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COORDINATION OF MONETARY AND FISCAL POLICIES IN FRANCE: AN EMPIRICAL OVERVIEW

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Abstract
Coordination of economic policy has long time, constituted a major problem for countries with high levels of real and financial integration, which is the case in Europe. Following the importance of economic policy the investigation of the causal relationship between monetary and fiscal policies has a fundamental role in implementing suitable policies. This paper examines the causal relationship between public debt, budget deficit, output gap, inflation rate and interest rate in France from 1980 to 2014. Using Granger's technique, it is shown that various results are obtained regarding the direction of causality between competing variables. The evidence does not let hear strong political coordination in France, and supports the idea that the monetary policy is more stabilizing in its influence on the economic activity than the budget policy. The particular stance of monetary policy affects the capacity of the government to finance the budget deficit by changing the cost of debt service and limiting or expanding the available sources of financing.

Keywords: Economic policy, Public debt, Budget deficit, France

INTRODUCTION

Coordination of economic policy has long time, constituted a major problem for countries with high levels of real and financial integration, which is the case in Europe. The years 1980-1990 have frequently shown the difficulties posed by non-cooperative monetary policies: in case of economic slowdown, it is tempting for a country to lower its interest rates in order to support its internal demand by direct effect (revival of investment) and indirect (through the depreciation of

the national currency); so doing, partner countries undergoing appreciation of their currencies, while they may also need to support their request.

Establishing a single currency in 1999 put an end to non-cooperative monetary policies in eleven of the euro area member countries. Attention was then transferred to the final instrument of demand management: fiscal policy. If downturn, each government will be tempted to support domestic demand through fiscal stimulus, and especially as he no longer fears a reaction to the rise in the national interest, the impact of fiscal policy on interest rates now being diluted in the euro area.

In theory, a government has no reason to respond to a general deterioration in economic conditions across the euro area if a slowdown from a weakening demand, then inflation falls with activity and the European Central Bank normally relaxes its monetary policy. However, fiscal policy has a more direct and faster action on the request did monetary policy based on long and uncertain transmission channels. That is why fiscal policy can be justified even when demand shocks are shared by all of the euro zone partners. Its effectiveness will be greater if all partners follow similar policies to stabilize demand. The issue of coordination arises, therefore, again on so-called shock "symmetrical" (affecting all countries in the area), but this time the risk is twofold, since coordination must take place both between governments and the central bank that is independent:

- Coordination between governments: the risk is that some countries do not participate in the economic stabilization effort, or on the contrary they practice overly expansive policies since they have no direct sanction of markets or the central bank;
- Coordination with the central bank: the risk is that the central bank cancels government efforts to stabilize the economy by raising (or not lowering) interest rates when demand slows pretext that deficits increase.

These two risks were very present in economic policy debates since 1999. Some economists have pointed to the fiscal slippages in Germany and France; others, however, highlighted the positive impact that these abuses could have on other economies remained virtuous. European Council decisions on the implementation of the Stability and Growth Pact (SGP) to the two largest countries in the euro area, from this point of view, accurately reflected the ambivalence of arguments.

An optimistic vision of the PSC is to consider it as a coordination rule between fiscal policy and monetary policy by limiting budget deficits, the SGP provides insurance to the ECB against fiscal slippages, which should encourage them to lower rates in times of economic slowdown, to meet them in times of accelerating climate. Moreover, the obligation of Member

States to bring their public finances "in equilibrium or near-equilibrium" in the medium term may be seen as the assurance that all will have the leeway necessary the appropriate time.

In practice, the coordination of economic policy seems to have worked or between governments or with the ECB, some Member States have complied with the PSC, others not. The PSC was then transformed into a rule of conduct of fiscal policy to use only the automatic stabilizers, fiscal targets are now expressed in terms of the structural deficit (cyclically adjusted).

Public debt has been known in the history of strong variations, only taking the extent that the eighteenth century and reaching in the wars of the Revolution and astronomical levels, then blotted by periods of high inflation, growth or increase in government revenue.

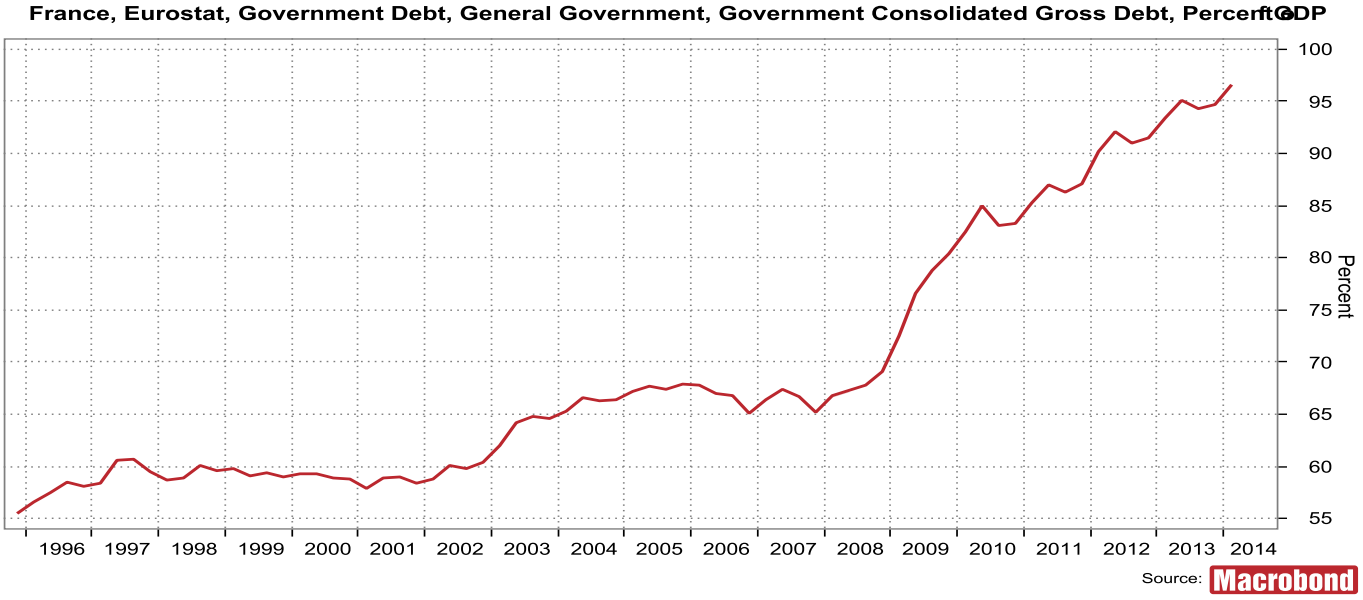
Membership of France to the European Economic and Monetary Union since 1999, needs to avoid free riding phenomena, compliance criteria defined in 1992 by the Treaty of Maastricht, including:

- an annual public deficit should not exceed 3% of GDP.
- public debt should remain below 60% of GDP.

Since 2007, France does not meet any of these criteria.

The issue of public debt now occupies the public debate. The growth of the debt of the major developed countries, from the 1980s, has led some economists to define and evaluate the long-term sustainability of the public debt of a country. France appears in this literature as having medium debt sustainability. The persistence of high public deficits affect this sustainability.

Figure 1: Gross public debt in France



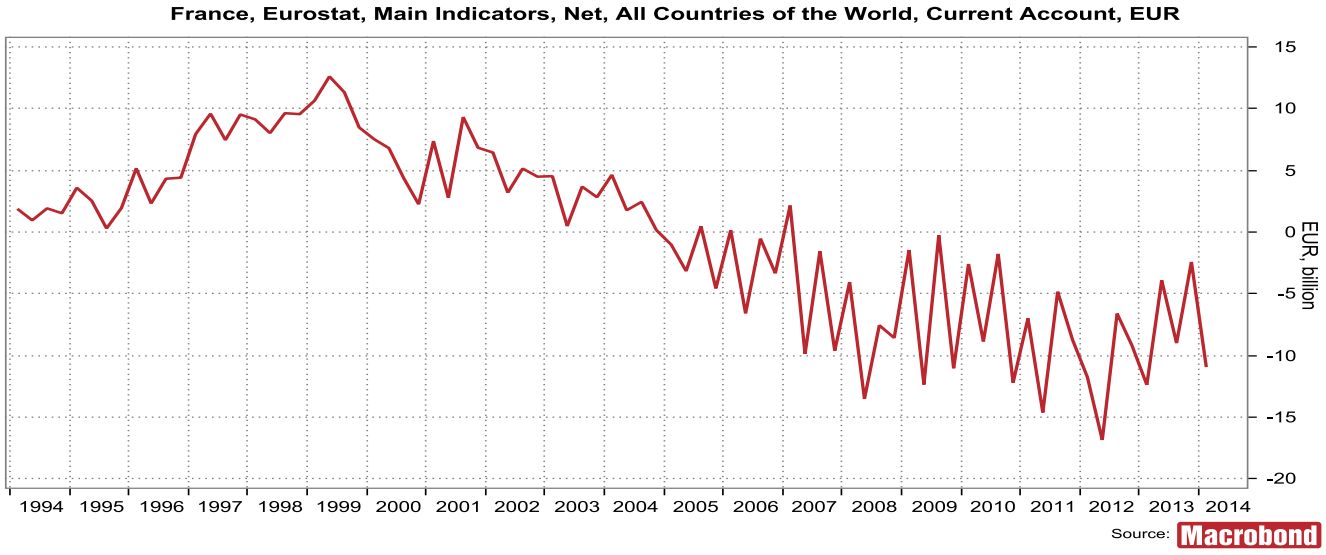
Public debt increases when the budget is in deficit administrations. As interest payments on existing debt burden on their budget, we calculate a "primary balance of public finances", equal to the fiscal balance of public finances before taking into account the interests ("primary deficit" when the balance is negative "primary surplus" when it is positive). If the debt was zero, then the deficit would be equal to primary deficit. A high public deficit translates into increased debt, which will be reduced by future revenue (tax or otherwise), Robert Barro explain that the deficit is "Tax tomorrow," or inflation, which a disadvantage creditors.

In 2006 and 2007, the state budget (and not all French government) was primary surplus (+ € 0.7 billion for 2007), but the final budget balance remained negative due to interest, called "debt burden". In the high phases of the economic cycle, because of the good tax revenue and expenses deducted, the primary balance improves mechanically. To assess the real budgetary efforts of governments, a government structural balance is calculated, which is the level of balance excluding cyclical effects.

Public debt is to distinguish, among others, of "external debt of France", which corresponds to all the commitments of governments and the private sphere vis-à-vis the rest of the world (that is, ie other countries). In 2006, the gross external debt was 2,918 billion euros, or 162% of GDP, net external debt (that is to say, by counting the claims held by France abroad) being close to zero.

In the case of simultaneous fiscal deficits and current account, it is called the twin deficits. France is engaged for several years in a voluntary policy of reducing its budget deficit. This was 7.9% of gross domestic product (GDP) in 2009 and 4.3% in 2013.

Figure 2: Current account in France



This paper examines the causal relationship between output gap, public debt, budget deficit, interest rate and inflation rate, and the impact of monetary policy on public debt management, in France from 1980 to 2014. The evidence does not let hear strong political coordination in Euro Area, and supports the idea that the monetary policy is more stabilizing in its influence on the economic activity than the budget policy. This paper deals with the problems of coordination between monetary and fiscal policies in France. The particular stance of monetary policy affects the capacity of the government to finance the budget deficit by changing the cost of debt service and limiting or expanding the available sources of financing. The paper is organized as follows: Section 2 reviews the Empirical literature review. Section 3 analyzes Methodology and data. Section 4 presents empirical result and in end we have concluding remarks.

THEORETICAL AND EMPIRICAL REVIEW

Thinking about macroeconomic policy has been transformed in the past 20 years. Nearly all of us now analyse short-run macroeconomics using a simple three-equation system. This contains an IS curve, a Phillips curve and a Taylor-type rule for monetary policy. This was explained in papers by Sevensson (1977) and Ball (1999), and was applied to the UK in a simple paper by Bean (1998). This set-up contains no fiscal policy.

Kirsanova and al (2005) extend the three equations of monetary-policy model to a five equations model of monetary and fiscal policies by adding a Taylor-type rule for fiscal policy, and also by adding an equation which tracks the evolution of public debt. They show that one can use the resulting of five-equation system to analyse the interaction of monetary policy and fiscal policy.

They suppose that there are a lag period of implementation of fiscal policy that reflects the legislative and political processes required for important modifications in discretionary fiscal policy, and shift a one period of effect of the monetary policy, which reflects the transmission system.

Kuttner (2002) doubts if the budget policy, taking into account these delays, could arrive to an interaction with the monetary policy and a period of effect of the shift monetary policy, which reflects the transmission mechanism.

The Three-equation Taylor-type macroeconomics:

It is an IS curve, a Phllips curve, a Taylor rule for monetary policy, and no active fiscal policy. The first equation is an IS curve, showing the evolution of the output gap (y_t) driven by the real interest rate (r_t):

$$y_t = ky_{t-1} - \delta r_{t-1} + \epsilon_t \qquad (1)$$

Where (ϵ_t) is a demand shock. As discussed by Woodford (2003), an equation like this can be obtained by optimizing behavior of individuals who choose consumption, given by a budget constraint.

The second equation is an accelerationist Philips curve. This describes the dynamics of inflation (π_t) in term of past inflation and he output gap:

$\pi_t = \pi_{t-1} + \omega y_{t-1} + \vartheta_t$ (2)

Where (π_t) is an inflation shock.

In these two equations, the real interest rate is taken to be the instrument of monetary policy, and it affects output with the lag of one period. It then takes output another period to affect inflation. Following Bean (1998), there is "persistence" in output as well as in inflation process.

The third equation Taylor (1995) famously demonstrated that actual US monetary policy could be well described by a simple rule that relates the real interest rate to inflation and output gap, with parameters θ_z and θ_y respectively:

$r_t = \theta_\pi \pi_t + \theta_y y_t$ (3)

The first term in the Taylor rule shows that if inflation raised to weaken demand, which will reduce inflation. The second term shows that the real interest rate is raised if output rises.

Let the preferences of the monetary policy-maker be:

$L = E_0 \frac{1}{2} \sum_{t=0}^{\infty} \beta^t (\pi_t^2 + \alpha (y_t - \bar{y})^2)$ (4)

Where E_0 denotes expectations conditional on information available at time zero. Every period, the loss function penalizes deviations of inflation from its target (here zero for simplicity), and of output from its target, $\bar{y}$, where $\bar{y}$ denotes the extent to which the output target is in excess of its potential level. The parameter α denotes the relative weight given to deviations of output from target.

The Five-equation macroeconomics with fiscal policy:

Kirsanova and al. (2005) add fiscal policy to the model, by adding a description of the behavior of the fiscal policy authority, and also an equation showing the evolution of public debt. The model presented here is analyzed in more detail in Sthein (2006).

The first equation is, as before, a dynamic IS curve:

$y_t = k y_{t-1} - \delta r_{t-1} + \omega b_t + \delta g_t + \epsilon_t$ (5)

Where ϵ_t is a demand shock.

As in equation (1), monetary policy sets the interest rate which affects output with a lag. Fiscal policy will be taken to mean changes in government expenditure, g_t, not change in tax rates.

The second equation is, as before, a standard accelerationist Phillips curve:

$$\pi_t = \pi_{t-1} + \omega y_{t-1} + \vartheta_t \qquad (7)$$

Note that, in the five-equation model, (i) both fiscal policy and monetary policy affect the IS curve, and (ii) neither policy influences inflation, other than through an indirect effect via output. This means that, in the control of inflation and output, he two instruments are perfect substitutes.

The real stock of debt at the beginning of this period (b_t) depends on the stock of debt at the beginning of the last period, (b_{t-1}), plus the flows that occur between t-1 and t, in the following way:

$$b_t = (1 + r_0)\, b_{t-1} + r_{t-1} b_{0+}\, g_{t-1} - \tau y_{t-1} + \mu_t \qquad (8)$$

Where μ_t is a debt shock.

When we return to the three-equation model if (i) government expenditure was exogenous, so that we could include any changes in government spending in the (exogenous) demand shock, ϵ_t, (ii) we could impose Ricardian Equivalence, by setting $\omega = 0$, and (iii) there were no other effects of debt accumulation. That last requirement would effectively mean that endogenous accumulation of debt did not induce changes in government expenditure or the interest rate, so as to avoid fiscal insolvency.

The five-equation model is completed by adding two equations showing the behavior of monetary policy and fiscal policy to the three equations (5, (6) and (7).

Dixit and Lambertini (2000) consider the interactions between policies in a configuration where the monetary authority controls the inflation. The source of conflict is that the fiscal authority aims to increase output and inflation than the monetary authority. The non-cooperative Nash equilibrium Leeper (1991) developed the Fiscal Theory of the Price Level (FTPL), he introduced two essential points: the distinction between active and passive policies, highlighting two stable organizations of economic policies (active monetary policy and passive fiscal policy passive or vice versa).

Melitz (1997) examine the interaction between monetary and fiscal policies in a pooled regression annual data on 19 OECD countries. He notes that the monetary and fiscal policies settle in opposed directions, as substitutes, then, that the budget policy plays a stabilizing role of low debt « the taxes behave in a preoccupation with a stabilization, but move the expenditure in a destabilizing way ».

Favero and Monacelli (2003) studies the interactions of policies by using Markov-Switching Vector Autoregressive Models (Krolzig, 1997), they stipulated that although fiscal policy shall be subject to a given regime change in an endogenous way and the regime changes monetarist are imposed in an exogenic way. They note than in the U.S., only between 1987 and 2001 can be described as passive fiscal regime. Thus, Woodford (1998) affirms that since 1980 the passivity would be a good description, and Gali and Perotti (2003) found that fiscal policy more and more passive during this period, after having discussed significant contributions to monetary and fiscal policies and their interactions.

Hughes and Hallett (2005) use individual regressions by instrumental variables to study the interactions between monetary and fiscal policies in the United Kingdom and the euro area. He notes that monetary and fiscal policies acting as substitutes in the UK, but complement each other in the euro area.

Kirsanova and al. (2006) study the interactions between fiscal and monetary policy when it stabilize a single economy against shocks in a dynamic environment. They suppose that fiscal and monetary policies stabilize the economy by causing changes in aggregate demand. Thus, they find that if policy makers are both volunteers, then the best result is obtained when the tax authority can perform monetary policy.

J.J.Reade and J.Sthe (2008) applied the cointegrated VAR method to study the interaction of monetary and fiscal policy and its effect on the sustainability of developments in public debt in the United States in 1960-2005. They conclude that fiscal policy has ensured the sustainability of long-term debt by responding to the increase in debt in a way that the stabilization of the reaction was moderate. However, according to their results, discretionary fiscal policy did not ensure a countercyclical behavior. In addition, monetary policy has followed a Taylor rule type and corrected the imbalance both in the short and long term.

METHODOLOGY

The present study is carried out using annual time series of France 1980-2014. The data used include y_{t} is the output gap, pi_{t} the inflation rate, r_{t} the nominal interest rate, d_{t} the public debt and pb_{t} the primary government balance defined as government receipts minus spending. The latter two fiscal variables are represented as fractions of GDP. For inflation, we calculate this from the consumer price index (CPI) measure as the most appropriate measure. Debt, deficit, interest rate and inflation rate variables are downloaded from the Annual Macro-Economic database (AMECO) and the output gap is downloaded from the International Monetary Fund (IMF).

Following the literature, the interest rate rt is the instrument of monetary policy, while pbt is defined here as the instrument of fiscal policy. There is disagreement whether the fiscal instrument should be taxes or spending or the balance. Kirsanova et al. (2005) take government spending to be the tool, Schmitt-Grohé and Uribe (2004) consider taxation and a number of others take both (for example Muscatelli and Tirelli (2004); Gali and Perotti (2003).

Considering fiscal variables, there is disagreement over whether taxes, government spending or the primary balance ought to be used as the fiscal tool. Primary balance data is defined as:

$$\boldsymbol{PB_t = T_t - G_t} \qquad (1)$$

Hendry (1980) notes that measures of the public debt are readily available and accord to the theoretical variable for gross debt, which can deviate dramatically from net debt.

Our model allows for non-stationarity data and endogeneity, questions such as the role of monetary policy in debt-sustainability can be investigated in this manner.

The empirical strategy used in our study can be combined to form vector autoregression:

$$\Delta \boldsymbol{X_t} = \boldsymbol{\alpha \breve{\beta}' X^*_{t-1}} + \sum_{i=1}^{k-1} \boldsymbol{\Gamma_i \Delta X_{t-k}} + \boldsymbol{u_t}, \qquad (4)$$

Where $\breve{\beta} = (\beta, \beta_0)'$, $X^*_{t-1} = (X_{t-1,}1)$, $\Gamma_i = -\sum_{j=i+1}^{k} \Pi_j$ and $\mathrm{X}^*_{t-1} = (X_{t-1,}1)$. The $\breve{\beta}'\mathrm{X}^*_{t-1}$ terms are cointegrating vectors, the stationary relationships between non-stationary variables, or steady-state relationships. Importantly, $\mathrm{E}(\beta' \mathrm{X}_t)$ since these cointegrating vectors describe steady state relationships which must be mean zero.

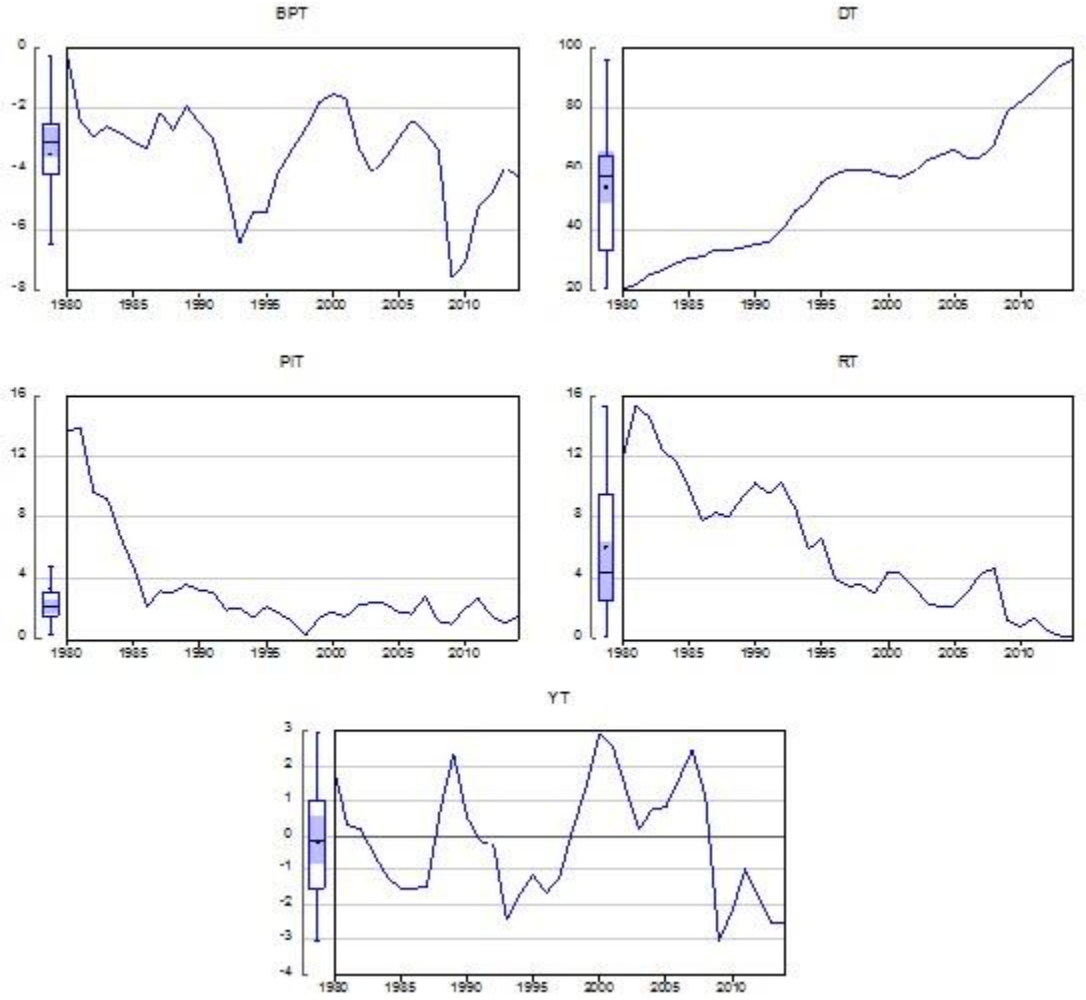
Three-stage procedure is followed. First, we search for the order of integration of the different time series using unit root tests. Generally, a variable is said to be integrated of order d, written by I(d), if it turns out to be stationary (integrated of order 0, I(0) after differencing d times.

In this paper, we conduct unit root tests using the Augmented Dickey-Fuller(ADF) Dickey and Fuller (1979), Phillips-Perron (PP) Phillips-Perron (1988) tests.

We use two tests in order to check the robustness of the results. One advantage of the PP test over the ADF test is that the former is robust to general forms of heteroskedasticity in the error term. Akaike information criterion (AIC) isused to select the lag length in ADF test, while Newey-West Bartlett kernel is used to select the bandwidth for the PP test. These tests are carried out by the Logiciel E-Views 6.

EMPIRICAL RESULTS

Figure 3: Evolution of the main variables



In figure 3 we present the evolution of the main economic variables during the period of our study 1980 to 2014 and the unit root test. In order to describe the economic cycle of the France, we use the description of data, such as public debt, primary balance, nominal interest rate, inflation and output gap.

Stationary tests:

Based on the ADF, PP and KPSS unit root tests, we find that all tested series are non-stationary in level, that is, we cannot reject the null hypothesis of non-stationarity. However, the stationarity property is reached after first differencing the series for r_t $pb_{t,}$ dt, and y_t . Unit root testing is carried out and reported in Table 1 and 2. Augmented Dickey-Fuller (ADF) unit root

tests are carried out using enough lags for each variable to ensure that no residual autocorrelation remains.

Table 1: Results of ADF unit root tests

Variables	Trend and constant	Constant	None
d_t	-2.401535(1)	0.163927(1)	2.205400(1)
$d(d_t,1)$	-3.626586(0){**}	-3.602615(0){**}	-2.471078(0){**}
y_t	-2.836072(1)	-2.884802(1)	-1.476504(8)
$d(y_t,1)$	-4.916761(1)^{*}	-4.981592(1)^{*}	-5.024148(1)^{*}
π_t	-1.577675(8)	-1.645639(8)	-0.939775(8)
$d(\pi_t,1)$	-3.622535(1)^{**}	-3.465251(1)^{**}	-3.501857(1)^{*}
pb_t	-3.204061(1)	-2.829655(1)	-0.533316(0)
$d(pb_t,1)$	-4.826311(0)^{*}	-4.942456(0)^{*}	-5.022584(0)^{*}
r_t	-2.630337(0)	-0.980416(0)	-1.791417(0)
$d(r_t,1)$	-6.137686(0)^{*}	-6.147086(0)^{*}	-5.585004(0)^{*}

The values in parentheses indicate the optimum number of lags, respectively. The critical values for the ADF tests t-statistics are obtained from MacKinnon (1996).

** Significance level at 1%, ** Significance level at 5%.*

Table 2: Results of PP unit root tests

Variables	Trend and constant	Constant	Conclusion
d_t	-1.489287(1)	0.926663(0)	5.122131(0)
$d(d_t,1)$	-3.426841(5){***}	-3.522231(4){**}	-2.439628(2){**}
y_t	-2.523557(1)	-2.547718(1)	-2.520244(1)
$d(y_t,1)$	-5.020927(8){*}	-4.938075(7){*}	-5.036157(7){*}
π_t	-3.333532(3)	-3.333532(3)	-5.677998(3)
$d(\pi_t,1)$	-6.335738(3){*}	-5.355415(3){*}	-4.976806(3){*}
pb_t	-2.760054(8)	-2.815982(8)	-0.376570(9)
$d(pb_t,1)$	-5.804868(13){*}	-6.096941(13){*}	-6.148488(13){*}
r_t	-2.870600(4)	-0.986410(1)	-1.786355(1)
$d(r_t,1)$	-6.191862(5){*}	-6.186770(6){*}	-5.578731(7){*}

The values in parentheses indicate the optimum number of lags and bandwidths, respectively. The critical values for the PP tests t-statistics are obtained from MacKinnon (1996).

** Significance level at 1%, ** Significance level at 5%.*

According to the results of these three tests, we can conclude that the following series: Public debt, inflation, primary balance, output gap and nominal interest rates are non-stationary.

The non-stationary character of the series used to search for the presence of a stationary or more linear combinations of these variables. Indeed, the study of the series in first difference for the inflation rate and the nominal interest rate, and the second difference for the remaining variables, ensures the stationary nature of differentiated series.

However, the three tests retain the integration of order 1 of the following series: nominal interest rate and inflation rate, public debt, primary balance and the output gap. This implies the existence of cointegration between the various variables.

The cointegration test is used to check the long-term equilibrium relationship between the variables d_ {t}, pb_ {t}, r_ {t}, pi_ {t} and y_ {t}. The presence of an equilibrium relationship among these variables is the most used formally tested using statistical procedures, are those of Engle and Granger (1987) and Johansen (1988). If the presence of cointegration is confirmed between different variables, then Engle and Granger (1987) error correction specification can be used to test for Granger causality and show its direction.

Table 3: Trace test results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.992483	246.5350	47.85613	0.0001
At most 1 *	0.860037	104.7065	29.79707	0.0000
At most 2 *	0.797885	47.68168	15.49471	0.0000
At most 3	0.044267	1.313027	3.841466	0.2518

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.992483	141.8284	27.58434	0.0000
At most 1 *	0.860037	57.02486	21.13162	0.0000
At most 2 *	0.797885	46.36866	14.26460	0.0000
At most 3	0.044267	1.313027	3.841466	0.2518

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

From Table 3, we see three cointegrating equations, so that variables are cointegrated, where they have a cointegrating relationship long term. Therefore, the null hypothesis of no cointegration is rejected because the trace test indicates two cointegrating equations. Moreover, the existence of cointegration relationship justifies the adoption of a model error correction Engle and Granger (1987).

Cointegration between series indicates causality relationships confirmed in the long term, but it does not give the direction of causality. Therefore, the vector error correction model (VECM) is used to examine causality in the short term as well as Granger causality in the long term. The VECM is a template that models adjustments leading to a state of long-term equilibrium. This is a model which incorporates the time, the evolution of short and long term. Thus, the use of error correction model can highlight the common cointegrating relationship (common trend) and deducing the interactions between variables.

Results suggest that there is a causal relationship from long-term public debt and budget deficit to the output gap (the term correction associated with the restoring force x error is negative (-0.266766)., and is significantly different from zero at 5% statistical level (prob. equal to 0.0347) so there is catching up to the equilibrium value ie, a mechanism error correction: in the long term the imbalances between 5 variables are offset so the series have similar trends.

Table 4: Wald test

Test Statistic	Value	df	Probability
F-statistic	0.439689	(4, 10)	0.7775
Chi-square	1.758755	4	0.7800

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(8)	-0.689513	0.783520
C(9)	-0.302377	0.668597
C(10)	-0.016958	0.394879
C(11)	-0.102030	0.293856

Restrictions are linear in coefficients.

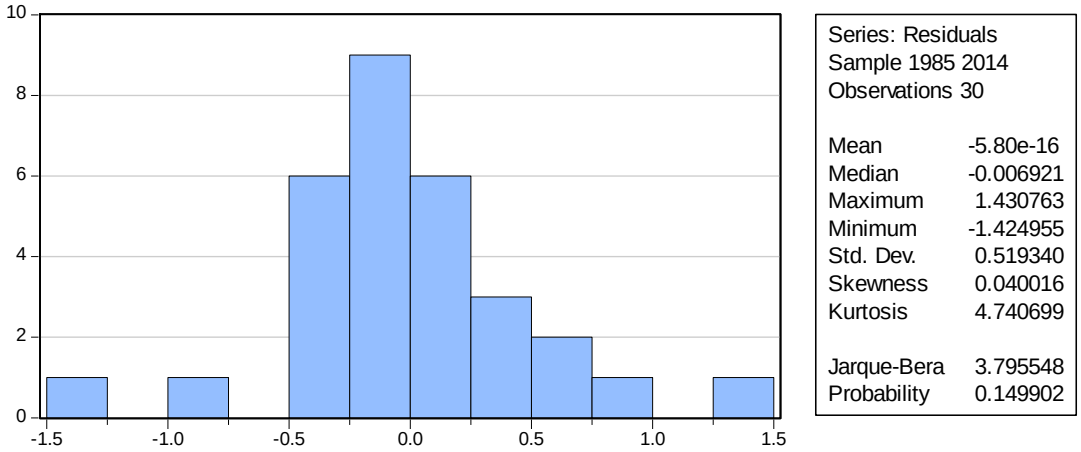
Nevertheless, in the short term testing and test Wald (table 4) we find that there is not a causal relationship from the budget deficit and public debt to output gap (Chi-square: 0.7800 > 0005 therefore we accept the null hypothesis). The value of R2 = 0.61% > 0.60% and the Prob (F-statistic) 0.000647 <0.005 shows an explanatory power of the model.

Table 5: Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.524934	Prob. F(2,8)	0.2747
Obs*R-squared	8.280285	Prob. Chi-Square(2)	0.1509

Concerning tests of residues, we tested serial correlation (table 5) we have: Prob Chi-Square (2) = 0.1509> 0.005) so the model does not admit a serial correlation. The model errors are heteroscedastic since the value of probability is less than 5 % (prob. Chi-Square 0.01024) we reject the null hypothesis) and normality test presented in the following figure.

Figure 4: Normality test of residuals



From the figure 4 we see that the prob. Jaque-Berra = 0.149902 more than 5%, or the errors of the model are normally distributed.

In contrast, the causal relationship between the interest rate and the inflation rate is as follows: at a disaggregated level, the results suggest that there is a causal relationship from long-term inflation rate of interest (the term associated with the restoring force β error correction is negative (-0.007716) and is significantly different from zero at statistical threshold of 5 % (prob. equal to 0.0347). There so much catching up to the equilibrium value ie, an error correction mechanism: in the long term the imbalances between the interest rate and the inflation rate are offset so the series have similar trends.

Indeed, Granger (1969) introduced the concept of non-causality, which aims to make the optimal forecast made at the variables. The causality test's objective is to evaluate the temporal order and the ability to forecast variables. Thus, it allows to formalize statistically economic relations between the variables of monetary and fiscal policies for obvious reasons of economic

policy but also to study the variables that are likely to predict the evolution of variables monetary and fiscal policies and inflation. The causation analysis will highlight the interactions between the variables of monetary and fiscal policies. Thus, it can also have "information on the temporal relations between variables.

The relationship between debt and instruments of monetary policy will be analyzed from the causality test Granger (1969). This test is to study the relationship between debt and the different variables of fiscal policy. If the coefficients values of debt are significant, then the primary balance and the output gap is a "cause" of the debt.

Table 6: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
DT does not Granger Cause BPT	33	1.02750	0.3710
BPT does not Granger Cause DT		0.71429	0.4982
PIT does not Granger Cause BPT	33	0.53770	0.5900
BPT does not Granger Cause PIT		0.21750	0.8059
RT does not Granger Cause BPT	33	0.24330	0.7857
BPT does not Granger Cause RT		2.43162	0.1062
YT does not Granger Cause BPT	33	3.32260	0.0507
BPT does not Granger Cause YT		1.11607	0.3417
PIT does not Granger Cause DT	33	0.12841	0.8800
DT does not Granger Cause PIT		0.11922	0.8881
RT does not Granger Cause DT	33	1.98005	0.1569
DT does not Granger Cause RT		7.76559	0.0021
YT does not Granger Cause DT	33	0.58958	0.5613
DT does not Granger Cause YT		1.67913	0.2048
RT does not Granger Cause PIT	33	0.00189	0.9981
PIT does not Granger Cause RT		1.29216	0.2906
YT does not Granger Cause PIT	33	0.30070	0.7427
PIT does not Granger Cause YT		1.76592	0.1895
YT does not Granger Cause RT	33	3.72461	0.0368
RT does not Granger Cause YT		0.46092	0.6354

Table 6 shows the one hand, a bi-directional causality between pairs of variables (debt and deficit) (the output gap and the budget deficit), (debt and the output gap). On the other hand, a uni-directional causality between the couple (the output gap and the budget deficit).

CONCLUSIONS

A policy of controlling deficits and public debt necessary but very expensive: according to the calculations of the OFCE, the restrictive effect of fiscal austerity has reached a level like we have not seen over the last forty years, including in 1990 when he had to adapt to the convergence criteria of Maastricht.

Monetary and fiscal policies appear to be two categories of economic policies that have been the subject of several controversies. The question of their interaction and their influence on economic activity and inflation are acute. Each of the two policies is likely to increase or slow aggregate demand. They can have very different impacts on the economy and a change in one can affect the other.

Based on the approach of Johansen cointegration and Granger causality, we find that, at the aggregate level, there is evidence of unidirectional causality between pairs of variables (the budget deficit because public debt Granger) (the output gap because the budget deficit Granger) (the output gap because public debt Granger). It is observed that the public debt has a direct impact on the budget deficit, and it is observed that the budget deficit and public debt have a direct impact on the output gap. Also, we find a unidirectional causality between the pair of variables (inflation causes interest rates Granger) indeed, we note that the interest rate has a direct impact on the rate inflation.

At the disaggregated level, the results suggest that there is a causal relationship to long-term public debt from dt and the budget deficit bt to yt as a causal relationship from long-term rate of inflation in interest rates. So there is a catch to the equilibrium value, an error correction mechanism: long-term imbalances between different variables are offset so that the series have similar trends.

Nevertheless, in the short term, we see that there is no causal relationship from the budget deficit and public debt to output gap; however, we see that there is a causal relationship ranging from inflation to interest rates.

From the results found we can conclude that the monetary and fiscal policy are not complementary in the France and there is a negative effect of policy coordination in the France, and the advantage of using methods cointegation is that each policy area will have its own way to steady state, which should be ungovernable in the data, and the responses of policy instruments and target variables can also be set using the cointegrated VAR approach. In addition, our results show that there is no strong interaction between monetary policy and fiscal policy in the France. Without efficient policy coordination, financial instability could ensure, leading to high interest rates, exchange rate pressures, rapid inflation, and an adverse impact on economic growth.

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