



CAN CONTRACTIONARY FISCAL POLICY BE EXPANSIONARY? EVIDENCE FROM TUNISIA



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ABSTRACT

Article History

Received: 14 March 2017

Revised: 20 April 2017

Accepted: 16 May 2017

Published: 15 June 2017

Keywords

Private consumption
Fiscal policy
Expansionary fiscal contraction
Public debt
Threshold regression model
Non-linearity
Tunisia.

JEL Classification

C24, E21, E62, E65, H63.

In this paper, we study the non-linear relationship between fiscal policy and private consumption in Tunisia from 1975 to 2010. Our analysis, which is based on a threshold regression (TR) model proposed by Hansen (2000) confirms the non-linearity of the relationship between fiscal policy and private consumption, indicating an estimated threshold of public debt equal to 57% of GDP. The empirical results indicate that when public debt exceeds 57% of GDP, tax revenues are positively associated with private consumption. This finding confirms the expansionary fiscal contraction (EFC) hypothesis, occurring via tax revenues increases.

Contribution/ Originality: This study is one of very few studies which have investigated the non-linear relationship between fiscal policy and private consumption in Tunisia. The main finding of this study is in line with the expansionary fiscal contraction hypothesis.

1. INTRODUCTION

From the 1990s, the majority of the developing countries, as well as the European countries, have been engaged in a process of consolidation of public finance. Theoretically, Giavazzi and Pagano (1990); Blanchard (1990); Sutherland (1997) and Perotti (1999) showed that the reduction of fiscal deficits is required to boost the economy and employment in these countries. However, Hjelm (2002;2007); Van Aarle and Garretsen (2003); Hogan (2004) and Schclarek (2007) opposed fiscal contractions showing the expansionary role of fiscal policy.

The paper of [Giavazzi and Pagano \(1990\)](#) is based on the expectations view¹, that underlines the role of current changes in taxes or government spending as a signal of possible future changes. A permanent decrease in government spending can be associated with a future decrease in taxes, so that the private agents increase their consumption and decrease their savings. Analogously, an increase in taxes leads households to support less severe fiscal adjustments in the future.

The economic literature has revealed several channels through which fiscal contractions have favorable effects on the economic activity. These transmission channels can be on the demand side (demand-side channel) or on the supply side (supply-side channel). From the demand-side channel, the anti-Keynesian effects of fiscal policy come from the expectations view, through the wealth effect on private consumption and the credibility effect on the interest rates. From the supply-side channel, the anti-Keynesian effects come from the view of the labor market.

The aim of this paper is to study the non-linear relationship between fiscal policy and private consumption in Tunisia during the 1975-2010 period. Using a threshold regression model developed by [Hansen \(2000\)](#) we found that the level of the public debt-to-GDP ratio of 57% is a triggering factor of non-linear effects of fiscal policy on private consumption in Tunisia. Beyond this threshold, the effect of tax revenues switches from negative to positive, and there is a presence of an expansionist effect of a fiscal contraction.

2. THE EXPECTATIONS VIEW: THE WEALTH EFFECT ON PRIVATE CONSUMPTION

The expectations view stipulates that large and persistent fiscal adjustment² can lead household to expect a permanent decrease in taxes. This causes an increase in the permanent household income, which leads to an increase in private consumption and investment and therefore, increases the aggregate demand. The expectations view is based on changes in expectations about the future fiscal policy. The behavior of the economic agents is affected by changes of the future fiscal policy, which are triggered by changes in the current fiscal policy. This channel gives results contrary to traditional Keynesian theory. These are the anti-Keynesian effects of fiscal policy. Consequently, the source of this anti-Keynesian effect is the wealth effect on private consumption.

The expectations view was first introduced by [Feldstein \(1982\)](#) who showed that changes in permanent income depend on the expectations of private agents. Moreover, this idea was taken up by [Giavazzi and Pagano \(1990\)](#) who studied the experiences of two small European countries, Denmark and Ireland. These authors suggested an explanation based on the expectations view. According to this view, any fiscal contraction, due to a decrease of government spending accompanied by an increase of taxes, generates changes in the expectations of private agents. These agents anticipated that the decrease of government spending is accompanied by an important decrease of taxes, because they are rational. Consequently, since fiscal contraction is defined as a signal of changes in lower future taxes, households will increase their consumption and reduce their savings.

However, [Giavazzi and Pagano \(1990\)](#) pointed out that a fiscal contraction based on government spending decreases is preferred to another based on tax increases, because the tax burden raises a problem of credibility of fiscal austerity. On the other hand, [Blanchard \(1990\)](#) supported this idea by showing that a fiscal consolidation, taking place before reaching a certain limit of tax rate, will avoid costly consolidations in the future and therefore remove the danger of low output.

An important characteristic of the hypothesis of the anti-Keynesian effects of fiscal policy is to model the non-linear effects of fiscal policy. This non-linearity is examined by the consumption and savings behavior³. Several

¹According to [Giavazzi and Pagano 1990](#), the expectations view is also known in Europe as the German view.

²The fiscal adjustment, that generates a wealth effect on private consumption, occurs more directly in the case of a permanent decline in public spending, rather than in the case of a tax increase.

³The majority of the empirical studies are interested in household consumption behavior, exception that of [Giavazzi and Pagano2000](#) which studied the savings behavior.

authors showed that the Keynesian effects of fiscal policy change into anti-Keynesian effects, according to the state of the economy. Theoretically, Blanchard (1990); Sutherland (1997) and Perotti (1999) introduced that the anti-Keynesian effects of tax increases depend on the level of public debt. Bertola and Drazen (1993) assumed that the consumption behavior of private agents depends on the level of government consumption.

In a Keynesian model, Blanchard (1990); Sutherland (1997) and Perotti (1999) emphasized the effects of fiscal policy on the economic activity depending on the public debt. Consequently, fiscal policy has Keynesian effects on private consumption when the level of public debt is low. However, fiscal policy generates anti-Keynesian effects once the debt reaches a maximum value. In this type of model, the consumption behavior of households is non-linear.

Blanchard (1990) modeled the effects of the fiscal consolidation on private consumption, using tax increases, through two channels. On the one hand, the first channel is the negative wealth effect on private consumption, because the tax burden is supported by current generation. This is coherent with the Keynesian theory. On the other hand, the second channel is the positive effect on the output, because the consolidation⁴ has taken place before waiting for a certain tax rate limit protects the economy from high distortionary tax. Consequently, a tax increase is a factor that reduces the uncertainty about future tax policy. Therefore, consumers reduce precautionary savings collected to face the tax increase in the future. The second effect will be present as long as consumers are Ricardian and in that case the fiscal contraction is expansionary.

Blanchard (1990) found that, in normal times⁵, consumers have a Keynesian behavior, whereas in bad times, their behavior is reversed and there is presence of non-Keynesian effects. Thereby, fiscal policy has non-linear effects on private consumption.

Sutherland (1997) showed how the impact of fiscal policy on private consumption depend on the level of public debt. Sutherland's model assumed finitely lived consumers. These consumers envisaged that government adopted restrictive fiscal policy, based on tax increases, when public debt reaches a certain critical level.

At low levels of public debt, Sutherland (1997) found that there is a high probability that current consumers die before the next fiscal stabilization being imposed. Consumers heavily discount future taxes and therefore higher taxes will be borne mainly by the future generations. Fiscal policy has the usual Keynesian effects. At high levels of public debt, the current generations of consumers would be alive when stabilization takes place. Consumers are not able to move the burden of public debt to future generations. Moreover, they know that if these stabilization programs are put in place, higher taxes will be imposed. Therefore, fiscal policy has the anti-Keynesian effects (Sutherland, 1997). The solution to the model indicates that there is a smooth transition from the Keynesian to the anti-Keynesian effect as public debt increases. Theoretically, and following Sutherland (1997) the central hypothesis of non-linear effects is the expansionary impact of a fiscal contraction in a situation of critical indebtedness.

While Blanchard (1990) and Sutherland (1997) model emphasized the effects of tax on private consumption, Perotti (1999) developed another model where the anti-Keynesian effects of tax revenues and government expenditure can be analyzed. The latter considered the change in consumption of unconstrained and constrained individuals and investigated the role of credit constraints in the transmission of fiscal policy. The author showed that the negative wealth effect of expenditure shocks and the positive wealth effect of tax shocks in the aggregate demand is present when the share of non-constrained individuals is large.

In a standard neoclassical model, Bertola and Drazen (1993) demonstrated the expansionist effect of a fiscal contraction. Their model showed that a decrease of government spending must have an expansionary effect on private consumption. If the government spending decreases, wealth and private consumption increase. On their part, Bertola and Drazen (1993) introduced a non-linear relationship between the level of consumption chosen by optimizing the agents and the level of government consumption. This relationship depends on the level reached in the ratio of

⁴ Blanchard, 1990. Defined a consolidation as « an increase in taxes such that debt is stabilized at a constant value forever ».

⁵ Consumers have a constant probability of death.

government spending to GDP. In normal times, a rise of government spending reduces private consumption. However, the private consumption behavior changes around the triggering values of government spending. Moreover, the results are explained in terms of the infinitely lived consumers.

3. EMPIRICAL BACKGROUND

Several empirical studies analyzed the episodes of fiscal consolidation. They proved that fiscal contractions exhibit a positive effect on economic growth.

In their paper, [Giavazzi and Pagano \(1990\)](#) identified Denmark and Ireland as the two most striking case studies of successful expansionary fiscal consolidation in Europe. After a massive deterioration of public finance⁶, restrictive fiscal policies were implemented in Denmark and in Ireland. [Giavazzi and Pagano \(1990;1996\)](#) showed that a sharp fiscal consolidation was associated with a large expansion of private demand in these two European countries. In Denmark, the fiscal stabilization measures of 1983-1986, completed by a limitation of public consumption, a decrease in public investment and an increase in net taxes, were accompanied by a stimulation of private consumption and investment. The Irish government made two attempts of fiscal stabilization. The first attempt, which was based on tax increases, began in 1982. Although this attempt led to a reduction of the primary budget deficit in 1984, it was accompanied by a decrease of private consumption and investment. The second attempt, which was based on public spending decreases, was launched in 1987. It had positive effects on economic growth, which led to an increase of the GDP growth rate from 4.7% in 1987 to 5% in 1989. In Ireland, the decrease of expenditure led mainly to the expansion of production. The second Irish stabilization of 1987 and the Danish stabilization of 1983-1986, which stopped the growth of the ratio of the public debt to the GDP, were accompanied by a stimulation of production.

Besides this descriptive analysis for Ireland and Denmark, other empirical studies based on estimating regression models, confirmed the expansionary fiscal contraction hypothesis for several countries. These studies showed that the public debt/GDP ratio⁷ is the threshold variable that determines the anti-Keynesian effects of fiscal policy.

For 19 OECD⁸ countries between 1965 and 1994, [Perotti \(1999\)](#) showed that the level of public debt is a triggering factor of the non-linear effects of fiscal policy on private consumption. The author concluded that at high levels of public debt, higher government spending and lower tax revenues have anti-Keynesian effect on private consumption. [Perotti \(1999\)](#) paper confirmed that a fiscal contraction is more likely to be expansionary if the debt-to-GDP ratio is large. [Pozzi \(2001\)](#) examined the effect of fiscal policy on private consumption in two highly indebted countries, Canada and Italy, from 1961 to 1997. He proved that the effects of fiscal policy become non-Keynesian at high levels of government debt. This is evidence in favor of the presence of perfectly informed permanent income consumers ([Pozzi, 2001](#)). The estimation results found a threshold of government debt equal to 30% of GDP for Canada, and equal to 60% for the case of Italy.

From the estimation of the consumption function for a panel data for OECD countries over the 1970-2001 period, [Siwinska and Bujak \(2006\)](#) showed that households tend to behave in a Keynesian fashion in « normal fiscal times », and in non-Keynesian manner in « bad fiscal times »⁹. Using annual data over the 1970-2005 period for 15 European Union (EU) countries, [Afonso \(2006\)](#) showed that the impact of government spending on private consumption depends on the level of government indebtedness. He found that if the debt-to-GDP ratio is above the estimated

⁶ This deterioration was reflected in high levels of fiscal deficit and public debt as a percentage of GDP.

⁷ Recently, several empirical studies showed that the fiscal deficit/GDP ratio is another threshold variable that determines the anti-Keynesian effects of fiscal policy [Tounsi and Abdenour, 2015](#).

⁸ Organisation for Economic Cooperation and Development

⁹ [Siwinska and Bujak, 2006](#). defined a « normal fiscal times » as a period when public debt is low, and a « bad fiscal times » as a period when the level of public debt is large.

threshold, social transfers have a negative effect on private consumption. This result shows some evidence in favor of an expansionary fiscal contraction hypothesis in the European Union.

Diane and Fall (2007); Kinari and Shibamoto (2007); Ary *et al.* (2008); Minea and Villieu (2008) and Landry (2010) showed non-linear effects of fiscal policy. These authors indicated that the anti-Keynesian effects dominate when public debt ratio is higher than a certain threshold and a fiscal contraction has a positive effect on economic activity. Between 1980 and 2005, Diane and Fall (2007) suggested that fiscal policy has anti-Keynesian effects on economic growth for the Senegal, when the external debt is greater than 69% of GDP. Using quarterly data for the 1980-2004 period, Kinari and Shibamoto (2007) found that the Japanese fiscal policy has anti-Keynesian effects on private consumption, when government debt/GDP ratio is above 1,899%. For the West African Economic and Monetary Union (UEMOA)¹⁰ countries during the 1986-2002 period, Ary *et al.* (2008) clarified that the anti-Keynesian effects dominate and the fiscal contraction has an expansionary effect on the economic activity once the public debt level exceeds 83% of GDP. Over the 1978-2005 period, Minea and Villieu (2008) found that the fiscal contraction has a positive effect on the economic activity for 19 OECD countries when the public debt/GDP ratio is more than 90%. Using annual data from the Central African Economic and Monetary Community (CEMAC) countries from 1970 to 2006, Landry (2010) concluded that contractionary fiscal policies become effective if the public debt ratio is beyond 79% of GDP.

Contrariwise, Hogan (2004) found limited evidence in favor of the expansionary fiscal contraction hypothesis for a panel of 18 OECD countries, during the 1970-1999 period. More particularly, for Ireland, Italy, Belgium, Japan, Greece and Canada, He showed that a decrease in the government spending stimulates private consumption, when the public debt to GDP ratio is superior to 81%. Schclarek (2007) introduced that there is no evidence in favor of the expansionary fiscal contraction hypothesis in the industrial and developing countries.

4. EMPIRICAL METHODOLOGY

4.1. Model Specification

Before evaluating the existence of a non-linear effect of fiscal policy on private consumption, we will begin with the specification of a linear model. In this paper, we use Perotti (1999) model as point of reference to our empirical investigation. Theoretically, Perotti (1999) showed that the change of private consumption depends on unexpected fiscal policy shocks and on an expected change in the disposable income. The empirical specification of the consumption function may be written as follows:

$$(1) \quad \Delta C_t = \alpha^G \varepsilon_t^G + \alpha^T \varepsilon_t^T + \mu \Delta Y_{t/t-1}^d + \epsilon_t$$

ΔC_t , ε_t^G , ε_t^T and $\Delta Y_{t/t-1}^d$ indicate the change of private consumption, government expenditure shock, tax revenue shock and the expected change in the disposable income.

The analysis is based on two steps. In the first step, the fiscal policy shocks (ε_t^G and ε_t^T) and the expected change in the disposable income $\Delta Y_{t/t-1}^d$ must be estimated using a Structural Vector Auto-Regression model (SVAR), presented by the following equation¹¹ :

$$(2) \quad \Delta X_t = I + A \Delta X_{t-1} + \varepsilon_t$$

¹⁰ The West African Economic and Monetary Union is also known by its French acronym, UEMOA.

¹¹ To simplify the general specification of the VAR model, we use one delay in the model.

ΔX_{t-1} is the vector of endogenous variables composed of the net public expenditure (G_t), tax revenues (T_t) and real GDP (Y_t). ε_t is the residual vector. Unexpected fiscal policy shocks (ε_t^G and ε_t^T) correspond to the first two residuals of vector ε_t .

According to Schclarek (2007) the expected change in the disposable income between t and $(t-1)$ ¹² is given by equation 3 :

$$(3) \quad \Delta Y_{t/t-1}^d = \beta_0 + \beta_1 \Delta Y_{t-1}^d + \omega_t$$

In the second step, using the threshold regression technique proposed by Hansen (2000) we estimate the following non-linear model¹³ :

$$(4) \quad \Delta C_t = (\alpha_1^G \varepsilon_{t-1}^G + \alpha_1^T \varepsilon_{t-1}^T + \mu_1 \Delta Y_{t/t-1}^d) I(Z_t \leq Z) + (\alpha_2^G \varepsilon_{t-1}^G + \alpha_2^T \varepsilon_{t-1}^T + \mu_2 \Delta Y_{t/t-1}^d) I(Z_t > Z) + \varepsilon_t$$

Where $I(\cdot)$ is an indicator function which equals 1 when $I(Z_t \leq Z)$ and 0 otherwise. Similarly, it is equal to 1 if $I(Z_t > Z)$ and 0 otherwise. Z_t is the threshold variable.

4.2. Threshold Regression Model

To investigate the presence of non-linearity in the relationship between fiscal policy and private consumption, we apply the threshold regression (TR) model proposed by Hansen (2000). This methodology enables us to estimate the threshold. The specification of the threshold regression model is as follows:

$$(5) \quad y_i = \theta_1' X_i + e_i, \quad q_i \leq \gamma$$

$$(6) \quad y_i = \theta_2' X_i + e_i, \quad q_i > \gamma$$

where q_i is the threshold variable and e_i is a regression error. The threshold regression model takes the form (5)-(6). This model make it possible for the regression parameters to differ depending on the value of q_i .

To identify the threshold, we estimated the equation (4) using OLS. The sum of squared error function is :

$$(7) \quad S_n(\gamma) = S_n(\hat{\theta}(\gamma), \hat{\delta}(\gamma), \gamma)$$

$\hat{\gamma}$ is the threshold value that minimizes $S_n(\gamma)$ and can be defined as :

$$\hat{\gamma} = \operatorname{argmin} S_n(\gamma)$$

¹² According to Schclarek, 2007. $\Delta Y_{t/t-1}^d$ depends only on the lagged information (ΔY_{t-1}^d), and not on contemporaneous information about fiscal policy shocks.

¹³ By assumption, we assume that the consumption decision in period t is made with a lag to fiscal policy changes ε_{t-1}^G and ε_{t-1}^T .

The slope parameter estimates can be computed through $\hat{\theta} = \hat{\theta}(\hat{\gamma})$, and $\hat{\delta} = \hat{\delta}(\hat{\gamma})$.

To test the hypothesis $H_0: \gamma = \gamma_0$, a standard approach is to use the likelihood ratio statistic under the auxiliary assumption that e_i is independent and identically distributed (iid) $N(0, \sigma^2)$.

According to Hansen (2000) we consider this statistics :

$$LR_n(\gamma) = n \frac{S_n(\gamma) - S_n(\hat{\gamma})}{S_n(\hat{\gamma})}$$

The likelihood ratio test of H_0 is rejected for large values of $LR_n(\gamma_0)$.

5. DATA AND EMPIRICAL RESULTS

This paper used annual data for the case of Tunisia over the 1975-2010 period. The budget variables used are the private consumption (C_t), the net public expenditure (G_t), the tax revenue (T_t), the real GDP (Y_t) and the household income (Y^d). Z_t designate the public debt/GDP ratio ($DEBTG_t$)¹⁴.

Before estimating the non-linear model (equation 4), it is necessary to test the presence of threshold effect and specify the threshold variable for which linearity is the most strongly rejected. Using the methodology developed by Hansen (2000) the linearity test results indicated that the null hypothesis of no threshold is rejected at 5% threshold. Figure 1 shows that the value of the endogenous threshold corresponds to the ratio of the public debt to GDP of 57%. This value is statistically significant over the confidence interval [37,39%; 57,39%].

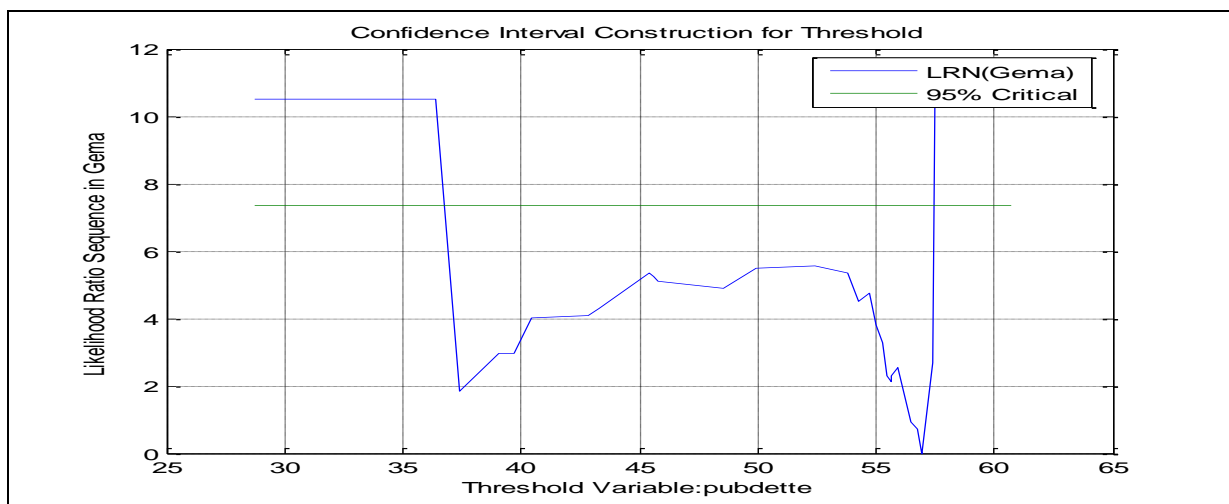


Figure-1. Confidence interval for the threshold of public debt

Source: Author's compilation using Matlab 7.0.1

As shown in table 1, our results suggest that, when the public debt ratio to GDP is lower than the estimated threshold of 57%, the impact of public expenditure and tax revenues on private consumption are negative and

¹⁴ The private consumption, net public expenditure, tax revenue, real GDP and household income are real and in per capita terms.

statistically non significant. Above the estimated threshold, the public expenditure effect on private consumption remains negative and statistically non significant. On the other hand, the coefficient of tax revenues changes signs and becomes positive and statistically significant. In other words, an increase of tax revenues leads to a stimulation of private consumption. Consequently, when the public debt ratio exceeds 57% of GDP, tax revenues have an anti-Keynesian effect on private consumption. A fiscal contraction, based on tax revenues increases, has a favorable effect on the economic activity. This finding confirms the expansionary fiscal contraction hypothesis.

Table-1. Estimation of the non-linear effect of fiscal policy on private consumption

Parameters	$DEBTG_t \leq 57\%$	$DEBTG_t > 57\%$
Constant	0,111 (2,93)*	-0,058 (2,52)*
ε_{t-1}^G	-0,012 (0,29)	-0,045 (1,02)
ε_{t-1}^T	-0,065 (1,43)	0,221 (3,50)*
$\Delta Y_{t/t-1}^d$	-3,260 (2,54)	1,926 (2,568)*
Threshold estimate	57%	
Value of LM test	9,91	
Bootstrap P-Value	0.04**	
95% confidence intervals for the threshold	[37,39%; 57,39%]	

*and **denotes significance at the 1% and 5% level, t-statistics are presented in parentheses.

6. CONCLUSION

This paper has contributed to the existing theoretical and empirical literature of the anti-Keynesian effects of fiscal policy. First, the theoretical literature showed that the expectations view studies the impact of the current fiscal policy on the economy, through its influence on the changes of the agents' expectations of the future policy. Second, the empirical literature found that the anti-Keynesian effects of fiscal policy depend on the public debt/GDP ratio.

Our analysis, which is based on a threshold regression (TR) model, confirms the significance of the non-linear relationship between fiscal policy and private consumption. Our results for Tunisia over the 1975-2010 period, indicated that once the public debt ratio exceeds 57% of GDP, the relationship between tax revenues and private consumption becomes positive and statistically significant. Consequently, at high public debt levels, a fiscal contraction, based on tax revenues increases, stimulates private consumption. This result supports the expansionary fiscal contraction (EFC) hypothesis in Tunisia.

However, further research should study the credibility effect on the interest rates, as the additional channel by which current fiscal policy can affect the economy. Several authors showed that this effect is present during « fiscal stress » period¹⁵ (Miller *et al.*, 1990; McDermott and Wescott, 1996; Alesina *et al.*, 2002).

Funding: This study received no specific financial support.

Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.

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¹⁵ A « fiscal stress » period is characterised by a high level of public debt and fiscal deficit.

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