	0.0378	(0.1296)	0.0325	(0.1095)
Constant	-0.0506	(0.0823)	-0.2154**	(0.0979)	-0.9133***	(0.2191)
Observations	1,223 (568+655)		923 (341+582)		798 (274+524)	
Pseudo R^2	0.0668		0.1097		0.1002	

*** p<0.01, ** p<0.05, * p<0.10 . Robust standard errors in parentheses. Size_S, RET_DISTR, SGMT_1 and SPRO_1 used as reference terms.

Table A.5.2 - Mean differences of firm observable characteristics before and after the matching – CIS 2008

		Mean		t.test	
Observables	Unmatched/Matched	Treated 568 firms (562 matched)	Controls I 1659 firms	t	p>|t|
Size_M	U	0.39261	0.28692	4.71	0.00
	M	0.39502	0.39502	0.00	1.00
Size_L	U	0.38204	0.22061	7.65	0.00
	M	0.37722	0.37722	0.00	1.00
High-tech_IND	U	0.31162	0.18626	6.30	0.00
	M	0.31495	0.31495	0.00	1.00
Low-tech_IND	U	0.49472	0.42375	2.94	0.00
	M	0.49822	0.49822	0.00	1.00
KIBS	U	0.09683	0.14105	-2.71	0.00
	M	0.09786	0.09786	0.00	1.00
Other_SERV	U	0.03345	0.10187	-5.09	0.00
	M	0.03381	0.03381	0.00	1.00
CONSTR	U	0.02289	0.05304	-2.99	0.00
	M	0.01601	0.01601	0.00	1.00
GROUP	U	0.38204	0.2598	5.57	0.00
	M	0.38078	0.40214	-0.73	0.46
MULTINAT_CORP	U	0.16373	0.12893	2.11	0.04
	M	0.1637	0.15302	0.49	0.62
SGMT_2	U	0.09683	0.05184	3.81	0.00
	M	0.09609	0.10142	-0.30	0.76
SGMT_3	U	0.03697	0.01869	2.49	0.01
	M	0.03559	0.01779	1.85	0.06
SPRO_2	U	0.20599	0.21459	0.43	0.67
	M	0.20285	0.20285	0.00	1.00
SPRO_3	U	0.0493	0.05063	-0.13	0.90
	M	0.04982	0.03203	1.51	0.13
COOP_GOV	U	0.08099	0.03677	4.27	0.00
	M	0.07651	0.07473	0.11	0.91
COOP_COOMP	U	0.09155	0.06631	2.00	0.05
	M	0.09075	0.07651	0.86	0.39
EXPORT	U	0.79225	0.63171	7.11	0.00
	M	0.79537	0.80961	-0.60	0.55
ORG_INN	U	0.6743	0.65461	0.85	0.39
	M	0.67438	0.67794	-0.13	0.90

Table A.5.3 - Mean differences of firm observable characteristics before and after the matching – CIS 2008

		Mean		t.test	
Observables	Unmatched/Matched	Treated 568 firms (558 matched)	Controls II 655 firms	t	p>|t|
Size_M	U	0.39261	0.34504	1.72	0.09
	M	0.39068	0.39068	0.00	1.00
Size_L	U	0.38204	0.21374	6.56	0.00
	M	0.37993	0.37993	0.00	1.00
High-tech_IND	U	0.31162	0.21221	3.98	0.00
	M	0.3172	0.3172	0.00	1.00
Low-tech_IND	U	0.49472	0.46565	1.01	0.31
	M	0.50358	0.50358	0.00	1.00
KIBS	U	0.09683	0.1313	-1.88	0.06
	M	0.09857	0.09857	0.00	1.00
Other_SERV	U	0.03345	0.07786	-3.35	0.00
	M	0.03405	0.03405	0.00	1.00
CONSTR	U	0.02289	0.04733	-2.29	0.02
	M	0.01434	0.01434	0.00	1.00
GROUP	U	0.38204	0.26107	4.57	0.00
	M	0.38172	0.33871	1.5	0.14
MULTINAT_CORP	U	0.16373	0.1145	2.5	0.01
	M	0.16487	0.16487	0.00	1.00
SGMT_2	U	0.09683	0.11603	-1.08	0.28
	M	0.09857	0.09319	0.30	0.76
SGMT_3	U	0.03697	0.04122	-0.38	0.70
	M	0.03763	0.03584	0.16	0.87
SPRO_2	U	0.20599	0.25496	-2.02	0.04
	M	0.20251	0.20789	-0.22	0.82
SPRO_3	U	0.0493	0.07176	-1.63	0.10
	M	0.05018	0.03047	1.67	0.09
COOP_GOV	U	0.08099	0.08244	-0.09	0.93
	M	0.07885	0.04839	2.09	0.04
COOP_COOMP	U	0.09155	0.10534	-0.81	0.42
	M	0.0914	0.04839	2.83	0.01
EXPORT	U	0.79225	0.71603	3.09	0.00
	M	0.80108	0.81183	-0.45	0.65
ORG_INN	U	0.6743	0.67786	-0.13	0.894
	M	0.67384	0.67384	0.00	1.00

Table A.5.4 - Mean differences of firm observable characteristics before and after the matching – CIS 2010

		Mean		t.test	
Observables	Unmatched/Matched	Treated 341 firms (287 matched)	Controls I 1967 firms	t	p>|t|
Size_M	U	0.37243	0.27781	3.56	0.00
	M	0.37243	0.37243	0.00	1.00
Size_L	U	0.40176	0.22295	7.13	0.00
	M	0.40176	0.40176	0.00	1.00
High-tech_IND	U	0.35191	0.16709	8.08	0.00
	M	0.35191	0.35191	0.00	1.00
Low-tech_IND	U	0.43109	0.33266	3.54	0.00
	M	0.43109	0.43109	0.00	1.00
KIBS	U	0.10264	0.20735	-4.55	0.00
	M	0.10264	0.10264	0.00	1.00
Other_SERV	U	0.02346	0.06442	-2.98	0.00
	M	0.02346	0.02346	0.00	1.00
CONSTR	U	0.03226	0.007499	-2.89	0.00
	M	0.03226	0.03226	0.00	1.00
GROUP	U	0.44282	0.30951	4.86	0.00
	M	0.44282	0.46041	-0.46	0.65
MULTINAT_CORP	U	0.17009	0.11877	2.64	0.01
	M	0.17009	0.16716	0.10	0.92
SGMT_2	U	0.09677	0.0619	2.38	0.02
	M	0.09677	0.08504	0.53	0.60
SGMT_3	U	0.02639	0.01963	0.81	0.42
	M	0.02639	0.02053	0.51	0.61
SPRO_2	U	0.18475	0.20232	-0.75	0.45
	M	0.18475	0.17595	0.30	0.77
SPRO_3	U	0.05865	0.0619	-0.23	0.82
	M	0.05865	0.04399	0.87	0.39
COOP_GOV	U	0.06158	0.03674	2.15	0.03
	M	0.06158	0.05865	0.16	0.87
COOP_COOMP	U	0.7331	0.05939	0.99	0.32
	M	0.07331	0.05572	0.93	0.35
EXPORT	U	0.86217	0.60745	9.24	0.00
	M	0.86217	0.86804	-0.22	0.82
ORG_INN	U	0.64516	0.6774	-1.17	0.24
	M	0.64516	0.66862	-0.64	0.52

Table A.5.5 - Mean differences of firm observable characteristics before and after the matching – CIS 2010

		Mean		t.test	
Observables	Unmatched/Matched	Treated 341 firms (336 matched)	Controls II 582 firms	t	p>|t|
Size_M	U	0.37243	0.30756	2.02	0.04
	M	0.37202	0.37202	0.00	1.00
Size_L	U	0.40176	0.20447	6.61	0.00
	M	0.40179	0.40179	0.00	1.00
High-tech_IND	U	0.35191	0.23024	4.03	0.00
	M	0.35714	0.35714	0.00	1.00
Low-tech_IND	U	0.43109	0.32302	3.31	0.00
	M	0.4375	0.4375	0.00	1.00
KIBS	U	0.10264	0.21306	-4.33	0.00
	M	0.10417	0.10417	0.00	1.00
Other_SERV	U	0.02346	0.08076	-3.57	0.00
	M	0.02381	0.02381	0.00	1.00
CONSTR	U	0.03226	0.0756	-2.69	0.01
	M	0.02381	0.02381	0.00	1.00
GROUP	U	0.44282	29.7	4.40	0.00
	M	0.44048	0.4375	0.08	0.94
MULTINAT_CORP	U	0.17009	0.09107	3.58	0.00
	M	0.16964	0.14286	0.96	0.34
SGMT_2	U	0.09677	0.11168	-0.71	0.48
	M	0.09821	0.07738	0.95	0.34
SGMT_3	U	0.02639	0.0378	-0.93	0.35
	M	0.02679	0.02976	-0.23	0.82
SPRO_2	U	0.18475	0.22337	-1.39	0.16
	M	0.18155	0.14583	1.25	0.21
SPRO_3	U	0.05865	0.07388	-0.89	0.38
	M	0.05952	0.04464	0.87	0.39
COOP_GOV	U	0.06158	0.1134	-2.61	0.01
	M	0.0625	0.0625	0.00	1.00
COOP_COOMP	U	0.07331	0.14261	-3.18	0.00
	M	0.0744	0.05952	0.77	0.44
EXPORT	U	0.86217	0.7079	5.41	0.00
	M	0.8631	0.87202	-0.34	0.73
ORG_INN	U	0.64516	0.7079	-1.98	0.05
	M	0.64881	0.65179	-0.08	0.94

Table A.5.6 - Mean differences of firm observable characteristics before and after the matching – CIS 2012

		Mean		t.test	
Observables	Unmatched/Matched	Treated 274 firms (274 matched)	Controls I 1549 firms	t	p>|t|
Size_M	U	0.31022	0.29374	0.55	0.58
	M	0.31022	0.31022	-0.00	1.00
Size_L	U	0.51460	0.28922	7.46	0.00
	M	0.51460	0.51460	0.00	1.00
High-tech_IND	U	0.32117	0.21756	3.75	0.00
	M	0.32117	0.32117	-0.00	1.00
Low-tech_IND	U	0.37226	0.28599	2.88	0.00
	M	0.37226	0.37226	-0.00	1.00
KIBS	U	0.16788	0.18076	-0.51	0.61
	M	0.16788	0.16788	-0.00	1.00
Other_SERV	U	0.05109	0.08134	-1.73	0.08
	M	0.05109	0.05109	0.00	1.00
CONSTR	U	0.02190	0.09038	-3.86	0.00
	M	0.02190	0.02190	-0.00	1.00
GROUP	U	0.64234	0.50549	4.20	0.00
	M	0.64234	0.63869	0.09	0.93
MULTINAT_CORP	U	0.14234	0.14461	-0.10	0.92
	M	0.14234	0.14599	-0.12	0.90
SGMT_2	U	0.18978	0.11298	3.56	0.00
	M	0.18978	0.20073	-0.32	0.75
SGMT_3	U	0.04745	0.03422	1.08	0.28
	M	0.04745	0.04380	0.20	0.84
SPRO_2	U	0.19343	0.21691	-0.87	0.38
	M	0.19343	0.21168	-0.53	0.60
SPRO_3	U	0.05839	0.05617	0.15	0.88
	M	0.05839	0.04745	0.57	0.57
COOP_GOV	U	0.13504	0.04390	6.02	0.00
	M	0.13504	0.12774	0.25	0.80
COOP_COOMP	U	0.09489	0.07230	1.30	0.19
	M	0.09489	0.08029	0.60	0.55
EXPORT	U	0.81752	0.67786	4.67	0.00
	M	0.81752	0.82482	-0.22	0.82
ORG_INN	U	0.73723	0.71078	0.89	0.37
	M	0.73723	0.75912	-0.59	0.56

Table A.5.7 - Mean differences of firm observable characteristics before and after the matching – CIS 2012

		Mean		t.test	
Observables	Unmatched/Matched	Treated 274 firms (269 matched)	Controls II 524 firms	t	p>|t|
Size_M	U	0.31022	0.30725	-0.09	0.93
	M	0.30483	0.30483	0.00	1.00
Size_L	U	0.51460	0.24809	7.82	0.00
	M	0.51673	0.51673	-0.00	1.00
High-tech_IND	U	0.32117	0.25000	2.14	0.03
	M	0.32714	0.32714	-0.00	1.00
Low-tech_IND	U	0.37226	0.30916	1.80	0.07
	M	0.37918	0.37918	-0.00	1.00
KIBS	U	0.16788	0.17748	-0.34	0.74
	M	0.17100	0.17100	-0.00	1.00
Other_SERV	U	0.05109	0.08397	-1.70	0.09
	M	0.05204	0.05204	-0.00	1.00
CONSTR	U	0.02190	0.07061	-2.91	0.00
	M	0.00743	0.00743	-0.00	1.00
GROUP	U	0.64234	0.52099	3.30	0.00
	M	0.63569	0.65056	-0.36	0.72
MULTINAT_CORP	U	0.14234	0.11450	1.13	0.26
	M	0.14498	0.13755	0.25	0.81
SGMT_2	U	0.18978	0.17939	0.36	0.72
	M	0.18587	0.14498	1.28	0.20
SGMT_3	U	0.04745	0.09160	-2.23	0.03
	M	0.04833	0.04833	-0.00	1.00
SPRO_2	U	0.19343	0.24046	-1.51	0.13
	M	0.19331	0.17100	0.67	0.50
SPRO_3	U	0.05839	0.06298	-0.26	0.80
	M	0.05948	0.03346	1.43	0.15
COOP_GOV	U	0.13504	0.15076	-0.60	0.55
	M	0.13755	0.08550	1.92	0.06
COOP_COOMP	U	0.09489	0.14695	-2.09	0.04
	M	0.09665	0.11896	-0.83	0.41
EXPORT	U	0.81752	0.72901	2.79	0.01
	M	0.81413	0.86989	-1.77	0.08
ORG_INN	U	0.73723	0.70992	0.81	0.42
	M	0.73234	0.74721	-0.39	0.70

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