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Francisca Tejedo-Romero & Joaquim Filipe Ferraz Esteves Araujo

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Francisca Tejedo-Romero  and Joaquim Filipe Ferraz Esteves Araujo 

ABSTRACT

Recent literature on transparency claims that e-government-enabled transparency through websites may be conditioned by political and social factors. Being more transparent while conducting its activities and political responsibilities has been the response of governments to citizens' demand for access to public information. This paper analyzes if political and social conditions influence transparency in Portuguese municipalities. The results show that political ideology, electoral turnout, proximity of elections, citizens' access to Internet and geographic location influence municipalities' transparency. The analyses are based on panel data from all 308 Portuguese municipalities.

KEYWORDS

E-government; Internet; local government; municipalities; transparency

Introduction

Several international organizations have urged transparency as a means to improve government's functioning, accountability, and civic participation in the decision-making process (Arapis & Reitano, 2017; Christensen & Læg Reid, 2010; Piña & Avellaneda, 2019; Piotrowski & Van Ryzin, 2007; Wehner & De Renzio, 2013). The creation of the Open Government Partnership (OGP), the Information and Communication Technology (ICT) and e-government opened a window of opportunity for citizens' interaction with governments (Ding, 2009; Garrido-Rodríguez, López-Hernández, & Zafra-Gómez, 2019; Jansson & Erlingsson, 2014; Rey & Ozymy, 2011; Sheryazdanova & Butterfield, 2017). ICTs and the Internet have changed the means information and services are accessed, allowing governments to engage in more active dissemination of information (Ingrams, 2017), and thus offering new forms of increasing governmental transparency.

The literature claims that the process each country deals with transparency and implements freedom of information (FOI) laws may vary (Coronel, 2012). Similar social developments in different countries may lead to different policy developments that could influence levels of transparency (Meijer, 2015). This is one of the reasons why the literature suggests additional studies on

transparency in countries with different administrative cultures (Cucciniello, Porumbescu, & Grimmelikhuijsen, 2017; Grimmelikhuijsen & Welch, 2012).

Portugal has been launching e-government projects since the late 1990s, focused on providing online information and services to citizens. In 2016, the FOI Law 26/2016 established the creation of a transparency portal. This Law has also made mandatory the disclosure of information about public services through websites. Hence, Portugal seems to be an interesting case study on transparency for several reasons. The country shows improvements toward a democratic, accountable, and transparent administrative culture. (Rocha & Araujo, 2007). However, the old standards of traditional bureaucracy are still present in Portuguese Public Administration (Magone, 2011). Portugal follows the continental tradition of unitarism and centralism, dominated by the central government (Araujo, 2002). These political and administrative characteristics are different from those countries with federalist or similar systems. In the latter, the different spheres of government have a certain degree of political and administrative autonomy to exert their influence. The existence of transparency policies in federal state systems implies a greater possibility of adaptation at different levels of

government. Hence, the institutional context may influence the way transparency is considered and implemented (Coronel, 2012; Meijer, 2015).

In view of the mentioned above and gaps concerning transparency, it is worth analyzing whether the drivers that influenced transparency in other OGP member countries¹ had the same influence on Portuguese local government. Portuguese municipalities are all subject to the same political and administrative rules and have similar policy instruments. The differences in the level of transparency may result from voluntary action by municipalities and from political and social factors (Albalade Del Sol, 2013; Arapis & Reitano, 2017; Chen & Han, 2019; Piña & Avellaneda, 2019; Sáez-Martín, López-Hernández, & Caba-Pérez, 2019; Tejedero-Romero & de Araujo, 2018).

This raises the following research question: What drivers influenced the level of transparency in Portuguese municipalities? The goal of this study is two-fold: improve the understanding of the evolution of e-government-enabled transparency that Portuguese municipalities have experienced and explore if political and social aspects and citizens' access to Internet have influenced the level of municipal transparency. The variation in transparency across municipalities may be driven by municipalities' specific factors. This limitation is addressed in this study by using a panel data analysis to control for the unobserved heterogeneity. The analysis allows us to gain further understanding of the drivers associated with transparency and its evolution. In addition, it considers the potential endogeneity problem and mitigates it using the Hausman-Taylor estimator for panel data.

This study is a contribution to the literature that seeks to enrich the debate regarding the drivers influencing transparency through websites. It conducts an econometric analysis based on panel data for all 308 Portuguese municipalities. The results show that there were improvements regarding municipal transparency through municipalities' websites. It indicates that political ideology, electoral turnout, proximity of elections, citizens' access to Internet and geographic location have influenced the levels of municipal transparency.

The structure of the paper is organized as follows. The next three sections present the literature review, the theoretical framework and

hypotheses development, and the Portuguese Local Governments' context. The fifth section develops and presents the research methodology, followed by the results and the discussion of the findings. The last section presents the main conclusions.

Literature review

In a public management and governance context, transparency can be defined as the availability and accessibility of information concerning government organizations (Chen & Han, 2019; Harrison & Sayogo, 2014; Piña & Avellaneda, 2019; Piotrowski & Van Ryzin, 2007; Roberts, 2006) and which regard matters that affect citizens' interests. It refers to the accessibility and usability of information by citizens and other stakeholders (demand-side of transparency). It also refers to the availability of information about government operations, procedures, and decision-making processes (supply-side of transparency). According to Brandsma, Curtin, and Meijer (2008), transparency incorporates both the passive right of every citizen to access information and the proactive governments' duty to ensure that information is accessible through websites. Regardless of the way information is available, Hood (2006) points out that the information should be understandable to citizens and other stakeholders. Transparency goes beyond mere access to information through government websites. The understandability of information analysis is not part of this study.

For the purpose of this study, transparency is related to information disclosed through government websites (supply side of transparency). It is also related with municipalities actively providing information to citizens and other external stakeholders (Bauhr & Grimes, 2014; Hood, 2006; Roberts, 2006). Transparency is defined as the disclosure of government information and its representatives' acts in order to provide relevant and reliable online information to citizens in a timely, complete, and accessible way (Harrison & Sayogo, 2014; Roberts, 2006). The operational definition of transparency used in this study excludes other dimensions, such as accessibility, understandability, intelligibility, reliability, and information quality. The concept of transparency

emphasizes the importance of providing information using government websites, so that citizens can act and participate in the policy process and improve the quality of government decision-making (Bauhr & Grimes, 2014; Brandsma et al., 2008; Piña & Avellaneda, 2019).

The transparency movement has been boosted by ICT (Ding, 2009; Garrido-Rodríguez et al., 2019; Ingrams, 2017; McNeal, Hale, & Dotterweich, 2008), government websites (Brandsma et al., 2008; Gandía & Archidona, 2008) and regulatory change (Araujo & Tejedo-Romero, 2016; Piña & Avellaneda, 2019). Together they improved access to information by focusing on two main issues: a) the right of citizens and society to access public services' information upon request – the public's right to know (Gesuele, Metallo, & Longobardi, 2018); and b) governments' responsibility to actively publish information about policy decision-making and all information of public interest – a practice of good governance (Bauhr & Grimes, 2014). These practices were framed in two types of government transparency. On the one hand, the reactive transparency in relation to citizens' requests for information (Brandsma et al., 2008). This is usually associated with FOI laws which, according to Michener and Bersch (2013), is a 'passive' transparency. On the other hand, the proactive transparency which is the recent e-government variant through the 'active' release of information through websites (Garrido-Rodríguez et al., 2019). It is a "computer-mediated transparency" that makes information available to all citizens on a voluntary or compulsory basis (Michener & Bersch, 2013). It refers to information that is made public on the initiative of a government body through websites, without a request being filed (Ingrams, 2017). This does not mean that all areas of government activity will disclose information. Certain areas of the government or activities, related to the security services, foreign policy, or certain aspects of policing, need secrecy to be effective in protecting national interests.

The literature claims that disclosure of information can improve good governance (Bauhr & Grimes, 2014; Hirsch & Osborne, 2000; Mundkur & Venkatesh, 2009; Piña & Avellaneda, 2019). Information disclosure allows citizens and other stakeholders to monitor and assess the performance of public organizations (Grimmelikhuisen

& Welch, 2012; McNeal et al., 2008; Meijer, 2013). The underlying argument is that e-government-enabled transparency will lead to greater effectiveness of public resources and higher accountability (Christensen & Lægreid, 2010; Garrido-Rodríguez et al., 2019). It acts as a disciplinary tool for governments and civil servants, so that citizen surveillance may lead them to behave according to higher ethical standards.

The way information is available and how transparency works varies among administrative systems (Cucciniello et al., 2017). In some countries, information is disclosed proactively, with public organizations being 'active' in providing information to external stakeholders. In other countries, information is disclosed reactively with public organizations being 'passive', providing information upon citizens' request (Araujo & Tejedo-Romero, 2016). Nevertheless, there are many issues that need to be analyzed and further deepened, namely what explains different levels of transparency among municipalities.

Theoretical framework and hypotheses development

According to Bearfield and Bowman (2017, p. 174), to date, no grand theory explains why local governments have embraced transparency. In the absence of such a theory, several academics based their studies on different theories to explain the disclosure of information and transparency policy (Bearfield & Bowman, 2017; Gesuele et al., 2018; Mendes et al., 2016; Mundkur & Venkatesh, 2009; Serrano-Cinca, Rueda-Tomás, & Portillo-Tarragona, 2009; Tejedo-Romero & de Araujo, 2018).

A vein of literature focuses on the pressures from society and other stakeholders to render public organizations more accountable and transparent (Bauhr & Grimes, 2014; Harrison & Sayogo, 2014; Piña & Avellaneda, 2019). Reforms influenced by ICT and e-government, the New Public Management and the increased participatory role of citizens have changed the institutional context where public organizations operate (Christensen & Lægreid, 2010; Garrido-Rodríguez et al., 2019). Moreover, changes in the FOI laws and the influence of international organizations, such as International Transparency or the OGP,

compel governments to be more transparent (Chen & Han, 2019; Piña & Avellaneda, 2019). In the new institutional context, there are factors that influence accountability and transparency, making it a critical issue for citizens to control government activities.

Most of the studies which focus on the factors that promote disclosure of information in government are mainly based on Agency, Neo-Institutional and Legitimacy Theories (Archel, Husillos, Larrinaga, & Spence, 2009; Fung, 2013; Gesuele et al., 2018; Pina, Torres, & Royo, 2010; Tejedó-Romero & de Araujo, 2018). According to the Neo-Institutional Theory, organizations respond to external pressures by adopting new structures, behaviors, and management practices considered legitimate to respond to institutional changes (DiMaggio & Powell, 1983; Pina et al., 2010). This response is considered legitimate and socially acceptable, producing homogeneous practices and structures (DiMaggio & Powell, 1983). Similarly, transparency and information disclosure are seen as symbols of modernity and trends that governments follow to respond to external pressures. Among other things, organizational responses to legitimize activities focus on increasing information disclosure (Gesuele et al., 2018) and transparency in the use of public resources to demonstrate the adoption of best practices. Therefore, institutional pressures could affect information disclosure and transparency in local governments.

The demand for more transparency is also a requirement of citizens who want to have more information about government activity and reduce information asymmetry. The Agency Theory claims that there is information asymmetry in the relationships between governments and citizens (Eisenhardt, 1989; Lane, 2005; Zimmerman, 1977). Since elected officials do not have the same interests as citizens, they should be held accountable for their actions and demonstrate that they acted in accordance with their responsibilities (Lane, 2005; Shapiro, 2005). Citizens should have access to information that allows them to monitor and scrutinize the actions of elected officials, thus holding them accountable and responsible (Laswad, Fisher, & Oyelere, 2005). E-government-enabled transparency has

been a way to reduce information asymmetries and increase the degree of public trust in political players (Fung, 2013), thus enhancing municipalities' reputation.

The more information is disclosed about municipalities' activities and the more transparent it is, the higher the probability of legitimizing their actions. The Legitimacy Theory (Suchman, 1995) states that information disclosure may be used to improve citizens' confidence in the activities and actions of organizations (Archel et al., 2009; Jansson & Erlingsson, 2014). This can enhance the legitimacy of elected public officials and project an image of good governance (Tejedó-Romero & de Araujo, 2018). E-government has helped disseminate information through websites and increased citizens' sense of control. It has contributed to a positive effect on public perceptions of political decisions and decision makers. Transparency may be used to change citizens' perceptions of government in order to restore confidence, ensure legitimacy, and improve the reputation of municipalities (Pina et al., 2010). The importance granted to e-government information disclosure, aiming to improve accountability and transparency by the Portuguese government and non-governmental organizations, led to the development of this study. The aforementioned theories helped to identify which factors may explain different levels of transparency among Portuguese municipalities.

Determinants of municipal transparency

Several studies underlined the role of political and social conditions as key drivers of transparency by national and local governments through government websites. For instances, the effect of citizens' access to Internet (Arapis & Reitano, 2017; Cicatiello, De Simone, & Gaeta, 2017; Ingrams, 2017), electoral turnout (Albalade Del Sol, 2013; García-Tabuyo, Sáez-Martín, & Caba-Pérez, 2016), and political ideology (Araujo & Tejedó-Romero, 2016; Cicatiello et al., 2017; Sáez-Martín et al., 2019) on transparency was analyzed in previous researches.

In order to expand the research area to Portugal, this study argues that municipalities' predisposition for transparency is influenced by

the following conditions: political ideology, electoral turnout, proximity of elections, political competition, political strength, citizens' access to Internet and geographic location. The purpose of this paper is to build up an explanatory model, supported by the Legitimacy, Agency and Neo-Institutional Theories. The model applies a valid operationalization of the above-mentioned factors and tests their relative importance in Portuguese municipal transparency. It examines these factors because they are the common basis of the existing models in the academic literature. The hypotheses are developed and proposed below.

Political ideology

According to the literature, political ideology is "a set of beliefs about the role of government that shapes responses to a wide range of specific policy issues" (Abramowitz & Saunders, 2006, p. 177). Studies suggest that the ruling party's ideology influences information disclosure and transparency (Albalate Del Sol, 2013; Chen & Han, 2019). This is supported by the Legitimacy Theory that states that governments will use information disclosure to reinforce the legitimacy of their decisions (Cárcaba-García & García-García, 2010). Most studies have found that municipalities ruled by left-wing parties are more transparent than those ruled by right-wing parties (see, among others, Albalate Del Sol, 2013; Caamaño-Alegre, Lago-Peñas, Reyes-Santías, & Santiago-Boubeta, 2013; Cicatiello et al., 2017; Grimmelikhuisen & Welch, 2012; Guillamón, Bastida, & Benito, 2011). This may be because left-wing parties tend to advocate for greater state intervention and need to disclose more information to justify their choices. In the Portuguese case, left-wing governments also seem to be more receptive to information disclosure than right-wing parties. It was during the left-wing governments that the FOI laws were more favorable to transparency. Hence, the following hypothesis has been formulated:

H1: There is a positive relationship between left-wing Political Ideology and the level of municipal Transparency.

Electoral turnout

Citizens' concern and involvement in politics are expressed by electoral turnout. Several studies

show that citizens' involvement and growing interest in local government activities are influenced by access to information through municipalities' websites (Caamaño-Alegre et al., 2013; Hollyer, Rosendorff, & Vreeland, 2011). Likewise, it is expected that there will be a link between transparency and electoral turnout (Albalate Del Sol, 2013). A high level of electoral turnout may indicate high interest in local government activities. By the same token, low levels of electoral turnout might indicate that citizens have low interest in local government activities. Increasing the levels of municipal e-government-enabled transparency may boost citizens' involvement in politics and their interest in municipal activities, thus influencing the level of electoral turnout (Araujo & Tejedó-Romero, 2016; Serrano-Cinca et al., 2009). According to the Agency Theory, these will reduce information asymmetry and may increase citizens' confidence and public trust in political players (Laswad et al., 2005). The Legitimacy Theory suggests that, in the case of lower electoral turnout, the government will increase transparency to regain citizens' trust and change their perceptions about public organizations' functioning (Albalate Del Sol, 2013; Araujo & Tejedó-Romero, 2016). In order to increase electoral turnout, Portuguese municipalities are expected to increase the level of transparency through municipalities' websites. Hence, the following hypothesis has been formulated:

H2: There is a negative relationship between Electoral Turnout and the level of municipal Transparency.

Proximity of elections

The proximity of elections affects policy choices with politicians wanting to improve their reputation and increase their reelection chances (Martinez, 2009). According to Rogoff and Sibert (1988), information asymmetry encourages politicians to implement expansive policies before elections, thereby increasing the chances of reelection. The proximity of elections may have effects on expansive policies and e-government-enabled transparency. Preelection manipulation of spending and deficits may mitigate levels of transparency in order to increase the ruling

party's reelection chances (Alt & Lassen, 2006). Information disclosure about deficit spending and fiscal balance may improve the credibility about the effective management of public resources (Alcaide-Muñoz, Rodríguez-Bolívar, & López-Hernández, 2017), and improve citizens' confidence on local politicians (McNeal et al., 2008). If voters appreciate a politician's integrity and transparency, politicians may be more willing to commit to preelection information disclosure activities to attract extra votes. Alt and Lassen (2006) and Vicente, Benito, and Bastida (2013) analyzed political budget cycles and found a relationship between the fiscal balance and transparency. Thus, the effect of the proximity of elections may influence the level of municipal transparency. It is expected that there will be a positive relationship between the proximity of elections and transparency, i.e. in a preelection and election phase, the municipality will be more transparent than in a post-election phase. The following hypothesis has been formulated:

H3: *There is a positive relationship between Proximity of Elections and the level of municipal Transparency.*

Political competition

The literature claims that political rivalry creates pressures for information disclosure by the ruling political party, which may help reduce information asymmetry (Berliner, 2014; Berliner & Erlich, 2015; Chen & Han, 2019; Grzymała-Busse, 2006). Dissemination of information may be a signal from the ruling party of public commitment to transparency and good governance, aiming to gain support from the general public. It can work as a reelection incentive since it can yield crucial support or at least foreclose potential avenues of criticism (Berliner, 2014). In addition, competitive political environments may create uncertainty over the future for the ruling political party. Increasing transparency through FOI laws secures means of monitoring the new ruling party, in case the ruling political party loses the election (Grzymała-Busse, 2006). According to the Legitimacy Theory, the government has interest in demonstrating its commitment to efficient management and will make use of different ways of information disclosure

(Cárcaba-García & García-García, 2010; Laswad et al., 2005). The presence of strong opposition to monitor the ruling party may also influence the behavior of the politicians in power. Hence, the following hypothesis has been formulated:

H4: *There is a positive relationship between Political Competition and the level of municipal Transparency.*

Political strength

A party governing with an absolute majority does not need the support from other political parties (Tejedo-Romero & de Araujo, 2018). On one hand, according to the Agency Theory, a majority government will tend to be less transparent, since it does not need agreements with other political forces to govern. On the other hand, Alt and Lassen (2006) point out that less political strength is associated with increased levels of transparency, above those of single-party majority. The presence of a coalition in government increases the pressure to be more transparent. According to Guillamón et al. (2011), fragmented governments are more transparent than those of single-party majority governments. So, the municipalities ruled by an absolute majority have more control over political decisions made and over information. Hence, the following hypothesis has been formulated:

H5: *There is a negative relationship between Political Strength and the level of municipal Transparency.*

Citizens' access to Internet

The use of ICT in Public Administration and e-government has become widespread in the internal functioning of public services (Christensen & Lægreid, 2010; Ingrams, 2017). Externally, it provides access to information concerning services and the democratic process. E-government and ICT have enabled citizens' participation through feedback and allowing transactions between citizens and government (Ding, 2009; Garrido-Rodríguez et al., 2019). Internet access has increased citizens' ability to access municipalities' websites, and demand an

efficient, responsible, and transparent government (Gandía & Archidona, 2008; Mundkur & Venkatesh, 2009; Pina et al., 2010). Nevertheless, the increase in information disclosure via websites and citizens' access to Internet may both be just an expression of an overall diffusion of the Internet. According to the Neo-Institutional Theory, the level of citizens' access to the Internet will create additional pressure to disclose information through websites as the number of internet users increases (Pina et al., 2010). It is an institutional factor that influences the pattern of citizens' demand for information and pressures for information disclosure and transparency. Therefore, as a response, municipalities will have to try to be more transparent. Hence, the following hypothesis has been formulated:

H6: *There is a positive relationship between Citizens' access to Internet and the level of municipal Transparency.*

Geographic location

Within a single country, it is possible to identify regions that are significantly different in terms of geographic, historical, cultural, and social characteristics (Sáez-Martín et al., 2019). Each region's specific characteristics are part of the institutional context in which municipalities act and develop local policies. According to the Neo-Institutional Theory (DiMaggio & Powell, 1983), it is expected that these regional characteristics influence the way municipalities interact with citizens, affecting the level of municipal transparency (Pina et al., 2010). Empirical literature about regional development in Portugal has long underlined the asymmetrical socio-economic reality of Portuguese regions (Ruiz & Ribeiro, 2014; Silva & Ferreira-Lopes, 2014). There are asymmetries in the levels of development, urbanization, and culture between the north, the south, the center, and the islands. These asymmetries could influence the level of information disclosure. Thus, it is expected that the institutional and socioeconomics characteristics of the region, where the municipality is located, influence the level of municipal transparency. The following hypothesis has been formulated;

H7: *There is a positive relationship between Geographic Location and the level of municipal Transparency.*

Setting the context: Portuguese local government

Portugal is a unitary state with 278 municipalities on the Mainland, and 30 in the two Atlantic archipelagos. The Portuguese Constitution established three levels of Government: administrative regions, municipalities, and parishes (*freguesias*). Administrative regions have not yet been implemented in Mainland Portugal (Silva, Teles, & Ferreira, 2018). The only two autonomous regions are the Atlantic Archipelagos: the Azores and Madeira. Local governments include municipalities and parishes. Each municipality includes several parishes. Parishes are the lowest administrative unit, with a very limited scope of competences and resources, and make the link between the municipality and the population's needs (Araújo, 2018).

Municipalities are responsible for delivering local public services to the population. They are governed by a Municipal Assembly (the deliberative body), and a City Council (the executive body), both elected to a four-year term. The members of the deliberative and executive bodies are elected directly by citizens, with the Mayor being the first candidate of the most voted party's list for the City Council (Magre & Bertrana, 2007). Mayors have a key role in municipal government and substantial power and autonomy to make decisions. For example, mayors assign the tasks of Council members, manage human resources, authorize contracts, issue licenses, and, according to the overall policy framework, choose which projects to implement and their schedules (Law 159/99).

Transparency regulatory context

Portugal is one of the European countries that has pioneered in regulating the access to public information. In 1989, the Portuguese Constitution established the principle of 'Open Administration' (Article 268.2), granting citizens the right to access administrative files and records, except for issues

concerning internal and external security or relating to citizens' personal data. This constitutional principle was regulated in 1993, by Law 65/1993, establishing the conditions to access administrative information. However, the Law did not oblige government bodies or public entities to inform citizens about their activities. This does not mean that the country is a frontrunner regarding e-government publicly accessible information, as it adopted a passive form of transparency similar to other countries.

To ensure that public organizations do respond to citizens' requests for administrative information, a supervisory agency has been established: the Commission for Access to Administrative Documents (CADA). It is an independent administrative entity working with the Portuguese Parliament, whose purpose is to ensure compliance of public organizations with the right of citizens to access administrative information.

In 2007, the Socialist government repealed the Law 65/1993 and approved Law 46/2007 of 24th August which established "the right of access to administrative documents, which includes the right to consultation, reproduction, and information on their existence and content" (Article 5). The Law maintained that access to public information should be requested by citizens. It was not an obligation for government bodies or public entities to disclose information on their activities. The center-right parties refused the Socialists' proposal to introduce in the Law the obligation for all public entities to disclose information through government websites.

In 2016, the Socialist government approved Law 26/2016 of 22nd August, introducing the active disclosure of information on the operations and control of activities, to ensure the transparency of administrative activities. The Law establishes that 'Public information that is relevant to ensure the transparency of administrative activity, particularly that related to the operation and control of public activity, shall be actively disseminated, on a regular and updated basis, by the respective bodies and entities' (article 2, Law 26/2016). A list of information to be disclosed is in article 10 of the Law and should be updated every 6 months: administrative regulations and acts, names of the members of the directive and supervision bodies, organizational

chart, activity plans, budget, social reports, activity and financial reports, among other information at the public services' discretion. Since the list is not exhaustive, municipalities can disclose more information than that included in the Law. It should be disseminated on a regular basis, in an open and readable format, and disclosed freely and openly in public organizations' websites. This is what Brandsma et al. (2008) called 'a more proactive duty' to ensure the dissemination of information, whilst encouraging the use of the internet, where public organizations actively disclose information, without waiting for a specific request from citizens (see, among others, Meijer, Curtin, & Hillebrandt, 2012; Michener & Bersch, 2013).

Research methodology

In order to analyze local government transparency, this study focuses on all 308 Portuguese municipalities. These are all the municipalities on which the Transparency and Integrity, and the Civic Association (TIAC) (Transparência e Integridade, Associação Cívica), have available data about the index of transparency for a 4-year period (2013, 2014, 2015, and 2016). This is a longitudinal study based on panel data methodology, which has not been previously used in studies about transparency in Portugal. This methodology is consistent with the approach adopted by Alt and Lassen (2006), Arapis and Reitano (2017), Bauhr and Grimes (2014), Cicatiello et al. (2017) and Tejedoromero and de Araujo (2018). After discarding observations with missing data, it ended up with an unbalanced panel data of 1,098 observations (municipality-year), for 308 municipalities, for 4 years.

Variables and data collection

Dependent variable

Based on the literature about transparency and the experience of International Transparency in Spain, a Portuguese non-governmental organization, the TIAC, developed a methodology to produce a transparency index for Portuguese municipalities. The index measures e-government-enabled transparency of municipalities according to the information about their composition, functioning,

and management, available in the portals of the municipal councils. These aspects may contribute to improve good governance and reduce information asymmetry between citizens and government. The Transparency index includes 76 indicators on the information available on municipal websites. The indicators are binary variables, that is, they take up the value of 1 if the corresponding information is made available online, or 0 if it is not. The indicators are grouped into seven dimensions: A) Organizational information, social composition, and operations of the municipality (18 indicators); B) Plans and planning (13 indicators); C) Local taxes, fees, service charges, and regulations (5 indicators); D) Relationship with citizens (8 indicators); E) Transparency of public procurement (10 indicators); F) Economic and financial transparency (12 indicators); G) Transparency in urban planning (10 indicators) (TIAC, 2013). The index measures the active disclosure of information by municipalities, which is mandatory or not. Hence, the chosen dependent variable was the Portuguese municipalities' transparency index (TI), published by TIAC since 2013 (see: <https://transparencia.pt/indice-de-transparencia-municipal/>).

Independent variables

The following variables, which could contribute to increase or decrease the levels of e-government-enabled transparency, were selected: *Political Ideology*. It is a dummy variable that takes up the value 1 if the municipal ruling leader belongs to a left-wing party, and 0 otherwise. *Electoral Turnout*. This is a numerical variable that represents the percentage of participation in municipal elections. *Proximity of Elections*. For this variable, three dummies are included: *Preelection*. This variable that takes up the value of 1 in the year prior to elections, and 0 otherwise. *Election*. This variable that takes up the value of 1 in the election year, and 0 otherwise. *Post-Election*. It is a variable that takes up the value of 1 in the year after elections, and 0 otherwise. *Political Competition*. This is a numeric variable calculated as the difference between the percentages of votes obtained by the parties that placed first and second. *Political Strength*. It is a dummy variable given the value of 1 if the municipal party leader is ruling in an

absolute majority (maximum strength), and 0 otherwise (maximum fragmentation). *Citizens' access to Internet*. It is a numeric variable calculated as the total number of residents with access to broadband Internet service, divided by population (number of inhabitants). *Geographic Location*. For the Portuguese regions, six dummy variables were created, Alentejo, Algarve, Center, Islands, Lisbon, and North. According to the Decree-Law 494/79, these are the territorial divisions for integrated and sustainable development policies of the regions. The dummy variables take the value of 1 when a municipality is situated in these different regions and 0 otherwise.

Control variables

To avoid biased results, the following variables were selected: *Debt-to-income ratio*. The level of debt shows municipalities' financial condition, and their credibility vis-à-vis external agents (Caba-Pérez, Rodríguez-Bolívar, & López-Hernández, 2014) to finance the provision of public services and programs. In situations of indebtedness (the debt-to-income ratio), municipalities may use financial information disclosure to prove their ability to meet financial obligations. So, the presence of public debt will favor the disclosure of public information. This will improve the credibility of public finance and contribute to the effective management of public resources (Alcaide-Muñoz et al., 2017). Several studies have concluded that municipalities' financial condition (measured in relation to the level of indebtedness) has a positive association with information disclosure (Caamaño-Alegre et al., 2013; Caba-Pérez et al., 2014; Cárcaba-García & García-García, 2010; Gesuele et al., 2018; Laswad et al., 2005). Thus, due to financial pressures stemming from the economic and fiscal crisis that affected the public finances of local governments, financial control has increased. As a result, Portuguese municipalities which have higher levels of debt-to-income ratio will tend to be more transparent. *GDP (Gross Domestic Product per capita)*. It is a numerical variable representing income level per capita and reflecting the standard of living of the population in the municipalities considered. For Pina et al. (2010), wealthier municipalities, with a more prosperous population, will be more aware of transparency and accountability issues. Bastida and Benito (2007) argued, based on an empirical sample of OECD countries using the per

capita GDP variable, that increasing a country's wealth is positively related to increasing transparency. *Unemployment*. It is a numerical variable that represents the unemployed who are registered in a municipality. It is measured by the percentage of potentially active population. High unemployment rates are significantly related to a low transparency index (Albaladejo Del Sol, 2013; Araujo & Tejedoromero, 2016). *Population*. It is a numerical variable reflecting the number of inhabitants in each municipality. Research has concluded that the population size exerts a statistically significant influence on the transparency index (Araujo & Tejedoromero, 2016; Guillamón et al., 2011).

Data from independent and control variables were collected from official sources: the annual publication "Municipal Finances" of the General Directorate for Local Authorities, National

Elections Commission, Portuguese National Statistics Institute, and Marktest's Sales Index database. For 2013, data were collected from the results of the November 2009 elections. For the years 2014, 2015, and 2016, data were extracted from the results of the November 2013 elections. Data from the dependent variable, the municipal transparency index, were collected from the nonprofit organization TIAC.

Empirical model specification and estimation method

To confirm that the variables are not affected by multicollinearity, three models were proposed. The unbalanced panel data regression method was adopted, and the models have been empirically tested.

Model 1:

$$\begin{aligned}
 Transparency_{it} = & \alpha + \beta_1 Political\ Ideology_{it} + \beta_2 Electoral\ Turnout_{it} + \beta_3 PreElection_{it} + \beta_4 Election_{it} \\
 & + \beta_5 PostElection_{it} + \beta_6 Political\ Competition_{it} + \beta_7 Citizens'\ access\ to\ Internet_{it} \\
 & + \beta_8 Algarve\ Region_{it} + \beta_9 Centre\ Region_{it} + \beta_{10} Islands_{it} + \beta_{11} Lisbon\ Region_{it} \\
 & + \beta_{12} North\ Region_{it} + \beta_{13} Debt - to - Income\ Ratio_{it} + \beta_{14} GDP_{it} + \beta_{15} Unemployment_{it} \\
 & + \beta_{16} Population_{it} + \mu_{it}
 \end{aligned} \tag{1}$$

Model 2:

$$\begin{aligned}
 Transparency_{it} = & \alpha + \beta_1 Political\ Ideology_{it} + \beta_2 Electoral\ Turnout_{it} + \beta_3 PreElection_{it} + \beta_4 Election_{it} + \beta_5 \\
 & Post\ Election_{it} + \beta_6 Political\ Strength_{it} + \beta_7 Citizens'\ access\ to\ Internet_{it} \\
 & + \beta_8 Algarve\ Region_{it} + \beta_9 CentreRegion_{it} + \beta_{10} Islands_{it} + \beta_{11} Lisbon\ Region_{it} \\
 & + \beta_{12} North\ Region_{it} + \beta_{13} Debt - to - Income\ Ratio_{it} + \beta_{14} GDP_{it} \\
 & + \beta_{15} Unemployment_{it} + \beta_{16} Population_{it} + \mu_{it}
 \end{aligned} \tag{2}$$

Model 3:

$$\begin{aligned}
 Transparency_{it} = & \alpha + \beta_1 Political\ Ideology_{it} + \beta_2 Electoral\ Turnout_{it} + \beta_3 PreElection_{it} \\
 & + \beta_4 Election_{it} + \beta_5 PostElection_{it} + \beta_6 Political\ Competition_{it} + \beta_7 Political\ Strength_{it} \\
 & + \beta_8 Citizens'\ access\ to\ Internet_{it} + \beta_9 Algarve\ Region_{it} + \beta_{10} Centre\ Region_{it} + \beta_{11} Islands_{it} \\
 & + \beta_{12} LisbonRegion_{it} + \beta_{13} North\ Region_{it} + \beta_{14} Debt - to - Income\ Ratio_{it} + \beta_{15} GDP_{it} \\
 & + \beta_{16} Unemployment_{it} + \alpha_{17} Population_{it} + \mu_{it}
 \end{aligned} \tag{3}$$

where

α is a scalar; $\beta_1, \beta_2, \beta_3, \beta_4, \dots$ are the estimable parameter vectors; $i = 1, \dots, 308$; $t = 2013, 2014, 2015, \text{ and } 2016$; μ_{it} represents the disturbance term. Most panel data applications use a *one-way* error component model for disturbance, with:

$$\mu_{it} = \mu_i + \varepsilon_{it} \quad (4)$$

where

μ_i represents the unobservable municipality-specific effect, and is time-invariant, such as the municipality's ability to be transparent. The remaining disturbance ε_{it} varies with municipalities and years, and can be thought of as the usual disturbance in the regression.

The econometric models have been estimated with the Stata software using five alternative techniques: Pooled Ordinary Least Squares (POLS), Fixed Effects (FE), Random Effects (RE), Hausman-Taylor estimation (HT) and Robust Hausman-Taylor estimation (HT Robust). The POLS estimator assumes that all μ_i and δ_t are equal. By allowing μ_i and δ_t to differ, but assuming they are fixed numbers, the FE panel was generated. The RE panel assumes that unobserved effects are random variables. Hausman-Taylor (HT) estimator is used for the random effects model to allow for the potential correlation between regressors and unobserved municipality heterogeneity. The HT approach is typically recommended to mitigate and overcome endogeneity problems due to unobserved individual effects (Wooldridge, 2010). This estimator controls for unobservable variables, which often strongly influence estimates of the transparency on municipalities. The HT estimator is based on an instrumental variable estimator that uses both time and cross-sectional dimensions of the panel dataset to define proper instruments (Baltagi, 2014). In particular, the time-varying variables are used twice, namely as means and as differences from these means. In addition, Robust HT (HT Robust) estimator is employed by using cluster-robust standard errors in order to solve possible autocorrelation and heteroskedasticity problems.

Results and discussion

This section provides the empirical results of the study by using descriptive, bivariate, and

multivariate analyses. To avoid the influence of outliers, the continuous variables Debt-to-Income Ratio, GDP, Unemployment, and Population were winsorized at the 5% top and bottom percentiles of their distribution.

Descriptive analysis

Table 1 reports the descriptive statistics for the dependent variable – *Transparency*.

The above table shows that, over the years, there have been high increases in the average value of TI in the municipalities under analysis. The average value of TI increased from 33.7 in 2013 to 53.2 in 2016, with an average value of 41.6 for the index in the period 2013–2016. The maximum value was reached in 2016, the year the transparency Law was approved. This suggests that the level of Transparency in Portuguese municipalities is increasing. This increase may be a way to legitimize the actions of municipalities toward citizens (Cárcaba-García & García-García, 2010), and reduce the agency problem (Laswad et al., 2005). Perhaps the institutional context of municipalities is changing through reforms to improve good governance. The global spread of the Internet may have contributed to this change through increased dissemination of information. It seems that local politicians are becoming more aware that citizens are demanding more accountable actions. The political debate that led to the adoption of the transparency Law in 2016 may have influenced the decision of local politicians to disclose more information. Transparency seems to be a way to recover citizens' loss of trust. It is worth stressing that, although Portugal only joined the OGP² or other similar initiatives later, the path to open government is increasing the dissemination of information.

Table 2 reports the descriptive statistics for the independent and control variables. Panel A shows

Table 1. Descriptive statistics for the Transparency Index.

	2013	2014	2015	2016	2013-2016
Transparency					
Mean	33.7	34.5	45.1	53.2	41.6
Sd	9.54	12	16.9	19.6	17
Max	61	81.6	94.2	100	100
Min	7	3.02	7.97	16.2	3.02
N (observations)	274	273	278	273	1098

Table 2. Descriptive statistics for independent and control variables.

Panel A: Continuous variables		2013		2014		2015		2016		2013-2016	
Electoral Turnout											
Mean		63.4	58.8	59	59.1	60.1					
Sd		7.63	9.07	9.16	9.15	8.97					
Max		81.1	78.2	81.4	81.4	81.4					
Min		38.9	37.8	37.8	37.8	37.8					
Political Competition											
Mean		21.5	18.5	18.3	18.2	19.1					
Sd		14.5	13.5	13.5	13.5	13.8					
Max		63.4	72.2	72.2	72.2	72.2					
Min		0.07	0.04	0.04	0.04	0.04					
Citizens' access to Inter.											
Mean		0.146	0.171	0.196	0.197	0.178					
Sd		0.0666	0.0647	0.0681	0.0672	0.0698					
Max		0.352	0.385	0.422	0.423	0.423					
Min		0.0365	0.0595	0.046	0.0466	0.0365					
Debt to Income Ratio											
Mean		46	81.3	69.5	62.4	64.8					
Sd		49.8	54.4	51.9	50.4	53.1					
Max		206	206	206	206	206					
Min		-0.785	0.0813	0.103	0.144	-0.785					
GDP											
Mean		80	80	79.7	79.7	79.9					
Sd		13.7	13.7	14.2	14.2	13.9					
Max		110	110	110	110	110					
Min		61.2	61.2	61.2	61.2	61.2					
Unemployment											
Mean		9.72	8.88	8.03	8.03	8.66					
Sd		2.04	2.18	2.22	2.22	2.27					
Max		13.5	13.5	13.5	13.5	13.5					
Min		5.2	5.2	5.2	5.2	5.2					
Population											
Mean		32415.06	31960.43	31783.65	31786.48	31988.36					
Sd		40032.19	39765.	39913.94	40110.91	39901.87					
Max		154920	154920	154920	154920	154920					
Min		3384	3384	3384	3384	3384					
Panel B: Dummies variables		2013		2014		2015		2016		2013-2016	
Ideology		0	0	0	0	0	0	0	0	0	1
Frequency		122	103	106	105	168	168	168	436	662	662
Percentage		44.5	37.7	38.1	38.5	61.5	61.5	61.5	39.7	60.3	60.3
Proximity of Elections:											
PreElection											
Frequency		274	273	278	0	0	273	273	825	273	273
Percentage		100	100	100	0	0	100	100	75	25	25

(Continued)

Table 2. (Continued).

Panel A: Continuous variables		2013		2014		2015		2016		2013-2016	
Election											
Frequency		0	274	273	0	278	0	273	0	824	274
Percentage		0	100	100	0	100	0	100	0	75	25
PostElection											
Frequency		274	0	0	273	278	0	273	0	825	273
\Percentage		100	0	0	100	100	0	100	0	75	25
Political Strength											
Frequency		26	248	49	224	49	229	49	224	173	925
Percentage		9.49	90.51	17.95	82.05	17.63	82.37	17.95	82.05	15.76	84.24
Geographic Location:											
Alentejo Region											
Frequency		217	57	216	57	193	85	215	58	868	230
Percentage		79.2	20.80	79.12	20.88	79.14	20.86	78.75	21.25	79.05	20.95
Algarve Region											
Frequency		258	16	257	16	262	16	258	15	1035	63
Percentage		94.16	5.84	94.14	5.86	94.24	5.76	94.51	5.49	94.26	5.74
Center Region											
Frequency		178	96	177	96	179	99	177	96	711	387
Percentage		94.96	35.04	64.84	35.16	64.39	35.61	64.84	35.16	64.75	35.25
Azores and Madeira Islands											
Frequency		272	2	271	2	276	2	271	2	1090	8
Percentage		99.27	0.73	99.27	0.73	99.28	0.72	99.27	0.73	99.27	0.73
Lisbon Region											
Frequency		256	18	255	18	260	18	255	18	1026	72
Percentage		93.43	6.57	93.41	6.59	93.53	6.47	93.41	6.59	93.44	6.56
North Region											
Frequency		189	85	189	84	193	85	189	84	760	338
Percentage		68.98	31.02	69.23	30.77	69.42	30.58	69.23	30.77	69.22	30.78
N			274	273	273	278	278	273	273	1098	1098

the continuous variables, whereas Panel B presents information on the dummy variables.

It shows an increase in the number of municipalities ruled by left-wing parties. The decrease in Electoral Turnout seems to highlight the citizens' distrust due to the severity of austerity measures of the previous years. Data from Political Strength show that from the 2009 to the 2013 municipal elections, the percentage of municipalities ruled by an absolute majority decreased. This was perhaps a consequence of citizens' distrust on political parties. It seems that the 2009 financial and economic crisis influenced voters' preferences. There was also a decrease in the difference of votes between the top parties from 21.5% to 18.5%. This suggests an increase of Political Competition between parties. The difference from the second to the winning party in the 2013 municipal elections was lower than in the previous one.

It was observed an increase in the variable Citizens' access to Internet. This increase may be a consequence of the government's strategy to improve e-government and provide citizens with Internet access. It seems that the strategic plan to implement ICT in public services and the global spread of the Internet is producing positive results.

Over the period analyzed, the Debt-to-Income Ratio variable increased until 2014. The average GDP per capita is similar over time, with a value, for the period under analysis, of 79.9. Concerning the Unemployment, data show a slight decrease over the years, perhaps a sign of recovery from the economic crisis. In the period under analysis, the average of the Population variable is 31988.36 inhabitants. Concerning the Geographic Location of the municipalities under analysis, 20.95% belongs to the Alentejo Region, 5.74% belongs to the Algarve Region, 35.25% belongs to the Center Region, 0.73% belongs to the Azores and Madeira Islands, 6.56% belongs to the Lisbon Region and 30.78% belongs to the North Region.

Table 3 shows the correlation matrix through the Pearson coefficient, and the variance inflation factor (VIF). It analyzed the possible existence of linear relationships among dependent, independent, and control variables.

Transparency is positively correlated at 1% level with the Preelection year, Citizens' access to Internet, GDP, and Population. In addition,

Transparency is negatively correlated at 1% level with Electoral Turnout, the Election Year, the Post-Election Year and Unemployment. However, it was not possible to confirm a significant pairwise correlation at 1% level between Transparency and the following variables: Political, Ideology, Political Competition, Political Strength, Debt-to-Income Ratio and Geographic Location. Moreover, the values do not show collinearity. A collinearity problem is considered severe if a pairwise correlation coefficient is greater than 0.80 (Gujarati, 1995, p. 335). The average VIF value was 2.19, 2.18, and 2.16 for the three models, respectively (see the last column of Table 3), indicating that multicollinearity was not a problem in the regression models.³

Table 4 presents the panel data regressions for all estimators in the three proposed models. To determine whether the correct estimator was used, the Breusch-Pagan Lagrange Multiplier [LM] Test, the F-test for FE, and the Hausman Specification test were applied (Wooldridge, 2010). The Breusch-Pagan LM Test ($\chi^2_{(01)} = 243.81$, $\text{Prob} > \chi^2 = 0.0000$; $\chi^2_{(01)} = 244.86$, $\text{Prob} > \chi^2 = 0.0000$; $\chi^2_{(01)} = 243.95$, $\text{Prob} > \chi^2 = 0.0000$; respectively) confirmed that the RE estimation was more appropriate than the pooled OLS estimation for the three models. The F-test showed that the FE estimation was more appropriate than the POLS estimation for the three models ($F_{(277, 809)} = 3.87$, $\text{Prob} > F = 0.0000$; $F_{(277, 809)} = 3.88$, $\text{Prob} > F = 0.0000$; $F_{(277, 808)} = 3.87$, $\text{Prob} > F = 0.0000$; respectively). To identify the most appropriate estimation (FE or RE), the absence of correlation between the individual effects and the independent variables was checked by using the Hausman test. The RE estimation was the most suitable for the three models ($\chi^2_{10} = 2.05$, $\text{Prob} > \chi^2 = 0.9960$; $\chi^2_{10} = 1.55$, $\text{Prob} > \chi^2 = 0.9988$; $\chi^2_{11} = 1.40$, $\text{Prob} > \chi^2 = 0.9997$; respectively).

One possible bias, which could distort the reliability of results, is represented by endogeneity occurring when the explanatory variables are correlated with the error term. So, electoral turnout, Proximity of Elections, Political Competition, Political Strength, Citizens' access to Internet and Population can be influenced by the unobserved individual-level random effect and should be considered as endogenous variables.

Table 3. Pearson correlation matrix.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	Mod 1	Mod 2	Mod 3	VIF
1. Transparency	1																		1.14	1.14	1.14	
2. Political Ideology	0.03	1																	2.54	2.43	2.57	
3. Electoral Turnout	-0.23***	-0.04	1																1.49	1.49	1.49	
Proximity of Elections:																						
4. PreElection	0.41***	0.01	-0.07	1															2.28	2.28	2.28	
5. Election	-0.27***	-0.06	0.21***	-0.33***	1														1.68	1.68	1.68	
6. PostElection	-0.24***	0.02	-0.08***	-0.33***	-0.33***	1													1.13	1.13	1.33	
7. Political Competition	-0.02	-0.05	-0.06	-0.04	0.10***	-0.03	1												4.85	4.87	4.87	
8. Political Strength	-0.05	-0.11***	0.17***	-0.03	0.10***	-0.03	0.38***	1											1.50	1.49	1.50	
9. Citizens' access to Inter.	0.28***	0.14***	-0.63***	0.16***	-0.26***	-0.05	-0.10***	-0.24***	1										2.39	2.41	2.43	
Geographic Location:																						
10. Algarve	0.02	0.01	-0.11***	-0.01	0.00	0.00	-0.06	-0.08	0.27***	1									1.09	1.09	1.09	
11. Center	0.01	-0.11***	-0.05	0.00	0.00	0.00	0.04	0.07	-0.17***	-0.18***	1								1.86	1.87	1.89	
12. Islands	-0.02	-0.02	-0.09***	0.00	0.00	0.00	0.13***	0.04	0.05	-0.02	-0.06	1							2.77	2.77	2.80	
13. Lisbon	0.03	0.12***	-0.46***	0.00	0.00	0.00	-0.03	-0.08	0.44***	-0.07	-0.20***	-0.02	1						1.25	1.22	1.25	
14. North	0.03	-0.17***	0.16***	0.00	0.00	0.00	-0.07	0.07	-0.23***	-0.17***	-0.49***	-0.06	-0.18***	1					4.03	4.04	4.04	
15. Debt to Income Ratio	0.02	0.04	-0.03	-0.03	-0.20***	0.18***	-0.19***	-0.08	0.11***	0.01	0	-0.04	-0.07	0.09***	1				1.59	1.59	1.60	
16. GDP	0.18***	0.07	-0.57***	-0.01	0.01	0.01	-0.05	-0.18***	0.77***	0.07	-0.10***	0	0.39***	-0.20***	0.07	1			3.39	3.35	3.39	
17. Unemployment	-0.18***	0.06	0.21***	-0.16***	0.27***	0.05	-0.01	0.06	-0.13***	-0.01	-0.36***	-0.03	-0.07	0.40***	0.22***	-0.09***	1		2.19	2.18	2.16	
18. Population	0.22***	-0.02	-0.63***	-0.01	0.01	0.00	-0.11***	-0.17***	0.61***	0.01	-0.09***	-0.04	0.43***	0.12***	0.05	0.70***	0.02	1				
Mean VIF																			2.19	2.18	2.16	

The logarithm transformation is used for Population variable.
 *** 1% significance.

Table 4. Panel regression model.

Hypothesis	Model 1					Model 2					Model 3				
	POLS	FE	RE	HT	HT Robust ^a	POLS	FE	RE	HT	HT Robust ^a	POLS	FE	RE	HT	HT Robust ^a
Political Ideology	0.0135 (0.0095)	0.0389** (0.0185)	0.0181 (0.0119)	0.0218* (0.0132)	0.0218*** (0.0065)	0.0136 (0.0095)	0.0390** (0.0185)	0.0183 (0.0119)	0.0237* (0.0135)	0.0237*** (0.0072)	0.0139 (0.0095)	0.0391** (0.0185)	0.0185 (0.0119)	0.0219* (0.0131)	0.0219*** (0.0071)
H1 (+)	-0.0011 (0.0008)	-0.0009 (0.0025)	-0.0009 (0.0011)	-0.0008 (0.0022)	-0.0008*** (0)	-0.0013* (0.0008)	-0.0012 (0.0024)	-0.0011 (0.0001)	-0.0009 (0.0021)	-0.0009*** (0.0003)	-0.0012 (0.0008)	-0.001 (0.0025)	-0.001 (0.0011)	-0.0008 (0.0022)	-0.0008*** (0.0001)
Electoral Turnout															
H2 (-)															
Proximity of Elections:															
H3 (+)															
PreElection	0.0815*** (0.0123)	0.0823*** (0.0096)	0.0812*** (0.0095)	0.0810*** (0.009)	0.0810*** (0.0069)	0.0814*** (0.0123)	0.0821*** (0.0095)	0.0811*** (0.0095)	0.0810*** (0.0089)	0.0810*** (0.0067)	0.0815*** (0.0123)	0.0822*** (0.0096)	0.0812*** (0.0095)	0.0810*** (0.009)	0.0810*** (0.0069)
Election	-0.0915*** (0.0152)	-0.0669** (0.0285)	-0.0852*** (0.0152)	-0.0680*** (0.0215)	-0.0680*** (0.0093)	-0.0905*** (0.0152)	-0.0661** (0.0282)	-0.0846*** (0.0152)	-0.0675*** (0.0212)	-0.0675*** (0.0073)	-0.0912*** (0.0152)	-0.0674** (0.0285)	-0.0850*** (0.0152)	-0.0687*** (0.0216)	-0.0687*** (0.0091)
PostElection	-0.0990*** (0.0131)	-0.0927*** (0.0149)	-0.0957*** (0.0111)	-0.0876*** (0.0126)	-0.0876*** (0.0069)	-0.0987*** (0.0131)	-0.0921*** (0.0149)	-0.0954*** (0.0111)	-0.0875*** (0.0124)	-0.0875*** (0.0067)	-0.0987*** (0.0131)	-0.0924*** (0.015)	-0.0954*** (0.0111)	-0.0874*** (0.0126)	-0.0874*** (0.0072)
Political Competition	0.0004 (0.0003)	0.0003 (0.0005)	0.0003 (0.0004)	0.0003 (0.0005)	0.0003 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0003 (0.0004)	0.0002 (0.0005)	0.0002 (0.0004)	0.0002 (0.0005)	0.0002 (0.0004)
H4 (+)															
Political Strength															
H5 (-)															
Citizens' access to Internet	0.1503 (0.1378)	0.5365 (0.3309)	0.2101 (0.1797)	0.4351 (0.3093)	0.4351*** (0.0333)	0.1535 (0.1381)	0.5408 (0.3307)	0.2156 (0.18)	0.4499 (0.3047)	0.4499*** (0.0335)	0.1574 (0.1382)	0.5365 (0.3311)	0.2173 (0.1801)	0.4354 (0.3104)	0.4354*** (0.0402)
Geographic Location: H7 (+)															
Algerve	0.0019 (0.023)	omitted	-0.002 (0.0337)	-0.0217 (0.0547)	-0.0217 (0.0245)	-0.0011 (0.0229)	omitted	-0.0045 (0.0337)	-0.022 (0.057)	-0.022 (0.0242)	0.0008 (0.023)	omitted	-0.0032 (0.0338)	-0.0219 (0.0543)	-0.0219 (0.0243)
Center	0.0055 (0.0141)	omitted	0.0113 (0.0207)	0.0024 (0.0527)	0.0024 (0.0142)	0.003 (0.0142)	omitted	0.009 (0.0207)	0.0037 (0.053)	0.0037 (0.0175)	0.0041 (0.0143)	omitted	0.0097 (0.0208)	0.0009 (0.0527)	0.0009 (0.0149)
Islands	-0.0549 (0.0536)	omitted	-0.0515 (0.08)	-0.0652 (0.1064)	-0.0652*** (0.0016)	-0.0536 (0.0535)	omitted	-0.0511 (0.08)	-0.0627 (0.1146)	-0.0627*** (0.004)	-0.0564 (0.0537)	omitted	-0.0528 (0.0801)	-0.0648 (0.1046)	-0.0648*** (0.0017)
Lisbon	-0.0694*** (0.0241)	omitted	-0.0650* (0.0357)	-0.0804 (0.0959)	-0.0804** (0.0373)	-0.0735*** (0.0241)	omitted	-0.0689* (0.0357)	-0.0783 (0.0968)	-0.0783 (0.0432)	-0.0715*** (0.0242)	omitted	-0.0674* (0.0358)	-0.082 (0.0958)	-0.0820** (0.0383)
North	0.0235 (0.0157)	omitted	0.0256 (0.0231)	0.0178 (0.0793)	0.0178 (0.0149)	0.0209 (0.0158)	omitted	0.0232 (0.0231)	0.0195 (0.0787)	0.0195 (0.0216)	0.0222 (0.0158)	omitted	0.024 (0.0232)	0.0162 (0.0794)	0.0162 (0.0151)
Debt to Income Ratio	0 (0.0001)	0.0004* (0.0002)	0.0001 (0.0001)	0.0002 (0.0001)	0.0002*** (0)	0 (0.0001)	0.0003 (0.0002)	0.0001 (0.0001)	0.0002 (0.0001)	0.0002*** (0)	0 (0.0001)	0.0004 (0.0002)	0.0001 (0.0001)	0.0001 (0.0001)	0.0001*** (0)
GDP	0.0003 (0.0006)	-0.0021 (0.0037)	0.0002 (0.0009)	-0.0013 (0.0034)	-0.0013 (0.0012)	0.0003 (0.0006)	-0.0019 (0.0037)	0.0002 (0.0009)	-0.0011 (0.0033)	-0.0011 (0.0014)	0.0003 (0.0006)	-0.002 (0.0037)	0.0002 (0.0009)	-0.0012 (0.0034)	-0.0012 (0.0011)
Unemployment	-0.0061*** (0.0024)	0.0001 (0.0076)	-0.0061* (0.0033)	-0.0075* (0.0042)	-0.0075*** (0.0004)	-0.0060*** (0.0024)	0.0001 (0.0076)	-0.0061* (0.0033)	-0.0072* (0.0043)	-0.0072*** (0.0006)	-0.0061** (0.0024)	-0.0002 (0.0076)	-0.0061* (0.0033)	-0.0077*** (0.0042)	-0.0077*** (0.0004)
Population	0.0270*** (0.0075)	-0.0667 (0.6204)	0.0248** (0.0109)	0.0308 (0.069)	0.0308** (0.0151)	0.0265*** (0.0074)	-0.0928 (0.6136)	0.0245** (0.0109)	0.027 (0.0673)	0.027 (0.0222)	0.0271*** (0.0075)	-0.0608 (0.6207)	0.0250** (0.011)	0.0316 (0.0692)	0.0316** (0.0139)
(Constant)	0.2235** (0.0954)	1.1662 (6.1481)	0.2230* (0.1321)	0.2446 (0.4391)	0.2446*** (0.0471)	0.2296*** (0.0928)	1.4152 (6.0812)	0.2321* (0.1295)	0.2614 (0.4259)	0.2614** (0.1245)	0.2209** (0.0955)	1.0982 (6.1518)	0.2185* (0.1323)	0.2267 (0.4409)	0.2267*** (0.0472)
Observations	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098
R ² (overall)/rho	28.96	5.06	28.87	60.69	60.69	28.95	2.24	28.87	65.92	65.92	29.00	6.05	28.91	59.40	59.40
F	27.54***	51.14***	599.06 ***	638.11 ***	26.94***	27.53***	51.18***	600.05***	655.07***	655.07***	25.94***	46.87***	599.83***	634.49***	23.05***
Wald χ^2															

We used the index of transparency on a scale of 0–1. The logarithm transformation is used for Population variable. Figures in parentheses are standard errors. a. Robust standard errors and standard errors adjusted for 2 clusters in Capital. *** 1% significance, ** 5% significance, * 10% significance.

Possible causes of endogeneity can be misspecification (autocorrelation and heteroskedasticity) and simultaneity bias. To address these issues, a Hausman-Taylor instrumental variable (IV) estimator was applied (Hausman & Taylor, 1981). The Hausman test was also implemented to test the validity of the HT estimator and the quality of instruments used in the model. The test failed to reject the null hypothesis ($\chi^2_{16} = 3.15$, $\text{Prob} > \chi^2 = 0.9998$; $\chi^2_{16} = 3.36$, $\text{Prob} > \chi^2 = 0.9996$; $\chi^2_{17} = 3.05$, $\text{Prob} > \chi^2 = 0.9999$; respectively), then the HT estimator is consistent and efficient comparing to the RE estimator for the three models. For the models to be more robust, the standard errors were estimated using a cluster at the *Capital* level (Robust HT estimator). The purpose was to cluster groups of objectively homogeneous municipalities that have similar characteristics. The *Capital* variable represents those municipalities that are capitals of the administrative division called district (see Table 4).

The results are similar for the three proposed models. However, since Model 3 includes all the variables selected to test the hypotheses proposed in the theoretical framework, the results obtained in Model 3 will be discussed. The final results (see column 16 of Table 4) show that the variable *Political Ideology* is positively correlated with Transparency at 1% level ($\beta_1 = 0.0219$). In the Portuguese case, it seems that left-wing governments show greater receptivity to information disclosure through municipalities' websites than right-wing parties. Changes in the FOI laws and active information disclosure are perhaps a sign that left-wing governments are more favorable to increase transparency. Therefore, in line with the Theory of Legitimacy argument, governments will use transparency and information disclosure through websites to enhance their legitimacy (Cárcaba-García & García-García, 2010). Municipalities governed by left-wing parties seem to be more transparent than municipalities ruled by right-wing parties. The results are consistent with previous works (Albalade Del Sol, 2013; Caamaño-Alegre et al., 2013; Guillamón et al., 2011), which identified a positive relationship with the index of Transparency in municipalities governed by left-wing parties. This result supports hypothesis H1.

Regarding the variable *Electoral Turnout*, it is significant at the 1% level, and it is negatively associated with the dependent variable ($\beta_2 = -0.0008$). Low Electoral Turnout is a sign of lower trust in the municipal government. It is reasonable to assume that municipalities will provide more relevant information about their activities and management through websites, in order to increase citizen involvement and trust. According to the Agency Theory, this reduces information asymmetry and contributes to increase citizens' confidence and public trust in political players (Guillamón et al., 2011; Laswad et al., 2005). Similarly, the Legitimacy Theory points out that increasing transparency will regain the confidence of citizens and change their perceptions of how public organizations function (Albalade Del Sol, 2013; Araujo & Tejedo-Romero, 2016). These results are consistent with previous works by Fung (2013), and Araujo and Tejedo-Romero (2016). Thus, this result supports hypothesis H2.

Regarding the influence of the *Proximity of Elections* variable upon Transparency, the results showed that the Preelection years were positively correlated with Transparency at 1% level ($\beta_3 = 0.0810$). This suggests that municipalities tend to be more transparent in the year before elections, to show their competence in managing the resources. Similarly, it could be a sign that politicians have acted according to their responsibilities, in order to influence voters' decisions. The increase of information disclosure through websites and transparency is a way to enhance legitimacy toward citizens. The results showed that the Election and Post-election years were negatively correlated with Transparency at 1% level ($\beta_4 = -0.0687$; $\beta_5 = -0.0874$, respectively). According to the political budget cycle, after elections, the pressure for municipalities to disclose information through websites tends to decrease when a new political cycle begins. These results are similar to those found by Alt and Lassen (2006) for OECD countries. Thus, it supports hypothesis H3.

According to the statistical results of the model, *Political Competition* and *Political Strength* are not relevant for the level of municipal e-government-enabled transparency. Data suggest that in the Portuguese case, the pressures

from opposition parties, political rivalry, and the presence of a majority are not strong drivers for transparency. Maybe this is a consequence of the political and electoral systems' characteristics. It seems that mayoral candidates assume a leading role in campaigns and they are at least as important as the party that supports them (Castro & Martins, 2013), which could be an interesting topic for future research. Hence, hypothesis H4 and H5 were not accepted.

It was observed that *Citizens' access to Internet* has a positive and significant relationship for a significance level of 1% ($\beta_8 = 0.4354$). This confirms that Citizens' access to Internet is an important transparency factor, as it may increase citizens' ability to access the municipality's website for information. Based on the Neo-Institutional Theory, the relationship found between these two variables could be the result of changes in the institutional context. Perhaps the overall diffusion of the Internet is increasing both citizens' access to the Internet and the information disclosure via websites. Together they are driving the demand for more information (Garrido-Rodríguez et al., 2019; Pina et al., 2010), helping to reduce the agency problem (Lane, 2005; Tejedo-Romero & de Araujo, 2018). These results are consistent with previous work of Gandía and Archidona (2008). Hypothesis H6 was accepted. The influence of *Geographic Location* on Transparency has a negative and significant effect at 1% level in two regions ($\beta_{11} = -0.0648$ and $\beta_{12} = -0.0820$; Islands and Lisbon, respectively). For the other regions, there is no significant influence on Transparency. This does not confirm H7.

Regarding the control variables, *Debt-to-Income Ratio* variable has a significant positive relationship for a significance level of 1% with Transparency ($\beta_{14} = 0.0001$). According to the Neo-Institutional Theory, the presence of public debt will favor the disclosure of public information (Caba-Pérez et al., 2014). Transparency can help improve both the credibility of public finance and the effective management of public resources (Alcaide-Muñoz et al., 2017). It can contribute to reduce information asymmetry and increase the confidence of external stakeholders (Araujo & Tejedo-Romero, 2016; Cárcaba-García & García-García, 2010). The results are consistent

with previous works by Albalate Del Sol (2013), Caba-Pérez et al. (2014), and Gandía and Archidona (2008). Unlike previous researches, there is no significant relationship between *GDP* and Transparency ($\beta_{15} = -0.0012$). A negative and significant relationship was found between *Unemployment* and Transparency at the level of 1% ($\beta_{16} = -0.0077$). It suggests that municipalities with low rates of unemployment have higher level of Transparency. Since *Unemployment* is related to the level of *GDP*, perhaps this is a way for local politicians to legitimize their political actions concerning society. This is consistent with the findings of Albalate Del Sol (2013), Caamaño-Alegre et al. (2013) and Araujo and Tejedo-Romero (2016). Finally, the findings show a positive relationship between *Population* and the level of municipal Transparency for a significance level of 5% ($\beta_{17} = -0.0316$).

Conclusions

This research provides evidence of e-government-enabled transparency by Portuguese municipalities and the drivers that influenced it. The results suggest that institutional changes introduced by ICT-based modernization and e-government increased citizens' access to online information, with a positive and relevant effect on municipal transparency. It suggests that the importance of citizens' access to Internet is a highly relevant factor for higher levels of Transparency. The overall diffusion of the Internet has contributed to increasing citizens' ability to access and browse municipalities' websites for information. Both were important tools for the dissemination of municipal information. The results are consistent with the postulates of the Legitimacy Theory, which considers that higher levels of Citizens' access to Internet compel municipalities to publish more information to legitimize their actions and increase citizens' confidence.

It seems that politicians ruling the municipalities are becoming more aware of citizens' demand for greater transparency. The findings suggest that the increase in e-government-enabled transparency is the result of a proactive approach to transparency, political characteristics, and contextual factors. After several years of a reactive model of

transparency, it seems that the construction of a Transparency index by TIAC and the political debate, which led to the passage of the 2016 FOI Law, have influenced local politicians to be more proactive in disseminating information. Together they are legitimizing municipalities' actions toward citizens (Bauhr & Grimes, 2014) and reducing the problem of agency (Laswad et al., 2005). Based on the Neo-Institutional Theory, changes in the Transparency level suggest a gradual shift toward a more 'open' culture under the public administration modernization. The effort made by municipalities to make information available to citizens on their websites can contribute to the openness and good governance of municipalities. The results show the contributions provided by the Agency, Legitimacy and Neo-Institutional Theories toward understanding transparency in a unitary and centralized state.

It was observed that *Ideology* and *Electoral Turnout* have a significant effect on the level of e-government-enabled transparency. Municipalities ruled by left-wing parties showed higher levels of Transparency than those ruled by right-wing parties. It is worth stressing that, in Portugal, left-wing parties seem more receptive to transparency issues than right-wing parties. According to the Legitimacy theory, this suggests that municipalities governed by left-wing parties are more likely to use transparency to reinforce the legitimacy of their decisions. (Cárcaba-García & García-García, 2010). However, right-wing municipalities have increased transparency over the years observed. Together, left-wing and right-wing municipalities seem to contribute to increasing overall transparency. On one hand, in municipalities where electoral turnout was lower, there was more information disclosure through municipalities' websites. Perhaps this was a way of gaining voter sympathy for the forthcoming municipal elections. Increasing the information available to citizens through municipal websites can increase public trust (Araujo & Tejedo-Romero, 2016), reduce information asymmetry and agency conflicts (Laswad et al., 2005) and increase municipalities' legitimacy (Roberts, 2006). On the other hand, the institutional context resulting from the crisis and the recovery process may influence electoral turnout in Portugal. Furthermore, the inclusion of *Proximity of Elections* related effects shows that pre-electoral manipulation of information can

influence the levels of Transparency in order to increase the reelection chances of the ruling party (Vicente et al., 2013). Data show that in pre-electoral years, municipalities have higher levels of Transparency, and after election years, there is a decrease in transparency levels. However, *Political Competition* and *Political Strength* have no significant effect in e-government-enabled transparency. The political and electoral system's characteristics, and the role of mayoral candidates in campaigns seem to reduce the weight of political rivalry and the presence of a majority as drivers for Transparency. The model also included control variables that previous research had deemed as drivers associated with e-government-enabled transparency. In the Portuguese case, the significant variables are the Debt, Unemployment, and Population.

The results contribute toward extending the existing research, which is mainly based on panel data analysis that do not consider the endogeneity problem. This research not only provides an important contribution to the literature of transparency but also gains additional relevance, linking e-government-enabled transparency to political and contextual factors.

They can help policy-makers, both national and local actors, with directions for actions to improve municipalities' information disclosure through websites and empower stakeholders in monitoring local government activities. Since Internet access is an influential factor for transparency, actions should be implemented to improve citizens' access to the Internet, reduce the digital divide, and encourage municipalities to use the Internet and its tools to improve transparency and participation. For instance, the information and communication process could use social media, like Facebook, Twitter, and other social media. It can address different users' needs, opening interactive communication channels, and improve citizens' monitoring of local government activities.

There are several limitations in this study. It focuses on the supply side of transparency, but transparency can also be approached from the demand side. It does not analyze how citizens perceive the information either, an issue that would increase the understanding of transparency. Future research should analyze a longer period

and use other statistical methods. Since the participation of stakeholders is an emerging topic, the analysis could include the influence of stakeholders on local governments' transparency. In this regard, the analysis should include data that go beyond the current indexes such as consider the quality and accessibility of information disclosure through municipalities' websites. Other studies could do further analysis concerning political competition, political strength, and transparency, and the moderate role of mayoral candidates in political campaigns.

Notes

1. For a complete list of OGP member countries please see: <https://www.opengovpartnership.org/our-members/>.
2. In December 2017, the Portuguese Government sent a letter to the OGP network expressing its intention to join the network. See https://www.opengovpartnership.org/sites/default/files/LOI_Portugal_December2017.pdf.
3. A rule of thumb states that there is evidence of multicollinearity if $VIF > 10$ (Hair et al., 1998).

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Notes on contributors

Francisca Tejedo-Romero, Ph.D in Accounting, University of Castilla-La Mancha, Spain. Associate Professor of Accounting, Faculty of Economics and Business Administration, University of Castilla-La Mancha, Albacete, Spain. Interests subjects: Transparency and Disclosure, Local Government, Public Management, Intellectual Capital and Social Responsibility, Corporate Governance. E-mail: Francisca.Tejedo@uclm.es

Joaquim Filipe Ferraz Esteves Araujo, Ph.D. in Public Administration, University of Exeter, UK. Full Professor of Public Administration, School of Economics and Management, University of Minho, Braga, Portugal. Interests subjects: Public Management, Public Sector Reform, Transparency, Local Government, Governance, Corporate Governance. E-mail: jfilipe@eeg.uminho.pt

ORCID

Francisca Tejedo-Romero  <http://orcid.org/0000-0002-2600-9826>

Joaquim Filipe Ferraz Esteves Araujo  <http://orcid.org/0000-0001-8531-6036>

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