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António Afonso, José Alves

REM – Research in Economics and Mathematics
Rua Miguel Lúpi 20,
1249-078 Lisboa,
Portugal

REM – Research in Economics and Mathematics

Rua Miguel Lúpi, 20
1249-078 LISBOA
Portugal

Telephone: +351 - 213 925 912
E-mail: rem@iseg.ulisboa.pt

https://rem.rc.iseg.ulisboa.pt/

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https://www.facebook.com/researchrem/

Are fiscal consolidation episodes helpful for public sector efficiency?[*]

António Afonso[†]   José Alves[‡]

May

2022

Abstract

We assess the consequences of fiscal consolidation episodes on public sector efficiency (scores) for 35 OECD countries for the 2007-2020 period. We find that fiscal consolidations improve public sector efficiency and results are robust across efficiency models. Moreover, peripheral euro-area economies and economies with debt-to-GDP ratios between 60% and 90% are those whose public sector efficiency scores improve more when fiscal consolidation episodes occur. The evidence that fiscal consolidations enhance spending efficiency is an additional argument for fiscal consolidations, from a policy perspective.

JEL: C23, D61, H21, E62, H63
Keywords: fiscal consolidation episodes; government spending efficiency; panel data; OECD

1. Introduction

In just over a decade, several structural events have taken a toll on the global economy. Adverse events as the 2008's Global and Financial Crisis, with the consequent sovereign debt crisis felt in some peripheral euro-area countries, and the COVID-19 pandemic imposed several challenges for the global economy. More recently, the war in Ukraine is raising some challenges, not only for higher inflation rates but also for the uncertainty about the effects, possibly structural, for future growth, and, in particular, for the capacity to sustainable manage public finances.

In fact, it is well known that the fiscal stance is particularly affected by structural events, mainly in those economies that were previously already financially constrained. Some cases, as the peripheral euro-area countries are examples of economies that suffered particularly from such events, having had to ask for international institutional support to avoid fiscal insolvency. Hence, fiscal austerity programs were implemented, not only by increasing taxes but also by reducing public expenditures. Nevertheless, the effects of such fiscal consolidation programs on public sector efficiency have not been addressed in the existing literature, while one can certainly conceive the existence of such nexus.

Accordingly, our main contribution to the literature is to explore the linkage between fiscal consolidation episodes and their effects on public sector efficiency. More specifically, we explore the consequences of fiscal contractions on input-oriented efficiency scores. Indeed, these efficiency scores are computed in the perspective of how much one could reduce public spending keeping the actual level of public goods and services provision. In this respect, it makes sense to study these input-oriented public sector efficiency scores, and not the ones obtained from an output-oriented perspective – this approach studies how much more public goods and services can be provided with the actual level of inputs –, since fiscal consolidation programs intend to rationalize public spending levels.

Therefore, we analyze the fiscal consolidation effects for a set of 35 OECD countries covering the period between 2007 and 2020. Globally, and for the three input-oriented models that we consider in our analysis, our results show that an implementation of fiscal consolidation episodes has a positive impact on public sector efficiency. Additionally, we study the effects of austerity on efficiency considering other country sub-samples: i) euro-area vs. non-euro-area countries; ii) core and peripheral euro-area economies; and iii) and countries experiencing debt-to-GDP ratios below 60%, between 60% and 90% and above 90%. While the effects of fiscal consolidation episodes are felt

in both non-euro-area and euro-area economies, only the peripheral euro-area economies observe an increase in their public sector efficiency. Lastly, fiscal consolidation episodes lead to higher efficiency scores for countries experiencing debt levels between 60% and 90% of GDP.

Our paper is organized as follows. Section 2 provides the literature review. Section 3 presents the methodology and data employed in the analysis. Section 4 discusses the results and, lastly, Section 5 is the conclusion.

2. Literature

As pointed out, the literature has not paid a lot of attention to the effects of fiscal consolidations on public sector efficiency scores. However, there have been several studies analyzing fiscal consolidations effects and public sector efficiency scores. In that sense, we review the literature encompassing those two different strands in the following two sub-sections.

2.1. Fiscal consolidations

Besides the need to set a fiscal consolidation program in order to promote higher fiscal policy sustainability levels, there are economists who claim that fiscal consolidations may have positive impacts on economic growth, especially via increases in private consumption. This result may arise if households observe credible and permanent reductions in government spending, which are associated with future reduction of taxes (see the seminal work of Feldstein, 1982, for further details). Consequently, with the decrease in public spending, there are fewer needs for government borrowing contributing for the reduction of risk premia associated to public debt, thus reducing real interest rates, which can lead to higher private investment (Escolano et al., 2018)

Therefore, agents' expectations are fundamental for the success of fiscal policy consolidations, leading, in some cases to non-linear effects of fiscal policy on the private economic sector (see Sutherland, 1997; Perotti, 1999; Giavazzi et al., 2000; and Minea and Villieu, 2012). Additionally, Bertola and Drazen (1993) suggest the existence of turning points in which the occurrence of a fiscal consolidation is more likely to take place. Such turning points occur when government spending levels reach a certain threshold that forces the government to implement a fiscal consolidation policy.

In what respects the effects of fiscal consolidations, Blanchard and Leigh (2014) and Jordà and Taylor (2016) conclude that the wrong evaluation of fiscal policy multipliers are the main reason in explaining the absence of success of fiscal consolidations to foster economic growth. Furthermore, the composition of fiscal consolidation programs are considered to be important for the success of fiscal consolidations. In fact, some studies as Alesina et al. (2019) conclude that several differences on the fiscal consolidation effects, either when those consolidations are mainly performed through public expenditures cuts or via increases on tax revenues. Hence, they support the idea that is more beneficial for economic growth if a fiscal consolidation is more based on the expenditure-side. On the other hand, and regarding the political economy aspect of fiscal consolidation, some literature finds that left-wing and right-wing governments are more successful in their consolidations when they based their fiscal austerity measures on spending cuts and on taxation increases, respectively (see Tavares, 2004, and Potrafke, 2011, among others).

2.2. Public sector efficiency

As regards the public sector efficiency, this issue has been widely addressed in the literature (see, for example, Gupta and Verhoeven, 2001, and Afonso et al., 2010). Several studies evaluate the degree of public sector efficiency making use of mostly Data Envelopment Aanalysis (DEA) and semi-parametric approaches, namely for the most advanced economies, i.e., OECD and European economies (Adam at al., 2011; Dutu and Sicari, 2020; Afonso and Kazemi, 2017; Antonelli and de Bonis, 2019).

From these set of works, the main conclusions are that there is the possibility to improve the efficiency of the public sector. For instance, Afonso et al. (2005) conclude for a 23 OECD countries' sample, that the input-oriented average efficiency is, on average, 0.79. This result translates the idea that such economies could theoretically provide the same amount of public goods and services using 31% less of resources. Other studies conducted, for instance, by Afonso and Kazemi (2017) and Antonelli and de Bonis (2019), reach similar findings for other economies' samples, and either for a sectoral analysis or for the assessment of the performance of the public sector as a whole.

Additionally, not only advanced economies have been appraised regarding their public sector efficiency. For instance, Gupta and Verhoeven (2001), and Olanubi and Olanubi (2022), assessed the topic for African economies, Afonso et al. (2010) for

emerging economies, Afonso et al. (2013) for South and Central American economies, and Mohanty et al (2022) for Indian regions.

Moreover, and to complement the findings in cross-country efficiency gaps, related literature has explored also other determinants of government spending efficiency, such as population size, the composition of education, income level, quality of institutions and country's governance, the government tax burden and the political spectrum of governments (see, notably, Afonso et al., 2005; Hauner and Kyobe, 2010; Montes et al., 2018; Antonelli and de Bonis, 2019).

Still, and despite the importance of fiscal rules, public expenditure efficiency is rather relevant to explain fiscal sustainability, while institutional factors are found as substitutes, given that fiscal rules gain relevance in explaining higher fiscal sustainability degrees when public sector efficiency is increasing (Bergman et al., 2016).

3. Methodology

In what concerns the determination of the fiscal consolidation episodes, we build a dummy variable, *FE*, by following the criterion of Afonso et al. (2022), in which one defines a contractionary fiscal episode when the average change in the Cyclically Adjusted Primary Balance (CAPB), in two consecutive years, is greater or equal to 0.5 of GDP, as follows:

$$FE_t = \begin{cases} 1, & \text{if } (\Delta capb_t + \Delta capb_{t-1})/2 \geq 0.5 \\ 0, & \text{otherwise} \end{cases}. \qquad (1)$$

As already mentioned, our analysis comprises a set of 35 OECD countries and it covers the period between 2007 and 2020.[3] Moreover, and in order to construct this dummy variable, as explained in equation (1), we make use of the IMF *World Economic Outlook* data.

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[3] Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Chile (CHL), Colombia (COL), Czech Republic (CZE), Denmark (DNK), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary (HUN), Iceland (ISL), Ireland (IRL), Israel (ISR), Italy (ITA), Japan (JPN), Latvia (LVA), Lithuania (LTU), Luxembourg (LUX), the Netherlands (NLD), New Zealand (NZL), Norway (NOR), Poland (POL), Portugal (PRT), Slovakia (SVK), Slovenia (SVN), South Korea (KOR), Spain (ESP), Sweden (SWE), Switzerland (CHE), Turkey (TUR), the United Kingdom (GBR) and the United States (USA).

In Table 1, we present each country included in our study, with the years of the contractionary fiscal episodes' occurrence. We can see that quite a few contractionary fiscal episodes took place right after the Global and Financial Crisis (GFC), notably in the years 2011-2014.

Table 1. Years of Contractionary Fiscal Episodes by country, 2008-2020

Australia	2012-2013; 2018	Latvia	2011-2013
Austria	2012-2015	Lithuania	2010-2016
Belgium	2013; 2017	Luxembourg	2012; 2018
Canada	2012-2015	Netherlands	2012-2014; 2016-2017
Chile	2011-2012	New Zealand	2012-2014
Colombia	2012; 2016-2017	Norway	n.a.
Czech Republic	2011-2013; 2017	Poland	2011-2013; 2015
Denmark	2014-2015; 2019	Portugal	2011-2014
Finland	2014-2015	Slovakia	2011-2013; 2017-2018
France	2012-2014	Slovenia	2012; 2015-2018
Germany	2012-2014	South Korea	2016-2017
Greece	2010-2013; 2016-2017	Spain	2011-2014
Hungary	2009-2010; 2012-2013	Sweden	2016-2017
Iceland	2010-2011; 2013; 2015	Switzerland	n.a.
Ireland	2011-2016; 2018-2019	Turkey	2010
Israel	2011; 2014-2015	United Kingdom	2011-2014; 2016-2017; 2020
Italy	2012-2013	United States	2012-2014
Japan	2014-2016; 2018		

Source: Authors' calculations.

On the other hand, the other main variable of interest arises from the measure of public sector efficiency. In this case, we use the so-called public sector efficiency scores as computed by Afonso et al. (2021). These public sector efficiency scores are calculated via the use of DEA. DEA is a non-parametric frontier methodology, firstly enunciated in Farrell's (1957) seminal work, and after developed by Charnes et al. (1978) (for more details on this methodology, we suggest the introductory to DEA work of Coelli et al. (2002)). For computing public sector efficiency DEA is considered to be an appropriate approach since it does not impose an underlying production function, and, secondly, it accommodates deviations from the efficient frontier, and examining a country's efficiency regarding its peers.

Additionally, in equation (2) we illustrate the case of the use of an input-oriented approach to determine the relative decrease in inputs, while holding the output constant. One also assumes variable-returns to scale (VRS) to account for the fact that countries

may not operate at the optimal scale. On the other hand, from an output-oriented perspective, one can assess how much output could increase if the same level of inputs was maintained. The efficiency scores are computed by applying the following linear programming problem:

$$\min_{\theta,\lambda} \theta$$
$$s.t. \quad -y_i + Y\lambda \geq 0$$
$$\theta x_i - X\lambda \geq 0 \quad\quad\quad (2)$$
$$I1'\lambda = 1$$
$$\lambda \geq 0$$

where y_i is a column vector of outputs, x_i is a column vector of inputs, θ is the efficiency scores, λ is a vector of constants, $I1'$ is a vector of ones, X is the input matrix, and Y is the output matrix. In Equation (2), θ is a scalar between 0 and 1 ($0 \leq \theta \leq 1$), and it measures the distance between a country's efficiency and the most efficient one of the country's sample. In this sense, the efficiency frontier is defined as being a linear combination of the best sampled countries (but not necessarily the best possible one). If $\theta < 1$, then the country is within the frontier and it is inefficient, whereas if $\theta = 1$, this implies that the country is on the frontier and it is efficient.
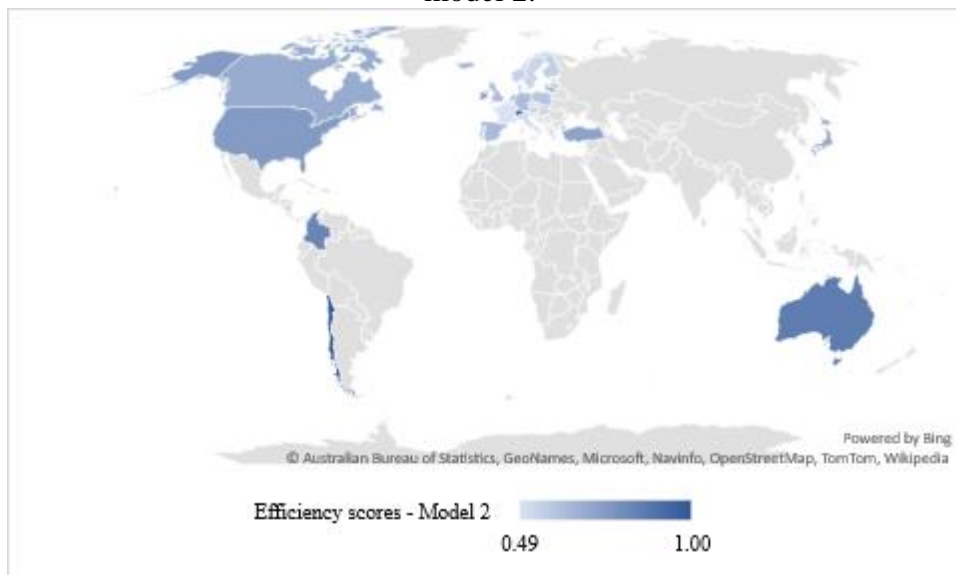
We used the results of three different DEA models, namely: the baseline model (Model 0), which includes just one input (government spending as percentage of GDP) and one output, and is in effect a composite public sector performance (PSP) indicator; Model 1 includes two inputs, governments' normalized spending on opportunity and on "Musgravian" indicators and one output, with total PSP scores; finally, Model 2 uses one input, governments' normalized total expenditure, and two outputs, the opportunity PSP and the "Musgravian" PSP scores. In fact, Afonso et al. (2005, 2021) used a set of metrics to construct a composite public sector performance (PSP) indicator. PSP is the simple average between so-called opportunity and Musgravian indicators. The opportunity indicators evaluate the performance of the government in terms of administration, education, health and infrastructure sectors, with equal weighting. The Musgravian indicators include three sub-indicators: distribution, stability, and economic performance, all of which also have equal weighting for the indicators. Accordingly, the opportunity

and Musgravian indicators result from the average of the measures included in each sub-indicator. To ensure a convenient benchmark, each sub-indicator measure is first normalized by dividing the value of a specific country by the average of that measure for all the countries in the sample (for further details see Afonso et al., 2021).

As already mentiond, use in this paper the input-oriented efficiency scores. The reason of this lies in the fact that during fiscal consolidation episodes, the purpose of fiscal policy is mainly to reduce expenditures. Therefore, we are interested in assessing how the reduction in government expenditures affect the overall efficency of the public sector admistration, which is then in lien with analysing government spending efficiency in an input-oriented approach.

In Figure 1, we illustrate the average efficiency score for the input-oriented model 2, that uses one input, governments' normalized total expenditure, and two outputs, the opportunity PSP and the "Musgravian" PSP scores, as previously mentioned. As we can see in the figure, Switzerland, South Korea and Chile are the most efficient countries during the years between 2007 and 2020, registering an efficiency score of 1, while, on the other hand, France (0.49), Greece and Slovenia (both with and efficency score of 0.51) are considered to be the less efficient, on average, during the abovementioned period.

Figure 1. Average efficiency scores for the country's sample, 2007-2020, input-oriented, model 2.

Source: Authors calculations based in Afonso et al. (2021).

Therefore, and in order to study the effect of fiscal consolidations episodes on public sector efficiency we estimate the following baseline specification:
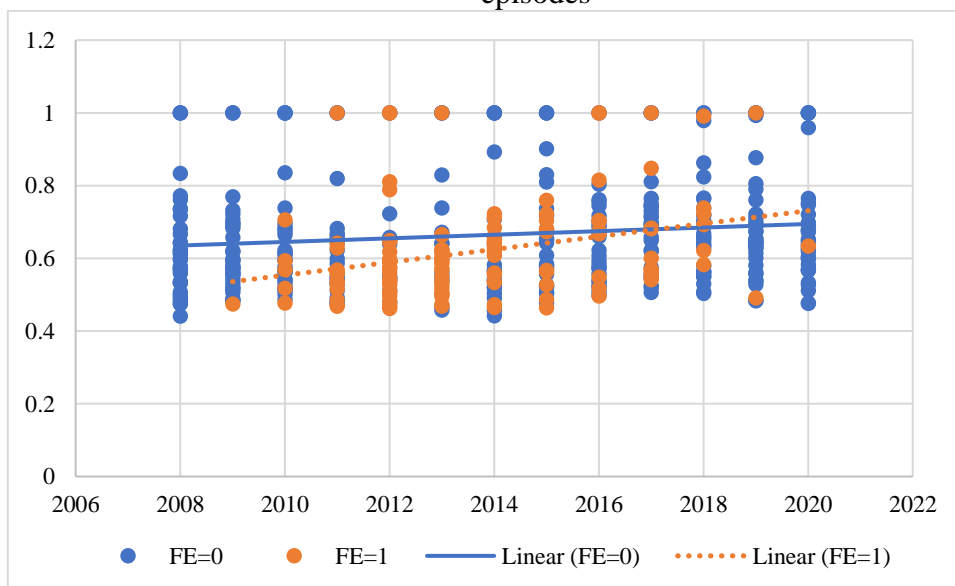
$$\theta_{it} = \alpha_1 + \alpha_2\theta_{it-1} + \alpha_3 FE_{it-1} + u_{it}, \tag{3}$$

where θ represents the efficiency scores, FE is a dummy that takes a value of 1 if there is a consolidation year and zero otherwise, and u is the error term. We estimate equation (3) using OLS, OLS-fixed effects to solve for heterogeneity problems in within our panel, and, lastly, the 2SLS estimator in order to deal with endogeneity issues.

4.   Empirical Analysis

As previously mentioned, fiscal consolidation episodes may have an impact on public sector efficiency. In that sense, and to have a first view of the data, we can see in Figure 2, for instance for Model 2, that the overall time increasing efficiency, is more clearly visible when contractionary fiscal episodes take place (FE=1) than when they do not occur (FE=0) (higher slope for the time linear regression in the chart). Regarding the other two DEA models used to compute the efficiency scores, we report similar graphical illustrations in the Appendix (Figures A1 and A2).

Figure 2. Efficiency developments (DEA Model 2), with and without fiscal episodes

Source: authors.

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Regarding the estimation of (3), from the results in Table 2, the likelihood of lower government expenditures levels stemming from a fiscal austerity program, creates additional government budget pressures to provide the amount of public goods that it once provided, prior to the fiscal contraction. Moreover, there is also a slowly moving pattern of efficiency as depicted by the statistical significance of the autoregressive term of efficiency scores. Overall, our results show that in the presence of a contractionary fiscal episode, public sector efficiency tends to increase. With the exception of the 2SLS estimator for Models 0 and 2, we obtain statistically significant impacts advocating the idea that is possible to reduce public expenditures without jeopardizing the provision of public goods and services, In other words, fiscal consolidation episodes can contribute to better public sector management levels. Moreover, and as it can be noted in our results, there are no structurally different results among the three efficiency models, which reinforces the robustness of our conclusions.

Table 2. Effects of fiscal consolidations on public sector efficiency, by model

Model 0	OLS	OLS-FE	2SLS
θ_{t-1}	0.942***	0.640***	0.825***
	(0.020)	(0.084)	(0.137)
FE_{t-1}	0.018***	0.016***	0.008
	(0.005)	(0.006)	(0.007)
Obs.	420	420	350
R^2	0.881	0.915	0.918
Model 1	OLS	OLS-FE	2SLS
θ_{t-1}	0.922***	0.646***	0.693***
	(0.018)	(0.066)	(0.167)
FE_{t-1}	0.018***	0.021***	0.012*
	(0.006)	(0.006)	(0.007)
Obs.	420	420	350
R^2	0.849	0.889	0.896
Model 2	OLS	OLS-FE	2SLS
θ_{t-1}	0.953***	0.669***	0.809***
	(0.017)	(0.084)	(0.149)
FE_{t-1}	0.021***	0.019*	0.014
	(0.006)	(0.010)	(0.010)
Obs.	420	420	350
R^2	0.886	0.907	0.909

Note: Constant term, country and time effects estimated and omitted for reasons of parsimony. Robust standard errors in parenthesis. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Furthermore, and in order to perform additional robustness checks for our results, we decided to assess the impact of such fiscal consolidation episodes on public sector efficiency scores for: i) non-euro-area and for euro-area countries; ii) the core and the

peripheral euro-area countries; and iii) the economies with debt-to-GDP ratios below 60%, between 60% and 90% and above 90%. These results are presented in Tables 3, 4 and 5, respectively. Regarding the analysis of non-euro-area vs. euro-area economies, we can conclude that both groups of economies show an increase in their efficiency scores when they apply fiscal consolidation measures. These conclusions are mainly witnessed when considering input-oriented models 1 and 2, as can be seen in Table 3.

Table 3. Effects of fiscal consolidations on public sector efficiency for non-euro-area and for euro-area countries, by model

	Non-euro-area			Euro-area		
Model 0	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS
θ_{t-1}	0.924***	0.516***	0.861***	0.974***	0.798***	0.369
	(0.023)	(0.119)	(0.176)	(0.049)	(0.095)	(0.230)
FE_{t-1}	0.016**	0.017**	0.010	0.020***	0.016**	0.013
	(0.008)	(0.009)	(0.012)	(0.008)	(0.007)	(0.009)
Obs.	239	239	197	181	181	153
R^2	0.870	0.914	0.902	0.841	0.895	0.888
Model 1	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS
θ_{t-1}	0.914***	0.503***	0.741***	0.945***	0.830***	0.286
	(0.021)	(0.091)	(0.191)	(0.035)	(0.060)	(0.367)
FE_{t-1}	0.019**	0.024**	0.012	0.017**	0.018**	0.008
	(0.009)	(0.010)	(0.012)	(0.007)	(0.007)	(0.012)
Obs.	239	239	197	181	181	153
R^2	0.844	0.897	0.889	0.820	0.881	0.814
Model 2	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS
θ_{t-1}	0.938***	0.492***	0.718***	0.961***	0.824***	0.779***
	(0.023)	(0.130)	(0.189)	(0.037)	(0.077)	(0.170)
FE_{t-1}	0.020**	0.022	0.020	0.022***	0.011	0.004
	(0.010)	(0.015)	(0.017)	(0.007)	(0.007)	(0.007)
Obs.	239	239	197	181	181	153
R^2	0.868	0.898	0.884	0.861	0.902	0.933

Note: Constant term, country and time effects estimated and omitted for reasons of parsimony. Robust standard errors in parenthesis. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively. The non-euro-area countries include AUS, CAN, CHL, COL, CZE, DNK, HUN, ISL, ISR, JPN, NZL, NOR, POL, KOR, SWE, CHE, TUR, GBR and USA. The euro-area countries include AUT, BEL, FIN, FRA, DEU, GRC, IRL, ITA, LVA, LTU, LUX, NLD, PRT, SVK, SVN, ESP.

However, when we analyze the impact of fiscal austerity in terms of the improvement of public administration efficiency, splitting between core euro-area countries and peripheral euro-area countries, we find heterogeneous results (presented in Table 4). In fact, the public sector efficiency of core euro-area countries seems to be indifferent to the implementation of fiscal consolidation episodes. In our opinion, this result can be related to the fact that usually such economies are more cautious in the management of their public finances. Additionally, the peripheral euro-area countries and their public sector efficiency are quite sensitive to fiscal consolidation episodes.

Independently of the input-oriented model used, the implementation of fiscal consolidation programs are always statistical significant for the improvement of government spending efficiency (only the 2SLS estimation using the input-oriented model 1 approach turns out to be not significant for the peripheral euro-area countries).

Additionally, it is important to mention that we consider Italy in the core euro-area countries based on the results of Afonso et al. (2014) to segregate between core and periphery countries. Nevertheless, we have estimated equation (1) also considering Italy as a peripheral euro-area economy, but we reached equivalent results to those presented in Table 4 (for reasons of parsimony those estimations are not presented here but they can be provided upon request).

Table 4. Effects of fiscal consolidations on public sector efficiency for core and peripheral euro-area countries, by model

	Core euro-area countries			Peripheral euro-area countries		
Model 0	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS
θ_{t-1}	0.835***	0.381	0.261	0.999***	0.838***	0.529**
	(0.116)	(0.244)	(0.213)	(0.060)	(0.101)	(0.217)
FE_{t-1}	0.004	-0.006	-0.011	0.027**	0.029**	0.029**
	(0.006)	(0.007)	(0.021)	(0.012)	(0.012)	(0.011)
Obs.	96	96	80	85	85	73
R^2	0.707	0.884	0.653	0.860	0.912	0.920
Model 1	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS
θ_{t-1}	0.889***	0.574***	0.244	0.943***	0.832***	0.426
	(0.057)	(0.168)	(0.411)	(0.044)	(0.069)	(0.285)
FE_{t-1}	-0.000	-0.001	-0.006	0.026**	0.034***	0.026
	(0.006)	(0.006)	(0.018)	(0.011)	(0.013)	(0.016)
Obs.	96	96	80	85	85	73
R^2	0.788	0.931	0.801	0.821	0.878	0.866
Model 2	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS
θ_{t-1}	0.914***	0.532***	0.758***	0.975***	0.779***	0.590***
	(0.060)	(0.178)	(0.255)	(0.044)	(0.092)	(0.217)
FE_{t-1}	0.007	-0.007	-0.007	0.032***	0.027**	0.019*
	(0.005)	(0.006)	(0.008)	(0.011)	(0.011)	(0.011)
Obs.	96	96	80	85	85	73
R^2	0.871	0.937	0.927	0.861	0.914	0.946

Note: Constant term, country and time effects estimated and omitted for reasons of parsimony. Robust standard errors in parenthesis. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively. The core euro-area countries include AUT, BEL, FIN, FRA, DEU, ITA, LUX and NLD. The peripheral euro-area countries include GRC, IRL, LVA, LTU, PRT, SVK, SVN, ESP.

For a last robustness check, we also assessed the impact of fiscal consolidation episodes over public sector performance when economies experienced different debt-to-GDP ratios. In fact, more indebted countries, with higher debt ratios, can be perceived as responding more acutely to fiscal consolidation episodes, since their need to constrain

public spending is higher. For that reason, we have divided our sample in three subsamples: economies experiencing a debt-to-GDP ratio below 60%, between 60% and 90% of the GDP and, lastly, for the economies observing debt ratios above 90% of GDP. The results, presented in Table 5, show that economies with debt levels below 90% of the GDP are positively affected by fiscal consolidation episodes, especially for those countries recording debt ratios between 60% and 90% of the GDP. These results are rather important since they signal the relevance of performing fiscal contractions without jeopardizing the actual provision of public goods and services

On the other hand, and as can be seen in Table 5, independently of the efficiency input-oriented model used, the economies experiencing debt ratios above 90% of the GDP are not sensitive to the existence of fiscal consolidation episodes in what respects the improvement of their public sector performance and government spending efficiency.

Table 5. Effects of fiscal consolidations on public sector efficiency for countries with debt-to-GDP ratios below 60%, by model

	Debt-to-GDP<60%			60%<Debt-to-GDP<90%			Debt-to-GDP>90%		
Model 0	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS
θ_{t-1}	0.942***	0.579***	0.929***	0.875***	0.544***	0.136	0.887***	0.359***	0.333
	(0.023)	(0.132)	(0.173)	(0.069)	(0.132)	(0.268)	(0.073)	(0.099)	(0.265)
FE_{t-1}	0.015**	0.012	0.010	0.025**	0.019*	0.009	0.015	0.006	0.002
	(0.008)	(0.010)	(0.015)	(0.011)	(0.008)	(0.008)	(0.011)	(0.008)	(0.008)
Obs.	213	213	174	105	105	86	102	102	90
R^2	0.889	0.925	0.916	0.752	0.855	0.871	0.775	0.908	0.899
Model 1	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS
θ_{t-1}	0.941***	0.610***	0.856***	0.817***	0.637***	-1.164	0.799***	0.372***	-0.487
	(0.019)	(0.111)	(0.172)	(0.059)	(0.138)	(2.656)	(0.082)	(0.106)	(2.291)
FE_{t-1}	0.014*	0.018	0.012	0.023**	0.027***	0.038	0.018	0.004	0.057
	(0.008)	(0.011)	(0.015)	(0.011)	(0.010)	(0.056)	(0.014)	(0.013)	(0.127)
Obs.	213	213	174	105	105	86	102	102	90
R^2	0.887	0.922	0.919	0.704	0.794	n.a.	0.605	0.797	n.a.
Model 2	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS	OLS	OLS-FE	2SLS
θ_{t-1}	0.945***	0.525***	0.742***	0.932***	0.800***	0.170	0.938***	0.685***	0.963***
	(0.023)	(0.147)	(0.187)	(0.051)	(0.118)	(0.489)	(0.044)	(0.086)	(0.278)
FE_{t-1}	0.020	0.016	0.021	0.027***	0.019**	0.018	0.019***	0.006	0.002
	(0.013)	(0.020)	(0.022)	(0.010)	(0.009)	(0.018)	(0.007)	(0.007)	(0.007)
Obs.	213	213	174	105	105	86	102	102	90
R^2	0.870	0.904	0.890	0.832	0.888	0.847	0.909	0.952	0.959

Note: Constant term, country and time effects estimated and omitted for reasons of parsimony. Robust standard errors in parenthesis. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

5. Conclusion

The existing literature has not yet addressed the issue of the potential impacts of fiscal consolidation episodes on the public sector efficiency. Therefore, and for a sample of 35 OECD countries and for the 2007-2020 period, we explore the relationship between fiscal consolidation episodes on the input-oriented efficiency scores. In addition, in our study we have decided to use the input-oriented efficiency scores, which translate how much a given government can reduce inputs without jeopardizing the actual level of public goods and services. The reasoning for using input-oriented efficiency scores is linked to the fact that during fiscal consolidation episodes, fiscal authorities desire to promote higher levels for public finances sustainability. Hence, and despite the mix between an increase of taxes and the reduction of public expenditures, the reduction of the size of the government is a clear purpose during fiscal consolidation efforts.

On the other hand, we analyze not only the euro-area and non-euro-area sub-samples, but also the core- and peripheral euro-area countries, as well as economies experiencing different debt-to-GDP ratios (below 60%, between 60% and 90%, and above 90%).

Therefore, our results show that the existence of fiscal consolidation episodes lead to an improvement in government spending efficiency. In fact, while we do not find differences between the positive impact on efficiency stemming from fiscal austerity programs in euro-area and in non-euro-area economies, we do find that only peripheral euro-area economies show government spending efficiency gains from the implementation of fiscal consolidations. This result can be related with the fact that core euro-area economies are usually more fiscally efficient, so they are already at a good fiscal stance level when they face fiscal consolidation episodes. Moreover, public sector efficiency of countries experiencing debt ratios between 60% and 90% of GDP are the one that benefit the most benefited from the implementation of fiscal contraction episodes. Lastly, our results are robust independently of the model used to compute the government spending efficiency scores.

Finally, and from a policy perspective, the evidence that fiscal consolidation episodes enhance the efficiency of government spending is a strong additional argument for implementing such fiscal consolidations.

For future work, it would be beneficial to disentangle tax-based or expenditure-based fiscal consolidation effects on public sector efficiency in order to proper understand what could be the best mix between public expenditure reductions or the increase in revenues for the improvement of public sector efficiency.

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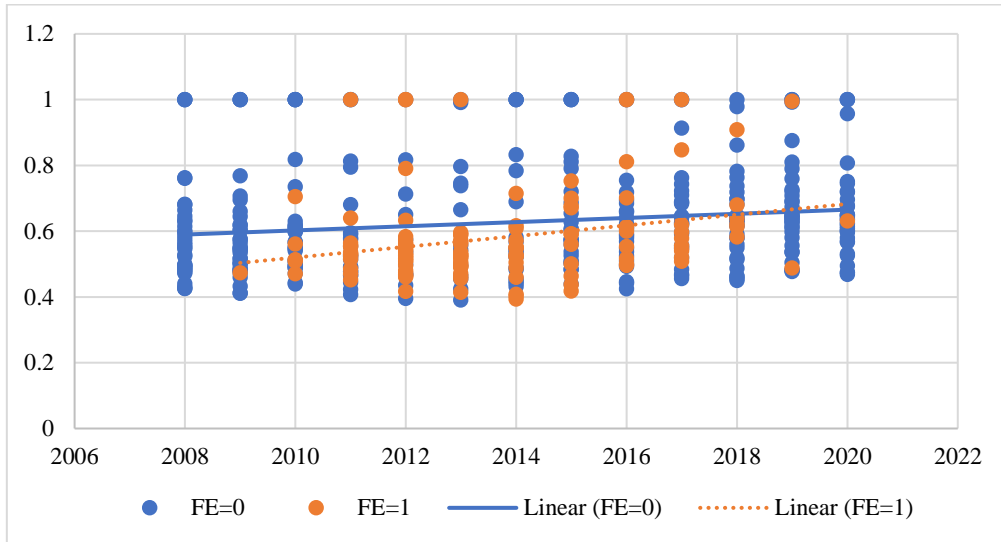
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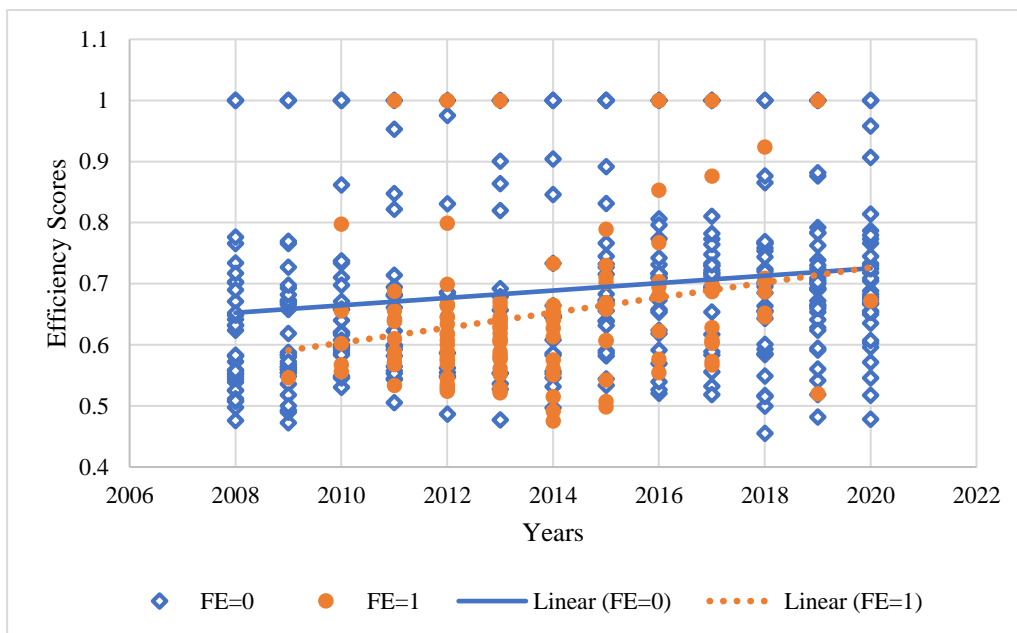
Appendix

Figure A1. Efficiency developments (DEA Model 0), with and without fiscal episodes

Source: authors.

Figure A2. Efficiency developments (DEA Model 1), with and without fiscal episodes

Source: authors.