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On the Sustainability of Budget Deficits in the Euro Area

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Abstract

We empirically examined the issue of budget sustainability for 11 euro area countries. Empirical analyses using non-stationary panel data analysis rejected, with statistical significance, the possibility of fiscal collapse in euro area countries during the period 1999 to 2005. This supports the notion that fiscal discipline rules are functioning and individual countries f fiscal deficits are steadily shrinking.

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1. Introduction

In January 1999, the euro single currency was adopted by 11 EU countries and the European Central Bank (ECB) began pursuing a unified monetary policy for the euro area. The ECB, of course, has authority over only monetary policy, and not over the fiscal policies or fiscal situations of individual countries. Therefore, if fiscal conditions in one euro area country were to significantly worsen, the ECB's management of monetary policy in the euro area could be greatly hindered. It is for that reason that budget deficit and government debt standards have come to be set and must be met from the time a country is admitted to the Economic and Monetary Union (EMU), the organization of countries that have adopted the euro single currency. The Maastricht Treaty (European Union Treaty), which was signed in February 1992, required compliance with the economic standards given below as a condition for participating in the third stage of the EMU, scheduled to commence on January 1, 1999.

(1) Average consumer price increase during the year preceding the assessment time less than the average for the three EU-members with the lowest consumer price increases, plus 1.5%.
(2) Average long-term interest rate during the year preceding the assessment time equal to or less than the average for the three EU-members with the lowest consumer price increases, plus 2.0%.
(3) Fiscal deficit not greater than 3% of nominal GDP, or a fiscal deficit that is effectively and continuously shrinking and close to meeting the 3% standard or, as a temporary and unusual development, above 3%.
(4) Government debt not greater than 60% of nominal GDP, or declining toward the 60% standard at an acceptable rate.
(5) Foreign exchange markets have not lowered the control rate because something that happened in the applying country and the exchange rate has moved within the range established through the Exchange Rate Mechanism (ERM) for at least the prior two years.

Standards like these were established because if the monetary union was implemented without sufficient convergence of the economic conditions in the participating countries, the ECB would face significant obstacles in pursuing a unified monetary policy and faith would be lost in both the ECB and the euro. In later discussions, it was decided that actual figures for 1997 would be used to determine whether individual countries met the conditions for participating in the monetary union. Among the five participation conditions, those that posed the greatest difficulty for individual countries were the fiscal deficit and government debt standards. As of 1996, only one of the then 15 EU member states, Luxembourg, met both standards. In response, the other member states instituted harsh measures to reduce their fiscal deficits and, as of 1997, a total of 14 countries had cut their deficits to less than 3% of GDP. Only Greece failed to do so. The situation was different, however, with regard to the government debt standard, which only Luxembourg, France, Finland, and the U.K. met with debts less than 60% of GDP. Nevertheless, judgments that countries not meeting the standard were steadily reducing their debts and approaching the standard, and, according to some, political considerations, came into play in determining which countries could participate. In the end, it was determined at a special summit of the European Council held in May 1998 in Brussels, Belgium, that 11 of the 15 EU-member

states would adopt the euro as a single currency. The U.K., Denmark, and Sweden chose not to participate in the monetary union, while Greece failed to meet all five of the participation conditions.

With the implementation of the monetary union, it was clear that promoting both the ECB's management of monetary policy and the success of efforts to stabilize the euro's value required individual countries to abide by fiscal discipline rules, so fiscal discipline rules were set forth in the Stability and Growth Pact. This agreement was initially proposed by Germany, which sought strict enforcement of Article 104(c) of the Maastricht Treaty, which addresses the emergence of excessive fiscal deficits in monetary union participants. The agreement approved by the European Council at the 1996 Dublin Summit had its name changed from the Stabilization Pact to the Stabilization and Growth Pact at the strong insistence of France.

The pact's two key points are as follows:

(1) Mutual Surveillance Framework for Realizing Sound Fiscal Management

All EU member states, whether monetary union participants or not, must establish medium-term fiscal targets and enumerate measures for achieving them, as well as put forth a fiscal program for releasing information on their country's fiscal condition. Submitted fiscal programs are to be reviewed by the European Commission and the Ecofin Council, both of which will issue an early warning to a country judged to be in danger of incurring an excessive fiscal deficit.

(2) Matters Regarding Rules and Sanction Procedures for Excessive Fiscal Deficits

An excessive fiscal deficit is basically a deficit greater than 3% of GDP. However, if a country with a fiscal deficit is also suffering a recession in which its economy is shrinking by 2.0% or more annually, it is not subjected to sanctions for an excessive deficit. Additionally, even if a country with a fiscal deficit is in the midst of a recession in which its economy is shrinking by less than 2.0%, the Ecofin Council will consider its request to be exempted from sanctions. To prevent abuse of this rule, the Council will not, in principle, consider such requests unless the economy is contracting by at least 0.75% on an annual basis. However, if the European Commission and the Council of the European Union determine that an excessive deficit does not exist, they must present a written explanation to higher authorities, so the system is set up to prevent simple avoidance of a decision to implement sanctions.

If the European Commission concludes that a country's fiscal deficit exceeds 3% of GDP, it will prepare an Excessive Deficit Procedure Report on the fiscal situation of the country concerned. The Economic and Monetary Committee (EMC) receives the report and renders its opinion within two weeks. The EMC is an economic and financial consultative body called for in Article 109(c) of the Maastricht Treaty and established in January 1999, at the same time the third stage of the EMU began. Its membership is comprised of one representative from each euro area country government and central bank, two representatives from the ECB, and two from the European Commission. The European Commission considers the opinion of the EMC and submits a report to the Ecofin Council, which, by a majority vote, will determine whether the subject country has an excessive deficit. At the same time, the subject country is advised to take measures for reducing its deficit. If it fails to do so, the Ecofin Council imposes, within ten months of the advice to take corrective measures, a sanction requiring the setting aside of a non-interest-bearing deposit. If no fiscal improvement is noted within two years, the non-interest-bearing deposit is taken by the EU as a fine. Non-interest-bearing

deposits consist of two portions, a fixed portion (0.2% of GDP) and a variable portion (1/10 of the deficit in excess of 3% of GDP), which together are not to exceed 0.5% of GDP.

If the Ecofin Council is unable to determine whether the country concerned has an excessive deficit, the European Council will issue a European Council Resolution regarding the matter. These resolutions carry significant weight as political guidance and the European Council would issue a resolution to provide guidance to the Ecofin Council and the European Commission. Sanction determinations, therefore, can be taken all the way to the European Council, the EU's highest decision-making body, in an extremely political process.

Summarizing the above, fiscal discipline rules have been maintained from the stage of determining euro area participants through today, with the ECB now pursuing a unified monetary policy for the euro area after introduction of the euro single currency. This paper seeks to determine whether fiscal discipline rules are functioning or not, via an empirical analysis of the possibility that a euro area country could suffer growing fiscal deficits that lead to a fiscal collapse.

Beginning with Hamilton and Flavin (1986) and Wilcox (1989), much research has been performed on budget sustainability because of the importance of that topic. In particular, as a reflection of recent developments in time-series analysis, much research has been performed using cointegrating tests. Prime examples of such research include Trehan and Walsh (1988), Hakkio and Rush (1991), Haug (1991), and Ahmed and Rogers (1995).

The cointegrating test, however, relies on the power of the unit root test, and, as is well known, the unit root tests put forth by Dickey and Fuller (1979), Phillips and Perron(1988), and others (or cointegrating tests based on these unit root tests) are much less powerful when sample sizes are small. This is a major problem for the use of fiscal data, which, because budgets are assembled once a year, is mainly annual. If a sustainability test based on cointegrating analysis can be performed only with annual data, sample sizes are naturally small, and a unit root test (or cointegrating test) could produce incorrect results indicating a certain variable does not have a unit root (or has a cointegrating relationship) when it actually does (or does not have a cointegrating relationship).

The contributions of this paper are twofold. First, is its empirical analysis of budget sustainability in the euro area. A certain level of fiscal discipline is required of countries wishing to adopt the euro single currency and place themselves under the ECB's unified monetary policy. Testing whether the requirements of the euro area result in fiscal performance is the key objective of this paper. The second contribution of this paper is our use of a panel unit root test to overcome traditional problems in analyzing budget sustainability. The implication of this decision is that a combination of data for multiple countries can be used to perform powerful tests, when only annual data is available for individual countries.

2. Model

Following Ahmed and Rogers (1995), we demonstrate the sustainability condition for the government budget constraint in this section. The government budget constraint for

period t is given by,

$$G_t - T_t + r_{t-1}B^g_{t-1} = B^g_t - B^g_{t-1}, \tag{1}$$

where B^g_t is government bonds at time t, G_t is government expenditure at time t, T_t is tax revenue at time t, and r_t is interest rate from t to $t+1$. Equation (1) shows that the government budget deficit has to be financed by creating new debt.

The consumer's optimization condition is then given by,

$$E_t[(1+r_t)s_{t,t+1}] = 1, \tag{2}$$

where $s_{t,t+j}$ is the marginal rate of substitution between consumption in period t and $t+j$.

It follows from equations (1) and (2) that

$$E_t[\sum_{j=0}^{\infty} s_{t,t+j}G_{t,t+j}] - E_t[\sum_{j=0}^{\infty} s_{t,t+j}T_{t,t+j}] + (1+r_{t-1})B^g_{t-1} = \lim_{N\to\infty} E_t[s_{t,t+N}B^g_{t+N}]. \tag{3}$$

When the limit term on the right-hand side of equation (3) is equal to zero, the government debt outstanding is equal to the expected present value of the future net surplus. This rules out the possibility of bubble financing of the economy and is also known as no-Ponzi game condition. Ahmed and Rogers (1995) say that the currently expected paths of government spending and taxation are sustainable when this condition holds.

If we take the first difference of equation (3) and substitute for ΔB^g_{t-1} from equation (1), then we get

$$\begin{aligned}\Delta E_t[\sum_{j=1}^{\infty} s_{t,t+j}G_{t+j}] - \Delta E_t[\sum_{j=1}^{\infty} s_{t,t+j}T_{t+j}] + (G + r_{t-1}B^g_{t-1} - T_t) \\ = \lim_{N\to\infty} E_t[s_{t,t+N}B^g_{t+N}] - \lim_{N\to\infty} E_{t-1}[s_{t-1,t+N-1}B^g_{t+N-1}].\end{aligned} \tag{4}$$

Under some certain (and plausible) conditions, Ahmed and Rogers (1995) demonstrate that the presence of a cointegrating relationship in $(T_t, G_t, r_{t-1}B^g_{t-1})$ with the cointegration vector (1, -1, -1) is a necessary and sufficient condition for the present-value budget constraint to hold (i.e. the limit term in equation (3), and therefore two limit terms in equation (4), to be zero).

It is clear from equation (1) that the cointegrating relation among $(T_t, G_t, r_{t-1}B^g_{t-1})$ with a cointegrating vector of (1, -1, 1) is equivalent to ΔB^g_t being stationary. Thus the stationarity of ΔB^g_t is the necessary and sufficient condition for the government present value constraints to be satisfied.

3. Data

We performed tests on the 11 countries (Austria, Belgium, Germany, Spain, Finland, France, Ireland, Italy, Luxembourg, Netherlands, and Portugal) that have been euro area

countries since the establishment of the ECB. Regarding limitations on data usability, we performed analyses using budget sizes relative to GDP. We obtained this data from the ECB's homepage.

Our empirical analysis covered the following two sample periods[1].

Sample A: 1991 to 2005
Sample B: 1997 to 2005

Considering the unification of East and West Germany, the period for Sample A was set to cover 1991 to 2005. The period for Sample B was set to cover 1997 to 2005 based on the fact that participation in the monetary union was determined using fiscal conditions for 1997.

4. Empirical Results

We use the techniques of the panel unit root test to analyze the budget deficits of EU countries. Levin et al. (2002) suggest that individual unit root tests have limited power against alternative hypotheses, especially in small samples. Since we have only annual data between 1991 and 2005, this is a serious problem for the current analysis. Panel unit root tests help us to overcome this problem. We used six different panel unit root tests, i.e., Levin, Lin and Chu test, Im, Pesaran and Shin test, ADF-Fisher Chi-Square test, ADF- Choi test, PP-Fisher Chi-Square test, and PP-Choi test (Levin, Lin and Chu, 2002; Im, Pesaran and Shin, 2003; Maddala and Wu, 1999; and Choi, 2001).

If $(T_t, G_t, r_{t-1}B^g_{t-1})$ is in a cointegrating relationship with a cointegrating vector of the form (1,-1,1), then ΔB^g_t is stationary, and if ΔB^g_t is stationary, the budget is sustainable. Given that, we analyzed budget sustainability by performing panel unit root tests on government budget deficit.

As the deterministic term specification, we used the fixed effect. We used SBIC to select the lag order. The null hypothesis was that government debt has a panel unit root. The alternative hypothesis was that government budget deficit does not have a panel unit root.

Table 1 presents empirical results for the period 1991 to 2005 and clearly shows that the null hypothesis is rejected for only one of the six cases at the 1% significance level. At the 5% significance level, the null hypothesis is rejected for three of the six cases. This indicates, therefore, that budget deficits are non-stationary variables with unit roots and supports the judgment that budget deficits are not necessarily sustainable.

Table 2 presents empirical results for the period 1997 to 2005 and shows that the null hypothesis is rejected for five of the six cases at the 1% significance level. The null hypothesis is rejected for all six cases at the 5% significance level. These results, therefore, indicate that government budget deficit is stationary variables that do not have a unit root, and strongly hint that government budget deficit is sustainable.

We checked the robustness of our results by shifting the beginning of the sample period in one-year increments. Specifically, this means that we analyzed sample periods

[1] Data for Spain could be used only for the period beginning with 1995.

1991-2005, 1992-2005, 1993-2005, 1994-2005, 1995-2005, 1996-2005, and 1997-2005, and examined the movement of test statistics. Our results appear in Figure 1 and show that, at both the 1% and 5% significance levels, budget sustainability is supported when the sample period is set to begin around 1997.

5. Some Concluding Remarks

We empirically examined the issue of budget sustainability for 11 euro area countries. We have demonstrated that the fiscal performance of the Euro Area countries between 1999 and 2005 was sustainable. This supports the notion that fiscal discipline rules are functioning and individual countries' fiscal deficits are steadily shrinking.

That said, however, the demands by Germany, France, and other large countries at the March 2005 European Council meeting in Brussels were accepted and it was agreed to fundamentally change the Stability and Growth Pact. One of the changes was to forego an excessive deficit determination even for a country with a deficit greater than 3% of GDP, if the margin of excess is small and temporary, and economic growth is negative or the growth rate is persistently below the potential growth rate. Another change excluded from deficit calculations items like pension reform costs; expenditures on research, development and innovation; and burdens arising from achieving of European policy objectives, notably the process of European unification[2].

The 3% rule has been kept, but, with the acceptance of various exception provisions, greatly loosened. Furthermore, the time limit for excessive deficit recognition and sanction procedures has been extended. The ECB and national central banks of the member countries have criticized these revisions of the Stabilization and Growth Pact as weakening fiscal discipline rules, working to the detriment of fiscal strengthening policies, and increasing the risk of expanding deficits over the medium-to-long term. Expanding or chronic deficits in euro area countries will make it difficult for the ECB to pursue stable monetary policy management. Whether the favorable empirical results obtained in our analysis continue to be supported could be said to depend on whether the European Commission, European Council, and other institutions and the governments of euro area countries recognize their responsibilities and can apply fiscal discipline rules for the purpose of achieving sound budgets over the medium term.

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Table 1

Panel Cointegration Tests

1991-2005

Method	Test-Statistic	p-value
Levin, Lin and Chu $t-$test	-2.912	0.002
Im, Pesaran and Shin $W-$test	-1.758	0.039
ADF-Fisher Chi-Square test	30.503	0.107
ADF- Choi $Z-$test	-1.869	0.031
PP-Fisher Chi-Square test	28.466	0.161
PP-Choi $Z-$test	-1.410	0.079

Note

p-value for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

ADF-Fisher Chi-Square and ADF-Choi Z tests show that individual unit root test is based on ADF type tests (Dickey and Fuller, 1979).

ADF-Fisher Chi-Square and ADF-Choi Z tests show that individual unit root test is based on Phillips-Perron type tests (Phillips and Perron, 1988).

Table 2

Panel Cointegration Tests

1997-2005

Method	Test-Statistic	p-value
Levin, Lin and Chu $t-$test	-5.188	0.000
Im, Pesaran and Shin $W-$test	-2.496	0.006
ADF-Fisher Chi-Square test	43.933	0.008
ADF- Choi $Z-$test	-2.995	0.001
PP-Fisher Chi-Square test	40.088	0.011
PP-Choi $Z-$test	-2.598	0.005

Note

p-value for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

ADF-Fisher Chi-Square and ADF-Choi Z tests show that individual unit root test is based on ADF type tests (Dickey and Fuller, 1979).

ADF-Fisher Chi-Square and ADF-Choi Z tests show that individual unit root test is based on Phillips-Perron type tests (Phillips and Perron, 1988).

Figure 1

P-value of ADF-Fisher Chi-Square Tests