

UNEMPLOYMENT AND SUSTAINABILITY OF FISCAL POLICY: AN ANALYSIS USING THE ACCOUNTING APPROACH FOR A SET OF EUROZONE COUNTRIES (1990-2022)

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ABSTRACT

The main objective of this article is to examine the sustainability of fiscal policy and to interpret these effects on employment in a set of Eurozone countries (1990-2022). Indeed, we presented the accounting approach technique used by the IMF in 1990 to assess the viability of fiscal policy.

In order to carry out the accounting diagnosis for each country, we used variables such as public debt as a % of GDP, the economic growth rate, as well as the monetary interest rate in order to calculate the primary balance necessary to stabilize the public debt.

Therefore, the statistics relating to the sustainability of the fiscal policy for all the countries studied show that a well-administered and sustainable fiscal policy promotes a favorable and stable environment favoring investment and job creation.

Therefore this policy is considered a strictly necessary short and long-term strategy to reduce unemployment, but its absence can create more serious problems in the future.

Keywords debt, deficit, fiscal policy, fiscal policy sustainability, unemployment

RESUME

L'objectif principal de cet article est d'examiner la soutenabilité de la politique budgétaire et d'interpréter ses effets sur l'emploi dans un ensemble de pays de la zone euro (1990-2022). En effet, nous avons présenté la technique d'approche comptable utilisée par le FMI en 1990 pour évaluer la viabilité de la politique budgétaire.

Afin de réaliser le diagnostic comptable pour chaque pays, nous avons utilisé des variables telles que la dette publique en % du PIB, le taux de croissance économique, ainsi que le taux d'intérêt monétaire afin de calculer le solde primaire nécessaire à la stabilisation de la dette publique.

Ainsi, les statistiques relatives à la soutenabilité de la politique budgétaire pour tous les pays étudiés montrent qu'une politique budgétaire bien administrée et durable favorise un environnement favorable et stable favorisant l'investissement et la création d'emplois.

Cette politique est donc considérée comme une stratégie strictement nécessaire à court et à long terme pour réduire le chômage, mais son absence peut créer des problèmes plus graves à l'avenir.

Mots clés : dette, déficit, politique budgétaire, viabilité de la politique budgétaire, chômage

INTRODUCTION

For European countries, fiscal policy represents one of the most usable means in these countries to resolve the problem of sustainability of fiscal policy and ensure economic stability. Indeed, since the subprime crisis, the level of public debt has risen considerably, which has caused the unemployment rate to rise.

The spread of the crisis has finished affecting all countries without exception; the public debt ratio has exceeded 60% of GDP in Portugal, Ireland, Greece, Cyprus, and France. The explosion of the public debt burden in these countries has led to lax and irresponsible fiscal policies, which calls into question the sustainability of their public debt.

Therefore, the present article aims to answer the question of the capacity of fiscal policy to stabilize certain macroeconomic variables such as debt, and economic growth and to revive overall demand in order to stimulate consumption, increase investment and reduce unemployment.

Since then, the use of fiscal policy as a means to revive the economy was developed by John Menard Keynes who states that, public spending can be intended to deal with underemployment through debt which could create a situation tomorrow better; of increased employment and new infrastructure would automatically increase public revenue and subsequently pay off initial expenses. As a result, the State can run into a budget deficit. It increases its spending without increasing its revenue.

According to the Keynesian multiplier, the autonomous increase in fiscal expenditure, without revenue increasing, induces a more than proportional increase in national production. The increase in fiscal spending further increases demand as well as production. This induces an additional distribution of income.

On the other hand, according to neoclassical theory, the recovery policy is less effective since when the State uses borrowing to finance expenditure, it sends interest rates upward, which tends to depress private investment an amount similar to the recovery.

Indeed, the ineffectiveness of fiscal policy was also confirmed by (Solow 2002). Similarly, the principle of Ricardian equivalence initiated by Barro (1974) also corroborates the idea of the insignificance of fiscal policy.

Therefore the question of the use of fiscal policy as a means to regulate economic activity was addressed empirically by several authors:

Perotti, 1998 a reduction in deficits pushes the private sector to reduce current and future tax forecasts, which increases investment and consumption.

Alesina et al, 2002) noted that a reduction in employment and the anticipated reduction in labor taxation lead to a reduction in wages, which will increase the increase in company profits, thus encouraging investment subsequently.

Afonso (2005) stated that European debts have been, over the last 20 to 30 years, poorly sustainable; then Stefan Collignon (2012) affirmed that they were, at least until 2008. The analysis of fiscal policy initiated by Henning Bohn (1998) proposes a study framework in terms of "fiscal rules" which trace the dynamic reaction of the primary fiscal balance to the level of public debt. Bohn concluded that a strictly positive reaction of the primary balance to the debt level is sufficient for the government to examine its long-term timeless budget constraint.

Thus, since there is a maximum threshold of public debt according to the literature, recent research considers that fiscal policy must set its public debt/GDP ratio in the medium term to cope with macroeconomic shocks of the magnitude of that of 2008-2009 (see especially Daniel and Shiamptanis (2013), Ghosh et al. (2013a,b)). A fiscal stabilization rule then implies that the primary debt balance is positive and greater than the real interest charge. Let us also point out that we are talking about sustainability when the fiscal policy controls the swelling of the public debt, that is to say the State would be able in the future to repay its debt without recourse to the fiscal surplus. Therefore, the State does not find itself continually obliged to issue new loans to repay debt when due (does not involve a Ponzi game).

The IMF (2011) announces that in the absence of the necessary fiscal adjustment, the government would be unable to service its debt and in this case we can say that fiscal policy is considered unsustainable. In 2013 the (IMF 2013) announced a new definition which considers public debt to be sustainable when "the primary balances necessary to at least stabilize the debt in both.

According to Gorina (2013), to maintain the financial viability of state budgets and boils down to the ability of governments to properly manage their fiscal expenditure from their own funds.

Financial viability, according to Barbera et al. (2017), can be summarized in 2 types: passive and active financial viability of local budgets. According to the authors, passive sustainability is defined as the State's capacity to deal with crises, while active sustainability is defined by the tool for anticipating threats.

In the same context, Lysiak & Kushnir, (2020) there are two forms of fiscal policy that address budget sustainability: active and passive. One is active, through the use of means that stimulate socio-economic development, and the other is negative, through

the use of automatic stabilizers(Expenditures and tax revenues), in the best case, ensure a return to the pre-crisis fiscal position of municipal budgets.

About the relationship between economic policy and the increase in unemployment rate Blanchard 1983 in his article unemployment and growth, gave a relationship between fiscal and monetary economic policies and the unemployment rate. He showed that the increase in unemployment rates at the beginning of the 1990 mainly resulted from a demand deficit, i.e. the government introduced restrictive monetary and fiscal policies in order to reduce the public deficit. He adds that in this climate of low growth, the profits collected by companies do not allow for investment and, ultimately, employment. So companies use their profits to reduce their debts, rather than to invest.

Soukaina, K. (2023) used the dynamic panel model (gmm) for a panel of 16 EU states, covering the period 1990-2019 to study the relationship between the unemployment rate and spending. She concluded that public spending have a significant positive impact on unemployment.

Soukaina, K., & Hammami, S. (2023) .The authors used the static and dynamic model to examine the interactions between budget deficit and macroeconomics in a set of Eurozone countries from 1990-2016. They found a negative impact of GDP per capita on the budget deficit which shows here that the increase in budget deficit negatively affects economic growth and indirectly employability in these countries

In this context, to respond to our central problem of this article which aims to seek the role of fiscal policy in regulating demand and reducing unemployment, we will first of all calculate the sustainable threshold of primary fiscal balance which makes it possible to stabilize public debt(SPS). Then, we will interpret the evolution of the unemployment rate according to the sustainability indicators. Therefore, the study constructs two fundamental hypotheses as shown below, to judge the sustainability of fiscal policy and its effects on the unemployment rate.

Hypothesis 1: Is the sustainability of fiscal policy a necessary condition for reducing the unemployment rate?

Hypothesis 2: Is the sustainability of fiscal policy not a necessary condition for reducing the unemployment rate?

It is therefore appropriate to present in the first section of this article the literature review of the different methods used to assess the sustainability of public debt. So, in the second section, we will focus on introducing the accounting method to interpret sustainability fiscal policy in a set of Eurozone countries for 32 years.

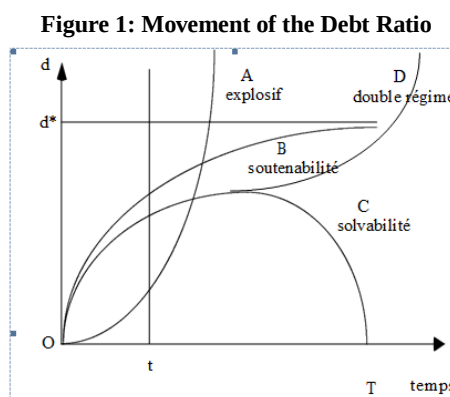
The major contribution of this article consists of using the accounting method which aims to introduce annual data in order to see the sustainability of fiscal policy, which allows us to have a clear picture of the annual fiscal situation of each country. Thus, to confirm or refute from an accounting perspective the idea of the Keynesian conception which stipulates that the recovery policy makes it possible to stimulate demand and reduce the unemployment rate.

II- Theoretical Analysis of Sustainability

- The Dynamic Approach

This approach was developed by the IMF to assess the sustainability of public debts based on medium-term projections. This method consists of introducing shocks to the variables. Also, the debt dynamics method.

2- Debt Dynamics Method



Source: RAFFINOT.M (1998)

This curve, called "External Debt Sustainability" developed by Raffinot, describes the different dynamics of the debt ratio. We observe 3 trajectories:

- Path C evokes the notion of solvency.
- Pathway B represents sustainable debt.
- At the level of trajectory A: explains a payment default.

Mathematically, we can simplify the notion of the dynamics of the public debt of such a country:

$$DF_{t+1} = dft(1 + RT - gT) - SPO_{t+1} \quad \text{Eq1}$$

Source: Mikael celévenot applied macroeconomics II

Where:

DF(t+1) = the public debt rate in a given year t+1

dft = public debt rate of the previous year

RT = interest rate applied to the public debt

gt = GDP growth rate

SPO = public balance excluding interest weight

This equation shows that the variation in the public debt rate depends on interest rates, growth rates, and public balance excluding debt burden.

The condition of public debt sustainability can, therefore, be written as:

$$SPS = (gt - rt)dft \quad \text{Eq2}$$

The stabilizing primary balance of the public debt, results from the gap between the growth rate of the economy (gt) and the effective interest rate of the public debt (rt). Therefore, to stabilize the public debt ratio as a percentage of GDP, it requires that the primary public balance be greater than the product of the public debt rate (dft) and the gap found between the interest rate on the public debt (rt) on one hand and the growth rate in the value of GDP (gt) on the other hand.

3- Approach using the inter-temporal budget constraint of the State

The State is considered an economic agent constrained by an inter-temporal fiscal constraint (cbit) in all of its financial decisions. Indeed, a State respects its cbit if the positive difference between the primary surplus and the current amount of debt is positive. This approach allows the State to prudently manage public finances to avoid the case of debt unsustainability. According to this approach, fiscal policy is sustainable if the set of primary surpluses necessary to cover the principal and the future debt burden. Furthermore, in the case where the State does not repay its debts with new debts, this condition is called a Ponzi Game. The no Ponzi game assumes that in the future, the value of public debt in an indefinite period converges towards zero.

4- The econometric approach

There are two types of tests: direct and indirect.

4-1 Direct actuarial tests

Indication of the State's CBIT based on updated public debt and budget deficit data series

Compliance with the State requires two fundamental conditions:

- The present value of the final debt converges, in the indefinite future, towards zero (transversality condition or also no Ponzi game condition).

- At each moment, the public debt must be equal to the present value of future seigniorage income adjusted for the primary budget deficit.

4-2 Tests of Effective Sustainability

Consist of the stationarity of the series of debts and deficits compared to GDP. These tests were conducted by Kremers (1988).

4-3 Indirect Tests of Sustainability

This indirect form of the sustainability test was used for the first time by Trehan and Walsh (1991).

- The stationarity of revenues and expenditures.

- The non-stationarity of the budget deficit, then the demonstration of the cointegration test between public expenditure and revenue and/or debt interest and the primary deficit.

Strong sustainability: if government revenue and expenditure are integrated of order 1, cointegrated, and with a unitary cointegration coefficient.

- Weak sustainability if the cointegration relationship exists but the cointegration coefficient is positive but not unitary (Engle, R. F., & Granger, C. W. (1987).

5 - The accounting approach

The accounting approach is a method developed by the IMF to detect sustainability based on past data. It can also be the origin of a prospective analysis if the indicators are calculated from forecasts to anticipate the fiscal policy of an economy in the future.

5-1 The accounting hypotheses of the explanation of sustainability

Hypothesis 1: Debt declines once we have an economic growth rate higher than the nominal interest rate.

Hypothesis 2: Debt inflation begins when the economic growth rate will be lower than the nominal interest rate.

5-2 Methods used

The accounting method used by the International Monetary Fund in 2009 to calculate the sustainability of public debt.

The sustainability threshold calculation is based on this mathematical formula:

$$SP = (gt - rt)df_t$$

After calculating this threshold, we will compare it with the primary balance.

The gap between the necessary primary fiscal balance and the observed balance indicates the degree of fiscal stabilization allowing sustainability to be achieved. This approach was used by the IMF in 2009.

Data:

dt: public debt ratios as a % of GDP

rt: The money market interest rate

gt: the growth rate

Spo: the observed primary balance

SPS: the primary sustainable threshold

The data used comes from Eurostat.

III- Accounting diagnosis of the sustainability of the fiscal policy of six Eurozone countries

France

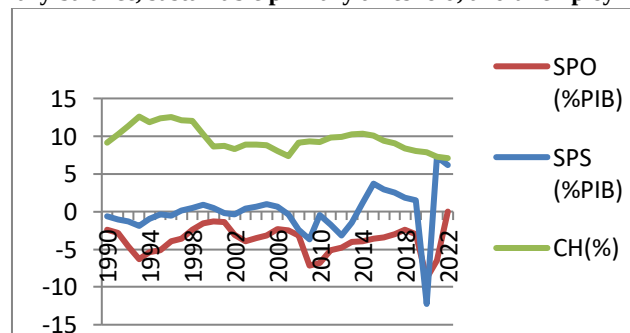
Based on equation 2, we will calculate the stabilizing threshold of public debt for each year from 1990 until 2022.

In France, the calculation of the sustainable threshold (sps) that judges the sustainability of the public debt requires a set of variables.

According to the statistics displayed in table n1 (see appendix), the public debt ratio in France has exceeded the threshold set by PSC of 60% of GDP over several years, which clearly threatens the sustainability of public debt in France.

At the turn of the years indicated in Table 1, the primary budget deficits achieved were below the sustainable threshold, which explains the sustainability of the public debt. This is due to the achievement of (gt) being quite high and the maintenance of (rt) at low levels. However, in 2020, we see $Spo > Sps$ as well as $gt < rt$ applied to debt, which explains the lack of public debt sustainability.

Graph n°2: Primary balance, sustainable primary threshold, and unemployment rate in France



Source: made by the auteur

In 1994, fiscal policy in France was unsustainable, economic growth was quite low relative to the interest rate, and the unemployment rate peaked at 12.59%.

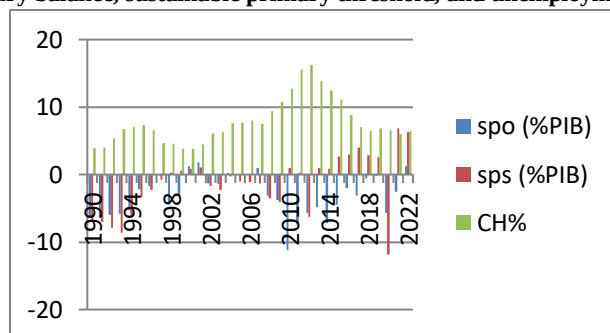
In 2022, the economic situation was favorable; the government achieved a budget surplus of 6.14% of GDP. This improvement is particularly due to sustained economic growth (gt) and an interest rate applied to the debt (rt) which is largely very low.

2. Portugal

According to Table 2, we note that in 1990-1997; 2000-2009; 2012, and in 2020, the realized primary budget deficits (spo) exceed the sustainable threshold (SPS), which requires a positive fiscal adjustment. This further reflects the unsustainability of public debt. The swelling of the public debt, as well as the economic blockage known for the years we have advanced, have led to a social burden summed up by the scourge of unemployment, which reached a peak of 16.19% in 2012.

However, during the years 1998, 1994, 2010, 2011, 2021, and 2022, primary deficits are below sustainable thresholds. This confirms the sustainability of public debt and subsequently of fiscal policy.

Graph n°3: Primary balance, sustainable primary threshold, and unemployment rate in Portugal



Source: made by the auteur

Graph 3 shows the increasing evolution of the unemployment rate (TCH), the primary budget deficit (spo), and the sustainable primary threshold (sps).

From 2000 until 2009, economic growth was quite low compared to the interest rate, and the unemployment rate increased from 3.83% in 2000 to 10.7% in 2009, an increase of 7%.

In 2012, the unemployment rate reached a peak of 16.19%. This increase is particularly due to relatively poor economic growth (gt) and an enormously high interest rate applied to the debt (rt), which reduces private investment.

It should be noted that an unsustainable fiscal policy creates a financial environment that is not conducive to investment.

3. Cyprus

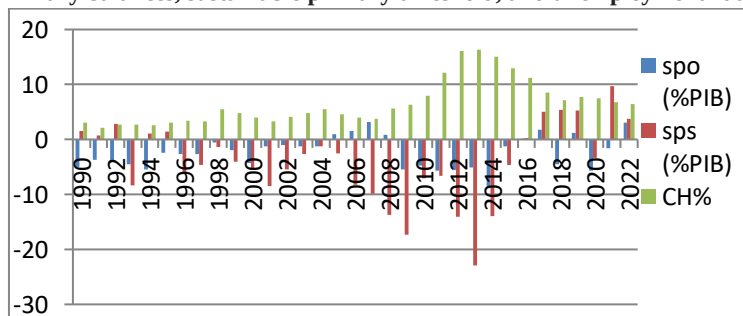
According to Table 3, the public debt was unsustainable, particularly for the years 1993 and between 2008 and 2015. The spo are superior to the sps. This period was characterized by serious economic disruptions, namely the emergence of the global financial crisis, the crisis of sovereign debt, and commodity price corrections, which have negatively affected Cyprus' economic policy.

1996 to 2015

On the other hand, we note that over the years (1993 as well as 1996 until 2015).

Primary deficits (spo) are constantly below the sustainable thresholds (sps), which show that fiscal policy was sustainable, thanks to the strengthening of economic activity.

Figure 4: Primary balances, sustainable primary threshold, and unemployment rate in Cyprus.



Source: made by the auteur

In 2013, fiscal policy was unsatisfactory; the public debt ratio was 180% of GDP, and the unemployment rate reached a peak of 16.28%.

In 2022, the year where we see the feasibility of the fiscal policy characterized by the reduction of the debt ratio to 77.3% of GDP, as well as the improvement in the economic situation, have played a crucial role in reducing the unemployment rate (6.43%).

4. Greece

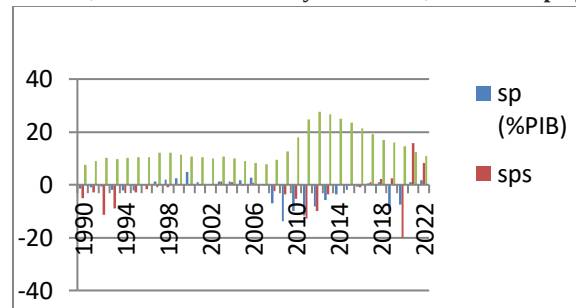
Examining the figures presented in Table 4 below, we see that Greece's public debt exceeded 60% during the period.

Indeed, the table shows that during the periods (1990-2007); (2011-2012); in 2016 and 2020, $s_{po} > s_{ps}$ as well as $rt > gt$, which demonstrates that the public debt in Greece was unsustainable. The unemployment rate reached an undeniable level of 27.47% in 2012, and the social situation is becoming even more complicated.

This situation leads to an increase in the debt burden, which reduces the future flexibility of fiscal policy and its capacity to maintain a counter-cyclical influence in the short term. It will also lead to rising interest rates, which will crowd out private investment, pushing the unemployment rate to high levels.

On the other hand, we note that in 2008 and 2009, and from 2013 until 2019, and again in 2021 and 2022, the public debt was sustainable because $gt > rt$, as well as $s_{po} < s_{ps}$.

Figure 5: Primary Balances, Sustainable Primary Threshold, and Unemployment Rate in Greece



Source : made by the auteur

In 2012, the unemployment rate reached a peak of 27.69%, economic growth was negative (-7%), and the increase in RT led to the reduction of fiscal leeway. Nevertheless, in 2022, the unemployment rate reached 10%, the improving growth rate, and the reduction in the cost of borrowing accompanied by a notable improvement in the financial situation. As a result, this creates an environment conducive to investment.

5. Ireland

Table 5 shows that during 1990; (1994 until 2007); 2010; from 2013 until 2022, the effective primary budget balances are below the sustainable thresholds, which explain why the public debt is sustainable.

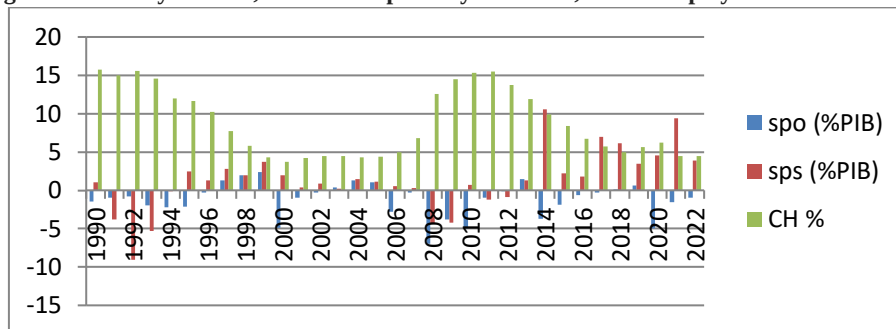
On the other hand, we note that during the years (1991-1993); 2003; (2008-2009); (2011-2012) as $s_{po} > s_{ps}$, which explains the lack of sustainability of the fiscal policy.

In 2008, the credit tap was abruptly shut off, and Ireland found itself on the brink of collapse. The growth rate became negative in 2008 and 2009, and the interest rate started to rise.

Indeed, in 2011, the country was once again able to go into debt, where it reached 110.55% of GDP, which poses anxieties in terms of the capacity for political maneuvering. At the same time, the GDP experienced a historic decline in the face of the continued increase in interest rates.

On the other hand, we note that during the years (1994-1996), (2001-2006), and (2008-2010), (2012-2016), the effective primary fiscal balances are below the sustainable thresholds, which explains why the public debt is sustainable. The unemployment rate was generally low during certain years of the said period: 4.22%, 4.48%, 4.49%, and 4.34%, respectively, in 2001-2002-2003-2004.

Figure 6: Primary balance, sustainable primary threshold, and unemployment rate in Ireland



Source : made by the auteur

In 2010, the CH reached 15.45% following the decline in the gt rate, which was 0.28%. We further note that the fiscal policy was not sustainable due to the increase in borrowing costs compared to the growth rate, as well as the lack of fiscal resources necessary to fill the amplified deficit.

In 2022, the unemployment rate declined to 4.45%. The strengthening of the economic climate has enabled economic dynamism to be conveyed and ensured the sustainability of fiscal policy.

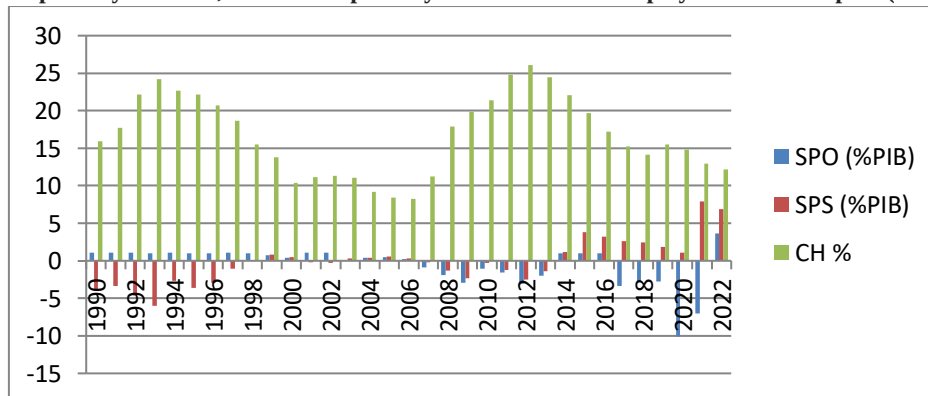
6. Spain

Table 6 shows that between 1990-1998, 2000 and 2001, and particularly between 2007 and 2013, $sps < spo$, which reflects the unsustainability of public debt.

Faced with this observation, we discern that the unemployment rate reached a peak of 24.44% in 2013. This is particularly due to the repercussion of an economic imbalance, the deterioration of gt compared to the increase in rt.

Nevertheless, from (1990-2000);(2003-2006) and (2014-2022) we see that with the help of the improvement in economic activity and the decline in money market rates $spo < sps$ and $gt > rt$ we can confirm that in this case only the feasibility of the long-term public debt.

Figure 7 primary balances, sustainable primary threshold and unemployment rate in Spain (1990-2022)



Source : made by the auteur

Graph 7 shows that the unemployment rate increased particularly in the mid-1990s and after 2008.

In 2011, the unemployment rate reached a peak of 26.9%, the critical threshold of sustainability was lower than the primary budget deficits, which made fiscal policy unsustainable.

In 2022, we note that the unemployment rate has seen a notable drop of 12.13%.

This is largely due to the increase in gt compared to the decline in rt. It should be remembered that during this period the primary balance was constantly below the critical threshold of sustainability, which made it possible to have a sustainable fiscal policy.

CONCLUSION

In general, we applied the IMF accounting method to judge the sustainability of fiscal policy each year from (1990-2022) for a sample of euro zone countries (France, Portugal, Ireland, Cyprus, Spain, and Greece). To do this we calculated the sustainable threshold of primary balance which stabilizes the public debt throughout the period and we subsequently tried to note the effectiveness of the fiscal policy during the 32 years and to see its impact on unemployment. This allowed us to conclude the

following points: fiscal policy is considered sustainable if the primary balance does not exceed the critical threshold of sustainability.

The sustainability of fiscal policy indicates the country's capacity to cover its current and future expenses, which gives a good image of the financial situation of this country.

It encourages business investment and job creation. As a result, when companies ensure the economic and political stability of such a country, they automatically find themselves in a situation of creating new projects, which will directly influence the level of unemployment by stimulating demand or the tax reduction which plays a key role in consumer purchasing power and labor demand.

In order to act on the increase in the unemployment rate, it is important that the government balances its fiscal policy and above all knows how to use public funds optimally in order to obtain the best effect on employment without compromising its fiscal situation.

Overall, the results obtained via the accounting approach for the six selected countries of the euro zone reveal that the economic policies adopted for the members of the euro zone have made it possible to visibly simplify the budget deficit and moderate the renovation of public debt.

Almost all Eurozone countries have benefited from these improvements; however their public finance situations still remain very different and quite far from the objectives set by the Treaties. This is why in 2011, 70% of countries still had a public deficit greater than 3% of GDP and debt greater than 60% of GDP. The fiscal imbalance observed according to the accounting diagnosis shows, in several years, these harmful economic effects, particularly on investment and job creation.

John Maynard Keynes' idea, on the effectiveness of fiscal stimulus policy can stabilize the economy and create employment, remains a relevant phenomenon in certain economic contexts, but it is not universal in all scenarios or in all eras and countries. However, we note that several factors can influence the effectiveness of these measures:

Ability of the economy to respond to stimulus i.e. stimulation may result from inflation rather than an increase in employment.

Market Confidence: A significant increase in public spending can also lead to a loss of market confidence especially when investors fear it will lead to unsustainable debt. Stimulus measures take time to have a significant impact on the economy.

Overall economic environment: The effects of fiscal policies can be moderated by external factors such as international trade, exchange rates, and the economic policies of other countries.

In overall and in order to respond to our problem on the importance of the sustainability of fiscal policy to reduce unemployment, we conclude that the sustainability of fiscal policy is a necessary condition for reducing the unemployment rate but remains insufficient, hence it is crucial to intervene with other factors such as the flexibility of labor market, monetary policy to reduce interest rates, which will encourage investment.

Appendix: accounting diagnosis of the sustainability of fiscal policy (ADSFP) in six Eurozone countries

Table 1 (ADSFP) in France

Année	Dp (% PIB)	rt (%)	rt/100	gt (%)	gt/100	SPO (% PIB)	SPS (% PIB)	Comment	CH(%)
1990	25.5	6.32	0.06	3.781	0.038	-2.4	-0.647	SPS>spo FPS	9.13
1991	25.9	6.62	0.07	2.546	0.025	-2.8	-1.055	SPS>spo FPS	10.2
1992	29.034	5.34	0.05	0.929	0.009	-4.6	-1.281	SPS>spo FPS	11.32
1993	33.673	4.59	0.05	-1.031	-0.010	-0.75	-1.893	SPS<spo NOFPS	12.59
1994	38.381	4.85	0.05	2.383	0.024	-5.4	-0.947	SPS>spo FPS	11.83
1995	41.55	3.58	0.04	2.757	0.028	-5.1	-0.342	SPS>spo FPS	10.37
1996	44.009	3.94	0.04	2.661	0.027	-3.9	-0.563	SPS>spo FPS	10.57
1997	45.598	3.46	0.03	3.702	0.037	-3.6	0.111	SPS>spo FPS	10.07
1998	61.87	3.56	0.04	4.393	0.044	-2.4	0.515	SPS>spo FPS	11.98
1999	58.87	2.96	0.03	4.491	0.045	-1.6	0.901	SPS>spo FPS	10.22
2000	58.04	4.39	0.04	5.246	0.052	-1.3	0.497	SPS>spo FPS	8.61
2001	57.58	4.26	0.04	3.933	0.039	-1.4	-0.188	SPS>spo FPS	8.7
2002	60.93	3.32	0.03	2.731	0.027	-3.1	-0.359	SPS>spo FPS	8.31

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2003	63.41	2.33	0.02	2.982	0.030	-3.9	0.413	SPS>spo	FPS	8.91
2004	64.39	2.11	0.02	3.123	0.031	-3.5	0.652	SPS>spo	FPS	8.88
2005	65.39	2.18	0.02	3.652	0.037	-3.2	0.963	SPS>spo	FPS	8.83
2006	60.81	3.08	0.03	4.103	0.041	-2.3	0.622	SPS>spo	FPS	8.01
2007	59.36	4.28	0.04	3.605	0.036	-2.5	-0.401	SPS>spo	FPS	7.39
2008	64.9	4.63	0.05	0.887	0.009	-3.2	-2.429	SPS>spo	FPS	9.12
2009	73.84	1.23	0.01	-3.763	-0.038	-7.2	-3.687	SPS>spo	FPS	9.28
2010	76.48	0.81	0.01	0.163	0.002	-6.8	-0.495	SPS>spo	FPS	9.23
2011	79.71	1.39	0.01	-0.814	-0.008	-5.1	-1.757	SPS>spo	FPS	9.84
2012	89	0.57	0.01	-2.959	-0.030	-4.8	-3.141	SPS>spo	FPS	9.91
2013	89.79	0.22	0.00	-1.403	-0.014	-4	-1.458	SPS>spo	FPS	10.27
2014	97.67	0.21	0.00	1.396	0.014	-3.9	1.158	SPS>spo	FPS	10.35
2015	98.04	0.02	0.00	3.839	0.038	-3.6	3.744	SPS>spo	FPS	10.06
2016	104.69	0.26	0.00	3.038	0.030	-3.4	2.908	SPS>spo	FPS	9.41
2017	102.262	0.50	0.01	2.976	0.030	-3.030	2.532	SPS>spo	FPS	9.02
2018	102.215	0.50	0.01	2.284	0.023	-2.404	1.824	SPS>spo	FPS	8.41
2019	101.622	0.50	0.01	1.984	0.020	-3.020	1.508	SPS>spo	FPS	8.01
2020	104.961	0.50	0.01	-11.167	-0.112	-8.813	-12.246	sps<spo	NO FPS	7.86
2021	122.890	0.50	0.01	6.403	0.064	-6.504	7.254	SPS>spo	NOFPS	9.31
2022	116.488	0.50	0.01	5.771	0.058	5,50	6.140	SPS>spo	FPS	7.081

Source : calculate auteur

Sps france :25.5*(0.038-0.06)= -0.647

Table 2 (ADSFP) in Portugal

Année	Dp (%PIB)	rt (%)	rt/100	gt (%)	gt/100	spo (%PIB)	sps (%PIB)	comment		CH%
1990	51.741	16.9	0.169	3.951	0.040	-6.3	-6.700	sps<spo	NO FPS	3.92
1991	52.689	17.74	0.1774	4.368	0.044	-6.4	-7.045	sps<spo	NO FPS	3.98
1992	50.516	16.71	0.1671	1.089	0.011	-6	-7.891	sps<spo	NO FPS	5.3
1993	56.34	13.25	0.1325	-2.043	-0.020	-5.8	-8.616	sps<spo	NO FPS	6.71
1994	58.37	11.11	0.1111	0.965	0.010	-5.3	-5.922	sps<spo	NO FPS	7.06
1995	60.064	9.79	0.0979	4.283	0.043	-2.2	-3.308	sps<spo	NO FPS	7.3
1996	59.591	7.37	0.0737	3.504	0.035	-1.7	-2.304	sps<spo	NO FPS	6.57
1997	56.241	5.74	0.0574	4.401	0.044	-0.01	-0.753	sps<spo	NO FPS	4.64
1998	63.92	4.31	0.0431	4.808	0.048	-4.4	0.318	SPS>spo	FPS	4.58
1999	61.53	2.96	0.0296	3.907	0.039	-3	0.582	SPS>spo	FPS	3.81
2000	60.91	2.39	0.0239	3.816	0.038	1.2	0.869	sps<spo	NO FPS	3.83
2001	61.75	2.26	0.0226	3.944	0.039	1.8	1.040	sps<spo	NO FPS	4.5
2002	64.94	3.32	0.0332	0.771	0.008	-1.3	-1.655	sps<spo	NO FPS	6.13
2003	68.52	2.33	0.0233	-0.931	-0.009	-1.4	-2.234	sps<spo	NO FPS	6.32
2004	74.05	2.11	0.0211	1.789	0.018	0.2	-0.238	sps<spo	NO FPS	7.58
2005	77.12	2.18	0.0218	0.782	0.008	0.3	-1.078	sps<spo	NO FPS	7.65
2006	76.75	3.08	0.0308	1.625	0.016	1..3	-1.117	sps<spo	NO FPS	7.97

2007	75.23	4.28	0.0428	2.507	0.025	1	-1.334	sps<spo	NO FPS	7.55
2008	80.18	4.63	0.0463	0.319	0.003	-3.1	-3.456	sps<spo	NO FPS	9.43
2009	92.88	1.23	0.0123	-3.122	-0.031	-3.8	-4.042	sps<spo	NO FPS	10.77
2010	100.25	0.81	0.0081	1.738	0.017	-11.2	0.930	SPS>spo	FPS	12.68
2011	102.72	1.39	0.0139	1.696	0.017	-7.4	0.314	SPS>spo	FPS	15.53
2012	135.31	0.57	0.0057	-4.057	-0.041	-5.7	-6.261	sps<spo	NO FPS	16.19
2013	139.49	0.22	0.0022	0.923	0.009	-4.8	0.980	SPS>spo	FPS	13.9
2014	151.82	0.21	0.0021	0.792	0.008	-7.2	0.884	SPS>spo	FPS	12.45
2015	150.27	0.02	0.0002	1.792	0.018	-4.4	2.663	SPS>spo	FPS	11.07
2016	170.14	0.26	0.0026	2.019	0.020	-2	2.994	SPS>spo	FPS	8.87
2017	126.1	0.3	0.003	3.506	0.035	-3.118	4.043	SPS>spo	FPS	6.99
2018	122	0.5	0.005	2.849	0.028	-0.592	2.866	SPS>spo	FPS	6.46
2019	117.7	0.5	0.005	2.683	0.027	-0.176	2.569	SPS>spo	FPS	6.8
2020	134.9	0.5	0.005	-8.301	-0.083	-5.716	-11.872	sps<spo	NO FPS	6.58
2021	130.5	0.5	0.005	5.737	0.057	-2.597	6.835	SPS>spo	FPS	6.01
2022	99.1	0.5	0.005	6.828	0.068	1.2	6.271	SPS>spo	FPS	6.47

Source : calculate auteur

Table 3(ADSEFP) in CYPRUS

Année	Dp (% PIB)	rt (%)	rt/100	gt (%)	gt/100	spo (% PIB)	sps (% PIB)	comment	CH%
1990	60	4.83	0.048	7.404	0.074	-5	1.544	SPS>spo FPS	3
1991	65	4.64	0.046	5.740	0.057	-3.7	0.715	SPS>spo FPS	2.09
1992	97.608	6.5	0.065	9.400	0.094	-3.7	2.831	SPS>spo FPS	2.7
1993	103.197	8.78	0.088	0.700	0.007	-4.5	-8.338	sps<spo NO FPS	2.7
1994	104.806	4.89	0.049	5.900	0.059	-5.4	1.059	SPS>spo FPS	2.6
1995	108.105	7	0.070	8.362	0.084	-2.4	1.473	SPS>spo FPS	3.1
1996	105.22	6.99	0.070	1.249	0.012	-2.6	-6.041	sps<spo NO FPS	3.4
1997	103.746	7.07	0.071	2.641	0.026	-2.7	-4.595	sps<spo NO FPS	3.3
1998	103.561	7.46	0.075	6.111	0.061	-0.5	-1.397	SPS<spo NO FPS	5.53
1999	94	9.33	0.093	4.998	0.050	-1.9	-4.072	sps<spo NO FPS	4.77
2000	104	11.21	0.112	5.965	0.060	-4.3	-5.454	sps<spo NO FPS	4.04
2001	105	11.99	0.120	3.953	0.040	-1.2	-8.439	sps<spo NO FPS	3.34
2002	103	8.97	0.090	3.723	0.037	-1	-5.404	sps<spo NO FPS	4.15
2003	98	5.35	0.054	2.623	0.026	-1.2	-2.672	sps<spo NO FPS	4.77
2004	100	6.29	0.063	5.026	0.050	-1.3	-1.264	sps<spo NO FPS	5.48
2005	101	7.36	0.074	4.853	0.049	1	-2.532	sps<spo NO FPS	4.59
2006	108	12.35	0.124	4.714	0.047	1.5	-8.247	sps<spo NO FPS	3.95
2007	107	14.29	0.143	5.098	0.051	3.2	-9.835	sps<spo NO FPS	3.76
2008	113	15.82	0.158	3.647	0.036	0.9	-13.756	sps<spo NO FPS	5.59
2009	130	11.28	0.113	-2.015	-0.020	-5.4	-17.284	sps<spo NO FPS	6.36
2010	148	6.79	0.068	2.015	0.020	-4.7	-7.067	sps<spo NO FPS	7.94
2011	170	4.26	0.043	0.401	0.004	-5.7	-6.560	sps<spo NO FPS	12.1
2012	157	5.51	0.055	-3.447	-0.034	-5.6	-14.062	sps<spo NO FPS	16.13
2013	180	6.19	0.062	-6.553	-0.066	-5.1	-22.938	sps<spo NO FPS	16.28
2014	177	6.05	0.0605	-1.829	-0.018	-8.8	-13.946	sps<spo NO FPS	15.03
2015	183	5.89	0.0589	3.383	0.034	-1.2	-4.588	sps<spo NO FPS	13.01

UNEMPLOYMENT AND SUSTAINABILITY OF FISCAL POLICY: AN ANALYSIS USING THE ACCOUNTING APPROACH FOR A SET OF EUROZONE COUNTRIES (1990-2022)

2016	182	6.33	0.0633	6.455	0.065	0.1	0.227	sps>spo	FPS	11.16
2017	93.9	0.5	0.005	5.853	0.059	1.744	5.026	SPS>spo	FPS	8.5
2018	100.6	0.3	0.003	5.693	0.057	-4.553	5.425	SPS>spo	FPS	7.15
2019	95.5	0.3	0.003	5.840	0.058	1.185	5.291	SPS>spo	FPS	7.76
2020	90	0.32	0.0032	-3.391	-0.034	-5.699	-3.340	SPS>spo	FPS	7.51
2021	103.6	0.55	0.0055	9.911	0.099	-1.634	9.698	SPS>spo	FPS	6.78
2022	77.3	0.2	0.002	5.058	0.051	3.1	3.755	SPS>spo	FPS	6.43

Source : calculate auteur

Table 4(ADSEFP) in Greece

Année	Dp (% PIB)	rt (%)	rt/100	gt (%)	gt/100	sp (% PIB)	sps (% PIB)	comment		CH%
1990	86.814	7.31	0.0731	1.50	0.02	-1.5	-5.044	sps<spo	NO FPS	7.57
1991	84.575	6.43	0.0643	3.10	0.03	-1	-2.816	sps<spo	NO FPS	8.93
1992	82.588	14.32	0.1432	0.70	0.01	-0.75	-11.248	sps<spo	NO FPS	10.2
1993	82.309	9.12	0.0912	-1.60	-0.02	-2	-8.824	sps<spo	NO FPS	9.81
1994	78.88	5.93	0.0593	2.00	0.02	-2.2	-3.100	sps<spo	NO FPS	10.1
1995	72.175	6.25	0.0625	2.10	0.02	-2.1	-2.995	sps<spo	NO FPS	10.4
1996	64.623	5.42	0.0542	2.86	0.03	-0.3	-1.653	sps<spo	NO FPS	10.5
1997	57.307	6.09	0.0609	4.48	0.04	1.3	-0.920	sps<spo	NO FPS	12.2
1998	60.07	5.43	0.0543	3.89	0.04	2	-0.922	sps<spo	NO FPS	12.1
1999	49.18	2.96	0.0296	3.07	0.03	2.4	0.055	sps<spo	NO FPS	11.3
2000	38.9	4.39	0.0439	3.92	0.04	4.9	-0.183	sps<spo	NO FPS	10.8
2001	35.06	4.26	0.0426	4.13	0.04	1	-0.045	sps<spo	NO FPS	10.4
2002	33.69	3.32	0.0332	3.92	0.04	0.3	0.203	sps<spo	NO FPS	9.84
2003	32.5	2.33	0.0233	5.79	0.06	1.2	1.126	sps<spo	NO FPS	10.6
2004	30.88	2.11	0.0211	5.06	0.05	1.3	0.911	sps<spo	NO FPS	10.1
2005	30.76	2.18	0.0218	0.60	0.01	1.6	-0.486	sps<spo	NO FPS	8.91
2006	27	3.08	0.0308	5.65	0.06	2.8	0.695	sps<spo	NO FPS	8.35
2007	26.92	4.28	0.0428	3.27	0.03	0.3	-0.271	sps<spo	NO FPS	7.66
2008	46.77	4.63	0.0463	-0.34	0.00	-7	-2.322	sps>sp	FPS	9.55
2009	66.87	1.23	0.0123	-4.30	-0.04	-13.8	-3.698	sps>sp	FPS	12.7
2010	83.2	0.81	0.0081	-5.48	-0.05	-10	-5.231	sps>sp	FPS	18
2011	110.55	1.39	0.0139	-10.15	-0.10	-11.7	-12.757	sps<spo	NO FPS	24.7
2012	129.84	0.57	0.0057	-7.09	-0.07	-8.1	-9.941	sps<spo	NO FPS	27.7
2013	132.36	0.22	0.0022	-2.52	-0.03	-5.7	-3.621	sps>sp	FPS	26.7
2014	122.66	0.21	0.0021	0.48	0.00	-3.7	0.326	sps>sp	FPS	25
2015	91.77	0.02	0.0002	-0.20	0.00	-1.9	-0.198	sps>sp	FPS	23.5
2016	119.9	0.26	0.0026	-0.49	0.00	-0.6	-0.896	sps<spo	NO FPS	21.4
2017	176	0.5	0.005	1.09	0.01	0.563	1.042	sps>sp	FPS	19.2
2018	180	0.5	0.005	1.67	0.02	1.112	2.103	sps>sp	FPS	17
2019	182	0.5	0.005	1.88	0.02	-9.991	2.511	sps>sp	FPS	15.9
2020	205	0.5	0.005	-9.32	-0.09	-7.372	-20.124	sps<spo	NO FPS	14.7
2021	200	0.5	0.005	8.38	0.08	1	15.760	sps>sp	FPS	12.4
2022	161.9	0.5	0.005	5.56	0.06	1.6	8.188	sps>sp	FPS	10.8

Source : calculate auteur

Table 5(ADSFP) in Ireland

Année	Dp (% PIB)	rt (%)	rt/100	gt (%)	gt/100	spo (% PIB)	sps (% PIB)	comment		CH %
1990	86.814	7.31	0.0731	8.467	0.085	-1.5	1.004	SPS>spo	FPS	15.77
1991	84.575	6.43	0.0643	1.930	0.019	-1	-3.806	sps<spo	FPS	15.02
1992	82.588	14.32	0.1432	3.343	0.033	-0.75	-9.065	sps<spo	FPS	15.57
1993	82.309	9.12	0.0912	2.693	0.027	-2	-5.290	sps<spo	FPS	14.54
1994	78.88	5.93	0.0593	5.756	0.058	-2.2	-0.137	SPS>spo	FPS	11.97
1995	72.175	6.25	0.0625	9.634	0.096	-2.1	2.443	SPS>spo	FPS	11.69
1996	64.623	5.42	0.0542	7.380	0.074	-0.3	1.266	SPS>spo	FPS	10.19
1997	57.307	6.09	0.0609	11.022	0.110	1.3	2.826	SPS>spo	FPS	7.7
1998	60.07	5.43	0.0543	8.766	0.088	2	2.004	SPS>spo	FPS	5.8
1999	49.18	2.96	0.0296	10.530	0.105	2.4	3.723	SPS>spo	FPS	4.32
2000	38.9	4.39	0.0439	9.404	0.094	-4.9	1.950	SPS>spo	FPS	3.68
2001	35.06	4.26	0.0426	5.306	0.053	-1	0.367	SPS>spo	FPS	4.22
2002	33.69	3.32	0.0332	5.899	0.059	-0.3	0.869	SPS>spo	FPS	4.48
2003	32.5	2.33	0.0233	3.014	0.030	0.4	0.222	sps<spo	FPS	4.49
2004	30.88	2.11	0.0211	6.788	0.068	1.3	1.445	SPS>spo	FPS	4.34
2005	30.76	2.18	0.0218	5.740	0.057	1.06	1.095	SPS>spo	FPS	4.41
2006	27	3.08	0.0308	4.988	0.050	-2.8	0.515	SPS>spo	FPS	4.98
2007	26.92	4.28	0.0428	5.310	0.053	-0.3	0.277	SPS>spo	FPS	6.77
2008	46.77	4.63	0.0463	-4.484	-0.045	-7	-4.263	sps<spo	FPS	12.61
2009	66.87	1.23	0.0123	-5.096	-0.051	-3.8	-4.230	sps<spo	FPS	14.53
2010	83.2	0.81	0.0081	1.683	0.017	-5	0.726	SPS>spo	FPS	15.35
2011	110.55	1.39	0.0139	0.281	0.003	-1	-1.226	sps<spo	FPS	15.45
2012	129.84	0.57	0.0057	-0.130	-0.001	-0.1	-0.908	sps<spo	FPS	13.73
2013	132.36	0.22	0.0022	1.175	0.012	1.5	1.264	SPS>spo	FPS	11.86
2014	122.66	0.21	0.0021	8.829	0.088	-3.7	10.572	SPS>spo	FPS	9.91
2015	91.77	0.02	0.0002	2.475	0.025	-1.9	2.253	SPS>spo	FPS	8.37
2016	119.9	0.26	0.0026	1.766	0.018	-0.6	1.805	SPS>spo	FPS	6.71
2017	76.451	0.23	0.0023	9.311	0.093	-0.316	6.943	SPS>spo	FPS	5.74
2018	74.998	0.25	0.0025	8.470	0.085	0.113	6.165	SPS>spo	FPS	4.95
2019	69.604	0.27	0.0027	5.298	0.053	0.606	3.499	SPS>spo	FPS	5.62
2020	71.278	0.28	0.0028	6.617	0.066	-4.962	4.517	SPS>spo	FPS	6.19
2021	64.226	0.5	0.005	15.125	0.151	-1.530	9.393	SPS>spo	FPS	4.48

UNEMPLOYMENT AND SUSTAINABILITY OF FISCAL POLICY: AN ANALYSIS USING THE ACCOUNTING APPROACH FOR A SET OF EUROZONE COUNTRIES (1990-2022)

2022	43.7	0.5	0.005	9.433	0.094	-1	3.904	SPS>spo	NO FPS	4.454
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Source : calculate auteur

Table 6(ADSF) in Espagne

Année	Dp (%PIB)	rt (%)	rt/100	gt (%)	gt/100	SPO (%PIB)	SPS (%PIB)	comment	CH %
1990	35	15.2	0.1515	3.781	0.038	1.073	-3.979	sps<spo NO FPS	15.93
1991	35	12.2	0.1223	2.546	0.025	1.088	-3.389	sps<spo NO FPS	17.7
1992	37	13.3	0.1334	0.929	0.009	1.052	-4.592	sps<spo NO FPS	22.16
1993	47	11.7	0.1169	-1.031	-0.010	1.006	-5.979	sps<spo NO FPS	24.21
1994	48	8.01	0.0801	2.383	0.024	1.093	-2.701	sps<spo NO FPS	22.68
1995	55	9.36	0.0936	2.757	0.028	1.041	-3.631	sps<spo NO FPS	22.14
1996	61	7.5	0.075	2.661	0.027	0.965	-2.952	sps<spo NO FPS	20.7
1997	61	5.37	0.0537	3.702	0.037	1.044	-1.017	sps<spo NO FPS	18.67
1998	61	4.24	0.0424	4.393	0.044	1.022	0.093	sps<spo NO FPS	15.48
1999	56	2.96	0.0296	4.491	0.045	0.736	0.857	SPS>spo FPS	13.79
2000	53	4.39	0.0439	5.246	0.052	0.44	0.454	SPS>spo FPS	10.35
2001	49	4.26	0.0426	3.933	0.039	1.051	-0.160	sps<spo NO FPS	11.15
2002	48	3.32	0.0332	2.731	0.027	1.063	-0.283	sps<spo NO FPS	11.28
2003	43	2.33	0.0233	2.982	0.030	0.059	0.280	SPS>spo FPS	11.09
2004	41	2.11	0.0211	3.123	0.031	0.364	0.415	SPS>spo FPS	9.15
2005	38	2.18	0.0218	3.652	0.037	0.474	0.559	SPS>spo FPS	8.45
2006	34	3.08	0.0308	4.103	0.041	0.248	0.348	SPS>spo FPS	8.23
2007	30	4.28	0.0428	3.605	0.036	-0.912	-0.203	sps<spo NO FPS	11.25
2008	34	4.63	0.0463	0.887	0.009	-1.909	-1.273	sps<spo NO FPS	17.86
2009	46	1.23	0.0123	-3.763	-0.038	-2.951	-2.297	sps<spo NO FPS	19.86
2010	48	0.81	0.0081	0.163	0.002	-1.036	-0.311	sps<spo NO FPS	21.39
2011	56	1.39	0.0139	-0.814	-0.008	-1.53	-1.234	sps<spo NO FPS	24.79
2012	72	0.57	0.0057	-2.959	-0.030	-3.023	-2.541	sps<spo NO FPS	26.09
2013	85	0.22	0.0022	-1.403	-0.014	-2.014	-1.380	sps<spo NO FPS	24.44
2014	99	0.21	0.0021	1.396	0.014	0.991	1.174	SPS>spo FPS	22.06
2015	99	0.02	0.0002	3.839	0.038	1.032	3.780	SPS>spo FPS	19.64
2016	116	0.26	0.0026	3.038	0.030	1.008	3.222	SPS>spo FPS	17.22

2017	107.286	0.5	0.005	2.976	0.030	-3.337	2.656	SPS>spo	FPS	15.25
2018	107.975	0.03	0.0003	2.284	0.023	-2.847	2.434	SPS>spo	FPS	14.1
2019	112.051	0.33	0.0033	1.984	0.020	-2.779	1.853	SPS>spo	FPS	15.53
2020	140.268	0.4	0.004	1.167	0.012	-10.123	1.076	SPS>spo	FPS	14.78
2021	134.102	0.5	0.005	6.403	0.064	-7.018	7.916	SPS>spo	FPS	12.92
2022	130	0.5	0.005	5.771	0.058	3.64	6.852	SPS>spo	FPS	12.137

Source : calculate auteur

Variable	Definition
dt	public debt ratios as a % of GDP
RT	The money market interest rate
gt	the growth rate as a % of GDP
Spo	the observed primary balance
SPS	the primary sustainable threshold
CH	unemployment rate
FPS	sustainability of fiscal policy
No FPS	No sustainability of fiscal policy
ADSFP	accounting diagnosis of the sustainability of fiscal policy
IBC	inter-temporal budget constraint

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