Making the Analysis of the Italian Legislative System Easy:

The ILMA Web Portal

The Italian Law-Making Archive, denoted ILMA, is a new web application for supporting the analysis of the Italian legislative processes. It aims to overcome the shortcomings that commonly affect quantitative analyses of legislative systems providing ready-to-use data on the Italian context organized in a relational structure and included in a unique repository. After having compared ILMA with other web information systems, the article describes the database architecture, proposes several examples of potential customized analyses that scholars may conduct through ILMA and, finally, explains its main functionalities for querying the database and exporting data.

Keywords: database; Italy; legislative process; roll-call analysis; web applications

1. Introduction

Legislative studies concern analysis of the activities of parliamentary assemblies. The parliament is a key institution for the functioning of contemporary representative democracies and it represents an interesting element of analysis even in authoritarian regimes. Given the pivotal role of parliaments in the decision-making process, the study of the complex dynamics that regulate the legislative activities assumes a fundamental relevance. Italy undoubtedly represents an interesting case in the field of legislative studies, because in the last twenty years it experienced relevant political and institutional changes that impacted the functioning of the law-making process. The collapse of the traditional party system, as a result of the corruption scandals that stroke all the most important parties, and the majoritarian electoral reform adopted in 1993 changed the political configuration and the style of the inter-party competition. Italy moved from a multi-party system to a bilateral system based on the alternation at the government of different coalitions. Several scholars investigated if and how these

changes affected the dynamics that regulate the legislative process. One of the main area of investigation is how the bilateral style of competition and the government alternation have modified the executive-legislative relations and the law production (Capano and Giuliani 2001a; Giuliani and Zucchini 2008; Verzichelli 2003; Zucchini 2001). Zucchini (1997) and Giuliani (1997; 2008) have focused on the degree of consensualism of the decision-making process. Borghetto and Giuliani (2012) and Capano and Giuliani (2001b) have investigated the factors that affect the duration of the legislative process. Della Sala and Kreppel (1998) and Vassallo (2001) have analyzed the increasing recourse to legislative delegation and decrees since the early 1990s. The impact of the political and institutional changes on the degree of party unity (Curini et al. 2011; Curini and Zucchini 2012) and the legislative agenda setting (Zucchini 2011) are other important investigated topics.

Although these studies made significant steps toward the understanding of the dynamics that regulate the legislative processes, several other important changes – a new electoral reform adopted in 2006 and a rapidly evolving party system – call for new and deeper analyses. However, these analyses require the integration of huge amounts of data on the Italian political and institutional framework, the law production and the related legislative processes. These data need to be gathered from different sources that are often heterogeneous, distributed and not easy to access. Scholars wishing to conduct a specific analysis need to carry out a long and cumbersome process for the identification of the resources, data cleaning and integration, and their organization into a spreadsheet format. This process often needs to be repeated even if the focus of the investigation only slightly changes and the re-use of existing collected data is quite difficult. Moreover, the lack of a wide overview of the available data and of their relationships prevents the possibility to identify and conduct useful and meaningful

analyses. The need arises to develop tools that can help scholars in the formulation of new research questions and the preparation of the data for the analysis.

In this paper we present ILMA, the Italian Law-Making Archive, a web information system that supports scholars in quantitatively analyzing the Italian legislative processes.[1] The ILMA database contains more than 50 tables and allows the representation of all the elements that characterize the legislation, the legislative processes, the actors involved in these processes, and the political context. Furthermore, it provides a unique and comprehensive classification of the policy content of different legislative acts. The unified and relational organization of data in a single repository allows the extrapolation of different kinds of analysis that can be carried out. Through the developed application scholars can easily search, extract and analyze data with standard statistical tools (like the R statistical package) or directly within the portal. The possibility of querying the database from different points of view and exporting the required data in a matrix format, depending on the analysis to be conducted, makes ILMA a fundamental tool for the analysis of the Italian legislative processes.

Several are the contributions of this paper. First, in Section 2 we provide a wide and reasoned presentation of the state of the art in web portals developed for legislative studies. From this overview it is clear the kind and quantity of information that have been collected within ILMA and the relationships among data that can be effectively exploited in the analysis. Starting from the description of the ILMA database (Section 3), in Section 4 we describe several typologies of analysis that can be easily conducted and that are already included in the portal. Finally, in Section 5 we present the main

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[1] ILMA is a product of the Centre for the Observation of Legislatures (COoL, www.coolresearch.net) and can be accessed through the following URL www.socpol.unimi.it/ilma.

functionalities implemented in the ILMA web portal for searching, exporting and analyzing information about the Italian legislative processes.

2. Related Work

The US legislative system was the first object of quantitative analyses and it is currently the most studied area. Congressional Bills Project[2] and the recently released LegEx[3], developed by the Center for American Politics and Public Policy (CAPPP), operates in synergy with the Poole and Rosenthal's VoteView[4] which is active since 1995. CAPPP also developed the Policy Agendas Project and the Comparative Agendas Project which data are currently used by research groups of different countries to unanimously identify the topic of legislative acts. Starting from the mid-2000s also the EU legislative system became the object of different research groups interested in studying its processes. The first initiative was the EUPOL system[5], followed by the VoteWatch[6] Europe project. VoteWatch Europe, founded by academic scholars, is a non-profit independent organization that offers data tools and applications on EU legislative systems for many purposes (among them we mention the Voting Advice Applications for European elections). In the Italian context, apart from ILMA, OpenParlamento[7] is the unique tool for the analysis of the Italian legislative system. However, this system is developed by a non-academic organization (OpenPolis) and it configures itself as a parliamentary activity monitoring instruments rather than a tool to be exploited for academic research.

[2] http://www.congressionalbills.org/

[3] http://www.legex.org/

[4] http://voteview.com/index.asp

[5] http://frankhaege.eu/data/eupol

[6] http://www.votewatch.eu/

[7] http://parlamento17.openpolis.it/

Table 1 reports the main characteristics of these information systems, realized by influential research groups on legislative studies, which represent the most relevant and used tools both by academic and independent communities. This table also provides a brief description of their focus, temporal range and content.

Table 1. Summary of the most useful systems for legislative studies

Information System	Focus	Temporal Range	Update frequency	Content
VoteView*	National (USA)	1789-2012	End of legislature	Roll-calls data of the US Congress and R software packages for their analysis.
Congressional Bills Project	National (USA)	1947-ongoing	Daily	Information on bills in traduced in the US House of Representatives and Senate and details of their legislative processes
LegEx	National (USA)	1947-ongoing	Daily	Interactive exploration of the legislative processes of the bills in traduced in the US House of Representatives and Senate
EUPOL*	EU	1975-2012	Yearly	Legislative and non-legislative acts of the European Commission
VoteWatch Europe	EU	2004-ongoing	Daily	Voting activity of MEPs and members of the EU Council of Ministers.
OpenParlamento	National (Italy)	current legislature	Daily	Legislative (initiative and votes) and non-legislative activity of the MPs of the Italian parliament.
ILMA	National (Italy)	1987-2008	End of legislature	Legislation adopted and information on the legislative processes and the legislative activity of the MPs (initiative and votes) and the Ministers (legislative and law decrees).

Note: *these information systems are not relational databases.

Five dimensions of comparison have been identified to compare the services offered by the ILMA system and these other tools, namely, data visualization, data selection through filtering options, parametric search, data exportation, and data analysis. For each of these dimensions, the level of support (basic, medium, advanced level) has been reported. The result of this evaluation is shown in Table 2.

Table 2. Comparison of the services provided by the systems reported in Table 1

Information system	Services Provided				
	Data Visualization	Selection / filtering	Parametric searching	Data exportation	Data Analysis
VoteView				BASIC	
Congressional Bills Project				BASIC	
LegEx	ADVANCED	ADVANCED			
EUPOL				BASIC	
VoteWatch Europe	ADVANCED	ADVANCED		MEDIUM	BASIC
OpenParlamento	ADVANCED	ADVANCED			BASIC
ILMA	ADVANCED	ADVANCED	ADVANCED	ADVANCED	ADVANCED

EUPOL, VoteView and the Congressional Bills Project only provide basic data exportation services. These systems simply collect data in web pages that scholars can download and use for their analysis. Their main advantage compared to the original sources from which data are gathered, such as PreLex for EUPOL and the Library of Congress for the Congressional Bills Project, is that they offer data in standardized machine-readable format useful for conducting quantitative analyses.

LegEx also relies on the data contained in the Congressional Bills Project and aims to present the different steps characterizing the US legislative process and the involved actors through advanced data visualization tools. While the Congressional Bills Project allows scholars to extract the entire set of bills introduced in the US Congress since 1947, LegEx also visualizes who introduced these bills and at which steps of the legislative process they arrived. Furthermore, users in LegEx can filter the entire set of bills according to different parameters.

VoteWatch Europe is one of the most evolved systems among the ones discussed here. In fact it offers advanced tools for the selection and visualization of data

regarding the main activities of the European Parliament and the EU Council of Ministers. Data can be filtered according to one or more legislative acts, arguments or political actors and the result of the query can be exported in .csv format. VoteWatch Europe also provides basic descriptive statistics such as the MEPs' (Members of European Parliament) participation in roll-call votes and their loyalty to the political group inside the European Parliament and to the national party to which they belong.

OpenParlamento focuses on the Italian legislative system. Data can be filtered according to different dimensions of the legislative process and to visualize the query results. Furthermore, OpenParlamento computes what it calls the "productivity index" which assesses the efficacy of the MPs' activity. However, this system only contains data on the current legislation, does not cover all the information on the legislative system (as ILMA does) and parametric search and data exportation are not supported. This last characteristic is a fundamental option for scholars aiming to conduct quantitative analyses on the Italian legislative system.

ILMA is the most complete portal compared to the other presented systems. ILMA does not only allow scholars to filter data to be visualized, but it is the only system that offers specific tools to execute parametric queries. Data exportation is possible and, differently from the other systems, ILMA allows users to choose and download only the required information. Moreover, as explained in details in Section 5, ILMA is equipped with facilities to carry out complex analyses on roll-calls. These facilities analyze data by invoking the R statistical software and the results can be visualized in the portal and exported for more complex investigations. Finally, different descriptive statistics can be computed on these results directly by ILMA.

3. ILMA Architecture and Information System

ILMA is a web application conceived with the purpose of covering different legislations and to maintain all the relevant information of the Italian legislative system from different perspectives. From a technological point of view, the use of standard relational databases and PHP, a widely adopted scripting language, for developing ILMA facilitates its maintenance. Different functionalities have been developed for supporting the users in browsing, exporting and analyzing data and will be discussed in Section 5. These functionalities have been conceived by considering the systems discussed in the previous section and by interviewing experts in the field in the context of the "PRIN 2009" research project on the institutional agenda setting conducted by the Universities of Milano, Bologna and Siena and co-financed by the Italian Ministry of Research and Higher Education (Grant No. 2009TPW4NL_002). Further functionalities are included for the database population and for invoking R scripts directly within ILMA.

The ILMA relational database covers all the most important information that characterizes the Italian legislative system and can be classified in four main areas: (1) the legislation and the legislative processes; (2) the actors involved in these processes; (3) the political context and (4) the codebook used to classify the legislative acts according to their policy content. This data organization permits users to conduct quantitative analyses on all the most significant aspects of the legislative process. The use of a relational model allows us to point out the relationships existing among information that can be exploited for the analysis. By means of the conceptual map reported in Figure 1, we wish to sketch the main information contained in the four areas listed above and their relationships.

Figure 1. Conceptual map of the ILMA database.
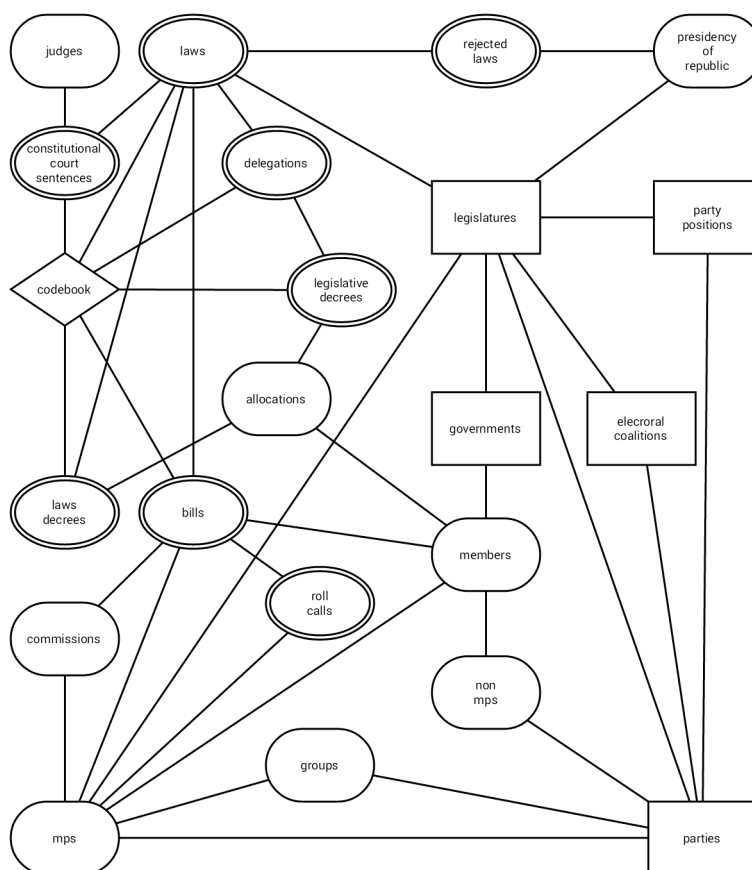
The core of the ILMA database is represented by the double oval entities and

their relationships which illustrate the legislative acts enacted and the legislative

processes that led to their adoption. Specifically, with legislative acts we mean the laws

adopted by the Italian parliament, the law decrees, and the legislative decrees emanated

by different governments. For each one of these acts ILMA reports information on their

main characteristics (e.g. title, type of law, date of adoption) and their content (e.g.

number of articles, number of words). Moreover, these entities include all the relevant

information regarding the legislative initiatives and the processes that led to their

approval. More precisely, it includes all the bills presented and discussed by the two

branches of the parliament (Chamber of Deputies and Senate), along with information

on the name, the party affiliation and/or the institutional role of the actors that propose

the bills, and the information on the commissions and the procedure (ordinary or decentralized) adopted to discuss and approve them. Finally, ILMA registers the roll-calls of all the bills voted on the floor for each reading in the Chamber of Deputies.[8]

The ellipse entities and their relationships include information on the individual and collective actors of the legislative processes. Among the former we include the members of the parliament (MPs), the ministers and junior ministers of different governments, along with their ministerial appointment, the Presidents of the Republic and the judges of the Constitutional Court. For each actor, the database provides information such as the date of birth, region of origin, level of education, professional activity and the political experience gained in parties and local governments. Moreover, ILMA contains the partisan affiliation of the MPs, the government members at the formation of legislatures and governments, and any possible changes successively made to other parties. ILMA also lists all the parliamentary groups and commissions (permanent and special) and their composition.

The rectangle entities and their relationships refer to the political context in which the legislative process occurs, such as the legislatures and the governments. In addition, ILMA lists all the parties present in the parliament and the electoral coalitions that contested elections. It is worth stressing that ILMA includes estimations of the position of different parties on several policy dimensions according to different sources and estimation techniques, such as expert surveys (Laver and Hunt 1992; Benoit and Laver 2006), content analyses of the parties' manifestos (Comparative Manifesto

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[8] In Italy the term "reading" refers to the whole passage of a bill in a chamber in a *navette* system and not to a specific stage of the legislative process as in the United Kingdom. Unfortunately, at the moment only roll-calls in the Chamber of Deputies are available.

Project) or the legislative speeches made by party leaders at the formation of governments (Curini and Martelli 2009).

As evidenced by the rhombus entities, laws and decrees are classified by their policy content, using the codebook developed by the Italian section of the Comparative Agendas Project (CAP, see Borghetto and Carammia 2010). Each legislative act is assigned to one or more of the 21 major topics (e.g., environment, health) and one or more of the 240 minor topics (e.g., waste disposal, regulation of the drug industry). ILMA also reports the topic classification based on the CAP master codebook, thus enabling scholars to compare Italian trends with those of other countries.

The current version of the database has been populated with information that covers a period that ranges from the beginning of the 10th legislature inaugurated on July 2, 1987, to the end of the 15th legislature on April 28, 2008 with a total of 15 different governments. Table 3 reports the main original data sources for each of the areas described above. These data have been semi-automatically gathered, cleaned, reconciled and integrated in the context of the PRIN 2009 research project in order to guarantee their consistency and correctness. In order to facilitate the introduction of new data about novel legislations in the ILMA system, some tools have been conceived for the acquisition of new data. These tools, by means of parsers, are able to extract from csv files data to be integrated in the current ILMA database and to execute checks for guaranteeing the integrity of the ILMA data. These csv files are obtained by ad-hoc extraction tools (applied on the original data sources) also developed in the context of the PRIN 2009 project. We are also currently working on data extraction tools integrated in ILMA that can directly access the original data source and semi-automatically extract and populate the database.

4. Table 3. Data sources (1987-2008)

Information	Data type	Main sources
Legislation and legislative processes	Laws Delegations (from delegating laws) Legislative decrees Bills Roll calls (only for deputies)	www.normattiva.it www.camera.it www.senato.it Camera dei Deputati (1997) www.camera.it
Individual and collective actors	MPs Parliamentary groups Commissions Ministers and Junior Ministers Constitutional Court (judges)	www.camera.it www.senato.it http://storia.camera.it Dataset of "CIRCaP" - Università degli Studi di Siena * www.governo.it Dataset of "Istituto Carlo Cattaneo" ° http://www.cortecostituzionale.it
Political context	Legislatures Governments Parties and coalitions Parties' ideological positions	www.parlamento.it www.governo.it www.interno.it Comparative Manifesto Project § Laver and Hunt (1992) Benoit and Laver (2006) Italian Legislative Speeches Dataset $ Curini and Martelli (2009)
Codebook Italian Policy Agendas Project	Major topic Minor topic	www.comparativeagendas.org http://italianpolicyagendas.weebly.com Borghetto and Carammia (2010)

5. Notes: * http://www.circap.org/; ° http://www.cattaneo.org/it/; § https://manifestoproject.wzb.eu/; $ www.socpol.unimi.it/docenti/curini/iLSD.htm.

6. Source: the table is based on Table 1 of Borghetto et al. (2012).

7. Typologies of Analysis

By exploiting the relational structure of the data and the fact that data are collected and organized in a single repository, several typologies of analysis can be conducted. Data can be selected, aggregated and finally exported in a matrix format or directly visualized within the ILMA portal (details in Section 5).

According to the notation used in the context of data warehouse design (Golfarelli and Rizzi, 2009) for the specification of "fact tables", in this section we

provide several examples of potential analyses offered by ILMA.[9] The descriptions
presented below explain how a specific "fact" can be analyzed. These examples refer to
the empirical analyses conducted by a group of scholars using data included in the
ILMA database, which results are reported in Borghetto et al. (2012).

4.1 Analysis of the Legislative Delegation Procedure

Since the early 1990s, and in particular with the advent of the "second" Republic, the
recourse to the legislative delegation has been established in the Italian political
landscape as one of the strongest instruments available to the executive to implement its
legislative agenda (Vassallo 2001). Most of the existing analyses have been restricted
just to a discussion of the quantitative rise in the number of legislative decrees over time
because of the heterogeneity of the information systems that collect the information and
the incoherencies among the different representations (Della Sala and Kreppel 1998;
Vassallo 2001). However, the legislative delegation is a complex process and focusing
only on the issued legislative decrees may be misleading.[10] In fact, several delegations
included in the delegating acts are not implemented or they are only partially fulfilled.

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[9] A fact table is a focus of interest in a decision-making process and describes different measures that can
be analyzed according to some dimensions of analysis. Dimensions are discrete attributes that
determine the minimum granularity adopted to represent facts. Several properties can be extracted
from the ILMA database for each dimension and exploited for data selection. A hierarchy can be
specified for each dimension representing many–to-one relationships that can be exploited for
aggregations (Golfarelli and Rizzi, 2009).

[10] The legislative delegation procedure is regulated by the Article 76 of the Italian Constitution and by the
Law 400/98. The government is authorized to emanate a legislative decree only if there is a law
(delegating law) approved by the parliament which contains one or more specific delegations which
specify the scope of the government's legislative activity and the deadline by fulfil this scope.

By contrast, looking at the delegating laws may be dangerous as well because these legislative acts often include numerous delegations that are related to different policy areas. As pointed out in Borghetto et al. (2012), "the ILMA database provides researchers, for the first time, with information on every delegation adopted since 1987, and it connects these data with records of each delegation law that contains it and the legislative decrees it authorized". This organization of data allows scholars to correctly analyze the activity of legislative delegations to the government.

A fact table about legislative delegation can be extracted from the ILMA database that depends on two dimensions. The first dimension represents the legislative decree which is the outcome of the process of delegation. Every legislative decree can be aggregated according to the micro- and the macro-topic of policy on which it focuses and according to the single delegation and the delegating law from which it originates. Then, every delegating law may be grouped on the basis of the type of law it represents. The second dimension is the member(s) of the government which sign(s) the decree. These ministers belong to a specific government which is in office in a legislature.

Scholars can easily conduct several analyses with this fact table. It is possible to assess, for instance, the average number of delegations included in every delegating law, how many legislative decrees are emanated by a government in every single legislature and which policy areas see the highest rate of issued legislative decrees.

4.2 Analysis of Intraparty similarity

The evaluation of party unity is an important research question that has received little attention in the literature because of the lack of available data. The analysis of roll-calls, discussed in the next section, is the main approach for the evaluation of party unity. However, by exploiting this approach it is not self-evident which factors lies behind the MPs' voting behavior. In fact, MPs' behavior may not stem from the similarity among

the policy preference of the MPs which belong to the same parliamentary group, but rather by the high levels of party discipline that characterizes parliamentary democracies and make the MPs vote together even though their preferences are different. Another approach, that is gaining momentum and allows scholars to overcome this shortcoming, is to consider parliamentary activities to infer MPs' original preferences. As pointed out by Aleman et al. (2009: 91-92), "activities that have no immediate policy consequences and do not depreciate the party label are not so tightly monitored by party leaders. Consequently, floor voting choices should more intensively reflect the costs of defection imposed by parties than cosponsoring should". Among the others, the analysis of legislative co-sponsorship is particularly interesting because in the Italian Parliament, sponsoring a bill is a very frequent and easy activity.

A fact table about co-sponsorship can be extracted from the ILMA database whose measure depends on three dimensions. The first dimension refers to the bill presented in the floor for the discussion. The entire set of bills sponsored can be aggregated according to their type or to the parliament branch (Chamber of Deputies or Senate) in which they are presented. Furthermore, the bills can be grouped on the basis of the policy area, at the micro- and the macro-level, to which they focus on. The second dimension is represented by the MP that has sponsored the bill. Every MP that has signed at least one bill can be aggregated, for instance, according to the gender, the parliamentary group to which he/she belongs and the constituency of election. Finally, the third dimension is the date of presentation of a bill that allows scholars to reconstruct under which government and in which legislature each bill is presented.

Starting from this simple fact table, scholars can perform several analyses of different levels of complexity. Scholars may compute for every legislature the number (or the percentage) of bills co-sponsored by MPs of different parties or blocks (e.g.

majority and opposition). Looking at the different attributes of the MP dimension of the fact table, scholars can also assess if MPs elected in the same constituency are more prone to co-sponsor bills together even though they belong to different parties. Moreover, as described by Borghetto et al. (2012), a more complex procedure allows scholar to analyze the degree of preferences' similarity of different parties and the average level of intra-party similarity of every legislature.

4.3 Analysis of Roll-calls

A roll-call analysis consists in the study of the recorded votes of a deliberative body, such as a democratic parliament. The primary use of roll-calls is the building of an Euclidean political space of a legislature on one or two policy dimensions (Poole and Rosenthal 1997). By analyzing the votes expressed by the MPs, it is possible to locate every single actor in the political space according to the estimation of his/her ideal point, i.e. the preferred preference in a specific policy area. The more distant a policy proposal is from the ideal point of an MP, the less his/her propensity to vote for adopting it. As argued by Clinton et al. (2004), the importance of roll-call analysis arises in two ways. First, the MPs' ideal point estimations allow the description of legislators and legislatures. Specifically, they reveal us if legislators tend to vote according to their partisan affiliation or relying on other factors. Second, the roll-call analysis serves to test theories of legislative behavior.

A fact table about roll-calls that can be extracted from the ILMA database whose measure depends on three dimensions: the bill that is voted on the floor, the MP that votes the bill and the date in which the vote takes place. The bills can be aggregated on the basis of the policy area, at the micro- and the macro-level, they focus on. The MPs can be grouped according to different attributes, such as gender, education, profession,

the geographic area and the parliamentary group to which they belong. Finally, the vote indicates under which government and in which legislature the vote takes place.

Starting from this simple fact table the following analyses can be easily performed. Scholars can assess the percentage of favorable and contrary votes given by single MPs and their parliamentary groups in every legislature. It is also possible to investigate in which policy area different parliamentary groups express the higher degree of consensualism, and if MPs of the same sex or coming from the same region tend to vote with a higher degree of accordance irrespective of their party affiliation.

8. ILMA Functionalities

The ILMA functionalities for supporting users in selecting, exporting and analysing data regarding the Italian legislative system have been organized in 6 areas according to the kinds of information they handle. The "Legislation" and "Bills" areas allow the access to the promulgated legislative acts, the processes that lead to their adoption and the codebooks used for the classification of laws on the basis of the argument they treat. The "Members of Parliament" and "Governments" areas permit the access to the actors involved in the legislative process, while "Party Positions" displays information on the political context. Finally, the "Roll-call Analysis" area allows users to build the political space of the Italian parliament in different legislatures on the basis of roll-calls.

8.1 Search and Visualization

When users enter in one of the areas in which the system is organized, a page for parametric search is loaded to express filtering conditions specific for that option. This page allows users to express different kinds of parameters. For example, in the case of laws, the page shown in Figure 2 is loaded and allows the specification of the following parameters: legislature, date of approval, year and the number of law, major topic,

minor topic, origin and place of approval. By contrast, in the case of members of

parliament the searching parameters are: name, surname, legislature, branch, gender,

year of birth and parliamentary group.

Figure 2. Parametric query specification for retrieving laws.

Suppose a user is interested in retrieving all the ordinary laws of governmental origin that have been promulgated during the 10th legislature and approved in the assembly. The conditions highlighted in Figure 2 should be selected. The retrieved objects are organized in pages of 20 rows to make easier the consultation. Our tool offers the possibility to order the data according to the value of specific columns and to further refine the results by specifying other filtering conditions. Users can access to the details of each single result of the query, in this case representing a law, by clicking on each returned row. For instance, Figure 3 shows the result of the evaluation of the previous query. The box containing the details of the selected law displays more specific data regarding for instance the sponsors (ministers or MPs) of the law, the argument on which it focuses on and the link to the text of the act. Moreover, the box reports information on the legislative process that led to the adoption of the law.

Figure 3. Result of a query evaluation.

Report - Laws								
Number of law	Constitutional law	Title	Type	Date of approval	Date of publication	Official gazette number	Place	Legislature
1987/332		Deroghe alla legge 25 maggio 1970, n. 352, in materia di referendum.	ordinary	07/08/1987	07/08/1987	1987/183	assembly	10
1987/417		Delega al Governo per l'emanazione di norme concernenti l'aumento o la riduzione dell'imposta di fabbricazione sui prodotti petroliferi con riferimento alla riduzione o all'aumento dei prezzi medi europei di tali prodotti.	ordinary	07/10/1987	12/10/1987	1987/238	assembly	10

Origin	government
First_signer	Antonio Gava (minister : Finance)
Co_sponsor	Giuliano Amato (vice_president : Presidency, minister : Treasury) Adolfo Battaglia (minister : Industry and commerce) Emilio Colombo (minister : Budget and economics)
Major Topic	Energy
Minor Topic	Natural Gas and Oil (Including Offshore Oil and Gas)
Link Law	http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:1987-10-09;417

Law-making process						
N. Bill	Date of presentation	Date of assignment	Commissions name	Date discussion start	Date discussion end	Procedure
1987/S0416	08/09/1987	14/09/1987	6 - Finance and treasury	16/09/1987	30/09/1987	ordinary_procedure
1987/C1606	03/10/1987	05/10/1987	6 - Finance	07/10/1987	07/10/1987	ordinary_procedure

8.2 Exporting

The export feature allows users to specify and generate a matrix from the relational database and is particularly interesting for creating customized matrixes that contain only the data required for the analysis and thus reducing their size that can be quite big.

The developed algorithm allows the passage from the relational representation to the matrix representation by identifying the values used as entry points of the rows and columns of the matrix and the values to insert into the matrix cells.

To download the retrieved data, users can click on the "Matrix export" button located in the upper-right side of the web page (see Figure 3 above). Doing this, another page is loaded where the user can select the entry points for columns, each containing a specific piece of information on the object reported in the row. The outcome at the end of this process is a file in csv format with the result of the query in a matrix format.

8.3 Analysis

Besides the retrieving and exporting functionalities previously described, ILMA also offers the possibility to perform roll-call analyses, by means of the R statistical package, directly in the portal.[11] When this functionality is activated, a page for the parametric search is shown. By specifying the legislature, the macro policy areas, and the estimation technique (either uni- or bi-dimensional), the system shows the number of MPs and bills respecting the selection criteria.[12] Whenever these numbers can lead to statistically significant results, the analysis is invoked and the results are visualized by means of three GUIs (graphical user interfaces) at different levels of details.

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[11] We have not developed such algorithms directly in PHP for performances reasons. Moreover, these algorithms are directly available in the R package and their implementation is optimized.

[12] The ILMA system predisposes a filtering selection on the policy area only at the macro-level because a filter at the micro-level may excessively decrease the number of bills with the risk to invalidate the analysis results. WNominate has been preferred to other estimation techniques, such as Ideal and Optimal Classification, because it has a better computational performance.

The first GUI reports, for each MP, a summary of the expressed votes and the coordinates that estimate his/her position in the political space, organized according to their parliament groups. The second GUI reports some graphics for having a visual idea of the analyzed data. Figure 4 shows the graphics for the analysis conducted on the entire set of bills voted in the Chamber of Deputies in the 10th legislature and the bi-dimensional estimation technique. The graphic at the left in the first row shows the ideal points of each MP highlighting with different colors their belonging to the parliamentary groups. This graphic allows scholars to see the level of cohesion of the group and the MPs that vote differently from the other group's members. The histogram at the right in the first row shows the frequency of cutting lines, i.e. lines of separation between those in favor and those against the proposal, for the different angles. The more the ideal point of an MP is located far from the cutting line referred to a bill proposal, the more his/her propensity to vote in the predicted way (Poole and Rosenthal 1997). The two graphs in the second rows confirm what reported in the histogram, namely most of the cutting lines have an angle comprised between 90 and 120 degrees. This configuration clearly indicates that for almost all the bills proposed the MPs' voting behavior is structured only on one dimension. This dimension represents the cleavage between majority and opposition.

Figure 4. Roll-call analysis: graphics.
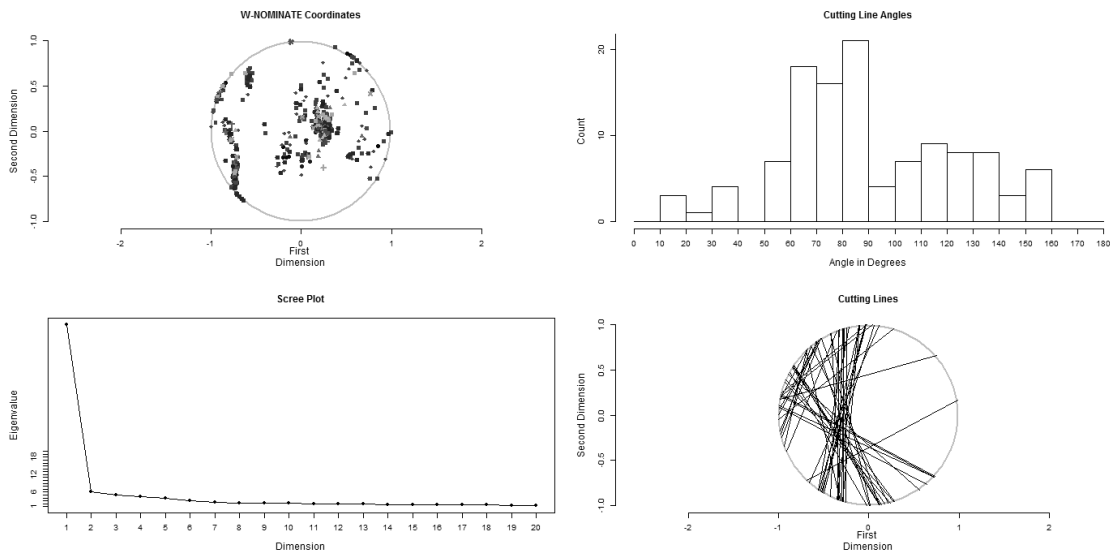
The last GUI reports four statistics calculated on the basis of the coordinates of the single MPs estimated by WNominate. Specifically, the GUI reports the coordinates of the position occupied by the median legislator in the parliament. Moreover, single MPs are grouped according to the sex, the geographical area where they were born and the parliamentary group to which they belong and the system computes the median position inside every group.[13]

9. Conclusions and Future Work

This paper presented the Italian Law-Making Archive (ILMA), an innovative web information system developed to support scholars that aim to study the Italian

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[13] The median legislator's position is particularly important for this kind of analysis because it is considered a robust estimation of the preferences expressed by a collective body, such as a party or a parliament. As demonstrated by the "Median Voter Theorem" (Downs 1957), in a one-dimensional space, in which the actors have single-peaked preference orderings, the ideal point of the median cannot be defeated by any other position in a pairwise competition adopting simple majority rule.

legislative processes. Information on the legislative acts enacted between the 10th and the 15th legislatures (1987-2008), the processes that led to their adoption, the actors involved in these processes and the political context are included in a single repository and organized in a relational database that allows scholars to extract machine readable data and conduct analyses directly in the portal.

In April 2014 ILMA has 30 registered users. Most of them are Italian, but there are also users from European and non-European countries. In order to evaluate the usability of ILMA we submitted an online survey to all the registered users containing different questions which aim to assess their experience with the system, and 16 of them completed the survey.

From the survey's results it emerges that all the respondents are affiliated to an Italian or European University: 14 users are postdoctoral fellows or scholars, while 2 are post-graduate students, and 13 are between 25 and 45 years old. Given the predominance of researchers, it is clear the reason for which 9 respondents explicitly affirms that they access ILMA for research purposes and another 6 users adopts ILMA to monitor the parliament and the government composition.

Among the six main ILMA areas, "Legislation", "Bills", "Parties Position" and "Roll-calls Analysis" have been evaluated as the most useful by the majority of respondents. Not surprisingly, respondents consider less useful the "Members of Parliament" and "Governments" sections because this kind of information can be more easily gathered from the institutional sources, such as the parliament and the government websites. Furthermore, "Legislation" (92%) and "Bills" (85%) are the sections of which respondents are more satisfied with their organization. Respondents confirm that the opportunity to export the results of the queries are particularly important because 44% of them have exported data from ILMA at least one time, but

another 31% states that they will use this tool when it is needed. Respondents download above all data on legislation, bills and roll-calls.

A specific part of the survey aims to assess the level of respondents' satisfaction on the integrated tool for the roll-calls analysis. Respondents are generally satisfied by this tool. The major strengths of the roll-calls analysis tool are the possibility to export the results and the fact that the exported results can be easily integrated in other tools and software. However, some weaknesses have been pointed out due to the long execution time needed for the analysis and the readability of the graphs produced by the tool.

In general 15 respondents over 16 are satisfied with the organization of ILMA and 13 of them declare that they will certainly use this tool for their future research. Moreover, all the respondents claim that they will suggest the use of the portal to colleagues or students. According to the respondents, the major strengths of ILMA are the completeness of the information included in the system and the longitudinal perspective offered that makes possible a comparison of the dynamics characterizing the legislative processes in different legislatures. Finally, respondents used the last part of the survey also to make their suggestions on how the system can be improved. Three main further improvements emerge from their comments that we wish to address. First, ILMA should be more "accessible" to those people that are interested in monitoring the legislative process but who are not experts in this field. Second, the graphical visualization of data should be more helpful in explaining the complexity of the legislative process. Third, the system should be integrated with the open data made available from the Italian Parliament.

On the basis of these results we wish to conclude making some important remarks. First, to preserve the longitudinal perspective of ILMA, namely one of its

major strengths, we are constantly updating and expanding the database. New releases will include data on legislatures before 1987 (at least the 8th and the 9th legislatures) and after 2008 (the 16th legislatures). At the same time we aim to include new contents in the database, such as law decrees, parliamentary inquiries and sentences of constitutional illegitimacy by the Constitutional Court, that are not present in the current version of ILMA. Second, we are currently extending the portal with new kinds of analysis and providing new facilities for helping scholars in their activities. Finally, when the open data of the Italian Parliament will be fully available for all the areas of the legislative system covered by ILMA, we aim to develop semi-automatic feeding procedures by exploiting these data.

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