economies

MDPI

Article

Does the Average Payment Period Play a Relevant Role in Explaining the Portuguese Municipalities' Financial Distress?

Paula Gomes Dos Santos and Fábio Albuquerque *

Department of Accounting and Audit, Lisbon Accounting and Business School (ISCAL), Instituto Politécnico de Lisboa, 1549-020 Lisbon, Portugal; pasantos@iscal.ipl.pt
* Correspondence: fhalbuquerque@iscal.ipl.pt

Abstract: The average payment period (APP) is an important measure to monitor public sector liquidity and commercial debt sustainability. In the European Union, the relevance of APP as an indicator to mitigate those concerns was settled by the issuance of a Directive on this topic. Then, considering the likely relationship between the APP and financial distress (FD), this paper aims to assess if the current and historical APP plays a relevant role in explaining the data for 308 Portuguese municipalities' FD. Regression analysis, including panel data and simple linear regression models, is used for the period between 2011 and 2019 (the last year available for APP). The findings show that the number of municipalities that exceed the debt limit has been reducing. Some of them comply with the 30 days threshold being, nonetheless, in a financial distress situation and subject to recovery mechanisms. By APP levels, the findings identify that the APP significantly predicts FD for those entities that do not comply with the threshold. By size, the FD seems to be better explained by historical APP within the smaller entities. Finally, the robustness test and further analyses performed indicate the likely relevance of macroeconomic factors for predicting FD using APP as an explanatory variable. This paper contributes to previous studies on the municipalities' financial condition, namely by considering the APP in the analysis of the financial situation of the municipalities. As a novelty, this study considers a new proxy for municipal FD and panel data analysis.

Keywords: average payment period; financial distress; Portuguese municipalities; over-indebtedness; panel data analysis

Citation: Dos Santos, Paula Gomes, and Fábio Albuquerque. 2023. Does the Average Payment Period Play a Relevant Role in Explaining the Portuguese Municipalities' Financial Distress? *Economies* 11: 183. https://doi.org/10.3390/economies11070183

Academic Editor: Robert Czudaj

Received: 28 May 2023
Revised: 29 June 2023
Accepted: 2 July 2023
Published: 5 July 2023

1. Introduction

Events such as the 2008 financial crisis, the COVID-19 pandemic, as well as the latest Russian invasion of Ukraine, among others, stressed the need to assess how to monitor the over-indebtedness of governments worldwide and ensure the government's financial sustainability (Bolívar et al. 2014, 2016; Navarro-Galera et al. 2016; Jorge et al. 2022; Shon and Kim 2019; Turley et al. 2015; World Bank 2022; Zafra-Gómez et al. 2009; Zhao et al. 2022).

Public sector financial sustainability has been understood as the ability to meet financial obligations, ensure the provision of public services, and not compromise future generations (CICA 2009; Controller and Auditor-General of New Zealand 2013; European Commission 2019; International Federation of Accountants 2014; Office of Auditor General of Canada 2015).

Excessive indebtedness has been pointed out as a risk factor for governments' financial health and intergenerational equity (Cabaleiro et al. 2013; João 2014). Therefore, controlling governments' debt is a key aspect, as deficit budgets and over-indebtedness can undermine a country's economic stability and its debt sustainability (CICA 2009; Navarro-Galera et al. 2016; International Public Sector Accounting Standards Board 2013; Ter-Minassian 2007).

According to the International Monetary Fund (IMF) (2013, Section I), "public debt can be regarded as sustainable when the primary balance needed to at least stabilize debt under both the baseline and realistic shock scenarios is economically and politically feasible, such

that the level of debt is consistent with an acceptably low rollover risk and with preserving potential growth at a satisfactory level". Moreover, the International Monetary Fund (IMF) (2021) stresses that, by including both solvency and liquidity, this definition is stronger than the one normally used by the academic literature, which focuses only on solvency. Therefore, any debt modeling must consider liquidity risks because solvency and liquidity risks are related (International Monetary Fund (IMF) 2013).

Public debt has been growing worldwide, reaching record levels during the pandemic (World Bank 2022). According to the Organisation for Economic Co-operation and Development (OECD) (2021), among twenty-two European Union and OECD member countries, general government debt has risen from 97% of gross domestic product (GDP) in 2019, to 115% in 2020. According to the European Commission (2023), "at the end of 2022, thirteen Member States had government debt ratios higher than 60% of GDP, with the highest registered in Greece (171.3%), Italy (144.4%), Portugal (113.9%), Spain (113.2%), France (111.6%) and Belgium (105.1%)". Not only has debt been rising, but its composition has also changed, with the increase in the indebtedness of the low- and middle-income economies to private creditors (World Bank 2022).

Regarding local governments' debt, the literature has been focusing on debt limits (e.g., Benito et al. 2015; Cabasés et al. 2007). These limits exist in most of the decentralized countries (Cabasés et al. 2007) and are mostly imposed by the central government (Lim and Hong 2012). They usually derive from the moral hazard (Ehalaiye et al. 2017), given the history of bailouts of subnational governments by the central government (Ter-Minassian 2007). According to Cabasés et al. (2007), the debt restrictions have been effective in introducing some financial discipline in the Spanish local governments. Notwithstanding, the population has a positive and significant relation to failing to comply with the debt limits (Benito et al. 2015).

In the Portuguese case, the chronic deficit and over-indebtedness problems that municipalities have experienced for decades put at risk their ability to continue to provide services (Carvalho et al. 2018; João 2014; Santos et al. 2021; Veiga 2014), highlighting the need to monitor their financial distress (FD) risks. According to local Law 73/2013 (2013), on September 3, the total municipalities' debt includes loans, leasing contracts, and any other debts to financial institutions, as well as those arising from budgetary operations, which has a limit of 1.5 times the average current revenue of the three previous years. Portuguese local municipalities that exceed the total debt limit are over-indebted and must resort to financial recovery mechanisms. Therefore, FD can be signalized through the difference between the total debt and that debt limit.

Governments manage scarce financial resources, and debt service diverts them from other functions such as health or education as it is essential that countries manage debt risks and use the resources efficiently (World Bank 2022). Therefore, the importance of a timely detection of local governments' financial vulnerabilities has reinforced the use of risk monitoring by the central government (Office of Auditor General of Canada 2015; Ter-Minassian 2007), emerging as a topic of interest in the academia (Christiaens et al. 2010; Cohen and Karatzimas 2015; Hermansen and Röhn 2015; Zafra-Gómez et al. 2009; Zhao et al. 2022).

In this regard, the average payment period (APP) is an important measure to monitor public sector liquidity and commercial debt sustainability (Olmo and Brusca 2021). Given that the more indebted entities have longer payment delays (Prašnikar et al. 2004), the APP can be an indicator of commercial debt levels (Pons 2017), as well as a key variable to control and ensure their financial sustainability (Saura 2013). Furthermore, some parallelisms between overall commercial debt and financial debt are stressed in the literature (e.g., Olmo and Brusca 2021).

In the European Union, the relevance of the APP as an indicator to mitigate the concerns of the public sector liquidity and debt sustainability was settled by the issuance of the Directive 2011/7/EU of the European Parliament and of the Council on 16 February 2011, which defines the need of entities to pay their commercial acquisitions within

30 days. Following that directive, in Spain, the Organic Law 2/2012 (2012), 27 April, defines that commercial debt is sustainable when the APP complies with the 30-day threshold. Therefore, complying with this threshold may be a proxy for identifying entities with lower indebtedness and in good financial condition (Alaminos et al. 2018; Balaguer-Coll and Ivanova-Toneva 2019). This directive was transposed by the Portuguese Decree-Law 62/2013, 10 May, with the APP methodology defined by the RMC 34/2008, 22 February (2008), and by the Administrative Decision 9870/2009, 13 April (2009).

Therefore, given Portugal's high debt (European Commission 2023), namely at the municipality level, and considering the possible use of the APP as an advanced measure for FD (e.g., Alaminos et al. 2018; Balaguer-Coll and Ivanova-Toneva 2019; Olmo and Brusca 2021; Prašnikar et al. 2004; Pons 2017; Saura 2013), this paper aims to assess if the APP plays a relevant role in explaining Portuguese municipalities' financial distress. In accordance with this, two complementary hypotheses (H) were defined for this research.

Given the previous suggestions in the literature (e.g., Alaminos et al. 2018; Balaguer-Coll and Ivanova-Toneva 2019; International Monetary Fund (IMF) 2021; Olmo and Brusca 2021), as well as policies defined by the European Union and adopted by the Member States (e.g., Directive 2011/7/EU 2011; Organic Law 2/2012 2012; Decree-Law 62/2013 2013), which associate the lower levels of APP with debt sustainability and the use of the APP as a possible advanced measure of the public sector financial situation, the first and second hypotheses (H1 and H2, respectively) are defined in a complementary way as follows:

H1. *The lower the APP for the Portuguese municipalities, the less likely they will be in FD.*

H2. *The APP can significantly predict the Portuguese municipalities' FD.*

As novelties, this paper adds to previous studies on the municipalities' financial condition (e.g., Bolívar et al. 2014, 2016; Zafra-Gómez et al. 2009) by considering the APP in the analysis of the financial situation of the municipalities (Alaminos et al. 2018; Balaguer-Coll and Ivanova-Toneva 2019; Olmo and Brusca 2021; Santos et al. 2021). Furthermore, this study considers a new proxy for municipalities' FD, based on Law 73/2013 (2013), established on September 3. Finally, it uses regression analysis, including panel data models and a more in-depth analysis by size, APP levels (those that comply or do not comply with the APP threshold), as well as the periods of the financial assistance program (FAP) and after. Furthermore, robustness tests for endogeneity issues and complementary analyses for APP are performed, which leads to stronger results in comparison to previous research in this area (e.g., Olmo and Brusca 2021; Santos et al. 2021). Therefore, this paper may significantly contribute to the literature and practice by providing insights on possible advanced indicators for assessing and predicting future municipalities' FD.

The paper is divided into four sections, including this introduction. The next section provides the material and methods underlying the analysis proposed. Section three summarizes the results of the empirical analysis, and the last section draws the main discussion and conclusions from this study, as well as its limitations and future avenues.

2. Material and Methods

To achieve its aim, this paper uses data from the 308 Portuguese municipalities from 2011 to 2019, reported on 31 December. Despite being obliged to a quarterly report, the last available APP data for those municipalities is that of the fourth quarter of 2019, which explains the inclusion of this year as the last one for this research purpose.

FD is proposed as the dependent variable of the regression models, being measured by the difference between the total debt and the debt limit, under Portuguese Law 73/2013 (2013); therefore, a municipality is considered in FD if the variable has a positive value. Otherwise, it is not in a FD situation. In turn, the APP represents the main independent variable of those models, which is based on the RMC 34/2008, 22 February (2008), and on the Administrative Decision 9870/2009 (2009).

For assessing the H1, since deficit budget and debt burden have been stressed by the literature as relating to the government's financial distress (e.g., Jorge et al. 2022; Letelier 2010; Ma and Brixi 2002), the following financial variables are included within the model for control purposes in addition to APP: balance (BAL) (the difference between the revenues and expenses) and debt service (DS) (interest and debt amortization). Furthermore, the Portuguese municipalities' inhabitants (POP) are also used for control purposes (Benito et al. 2015).

All the financial variables (FD, APP, BAL, and DS) come from the Directorate-General for Local Authorities (DGAL in the Portuguese acronym) website. The POP on December 31 of each year, in turn, is collected from PORDATA database. For a more in-depth analysis, Portuguese municipalities were classified according to their APP levels as follows:

- APP $\leq$ 30: Portuguese municipalities' levels of APP not higher than 30 days to identify those that comply with the threshold defined by the European Union Directive;
- APP > 30: Portuguese municipalities' levels of APP higher than 30 days to identify those that do not comply with the threshold defined by the European Union Directive.

The variable POP is also grouped according to the following categories of Portuguese municipalities by size, following the suggestion of the first group proposed by Carvalho et al. (2018):

- Small: Portuguese municipalities with up to 20,000 inhabitants;
- Other: Portuguese municipalities with more than 20,000 inhabitants.

The statistical procedure is mostly based on descriptive statistics and bivariate and multivariate regression analyses (panel data, and linear) using the software EViews 12.

Concerning the multivariate panel data regression analysis, two baseline models (M) are performed to assess the capability of the APP to explain the FD underlying H1, as follows:

- M1 includes all the independent variables, i.e., the main explanatory one (APP) and those used for control purposes (BAL, DS, and POP);
- M2, for comparison purposes, only includes the control variables (BAL, DS, and POP).

M1 and M2 are summarized in the following equations, respectively:

$$FD_{it} = \beta_0 + \beta_1 APP_{it} + \beta_2 BAL_{it} + \beta_3 DS_{it} + \beta_4 POP_{it} + e_{it} \quad (1)$$

$$FD_{it} = \beta_0 + \beta_2 BAL_{it} + \beta_3 DS_{it} + \beta_4 POP_{it} + e_{it} \quad (2)$$

where "i" indicates each one of the 308 municipalities and "t" each year from 2011 to 2019.

As "t" represents different periods for the same unit (the municipality), the unobserved effect is often interpreted as capturing characteristics of a municipality that can be viewed as being (roughly) constant over the period in question (Wooldridge 2010). Additionally, the sample exhausts the population whereby the corresponding variable is fixed (Green and Tukey 1960). Therefore, the generalized least squares fixed-effects model is appropriate (Wooldridge 2010).

Previously, the Pearson correlation between the independent variables was performed, which provided no figures higher than 0.7 and, therefore, no correlation issues were found. Additionally, a multicollinearity diagnosis test was performed through the variance inflation factor (VIF), which revealed figures below 5 for all cases, leading to the conclusion of no multicollinearity issues. Those figures are aligned, for instance, with the suggestions by Yoo et al. (2014), who indicate a threshold for collinearity analysis and a VIF lower than 10.

For a more in-depth analysis, H1 is also assessed by the subgroups of Portuguese municipalities that either comply or do not comply with the APP threshold, by size, as well as with a breakdown of two periods. Those periods are based on the years for which Portugal was subject to an FAP, namely between 2011 and 2014 (first period) and after (second period).

For assessing the H2, historical data regarding APP (from 2011 to 2018) are used as independent variables to predict the current figures for FD (for 2019) through linear regression models. POP is again included for control purposes. Besides also providing the by-size classification, the analysis also considers two distinct periods for Portuguese municipalities' APP as robustness tests, as follows:

- From 2011 to 2015, with historical APP figures from 2011 to 2014 (as independent variables), using 2015 as the current year for FD (the dependent one);
- From 2015 to 2019, with historical APP figures from 2015 to 2018 (as independent variables), using 2019 as the current year for FD (the dependent one).

Those periods were selected considering that, between 2011 and 2014, Portugal was subject to an FAP, which defined specific financial sustainability objectives. Then, the general model for H2 is summarized in the following equation:

$$FD_i = \beta_0 + \beta_1 APP_{it-1} + \cdots + \beta_n APP_{it-n} + \beta_{n+1} POP_i + e_i \quad (3)$$

where "i" indicates each one of the 308 municipalities, "t" each year from 2011 to 2019, and "n" a given number between 2 and 9.

Once again, before providing the results, collinearity and multicollinearity tests are performed, which imposes the exclusion of some historical data for APP from the proposed time series whenever the correlation and VIF are higher than 0.9 and 7.0 (for precautionary purposes), respectively.

Furthermore, the Durbin–Watson test is used to confirm the absence of independent errors, with no evidence of autocorrelation (values close to 2.0). The overall significance is tested, in turn, by the F test (analysis of variance (ANOVA)), which allowed verifying what the model can be applied to in order to perform statistical inference.

Finally, a robustness test is performed using a two-stage least squares (2SLS) regression analysis to test possible endogeneity issues for APP, and further analyses include a breakdown of the instrumental variables proposed, based on the literature on this theme.

The next section presents the findings from this research.

3. Results

3.1. Descriptive Statistics

Figure 1 shows the Portuguese municipalities' APP (from 2011 to 2019), on average, for the total and by size.

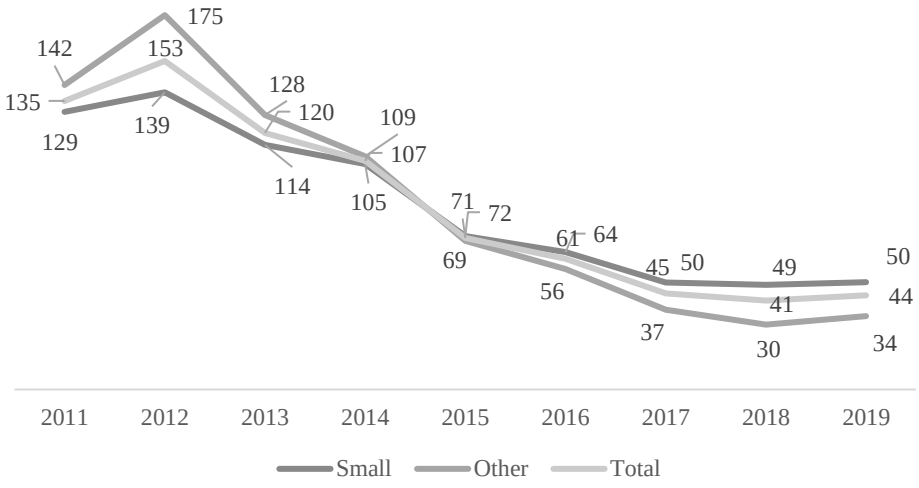

Figure 1. Portuguese municipalities' APP (from 2011 to 2019), on average, for the total and by size.

From the data in Figure 1, a significant decrease in the APP levels, either for the total or by size, is observed since 2012. Only from 2018 to 2019 did the APP increase again, as it

had from 2011 to 2012, albeit slightly. Furthermore, a major decrease is observed for the total and by size from 2012 to 2013 and from 2014 to 2015, where the APP levels reduced within more than 50 and 30 days, respectively, in some cases. It is worthwhile to stress that this period covers the FAP in Portugal. Finally, the reduction observed for the APP levels throughout the period is particularly higher for other municipalities (larger ones).

To understand, however, the number of Portuguese municipalities that comply or do not comply with the APP threshold throughout the period, Table 1 provides the percentage for each case with a breakdown by size.

Table 1. Percentage of the Portuguese municipalities by APP threshold (from 2011 to 2019), with a breakdown by size.

	2011	2012	2013	2014	2015	2016	2017	2018	2019
APP $\leq$ 30	20%	25%	33%	46%	60%	61%	64%	65%	63%
Small	14%	18%	21%	28%	37%	37%	37%	37%	36%
Other	6%	7%	12%	19%	23%	24%	27%	27%	27%
APP > 30	80%	75%	67%	54%	40%	39%	36%	35%	37%
Small	45%	42%	39%	32%	23%	23%	24%	23%	25%
Other	35%	33%	28%	22%	17%	16%	13%	12%	12%

Table 1 indicates a significant change between the subgroups proposed from 2011 to 2019, with those complying with the APP threshold shifting from 20% to more than 60% throughout this period. By size, the number of Portuguese municipalities has been increasing in both cases (smaller and larger ones) within those that comply with the established threshold (with about 20 percentage points in both cases as well).

Figure 2, in turn, provides data regarding FD, on average, for the total and by the APP threshold, namely for those municipalities that comply, or do not comply, with the APP threshold. The same period shown in Figure 1 is provided.

Figure 2 indicates, again, a trend for reducing FD either for the total or by the APP threshold. From 2011 to 2012, data remained stable or presented a slight growth. Moreover, the figures indicate that the highest decrease in FD throughout the period can be found for those that comply with the APP threshold. Despite changes throughout the period between those groups (that comply or do not comply with the APP threshold), this can indicate that the lower the Portuguese municipalities' APP levels, the lower their FD levels.

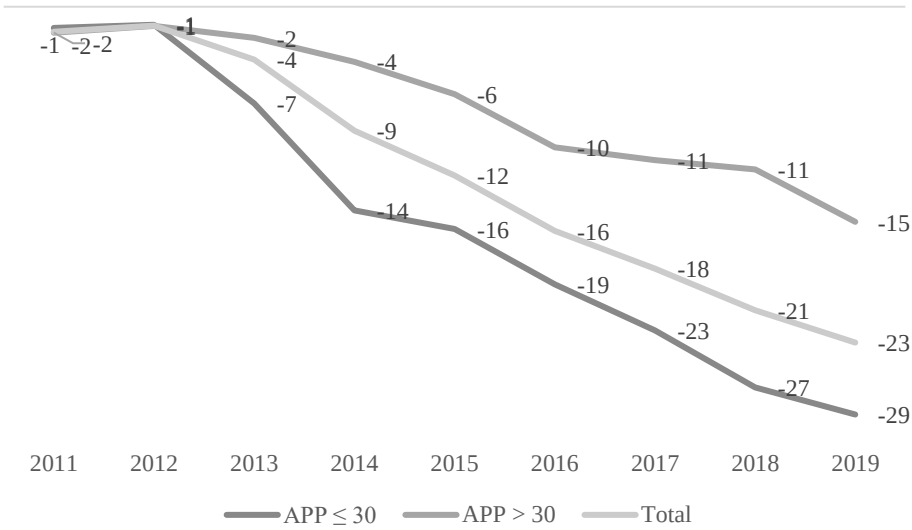

Figure 2. Portuguese municipalities' FD (from 2011 to 2019), on average, for the total and by APP threshold (in 10^6 euros).

Finally, data from Figure 3 intend to complement the previous analysis with a breakdown by size of the Portuguese municipalities' FD, on average (from 2011 to 2019).

The data in Figure 3 indicate a more significant decrease in FD over this period for other municipalities (larger ones), similarly to what was observed for those that comply with the APP threshold. The highest reduction can be seen from 2014 onward, which matches with the FAP period in Portugal, with the slightest decrease observed for the latest years (from 2017 to 2019). This is particularly evident for larger municipalities since the smaller ones present smoother changes throughout the period.

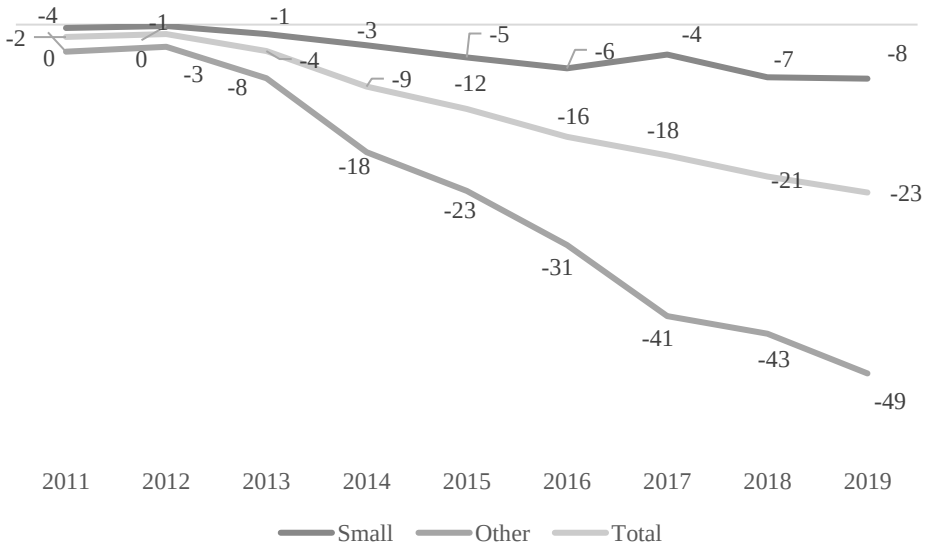

Figure 3. Portuguese municipalities' FD (from 2011 to 2019), on average, for the total and by size (in 10^6 euros).

From the data provided above, there is an indication that a higher decrease in FD can be observed for those municipalities that are larger and that comply with the APP threshold. Considering this, Table 2 provides data regarding FD by the APP threshold with an additional breakdown by size.

Table 2. Descriptive statistics data for the Portuguese municipalities' FD by the APP threshold with a breakdown by size (in 10^6 Euros).

FD	2011	2012	2013	2014	2015	2016	2017	2018	2019
APP $\leq$ 30	−1	−1	−7	−14	−16	−19	−23	−27	−29
Small	−1	0	−3	−5	−6	−7	−5	−8	−9
Other	−3	−4	−14	−29	−30	−38	−47	−52	−55
APP > 30	−2	−1	−2	−4	−6	−10	−11	−11	−15
Small	0	0	−1	−1	−2	−4	−3	−6	−6
Other	−4	−3	−4	−8	−12	−18	−25	−22	−35

Based on the figures in Table 2, the highest decrease in FD throughout the period can be observed for municipalities that simultaneously present those characteristics (larger ones and that comply with the APP threshold).

Table 3, in turn, provides data on the percentage of Portuguese municipalities in FD, with a breakdown of the APP threshold.

Data from Table 3 show that, for the last two years, the number of municipalities in FD has been reducing, with only less than 10% of cases. Notwithstanding, there is a trend of decreasing municipalities that are in FD within those that do not comply with the APP

threshold (5% in 2019). The higher changes between the subgroups that comply and do not comply with the APP threshold can be seen, however, within the municipalities that are not in FD, where it is observed that the majority have been complying with the 30-day limit since 2015 (after the FAP). Therefore, 60% of Portuguese municipalities that are not in FD also complied with the APP threshold in 2019, conversely to what was observed in 2011, where only 18% were in this circumstance. This is aligned with the previous evidence of the highest decrease in the figures for FD average levels throughout the period for those Portuguese municipalities that comply with the APP threshold.

Table 3. Percentage of the Portuguese municipalities in FD (from 2011 to 2019), with a breakdown of the APP threshold.

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
In FD	14%	12%	25%	21%	15%	10%	13%	8%	7%
APP $\leq$ 30	2%	2%	3%	4%	4%	2%	6%	3%	3%
APP > 30	12%	9%	22%	17%	11%	8%	6%	5%	5%
Not in FD	86%	88%	75%	79%	85%	90%	87%	92%	93%
APP $\leq$ 30	18%	23%	30%	42%	56%	59%	57%	62%	60%
APP > 30	68%	66%	45%	37%	29%	31%	30%	30%	33%

Nonetheless, comparing data from Table 1 with those provided in Table 3, it should be stressed the most significant changes in the number of Portuguese municipalities that comply or do not comply with the APP threshold throughout the period, in comparison to that observed for those that are or are not in FD. More specifically, while only 20% of the Portuguese municipalities complied with that threshold in 2011, these figures changed to 63% in 2019. In turn, the Portuguese municipalities in FD changed from 14%, in 2011, to 7% in 2019. Despite being an important change, it only represents seven percentage points, which is significantly lower than the reclassification between those that comply and that do not comply with the APP threshold (more than 40 percentage points).

Thus, to sum up, the figures above indicate that changes between the subgroups of Portuguese municipalities that either comply or do not comply with the threshold may impact the FD levels, but it only has a slight impact on reclassifications between those that are or are not in a FD situation.

Table 4 presents, in turn, data on the percentage of Portuguese municipalities in FD, with a breakdown by size.

Table 4. Percentage of the Portuguese municipalities in FD (from 2011 to 2019), with a breakdown by size.

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
In FD	14%	12%	25%	21%	15%	10%	13%	8%	7%
Small	9%	8%	13%	12%	8%	6%	9%	5%	5%
Other	5%	3%	11%	9%	7%	5%	4%	3%	3%
Not in FD	86%	88%	75%	79%	85%	90%	87%	92%	93%
Small	50%	51%	46%	48%	52%	55%	51%	56%	57%
Other	37%	37%	29%	31%	33%	35%	36%	37%	36%

By size, the figures in Table 4 show that, conversely to the assessment by the APP threshold, there are no significant changes of patterns, throughout the period, between the smaller and larger Portuguese municipalities that are, or are not, in FD. In this latter group, where most of them are included (93% in 2019), the smaller ones can be stressed as

the most representative (57% in 2019), while about one-third of Portuguese municipalities in this situation are classified as larger (36% in 2019).

Moreover, comparing the first with the last period of data availability (2011 versus 2019), and even considering reclassifications by size throughout this period (about 3 percentage points), the smaller are those that likely present the higher increase in this group of Portuguese municipalities that are not in FD since it changed 7 percentage points between those years. Then, these data also indicate that the evolution in the number of larger municipalities that are not in FD do not follow the significant decrease in the figures for FD average levels previously observed for this group throughout the period.

With regard to this, Table 5 shows the descriptive statistics data for the total municipalities.

Table 5. Descriptive statistics for the total Portuguese municipalities.

	APP (in Days)	**FD (in 10^6 Euros)**	**Bal (in 10^6 Euros)**	**DS (in 10^6 Euros)**	**POP (in 10^3)**
Total (N = 2772)					
Mean	86	−12	3	3	34
Median	32	−5	1	1	14
Std. Deviation	178	34	12	9	55
Min.	0	−680	−6	0	0.4
Max.	3411	137	371	360	558

The data in Table 5 identify a high range for the Portuguese municipalities' APP, which can reach nine years (3411 days). Furthermore, it shows that the average FD for the total cases is negative, i.e., the total debt does not exceed the debt limit. There is also a high level of standard deviation in all cases.

Table 6 presents, in turn, similar descriptive statistics data by the APP threshold.

Table 6. Descriptive statistics for Portuguese municipalities by the APP threshold.

	APP (in Days)	**FD (in 10^6 Euros)**	**BAL (in 10^6 Euros)**	**DS (in 10^6 Euros)**	**POP (in 10^3)**
APP $\leq$ 30 (N = 1346)					
Mean	13	−18	5	2	35
Median	13	−9	2	1	12
Std. Deviation	8	41	16	6	60
Min.	0	−680	−6	0	0.4
Max.	30	55	371	117	558
APP > 30 (N = 1426)					
Mean	155	−6	1	3	33
Median	88	−2	0	1	15
Std. Deviation	227	23	4	11	50
Min.	31	−232	−3	0	2
Max.	3411	137	75	360	537

The data in Table 6 identify that those which comply with the APP threshold have 13 days, on average and median terms, to pay their suppliers, while the opposite group presents more than 150 days (with a median of 88 days) to conduct their payments, having a standard deviation that is higher than 200 days. Furthermore, it shows that the average and

median FD is negative either for Portuguese municipalities that comply or do not with the APP threshold, but it is lower for the first group. Nonetheless, the FD standard deviation is higher for those that comply with the threshold, which also has a higher data range. Finally, there are no expressive differences for the remaining variables, on average and median terms, between Portuguese municipalities that comply or do not with the APP threshold. An exception should be highlighted for the variable BAL, which presents significantly lower levels for those statistics within the subgroup of Portuguese municipalities that do not comply with that threshold.

Finally, Table 7 provides descriptive statistics data by size.

Table 7. Descriptive statistics for Portuguese municipalities by size.

	APP (in Days)	**FD (in 10^6 Euros)**	**BAL (in 10^6 Euros)**	**DS (in 10^6 Euros)**	**POP (in 10^3)**
Small (N = 1663)					
Mean	85	−4	1	1	9
Median	32	−4	0	1	7
Std. Deviation	179	8	1	2	5
Min.	0	−29	−3	0	0.4
Max.	3411	137	13	29	20
Other (N = 1109)					
Mean	87	−24	6	5	71
Median	32	−11	2	3	47
Std. Deviation	176	50	18	14	72
Min.	0	−680	−6	0	20
Max.	3347	130	371	360	558

By size, the data in Table 7 show no relevant differences with regard to the APP, with an average and a median close to 90 and 30 days, respectively, for smaller and larger Portuguese municipalities. For FD, only the maximum value is close between these groups. On the other hand, the mean and median values for FD are significantly lower within the larger ones, while the opposite can be seen for the remaining variables (BAL, DS, and POP). Finally, the standard deviation is also higher in this subgroup of Portuguese municipalities for all variables assessed other than APP. For the variable BAL, it is interesting to notice that the mean and median have similar values between the larger and those Portuguese municipalities that comply with the APP threshold, as well as between the smaller and those that comply with it.

3.2. Bivariate and Multivariate Regression Analysis

Table 8 presents the data from the Pearson correlation between the dependent variable (FD) and the independent ones (APP, BAL, DS, and POP), for total cases, by APP threshold and by size.

The figures in Table 8 identify that all the variables have a statistically significant correlation with the FD but at reduced levels (lower than 0.7). Two exceptions should be made, however. The first relates to the variable APP within the Portuguese municipalities that comply with the threshold, for which no correlation with the FD was found at all. The second, on the other hand, is applied for BAL and POP, which had high or moderate levels of correlations (close or higher than 0.7) in some cases, particularly within those Portuguese municipalities that comply with the threshold and larger ones, which are also reflected within the total cases.

Table 8. Pearson correlation between the dependent variable (FD) and the independent ones (APP, CB, BAL, and POP), for total cases, by APP threshold, and by size.

	APP	BAL	DS	POP
Total (N = 2772)	0.185 **	−0.754 **	−0.255 **	−0.652 **
By APP threshold				
APP ≤ 30 (N = 1346)	0.049	−0.815 **	−0.453 **	−0.761 **
APP > 30 (N = 1426)	0.234 **	−0.519 **	−0.195 **	−0.493 **
By size				
Size Small (N = 1663)	0.251 **	−0.252 **	0.302 **	−0.133 **
Size Other (N = 1109)	0.253 **	−0.752 **	−0.219 **	−0.630 **

** The correlation is significant at the 0.01 level (2-tailed).

As stated before, correlation analysis and the VIF indicate no collinearity or multicollinearity issues, respectively, between the independent variables proposed, which justifies their inclusion in the regression models proposed.

Then, Table 9 presents the results of the two regressions proposed as baseline models (M1 and M2) for H1.

Table 9. Results of the regression models for Portuguese municipalities (H1).

Independent Variables	M1 (APP, BAL, DS, and POP)	M2 (BAL, DS, and POP)
APP	*** 18,385.05	
BAL	*** −1.503	*** −1.519
DS	*** 0.533	*** 0.555
POP	*** −266.837	*** −268.190
(Constant)	** −1,160,515	462,734.7
Adjusted R^2	0.691	0.682
F-statistic	0.000	0.000

*** Significance level of 1%, ** significance level of 5%.

Data from Table 9 indicate that, for the total cases, the overall model (M1), which includes the variable APP, explains the variance of FD for Portuguese municipalities at approximately 69% (adjusted R^2). However, the model does not gain a significant level of explanatory power in comparison to the alternative one (M2), where only the control variables are considered (with an adjusted R^2 of 68%).

Table 10 presents the results of the two regression models proposed (M1 and M2) for H1 by APP threshold.

Table 10. Results of the regression models for Portuguese municipalities by APP threshold (H1).

Independent Variables	M1 (APP, BAL, DS, and POP)	M2 (BAL, DS, and POP)
APP ≤ 30		
APP	−39,393.68	
BAL	*** −1.428	*** −1.424
DS	*** 1.462	*** 1.463
POP	*** −363.348	*** −364.139
(Constant)	1,287,572	*** −1,805,089
Adjusted R^2	0.788	0.788
F-statistic	0.000	0.000

Table 10. *Cont.*

Independent Variables	M1 (APP, BAL, DS, and POP)	M2 (BAL, DS, and POP)
APP > 30		
APP	*** 18,428.81	
BAL	*** −1.790	*** −1.835
DS	*** 0.290	*** 0.307
Pop	*** −196.850	*** −199.795
(Constant)	−567,404.70	*** 2,390,271
Adjusted R^2	0.418	0.388
F-statistic	0.000	0.000

*** Significance level of 1%.

The analysis by APP threshold in Table 10 shows that, for those complying with the 30-day limit, the explanatory power of the models proposed, with an adjusted R^2 of approximately 79%, is higher than the similar ones proposed to the opposite group (with up to 30 days for the APP). However, the APP in the first group has no significance and, therefore, does not increase the FD explanation in comparison to M2, where APP was not included, which is aligned with Pearson's correlation results. Conversely, for those municipalities with APP higher than 30 days, the M1 explains about 42% of the FD, with the APP having further explanatory power (3 percentage points), which means that not much is added when compared to M2, which is close to 39%. However, this may be an indication that this variable is particularly relevant in explaining the Portuguese municipalities' levels of FD for those that present higher levels of APP.

Table 11 presents the results of the two regression models proposed (M1 and M2) for H1 by size.

Table 11 shows that, by size, the APP appeared to be significant in both cases (for smaller and larger Portuguese municipalities). However, the models' explanatory powers are significantly higher within the second subgroup (larger ones), where the first model (M1) presents an adjusted R^2 of about 70%. This figure can be compared with the 27% obtained for the smaller ones. Despite that, comparing the difference between the explanatory power from M2 and M1, with the latter including the independent variable APP, the smaller ones have benefited more, although not significantly.

Table 11. Results of the regression models for Portuguese municipalities by size (H1).

Independent Variables	M1 (APP, BAL, DS, and POP)	M2 (BAL, DS, and POP)
Small		
APP	*** 6942.192	
BAL	*** −0.753	*** −0.870
DS	*** 1.554	*** 1.659
POP	*** −324.937	*** −305.283
(Constant)	*** −2,484,813	*** −2,065,609
Adjusted R^2	0.270	0.250
F-statistic	0.000	0.000
Others		
APP	*** 33,478.98	
BAL	*** −1.407	*** −1.421

Table 11. *Cont.*

Independent Variables	M1 (APP, BAL, DS, and POP)	M2 (BAL, DS, and POP)
DS	*** 0.524	*** 0.551
POP	*** −295.090	*** −300.319
(Constant)	625,277.7	** 3,874,450
Adjusted R^2	0.701	0.688
F-statistic	0.000	0.000

*** Significance level of 1%, ** significance level of 5%.

Table 12 provides the findings of the two regression models proposed (M1 and M2) for H1 with a breakdown according to the years of the FAP in Portugal and afterward.

Table 12. Results of the regression models for Portuguese municipalities by the years of FAP and afterward (H1).

Independent Variables	M1 (APP, BAL, DS, and POP)	M2 (BAL, DS, and POP)
From 2011 to 2014		
APP	*** 11,962.27	
BAL	*** −1.752	*** −1.868
DS	0.019	0.031
POP	*** −113.182	*** −111.665
(Constant)	659,300.5	*** 2,262,534
Adjusted R^2	0.438	0.413
F-statistic	0.000	0.000
From 2015 to 2019		
APP	*** 36,587.65	
BAL	*** −1.273	*** −1.302
DS	*** 1.737	*** 1.861
Pop	*** −452.028	*** −457.794
(Constant)	*** −3,627,579	*** −1,705,891
Adjusted R^2	0.764	0.755
F-statistic	0.000	0.000

*** Significance level of 1%.

Table 12 shows that the models where APP as an independent variable was included increased, in both cases, the models' explanatory powers, although not substantially. Furthermore, it also reveals that this statistic is significantly higher within the models that only considered the years after the FAP in Portugal (for M1, about 76% for those years, which can be compared with approximately 44% for the same model performed for years of FAP).

Table 13 presents the results of the regression model proposed for H2, with a breakdown by size, covering all the years from 2011 to 2019 (APP from 2011 to 2018 as independent variables and FD for 2019 as the dependent one).

Table 13. Results of the regression models for Portuguese municipalities from 2011 to 2019, with a breakdown by size (H2).

	All (N = 308)	**Small (N = 189)**	**Others (N = 119)**
Constant	−1,665,199	*** −7,748,537	9,088,704
APP_2011	15,996	** 12,662	−22,991
APP_2012	−6704	*** −9107	26,627
APP_2013	** 22,206	*** 18,596	4904
APP_2014	5593		
APP_2015			
APP_2016	−6106	*** −34,661	41,316
APP_2017	58,730	*** 60,981	32,010
APP_2018	−21,418	* 23,103	87,234
POP	*** −821	*** −487	*** −901
VIF (Max)	5.3	6.2	5.5
Adjusted R^2	0.779	0.423	0.774
Sig. ANOVA	0.001	0.001	0.001
Durbin–Watson	1.942	2.199	1.902

*** Significance level of 1%; ** significance level of 5%; * significance level of 10%.

Table 14 presents, in turn, the results of the regression model proposed for H2, with a breakdown by size, covering the years from 2011 to 2015 (APP from 2011 to 2014 as independent variables and FD for 2015 as the dependent one).

Table 14. Results of the regression models for Portuguese municipalities from 2011 to 2015, with a breakdown by size (H2).

	All (N = 308)	**Small (N = 189)**	**Others (N = 119)**
Constant	*** −8,674,624	*** −3,840,443	*** −16,822,232
APP_2011	** 30,989	*** 12,860	47,672
APP_2012	−1691	** −4409	20,224
APP_2013	10,373	*** 9469	9621
APP_2014	*** 14,794	*** 7257	17,247
POP	*** −294	*** −406	*** −276
VIF Max.	2.3	2.0	4.4
Adjusted R^2	0.415	0.345	0.383
Sig. ANOVA	0.001	0.001	0.001
Durbin–Watson	2.412	1.671	2.456

*** Significance level of 1%; ** significance level of 5%.

Considering the first period proposed in Table 14, the previous conclusions are strengthened by the significance of historical APP over the years for the smaller Portuguese municipalities, with a lower reduced level of loss in explanatory power in comparison to other groups (all cases and larger ones).

Finally, Table 15 presents the results of the regression model proposed for H2, with a breakdown by size, covering the years from 2015 to 2019 (APP from 2015 to 2018 as independent variables and FD for 2019 as the dependent one).

Table 15. Results of the regression models for Portuguese municipalities from 2015 to 2019, with a breakdown by size (H2).

	All (N = 308)	Small (N = 189)	Others (N = 119)
Constant	757,720	*** −6,786,451	* 9,848,144
APP_2015			
APP_2016	11,217	*** −42,774	42,411
APP_2017	84,119	*** 80,297	66,435
APP_2018	−27,984	** 30,099	81,632
POP	*** −820	*** −405	*** −901
VIF Max.	4.8	5.5	3.7
Adjusted R^2	0.773	0.287	0.778
Sig. ANOVA	0.001	0.001	0.001
Durbin–Watson	1.650	1.829	1.729

*** Significance level of 1%; ** significance level of 5%; * significance level of 10%.

Again, the historical APP emerges as relevant for all years included within the regression model performed for the smaller Portuguese municipalities in these latest years, as Table 15 shows. Despite that, and comparing with the previous period, the difference regarding explanatory power in comparison to the other groups (all cases and larger ones) is higher than that previously found and probably better explains those found within the models that included all the years. Furthermore, it is also aligned with the previous findings for H1, where the explanatory powers for the models that included the years after the FAP in Portugal were significantly higher than those found in the previous years.

3.3. Robustness and Additional Analyses

This section starts by addressing the endogeneity issues that the baseline model may suffer, which can be produced by different matters, namely by measurement errors, omitted variables, or simultaneity (Wooldridge 2010). The distinctions among the three possible forms of endogeneity are not always sharp since an equation can have more than one source of endogeneity. The method of instrumental variables (IVs) provides a general and usual solution to the problem of an endogenous explanatory variable (e.g., Barros et al. 2020; Wooldridge 2010).

This method is used along with the 2SLS estimators by defining the possible endogenous variable (e.g., Araujo and Tejedo-Romero 2016; Jacoby et al. 2019). Then, IVs estimation is performed with the aim of identifying the variable that will serve as an instrument for the endogenous variable in the second stage of the 2SLS to predict the dependent variable (FD). Therefore, the IVs must fulfil two conditions: being relevant and exogenous (Wooldridge 2010).

As the main explanatory variable in this research, APP is proposed as the endogenous one since it has a similar accounting nature to that which concerns the dependent one (FD), as both indicate municipalities' debt levels, and both may be explained by the IVs (unmeasured variables at this stage). The literature has indicated that proxies for macroeconomic conditions, such as the gross domestic product (GDP) level or the growth rates of macroeconomic measures, usually emerge as instrumental variables, particularly when explaining FD or when leverage ratios are the focus (e.g., Campello 2003; da Rosa München 2022; He and Zheng 2022). This research proposes two IVs as proxies for capturing both structural and cyclical macroeconomic factors, respectively: per capita income (PCI) and unemployment growth rates (UGRs).

Three post-estimation tests usually validate the assumptions behind 2SLS. The first step was to conduct an endogeneity test using Durbin and Wu–Hausman tests to determine whether the regressors were indeed endogenous. This further indicated that IVs were

indeed exogenous. Moreover, a valid instrument must be sufficiently correlated with the endogenous regressors, but uncorrelated with the error term. Then, the F-test subsequently shows that the instruments are not weakly correlated with the endogenous regressors. Therefore, those first two steps provide evidence that 2SLS is more robust and efficient than OLS (otherwise recommended) estimation. Finally, the overidentifying restriction test shows a J-statistic score of 1.22 with a *p*-value equal to 0.2592, corroborating the previous findings (no correlation between the instruments and the error term) and identifying that the instruments used are valid.

Table 16 presents the results for the 2SLS estimation (robust), which can be subsequently compared with the equivalent baseline model (M1).

According to Table 16, APP is still a significant variable and the proposed signal of association with FD remains, but its coefficient value has significantly increased, as well as its standard error (ten times higher than the baseline model). Additionally, the significance for the variable DS has also changed from a 1% to a 5% level, and the explanatory power has reduced from about 70% to 47%.

Table 16. Results of the 2SLS regression.

	M1
APP	*** 117,106.8
BAL	*** −1.441
DS	** 0.416
POP	*** −254.812
(Constant)	*** -1.01×10^7
Wald chi2(4)	296.20
Prob > chi2	0.0000
R^2	0.4657
Root MSE	2.5×10^7

*** Significance level of 1%; ** significance level of 5%.

Table 17 provides a further analysis using the median Portuguese municipalities' development levels, based on the municipalities' PCI (one of the instrumental variables), as subgroups for the baseline regression models proposed for H1.

Table 17. Results of the regression models for Portuguese municipalities by development level.

Independent Variables	M1 (APP, BAL, DS, and POP)	M2 (BAL, DS, and POP)
Less developed		
APP	*** 9360.166	
BAL	*** −0.645	*** −0.783
DS	*** 0.968	*** 1.020
POP	*** −248.867	*** −241.145
(Constant)	*** −2,770,325	*** −2,069,523
Adjusted R^2	0.321	0.300
F-statistic	0.000	0.000
More developed		
APP	*** 21,876.99	
BAL	*** −1.464	***−1.473
DS	*** 0.523	*** 0.548
Pop	*** −277.880	*** −283.371
(Constant)	−303,045.8	** 2,067,943
Adjusted R^2	0.695	0.686
F-statistic	0.000	0.000

*** Significance level of 1%; ** significance level of 5%.

Data in Table 17 provide similar results as those found by size, with more developed Portuguese municipalities having higher levels of explanatory power (about 70% for M1) compared to the less developed ones, as previously observed, respectively, when the larger ones were compared to the smaller ones. This may be possibly explained by the significant levels of correlation between the Portuguese municipalities' size and their levels of per capita income. Notwithstanding, the more developed ones present a still higher level of explanatory power than those classified as larger ones. On the other hand, the comparison between M2 and M1 for the more developed municipalities reveals that the variable APP does not increase substantially this statistic.

Finally, Table 18 presents a similar approach using the median for the UGR as subgroups for the baseline regression models proposed for H1, the second instrumental variable used as a proxy for a more cyclical macroeconomic measure.

Table 18. Results of the regression models for Portuguese municipalities by unemployment growth rates (H1).

Independent Variables	M1 (APP, BAL, DS, and POP)	M2 (BAL, DS, and POP)
Lower unemployment rates		
APP	*** 22,503.25	
BAL	*** −1.582	*** −1.598
DS	*** 0.412	*** 0.434
POP	*** −271.818	*** −273.775
(Constant)	−939,499.4	* 1,203,982
Adjusted R^2	0.733	0.720
F-statistic	0.000	0.000
Higher unemployment rates		
APP	*** 10,689.36	
BAL	*** −1.270	*** −1.282
DS	*** 1.071	*** 1.094
Pop	*** −304.973	*** −306.574
(Constant)	** −1,122,580	−236,376.4
Adjusted R^2	0.633	0.630
F-statistic	0.000	0.000

*** Significance level of 1%; ** Significance level of 5%; * Significance level of 10%.

Data in Table 18 indicate that APP significantly predicts FD in both cases (municipalities with lower and higher unemployment rates), with high levels of explanatory power (with the adjusted R^2 being higher than 60%). Notwithstanding, the APP does not increase this statistic in a meaningful way, which can be observed through the comparison from M2 to M1 in the two subgroups of Portuguese municipalities proposed (with lower and higher unemployment rates).

The next section presents the discussion, as well as the study's limitations, and future avenues.

4. Discussion and Conclusions

The findings from this paper show that the number of Portuguese municipalities that exceed the debt limit has been reducing. However, some of them, despite complying with the 30 days threshold, are still in an FD situation and, therefore, subject to recovery mechanisms (according to Law 73/2013 (2013), on 3 September). Furthermore, descriptive data revealed that the reclassification between Portuguese municipalities that comply or do not comply with the APP threshold is more evident and significant throughout the period than that observed between those that are or are not in FD. On the other hand, despite the previous evidence that larger Portuguese municipalities are those that mostly reduce their average levels of FD, it is the smaller ones that mostly increase their weight in the group of Portuguese municipalities that are not in FD throughout the period.

Concerning the regression models proposed for H1, with the Portuguese municipalities FD as the dependent variable, the inclusion of APP as a variable increased the additional explanatory power for all cases, but not significantly for those municipalities which do not comply with the threshold. For the ones who comply with the APP threshold, it has no significance, which aligns with the Pearson correlation results. Based on size, the variable APP slightly increased the explanatory power when the models proposed for the smaller Portuguese municipalities are compared with the larger ones, despite the latter having higher levels for this statistic. Finally, the periods after the FAP in Portugal present higher levels of explanatory power. Notwithstanding, the inclusion of the variable APP does not substantially increase this statistic. Therefore, H1 is only partially confirmed, since it is not valid for all subgroups of Portuguese municipalities under assessment, which reveals that the variable APP has contextual characteristics that should be considered for a more in-depth analysis.

Concerning H2, the findings identify that the APP significantly also predicts FD, with a higher explanatory power for the periods after the FAP in Portugal, consistent with the previous findings. By size, the FD is, however, better explained by historical APP within the smaller Portuguese municipalities, despite also having lower levels of explanatory power in comparison to larger ones, particularly for that period. Therefore, aligned with the previous findings regarding H1, H2 is only partially confirmed, considering the different patterns by period and size found for the Portuguese municipalities.

Therefore, the findings suggest that APP only plays a relevant role in what matters to the Portuguese municipalities' FD for those who do not comply with the 30-day limit. By size, the findings appear to be more consistent for smaller ones, considering that the APP better predicts FD, regardless of the period under assessment, within the models performed for this subgroup of Portuguese municipalities.

Additionally, the robustness test and further analyses performed indicate the likely influence of macroeconomic factors. From these findings, a significant increase arises in the coefficient levels of APP as an explanatory variable of FD. In this context, the structural macroeconomic factor seemed to play a more relevant role, despite not being substantially different from the findings provided by the size analysis.

As a result, that which seemed to be intended by Directive 2011/7/EU (2011) is not observed for Portugal, given that having a lower APP does not mean that the municipality is not in an FD situation, even when complying with the 30-day threshold.

The literature argues that when having a lower APP, namely when it is up to 30 days, entities have a lower and sustainable debt, and are not in an FD situation (e.g., Alaminos et al. 2018; Balaguer-Coll and Ivanova-Toneva 2019; Olmo and Brusca 2021; Organic Law 2/2012 2012). Therefore, it can be questioned as to why the European Union's policies on late payments do not have the intended effect in Portugal. This may be the result of the lack of reliability that has been pointed out by several researchers concerning the APP reported by Portuguese municipalities (Baleiras et al. 2018; Carvalho et al. 2018; Santos et al. 2021). For instance, being quarterly, the APP only considers the end of the quarter debt, regardless of the acquisition date, giving an APP bonus of up to ninety days (an APP of zero days, as reported by some of the larger municipalities, is not seen as probable given the bureaucratic expense rules in Portugal).

Moreover, the Portuguese municipalities APP methodology under RMC 34/2008 (2008), and Administrative Decision 9870/2009 (2009), given that the Directive 2011/7/EU did not settle a common methodology, does not consider all the debts, contrary to other government sectors. This has been pointed out as a vulnerability to accounting practices that manipulates the APP to provide a better picture of the entity's performance, which seems to be occurring mostly in the larger Portuguese municipalities, and in those that comply with the 30-day threshold (Santos et al. 2021; Santos and Martinho 2021). This may explain why APP is not relevant in explaining the FD for those groups of Portuguese municipalities.

It must be stressed that Portugal has already been pointed out as using accounting devices to improve financial indicators without improving public finances indeed, namely in what concerns hiding borrowings (Irwin 2012). It should be highlighted that hidden debt is closely linked to systemic financial risks (Zhao et al. 2022). The financial stability of municipalities is an important starting point for long-term sustainable development and over-debt can create risks for their proper functioning. The growing increase in the debt held by the subnational levels of government has raised the need to understand and monitor the causes (Jorge et al. 2022).

Although the study focuses on Portuguese municipalities, other European Union countries such as Greece, Italy, and Spain have also been pointed out as using accounting devices to distort financial indicators (Irwin 2012). When assessing the Directive 2011/7/EU implementation, Spain was notified by the European Commission regarding the methodology used, as it reduced 30 days to all the APP reported. Therefore, the results of this paper can contribute to stressing the need for the European Commission to define a common method-

ology to assess the Directive 2011/7/EU to ensure the desired comparability amongst the member states (Tymowski 2018).

The main limitations of the study include the reliability of the data, although coming from the DGAL website, and the variable used to measure the municipalities' FD. The results may be different if other variables were used. The absence of data for APP from 2020 onward can also be a limitation since it does not allow us to assess if the findings from this paper would remain for the latest years. It is worth remembering that events with relevant impacts from a macroeconomic perspective, such as the COVID-19 pandemic and Russia's invasion of Ukraine, happened in the latest few years, which were not covered in this research.

As future avenues, research with other variables to measure and/or predict the municipalities' FD could improve the evidence from this study. Furthermore, a cross-country comparison, particularly within the European Union, could be helpful to assess whether there are differences that can be explained by national specificities. This may also be relevant to assess those data from different perspectives of analysis, such as their reliability using gaming or earning management strategies.

Author Contributions: All authors have equally contributed to this research. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Instituto Politécnico de Lisboa [IPL/2022/WES_ISCAL].

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data presented in this study can be shared under request.

Conflicts of Interest: The authors declare no conflict of interest.

References

Administrative Decision 9870/2009. 2009. *Approves the Model of the Monitoring Report to Be Used in the Quarterly Monitoring of the Evolution of Average Payment Periods*, Lisbon. April 13.

Alaminos, David, Sergio M. Fernández, Francisca García, and Manuel A. Fernández. 2018. Data mining for municipal financial distress prediction. *Advances in Data Mining. Applications and Theoretical Aspects* 10933: 296–308.

Araujo, Joaquim Filipe Ferraz Esteves de, and Francisca Tejedo-Romero. 2016. Local government transparency index: Determinants of municipalities' rankings. *International Journal of Public Sector Management* 29: 327–47. [CrossRef]

Balaguer-Coll, Maria Teresa, and Mariya Ivanova-Toneva. 2019. La importancia de los efectos espaciales en la deuda municipal. *Revista de Contabilidad-Spanish Accounting Review* 22: 61–72. [CrossRef]

Baleiras, Rui Nuno, Rui Dias, and Miguel Almeida. 2018. Local Finance: Economic Principles, Institutions and the Portuguese Experience since 1987. Coleção Livros do CFP. Available online: https://www.cfp.pt/uploads/publicacoes_ficheiros/cfp-2018-livro-financas-locais.pdf (accessed on 2 February 2023).

Barros, Lucas, F. Henrique Castro, Alexandre Di Miceli Da Silveira, and Daniel Reed Bergmann. 2020. Endogeneity in panel data regressions: Methodological guidance for corporate finance researchers. *Review of Business Management* 22: 437–61. [CrossRef]

Benito, Bernardino, María-Dolores Guillamón, and Francisco Bastida. 2015. Non-fulfilment of debt limits in Spanish municipalities. *Fiscal Studies* 36: 75–98. [CrossRef]

Bolívar, Manuel Pedro Rodríguez, Andrés Navarro-Galera, Laura Alcaide Muñoz, and María Deseada López Subirés. 2014. Factors Influencing Local Government Financial Sustainability: An Empirical Study. *Lex Localis* 12: 31–54.

Bolívar, Manuel Pedro Rodríguez, Andrés Navarro-Galera, Laura Alcaide Muñoz, and María Deseada López Subirés. 2016. Risk Factors and Drivers of Financial Sustainability in Local Government: An Empirical Study. *Local Government Studies* 42: 29–51. [CrossRef]

Cabaleiro, Roberto, Enrique Buch, and Antonio Vaamonde. 2013. Developing a method to assessing the municipal financial health. *The American Review of Public Administration* 43: 729–51. [CrossRef]

Cabasés, Fermín, Pedro Pascual, and Jaime Vallés. 2007. The effectiveness of institutional borrowing restrictions: Empirical evidence from Spanish municipalities. *Public Choice* 131: 293–313. [CrossRef]

Campello, Murillo. 2003. Capital structure and product markets interactions: Evidence from business cycles. *Journal of Financial Economics* 68: 353–78. [CrossRef]

Canadian Institute of Chartered Accountants (CICA). 2009. *Public Sector Statements of Recommended Practice (SORP) 4. Indicators of Financial Condition*. Toronto: CICA.

Carvalho, João, Maria José Fernandes, and Pedro Camões. 2018. *Anuário Financeiro dos Municípios Portugueses—2017*. Lisboa: Ordem dos Contabilistas Certificados.
Christiaens, Johan, Brecht Reyniers, and Caroline Rollé. 2010. Impact of IPSAS on reforming governmental financial information systems: A comparative study. *International Review of Administrative Sciences* 76: 537–54. [CrossRef]
Cohen, Sandra, and Sotirios Karatzimas. 2015. Debate: Reforming Greek government accounting. *Public Money & Management* 35: 178–80.
Controller and Auditor-General of New Zealand. 2013. *Public Sector Financial Sustainability*. Wellington: Office of the Auditor-General New Zealand.
da Rosa München, Douglas. 2022. The effect of financial distress on capital structure: The case of Brazilian banks. *The Quarterly Review of Economics and Finance* 86: 296–304. [CrossRef]
Decree-Law 62/2013. 2013. *Establishes Measures against Delays in the Payment of Commercial Transactions and Transposes Directive 2011/7/EU of the European Parliament and the Council of 16 February 2011*, Lisbon. May 10.
Directive 2011/7/EU. 2011. *Directive 2011/7/EU of the European Parliament and of the Council of 16 February 2011 on Combating Late Payment in Commercial Transactions*. Brussels: Official Journal of the European Union.
Ehalaiye, Dimu, Nives Botica-Redmayne, and Fawzi Laswad. 2017. Financial determinants of local government debt in New Zealand. *Pacific Accounting Review* 29: 512–33. [CrossRef]
European Commission. 2019. *Fiscal Sustainability Report 2018*. Luxembourg: Publications Office of the European Union.
European Commission. 2023. Government Finance Statistics. Available online: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Government_finance_statistics#Introduction (accessed on 20 April 2023).
Green, Bert F., Jr., and John W. Tukey. 1960. Complex Analyses of Variance: General Problems. *Psychometrika* 25: 127–52. [CrossRef]
He, Yu, and Huan Zheng. 2022. Do environmental regulations affect firm financial distress in China? Evidence from stock markets. *Applied Economics* 54: 4384–401.
Hermansen, Mikkel, and Oliver Röhn. 2015. *Economic Resilience: The Usefulness of Early Warning Indicators in OECD Countries*. OECD Economics Department Working Papers, No. 1250. Paris: OECD Publishing.
International Federation of Accountants. 2014. *Handbook of International Public Sector Accounting Pronouncements*. New York: IFAC.
International Monetary Fund (IMF). 2013. *Staff Guidance Note for Public Debt Sustainability Analysis in Market-Access Countries*; Washington: IMF. Available online: https://www.imf.org/external/np/pp/eng/2013/050913.pdf (accessed on 28 November 2019).
International Monetary Fund (IMF). 2021. *Review of the Debt Sustainability Framework for Market Access Countries*. Washington: International Monetary Fund. Available online: https://www.imf.org/en/Publications/Policy-Papers/Issues/2021/02/03/Review-of-The-Debt-Sustainability-Framework-For-Market-Access-Countries-50060 (accessed on 15 December 2022).
International Public Sector Accounting Standards Board. 2013. Reporting on the Long-Term Sustainability of an Entity's Finances. Available online: https://www.ipsasb.org/projects/reporting-long-term-sustainability-public-finances (accessed on 6 March 2023).
Irwin, Timothy. 2012. *Accounting Devices and Fiscal Illusions*. Washington: International Monetary Fund.
Jacoby, Gady, Jialong Li, and Mingzhi Liu. 2019. Financial distress, political affiliation and earnings management: The case of politically affiliated private firms. *The European Journal of Finance* 25: 508–23. [CrossRef]
João, Vadim Manuel. 2014. *Estudo Comparativo das Leis de Finanças Locais n.^{os} 2/2007 e 73/2013: O Endividamento das Autarquias Locais*. Working papers. Braga: Universidade do Minho—Escola de Direito da Universidade do Minho.
Jorge, Susana, Pedro Cerqueira, and Sofia Furtado. 2022. Municipal revenue over-budgeting: A dynamic analysis of its determinants. *Local Government Studies* 49: 1–32.
Law 73/2013. 2013. *Establishes the Financial Regime of Local Authorities and Inter-Municipal Entities*. Lisbon: The Portuguese Republic, September 3.
Letelier, Leonardo. 2010. Theory and evidence of municipal borrowing in Chile. *Public Choice* 146: 395–411. [CrossRef]
Lim, Sung Il, and Seobeen Hong. 2012. Analysing the determinants of local borrowings in Korea. *The Korean Journal of Local Finance* 17: 83–106.
Ma, Jun, and Hana Brixi. 2002. Monitoring Fiscal Risks of Subnational Governments, World Bank. Available online: https://openknowledge.worldbank.org/entities/publication/50d3d097-ade0-5385-a8c3-985a0c747182 (accessed on 18 April 2023).
Navarro-Galera, Andrés, Manuel Pedro Rodríguez-Bolívar, Laura Alcaide-Muñoz, and María Deseada López-Subires. 2016. Measuring the financial sustainability and its influential factors in local governments. *Applied Economics* 48: 3961–75. [CrossRef]
Office of Auditor General of Canada. 2015. *Indicators of Financial Condition*. Nova Scotia: Office of Auditor General of Canada. Available online: https://oag-ns.ca/audit-reports/february-2015-report/chapter-3 (accessed on 23 January 2023).
Olmo, Jorge, and Isabel Brusca. 2021. Determinants of the municipal average payment period and effectiveness of the commercial debt sustainability principle. *Revista de Contabilidad/Spanish Accounting Review* 24: 1–18.
Organic Law 2/2012. 2012. *Fiscal Stability and Financial Sustainability*. Madrid, Spain: The Head of State Spanish Official Gazette (BOE), April 27.
Organisation for Economic Co-operation and Development (OECD). 2021. *Government at a Glance 2021*. Paris: OECD Publishing.
Pons, Manuel. 2017. Estudio descriptivo del Periodo Medio de Pago (APP) en las Entidades Locales para el período septiembre 2014 a septiembre 2016. *Auditoría pública: Revista de los Órganos Autónomos de Control Externo* 69: 115–28.

Prašnikar, Janez, Marko Pahor, and Andreja Cirman. 2004. Late Payments in Accession Countries: Causes and International Comparison. *Journal of Entrepreneurial Finance and Business Ventures* 9: 51–72. [CrossRef]
Resolution of the Ministers Council 34/2008. 2008. *The Pay on Time and Hours Programme*, Lisbon. February 22.
Santos, Paula Gomes, and Carla Martinho. 2021. Measures to Assess the Payment Behavior of the Portuguese Subnational Governments. In *Eurasian Economic Perspectives. Eurasian Studies in Business and Economics*. Edited by B. H. Bilgin, H. Danis, E. Demir and S. Vale. Berlin/Heidelberg: Springer, vol. 16, pp. 37–53.
Santos, Paula Gomes, Carla Martinho, and Fábio Albuquerque. 2021. Is the Commercial Debt Default Ratio a reliable indicator of the Short-Term Financial Sustainability of Portuguese Local Governments? *Polish Journal of Management Studies* 24: 322–36. [CrossRef]
Saura, Juan José. 2013. Problemas prácticos (y algunas soluciones) para el endeudamiento local. *Presupuesto y Gasto Público* 73: 179–95.
Shon, Jongmin, and Junghack Kim. 2019. The impact of revenue diversification on municipal debts: Comparing short-term and long-term debt levels. *Local Government Studies* 45: 241–61. [CrossRef]
Ter-Minassian, Teresa. 2007. Fiscal Rules for Subnational Governments: Can They Promote Fiscal Discipline? *OECD Journal on Budgeting* 6: 1–11. [CrossRef]
Turley, Gerard, Geraldine Robbins, and Stephen McNena. 2015. A Framework to Measure the Financial Performance of Local Governments. *Local Government Studies* 41: 401–20. [CrossRef]
Tymowski, Jan. 2018. Directive 2011/7/EU on Late Payments in Commercial Transactions. European Implementation Assessment. Available online: http://www.europarl.europa.eu/RegData/etudes/IDAN/2018/621842/EPRS_IDA(2018)621842_EN.pdf (accessed on 24 January 2023).
Veiga, José. 2014. *Da Lei das Finanças Locais à Recuperação Financeira Municipal. Apresentação efetuada no âmbito da Recuperação Financeira Municipal e o Fundo de Apoio Municipal*. Braga: Universidade do Minho.
Wooldridge, Jeffrey. 2010. *Econometric Analysis of Cross Section and Panel Data*. London: MIT Press.
World Bank. 2022. *International Debt Report 2022: Updated International Debt Statistics*. Washington: World Bank. Available online: http://hdl.handle.net/10986/38045 (accessed on 26 April 2023).
Yoo, Wonsuk, Robert Mayberry, Sejong Bae, Karan Singh, Qinghua Peter He, and James W. Lillard Jr. 2014. A study of effects of multicollinearity in the multivariable analysis. *International Journal of Applied Science and Technology* 4: 9.
Zafra-Gómez, José Luis, Antonio Manuel López-Hernández, and Agustín Hernández-Bastida. 2009. Developing an alert system for local governments in financial crisis. *Public Money & Management* 29: 175–81.
Zhao, Yinglan, Yi Li, Chen Feng, Chi Gong, and Hongru Tan. 2022. Early Warning of Systemic Financial Risk of Local Government Implicit Debt Based on BP Neural Network Model. *Systems* 10: 207. [CrossRef]