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The sustainability of Italian fiscal policy: myth or reality?

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ABSTRACT

In this paper, we analyse the sustainability of Italian public finances using a unique database covering the period 1862–2013. This paper focuses on empirical tests for the sustainability and solvency of fiscal policies. A necessary but not sufficient condition implies that the growth rate of public debt should at the limit be smaller than the asymptotic rate of interest. In addition, the debt-to-G.D.P. ratio must eventually stabilise at a steady-state level. The results of unit root and stationarity tests show that the variables are non-stationary at levels, but stationary in first-differences form, or $I(1)$. Some breaks in the series emerge, however, given internal and external crises (wars, oil shocks, regime changes, institutional reforms). Therefore, the empirical analysis is conducted for the entire period, as well as two sub-periods (1862–1913 and 1947–2013). Moreover, anecdotal evidence and visual inspection of the series confirm our results. Furthermore, we conduct tests on cointegration, which evidence that a long-run relationship between public expenditure and revenues is found only for the first sub-period (1862–1913). In essence, the paper's results reveal that Italy had sustainability problems in the Republican age.

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1. Introduction

The sustainability of fiscal policies is a central topic with regard to both economics and public policy. The rise of public indebtedness of many industrial countries during the last decades of the 20th century has caused increasing concern about its potentially unfavourable effects. Theoretically, equilibrium growth paths ought to be supported by adequate fiscal policy. Moreover, the European Union's (E.U.) treaties impose the practical necessity of sustainable public accounts, keeping the public debt/G.D.P. ratio below 60%, and the public deficit/G.D.P. below 3%.

A major question emerging from the global economic and financial crisis of 2008 is how to restore a country's economic growth while restoring fiscal health. This is relevant to the Euro area due to its dismal economic growth prospects coupled with high levels of public debt. Government debt and slow growth underscore the

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importance of understanding the potential effects for fiscal sustainability and economic growth and the trade-offs these often conflicting goals entail.

Traditionally, the Italian economy, the third largest economy in the Eurozone, has had a high debt-to-G.D.P. ratio. Italy has been hampered by weak productivity growth and low economic growth. The Italian budget has expanded continually since 1947, which we define as the Republican period due to increasing economic activity and the pressures of inflation. Currently at 135%, Italy has the second largest debt-to-G.D.P. ratio in the currency union after Greece. The size of the Italian economy remains smaller than in 2008, and approximately unchanged from the early years of the 21st century. Therefore, an Italian default would certainly have dramatic consequences for all Eurozone members, with sharp and robust contagion effects (Brady & Magazzino, 2018).

The Maastricht Treaty (1992) required Italy and other E.U. nations to undertake a well-focussed fiscal consolidation in order to meet the Maastricht reference values. At that time, Italy's debt level exceeded its G.D.P., and the fiscal deficit was 10% of G.D.P. From 1986, Italy had pursued fiscal consolidation policies with relatively moderate success although small setbacks had occurred periodically. During the period 1985–1990, the primary structural deficit was reduced by 1.7% of G.D.P. The fiscal consolidation process gained force after 1990 when external conditions were not conducive for initiating fiscal consolidations, and the predicted survival rate was low (von Hagen, Hughes Hallett, & Strauch, 2001).

To put order into the Italian public accounts, the main way involves a mix of moderate fiscal austerity, structural reforms capable of increasing long-term G.D.P. growth, privatisation and divestments (Cottarelli, 2016).

The usual way pursued in the literature to analyse the sustainability of fiscal policies implies stationarity and unit root tests for public debt and deficit, as well as cointegration tests between public expenditures and revenues.

A common criticism to most of the available literature, however, is that the econometric procedures used require a large number of observations, which is not usually the case in most tests of the intertemporal budget constraint. We try to overcome this problem for the case of Italy by using an extended dataset covering 152 years. The Italian case is of interest because of the difficulties in reordering the public accounts to meet fiscal consolidation goals. Our paper examines the sustainability of Italian public finance policies by applying unit root and cointegration tests to the data over the period 1862–2013. Moreover, we also test for the existence of structural breaks in the sample time period. Our study addresses a gap in the literature by applying the autoregressive distributive lag (A.R.D.L.) technique to examine this relevant issue for Italy. The A.R.D.L. approach is an important tool in modelling non-stationary time-series data and the effect of structural breaks. These results are, however, confirmed by recent cointegration tests developed Bayer and Hanck (2013). In addition, we use a unique dataset, with national series recently reconstructed by Forte (2011).

Besides the Introduction, the outline of this paper proceeds as follows. Section 2 provides a survey of the literature and briefly reviews the sustainability and solvency conditions. Section 3 contains an overview of the applied empirical methodology and

a brief discussion of the data used. Section 4 discusses our empirical results. Section 5 presents some concluding remarks and, finally, Section 6 gives suggestions for future research.

2. Theoretical framework and empirical literature review

2.1. Studies on fiscal consolidation

The sustainability of the fiscal policies of Europe and the U.S.A. has been in the headlines from the early 1990s.

A number of empirical studies have found that successful fiscal consolidation programmes focus on cutting government spending as a percentage of G.D.P. Many successful fiscal consolidations also reformed tax systems to lower marginal income tax rates and reduce the after-tax cost for business investment in productive assets while eliminating 'special interest' tax preferences for specific firms, industries and locations. Lilico, Holmes, and Sameen (2009) found that successful fiscal consolidation programmes comprised at least 80% government spending reductions and no more than 20% tax increases.

There is a large literature on the intertemporal budget constraint. The general conclusion to emerge from this is that fiscal policy is sustainable if the government budget constraint holds in present value terms. More precisely, the current debt should be offset by the sum of expected future discounted primary budget surpluses (Uctum & Wickens, 2000).

As regards empirical studies on O.E.C.D. countries, Alesina and Perotti (1995) found that fiscal adjustments relying primarily on tax increases failed to permanently stop the public debt growth. On the other hand, successful adjustments aggressively tackle the expenditure side. Moreover, coalition governments are incapable of implementing successful fiscal adjustments. Cour, Dubois, Mafhouz and Pisany-Ferry (1996) explained that fiscal balance variables are only significant during large-scale episodes. In addition, the fiscal balance variable is significant only for anti-Keynesian large-scale retrenchments.

Giavazzi and Pagano (1996) highlighted that both fiscal policy contractions and expansions can have non-Keynesian effects if they are sufficiently large and persistent.

McDermott and Wescott (1996) used the fiscal expansion and consolidation experiences of the industrial countries to examine the interplay between economic performance and fiscal changes. The results do not support the standard Keynesian view, but are in line with findings provided by Alesina and Perotti (1995). In fact, the episodes of fiscal consolidation need not trigger an economic slowdown. Alesina, Perotti, and Tavares (1998) concluded that fiscal adjustments do not always cause recessions. On the contrary, fiscal consolidations prompted by a fiscal crisis and achieved by trimming government spending often have expansionary effects. Furthermore, governments do not seem to be systematically punished at the ballot box for engaging in fiscal adjustments, nor do they lose popularity, as measured by opinion polls.

Perotti (1999) illustrates that in times of fiscal stress shocks to government revenues, and especially to expenditure, have very different effects on private

consumption than in normal times. Giavazzi, Jappelli and Pagano (2000) investigated non-linear responses in two datasets. In the O.E.C.D. sample, an increase in net taxes has no effect on national saving during large fiscal contractions, while it has a positive effect in less pronounced contractions. In the developing countries sample, non-linearities tend also to occur in periods in which debt is accumulating rapidly, regardless of its initial level.

Von Hagen et al. (2001) show that consolidations started in good times typically do not last long and do not achieve much. In contrast, consolidations started in difficult times are more likely to be successful, if only because the commitment to consolidation is higher. Alesina, Ardagna, Perotti and Schiantarelli (2002) found a sizable negative effect of public spending for O.E.C.D. countries, in particular of its public wage component on business investment. This result is consistent with models in which government employment creates wages pressure for the private sector. Ahrend, Catte and Price (2006) found that both policy interest rates (e.g., the target federal funds rate in the U.S.A.) and long-term interest rates are more likely to decline when fiscal consolidations rely on government spending reductions rather than tax increases. Using a dynamic general equilibrium model, Cournède and Gonand (2006) found that tax increases are a much more costly way, in terms of real G.D.P. growth, to achieve fiscal sustainability than government spending reductions.

Alesina and Ardagna (2009) examined 107 large fiscal adjustments in 21 O.E.C.D. member countries from 1970 to 2007. They identified 21 successful large fiscal adjustments in 10 O.E.C.D. member countries. After examining these episodes, they concluded that successful fiscal consolidations were based predominately or entirely on government spending reductions. Biggs, Hassett and Jensen (2010) found strong evidence that government spending reductions outweigh revenue increases in successful consolidations regardless of the methodology used to identify consolidations. They found that across two methods for identifying consolidations, successful fiscal consolidations averaged 85% spending cuts and 15% revenue increases, while unsuccessful fiscal consolidations averaged 47% spending cuts and 53% revenue increases. Further, the authors show that the degree of success correlates to a larger share of spending cuts.

The International Monetary Fund (I.M.F.) (2010) argued, however, that Alesina and Ardagna (2009) suffered from methodological issues that caused them to overstate the expansionary effects of fiscal consolidations in the short term. Instead, the I.M.F. used an 'action-based' method to identify fiscal consolidations that relies on an examination of ex-ante official plans with the goals of government budget deficit reduction and/or government debt stabilisation. The I.M.F. found that fiscal consolidations were contractionary overall, but that government spending reductions have much smaller contractionary effects. According to the I.M.F., a fiscal consolidation equal to 1% of G.D.P. based on tax increases caused a 1.3% decrease in G.D.P. and a 0.6 percentage point increase in the unemployment rate after two years, while a fiscal consolidation equal to 1% of G.D.P. based on government spending reductions caused a 0.3% decrease in G.D.P. and 0.2 percentage point increase in the unemployment rate after two years. Among different types of government spending reductions, the I.M.F. found that a reliance on reductions in transfer payments caused G.D.P. to

increase by 0.2% after two years, while reductions in government consumption and investment caused G.D.P. to decline by 0.4% and 0.6%, respectively, after two years. These results were, however, within the margin of error.

While I.M.F. studies strike a more cautionary note than Alesina and Ardagna (2009) or Giudice, Turrini and In't Veld (2003) regarding the ability of expansionary 'non-Keynesian' factors to overwhelm contractionary Keynesian reductions in aggregate demand in the short term, the I.M.F. and these other studies agree that fiscal consolidation programmes based predominately or entirely on government spending reductions – especially in transfer payments to households and firms – produce stronger G.D.P. growth in the short term than fiscal consolidation programmes in which tax increases play a significant role. Tsibouris, Horton, Flanagan and Maliszewski (2006), studying a very large dataset, pointed out that revenue measures need to be broad-based. When countries faced liquidity and solvency crises, expenditure-based adjustments represent the dominant strategy.

Molnár (2012) showed that the presence of fiscal rules – expenditure or budget balance rules – is associated with a greater probability of stabilising debt. Moreover, the analysis confirmed that spending-driven adjustments vis-à-vis revenue-driven ones are more likely to stabilise debt, and it also revealed that large consolidations need multiple instruments for consolidation to succeed. Sub-national governments, and in particular state-level governments, can contribute to the success of central government consolidation, if they co-operate.

For applied studies on E.U. member states, examining Denmark and Ireland in the 1980s, Giavazzi and Pagano (1990) found that large fiscal consolidation programmes based predominantly or entirely on government spending reductions were expansionary. Alesina and Ardagna (1998) examined fiscal adjustments in 15 advanced countries during the 1980s. Five fiscal adjustments involved both government spending reductions and tax increases. Fiscal adjustments in Ireland (1987–1989), Australia (1987), Belgium (1984–1985) and Italy (1993, 1994–1995) were based on government spending reductions. They concluded that 'regardless of the initial level of debt, a large fiscal adjustment that is expenditure-based and is accompanied by wage moderation and devaluation is expansionary. They found, however, that no large tax-based fiscal adjustment can be expansionary even if accompanied by devaluation'.

Giudice et al. (2003) studied the fiscal policy conducted by 14 E.U. member states over a period of 33 years. There have been 49 (based on size) and 74 (based on duration) episodes of fiscal consolidation. About half of them (24 and 43, respectively) have been connected with higher economic growth. Of that half, 11 and 19, respectively, are considered to be 'pure' growth episodes in which growth cannot be attributed to a concomitant monetary policy or devaluation of the exchange rate. The authors found that the size of the adjustment and the size of the initial debt (as a percentage of G.D.P.) do not seem to play a significant role. By contrast, they found that the composition of fiscal adjustment is of high importance. Fiscal consolidation programmes based predominately or exclusively on government spending reductions are more likely to enhance growth than programmes that involve significant tax increases. Barrios, Langedijk and Pench (2010) considered evidence regarding the determinants of successful fiscal consolidations considering a panel of E.U. and non-

Table 1. Summary of existing literature on fiscal consolidation.

Author(s)	Country	Study period	Type of analysis
Giavazzi and Pagano (1990)	Denmark and Ireland	1960–1989	F.I.M.L. and N.L.I.V. estimates
Alesina and Perotti (1995)	20 O.E.C.D. countries	1960–1992	P.O.L.S. estimates
Cour et al. (1996)	17 O.E.C.D. countries	1970–1994	Descriptive
Giavazzi and Pagano (1996)	19 O.E.C.D. countries	1970–1992	2SLS and N.L.I.V. estimates
McDermott and Wescott (1996)	20 O.E.C.D. countries	1970–1995	Logistic estimates
Alesina and Ardagna (1998)	20 O.E.C.D. countries	1960–1994	Probit and static panel data estimates
Alesina et al. (1998)	19 O.E.C.D. countries	1960–1995	Probit panel data estimates
Perotti (1999)	19 O.E.C.D. countries	1965–1994	I.V. G.M.M. estimates
Giavazzi et al. (2000)	18 O.E.C.D. countries	1970–1996	Static panel data estimates
von Hagen et al. (2001)	20 O.E.C.D. countries	1960–1998	Static panel data estimates
Alesina et al. (2002)	18 O.E.C.D. countries	1960–1996	2SLS estimates
Giudice et al. (2003)	14 E.U. countries	1970–2002	QUEST model
Ahrend et al. (2006)	24 O.E.C.D. countries	1980–2005	Probit and static panel data estimates
Tsibouris et al. (2006)	165 countries	1971–2001	Duration analysis and event study techniques
Alesina and Ardagna (2009)	21 O.E.C.D. countries	1970–2007	Static panel data estimates
Barrios et al. (2010)	E.U. and non-E.U. O.E.C.D. countries	1970–2008	Two-stage Heckman probit model
Biggs et al. (2010)	21 O.E.C.D. countries	1970–2007	C.A.P.B. and Action-Based methods
Molnár (2012)	28 O.E.C.D. countries	1960–2009	Survival data analysis, truncated and Heckman selection model
Mencinger et al. (2014)	25 E.U. countries	1980–2010	Static and dynamic panel data estimates
Forte and Magazzino (2016a)	18 E.M.U. countries	1980–2015	M.G. estimates

Notes: 2SLS: two-stage least squares; C.A.P.B.: cyclically adjusted primary balance; M.G.: mean group; N.L.I.V.: non-linear instrumental variables. Source: our elaborations.

E.U. O.E.C.D. countries during the period 1970–2008. Empirical findings show that the starting debt tends to play a secondary role in explaining the success of fiscal consolidations, implying that the high starting debt level of E.U. countries entering the current financial crisis does not compromise the chances of success of fiscal consolidation plans currently devised by the E.U. member states. Mencinger, Aristovnik and Verbic (2014) explored the transmission mechanism regarding the short-term impact of public debt and growth. The results across all models indicate a statistically significant non-linear impact of public debt ratios on annual G.D.P. per capita growth rates. Further, the calculated debt-to-G.D.P. turning point, where the positive effect of accumulated public debt inverts into a negative effect, is roughly between 80% and 94% for the old member states. Yet, for the new member states the debt-to-G.D.P. turning point is lower, namely between 53% and 54%.

Forte and Magazzino (2016a), studying the effects of large changes in fiscal policy, both in the case of a fiscal consolidation and of fiscal stimulus in 18 European Monetary Union (E.M.U.) countries from 1980 to 2015, showed that adjustments by cutting current expenditures, rather than by tax increases, are more likely to boost economic growth. They also showed that cuts of investment expenditures might reduce G.D.P. growth. During fiscal stimulus episodes, tax cuts and public investments are more likely to increase growth than current public expenditure increases.

In Table 1 we summarise some relevant contributions of empirical literature on fiscal consolidation.

2.2. Studies on fiscal sustainability

The basic framework of the theoretical analysis on fiscal sustainability draws on several outstanding contributions: see Afonso (2005) Bohn (1991a, 1991b, 1995, 1998), Bravo and Silvestre (2002), Corsetti (1991), de Haan and Siermann (1993), Hakkio and Rush (1991), Hamilton and Flavin (1986), Kremers (1988, 1989), MacDonald (1992), MacDonald and Speight (1990), Payne (1997), Spaventa (1987), Trehan and Walsh (1988) and Vanhorebeek and van Rompuy (1995).

Caporale (1995) tested fiscal solvency in 10 E.U. countries, using a test for speculative bubbles. It is found that the hypothesis of no bubble can be rejected for Denmark, Germany, Greece and Italy, implying that the governments are not intertemporally solvent.

Vanhorebeek and van Rompuy (1995) tested solvency and sustainability for eight European Exchange Rate Mechanism (E.R.M.) countries during the period 1970–1994, and for the Belgian central government from 1870 onwards. In a short-term comparison of the E.R.M. countries, no support was found for the sustainability presumption, suggesting the need for a structural change of fiscal policies in order to achieve sustainability. Only France and Germany, and perhaps Denmark, seem to obey the solvency criterion (i.e., the stationarity of the budget deficit), whereas Italy's fiscal policy undoubtedly leads to insolvency. For other countries, mixed results were obtained.

Payne (1997) examined the sustainability of budget deficits of the G-7 countries in the period 1949–1994. Following the approach by Hakkio and Rush (1991), in the case of Germany, it appears that for each dollar increase in expenditures, revenues increase by an equal amount. For France, Japan and Italy the budget deficits of these countries may not be sustainable due to the lack of cointegration.

Papadopoulos and Sidiropoulos (1999) examined the stationarity of the inclusive-of-interest public deficit for five E.U. economies. The results support the occurrence of sustainable deficits for the Greek, Spanish and Portuguese economies. Contrarily, Italy and Belgium may incur unsustainable deficits, implying that their selection in Phase 2 of the E.M.U. is questionable.

Uctum and Wickens (2000) derived conditions suitable for determining fiscal policies' sustainability in the presence of debt and deficit ceilings. On the basis of infinite-horizon tests, they found that many countries do not have a sustainable policy. There is, however, some evidence that the government discounted net debt is mean-reverting for a few countries, implying that their fiscal policies are sustainable. The evidence in favour of sustainability is strengthened for most countries when data are extended to incorporate future fiscal consolidation plans. This reflects the general shift towards fiscal austerity in recent years. In addition, the results suggest that satisfying the intertemporal budget constraint provides a sufficient fiscal discipline for governments.

The results of Artis and Marcellino (2000) are consistent with a realisation of stable debt/G.D.P. ratios in line with the Maastricht criteria. Moreover, the ambitious aims of the Stability and Growth Pact may drive debt ratios down towards zero.

Bravo and Silvestre (2002) tested for sustainability by performing an empirical analysis of cointegration between public expenditures and revenues as ratios of G.D.P. in

Table 2. Summary of existing literature on fiscal sustainability.

Author(s)	Country	Study period	Type of analysis
Caporale (1995)	10 E.U. countries	1960–1991	Unit root and West tests
Vanhorebeek and van Rompuy (1995)	8 E.R.M. countries	1970–1994	Stationarity tests, V.A.R. and S.U.R. estimates
Payne (1997)	G-7 countries	1949–1994	Unit root and cointegration tests
Artis and Marcellino (2000)	13 E.U. countries	1960–1995	Stationarity and cointegration tests
Papadopoulos and Sidiropoulos (1999)	5 E.M.U. countries	1961–1995	Stationarity with structural breaks; cointegration tests; cointegration with regime shift tests
Uctum and Wickens (2000)	U.S.A. and 11 E.U. countries	1965–1994	Stationarity tests
Bravo and Silvestre (2002)	11 E.U. countries	1960–2000	Stationarity and cointegration tests
Mendoza and Ostry (2007)	34 emerging market and 21 industrial countries over	1990–2005	Bohn's M.B.S. test
Baum et al. (2013)	12 E.M.U. countries	1990–2010	IV estimates
Afonso and Jalles (2014)	19 countries	1880–2009	Unit root and structural breaks tests; S.T.M. models; first and second generation P.U.R. tests; P.U.R. with structural breaks tests

Notes: I.V.: instrumental variables; M.B.S.: model-based sustainability; P.U.R.: panel unit root; S.T.M.: structural time-series; S.U.R.: seemingly unrelated regressions; V.A.R.: vector autoregressive. Source: our elaborations.

11 member states of the E.U. during the period 1960–2000. Assuming cointegration between expenditures and revenues as a sufficient condition for sustainability, the results point to the possibility of sustainable budgetary paths in Austria, France, Germany, Netherlands and the U.K., but not in Belgium, Denmark, Ireland, Portugal, Italy and Finland.

Mendoza and Ostry (2007) examined fiscal solvency and public debt sustainability in both emerging market and advanced countries. They recommended that countries should be wary of allowing public debt ratios to rise above the 50–60% range. Baum, Checherita-Westphal and Rother (2013) investigated the relationship between public debt and economic growth, focussing on 12 Eurozone countries for the period 1990–2010. The empirical results suggest that the short-run impact of debt on G.D.P. growth is positive and highly statistically significant, but decreases to around zero and loses significance beyond public debt-to-G.D.P. ratios of around 67%. In addition, the long-term interest rate is subject to increased pressure when the public debt-to-G.D.P. ratio is above 70%.

Investigating the sustainability of fiscal policy in a set of 19 countries by taking a longer-run secular perspective over the period 1880–2009, Afonso and Jalles (2014) concluded that, since in most cases non-stationarity can be rejected, longer-run fiscal sustainability is not rejected (Japan and Spain can be exceptions).

We summarise some important studies on fiscal sustainability in [Table 2](#).

2.3. Studies on Italian public finance sustainability

Baglioni and Cherubini (1993) analysed the sustainability of the Italian fiscal policy in the period 1979–1991, using monthly data. The principal findings show that primary surplus is stationary, while public debt is not; permanent shocks explain about 90% of forecast error variance of public debt; debt is not sustainable even if the discount rates are considered. Paesani, Strauch and Kremer (2006), focussing on the U.S.A., Germany and Italy over the period 1983–2003, studied how the

accumulation of government debt affects long-term interest rates, both nationally and across borders. Empirical evidence shows that in all cases a more sustained debt accumulation leads at least temporarily to higher long-term interest rates. This transitory impact also spills over into other countries, mainly from the U.S.A. to the two European countries.

Greiner and Kauermann (2008) tested how the primary surplus in two countries of the euro area, Germany and Italy, reacts to changes of public debt. Italian public debt does not seem to be sustainable although consolidation efforts in the 1990s have stabilised Italian debt.

Marattin and Marzo (2009) investigated the consequences of the adoption of a fiscal policy rule responding to a past real debt/G.D.P. ratio on the main public finance aggregates. According to their estimates, a significant and sustainable reduction of debt/G.D.P. ratio can be achieved over the following years if policymakers raise (up to 0.30) fiscal pressure's elasticity to public debt evolution, and/or reduce primary government expenditure by four percentage points over the next four years. Balassone, Francese and Pace (2011) investigated the link between government debt-to-G.D.P. ratio and real per capita income growth in Italy in the period 1861–2009. The empirical findings support the hypotheses of a negative relation between public debt and growth, and of a stronger effect of foreign debt compared to domestic debt before the First World War. The effect of public debt on growth appears to work mainly through reduced investment.

Dalena and Magazzino (2012) examined the long-run equilibrium relationship between government expenditure and revenue in Italy from 1862 to 1993, using cointegration and causality techniques in the long run as well as in the short run. Empirical findings show that, for each sub-period, the policy adopted reflects the prevailing paradigm of public finance. In fact, the 'tax-and-spend' argument received empirical support from the liberal period data. In contrast, the interwar years are in line with the 'spend-and-tax' hypothesis. Finally, the 'fiscal synchronisation' hypothesis emerges in the Republican ages (Magazzino, 2012a). Casadio, Paradiso and Rao (2012) analysed possible targets for the Italian debt-to-G.D.P. ratio with a small macroeconomic model. They found that external conditions play a fundamental role for Italian fiscal consolidation. To reach a target of 100% debt-to-G.D.P. ratio by 2020, a further growth-sustaining policy has to be implemented.

Magazzino (2012b) assessed the empirical evidence of Wagner's Law in Italy for the period 1960–2008 at a disaggregated level, using a time-series approach. The causality results show evidence in favour of Wagner's Law only for passive interests spending in the long run, and for dependent labour income spending in the short run.

Piergallini and Postigliola (2012) examined the historical dynamics of government debt in post-unification Italy (1861–2009). They found that, controlling for fiscal feedback policies, the debt-to-G.D.P. ratio is mean-reverting. Moreover, policymakers reacted to the debt accumulation, taking corrective measures to avoid potential long-run sustainability problems. Buiatti, Carmeci and Mauro (2014) reconstructed the macro regional government deficits of Italy. They found that the incredibly large and persistent fiscal imbalances of poorer Southern regions are the ultimate cause of the

national public debt of Italy. They suggest the introduction of a tight set of hard budget rules and fiscal responsibility that must substitute for the current set of norms and discretionary budget procedures.

Trachanas and Katrakilidis (2013) evaluated the sustainability of the fiscal deficit as well as the long-run macroeconomic relationship between government spending and revenues for Italy, Greece and Spain in the years 1970–2010. The evidence for all three countries suggests that, allowing for a structural break, the fiscal deficits are weakly sustainable in the long run, the ‘spend-and-tax’ hypothesis is supported, and the budgetary adjustment process is asymmetric in Italy and Spain.

Magazzino and Intraligi (2015) studied the relationships between government debt/G.D.P. and its macroeconomic determinants (such as primary balance/G.D.P., real G.D.P., the inflation rate and the average interest rate on treasury bills) in the period 1958–2013 in Italy. Consistent with the theory, the results reveal a significant causal relationship moving from the primary balance to the real growth rate, as well as a clear influence of the inflation on the interest rate. In contrast, the influence of public debt on growth rate emerges only marginally.

Forte and Magazzino (2016b) empirically assessed the relationship between government size and economic growth in Italy (1861–2008). The results show the presence of a non-linear relationship between the size of the public sector (measured by the share of government expenditure over G.D.P.) and the economic growth rate. In general, the presence of an inverted ‘U-shape’ curve, which emerges for the last two decades, suggests that expenditure cuts might foster the G.D.P. dynamic (Magazzino, 2013, 2014).

Brady and Magazzino (2017), analysing the sustainability of Italian public debt, revealed that Italy faced sustainability problems in the Republican age (1947–2013). The Markov-switching dynamic regression model indicates the existence of two distinct states, both for public debt and deficit, with means and standard deviations being rather different. Both states are extremely persistent.

The principal studies on Italian public finance sustainability are summed up in Table 3.

3. Data and methodology

The first step of our empirical strategy concerns stationarity and unit root tests. According to Engle and Granger (1987), a linear combination of two non-stationary series can be stationary and, if such a stationarity exists, the series are considered to be cointegrated. This requires, however, that the series have the same order of integration. Therefore, the Augmented Dickey and Fuller (A.D.F.) (1979), Elliott, Rothenberg and Stock (E.R.S.) (1996), Kwiatkowski, Phillips, Schmidt and Shin (K.P.S.S.) (1992) and Phillips and Perron (P.P.) (1988) tests were performed to test whether the data are difference stationary or trend stationary, as well as to determine the number of unit roots at their levels. Moreover, we also checked if any of the variables have structural breaks. To this extent, the Zivot and Andrews (Z.A.) (1992) and Clemente, Montañés and Reyes (C.M.R.) (1998) tests were performed.

Table 3. Summary of existing literature on Italian public finance sustainability.

Author(s)	Study period	Type of analysis
Baglioni and Cherubini (1993)	1979–1991	Unit root tests
Paesani et al. (2006)	1983–2003	Unit root and cointegration tests, I.R.F., F.E.V.D., S.V.A.R.
Greiner and Kauermann (2008)	1975–2003	Penalised spline smoothing
Marattin and Marzo (2009)	2007–2026	Forecasting
Balassone et al. (2011)	1861–2009	Unit root and cointegration tests, A.R.D.L.
Dalena and Magazzino (2012)	1862–1993	Unit root, structural breaks and cointegration tests, V.E.C.M., causality tests
Casadio et al. (2012)	1970–2011	S.U.R. estimates
Magazzino (2012b)	1960–2008	Unit root, structural breaks cointegration and causality tests
Piergallini and Postigliola (2012)	1862–2012	Linearity tests and non-linear estimates
Buiatti et al. (2014)	1963–2007	Unit root, structural breaks and <i>J</i> -test approach
Trachanas and Katrakilidis (2013)	1970–2010	Unit root, cointegration and causality tests
Magazzino and Intraligi (2015)	1958–2013	Unit root, structural breaks and causality tests
Forte and Magazzino (2016b)	1861–2008	A.R.I.M.A.X. estimates
Brady and Magazzino (2017)	1862–2013	Unit root and structural breaks tests, Markov-switching dynamic estimates

Notes: A.R.D.L.: autoregressive distributed lag; A.R.I.M.A.X.: autoregressive integrated moving average with exogenous variables; F.E.V.D.: forecast error variance decomposition; I.R.F.: impulse response function; S.U.R.: seemingly unrelated regression; S.V.A.R.: structural vector autoregressive; V.E.C.M.: vector autoregressive model. Source: our elaborations.

Once we found that the variables are non-stationary at their levels and are in the same order of the integration, we can apply the cointegration test.

The A.R.D.L. bounds testing approach of cointegration was developed by Pesaran and Shin (1999) and Pesaran, Shin, and Smith (2001). This approach has several advantages over the traditional cointegration approaches of Engle and Granger (1987) and Johansen and Juselius (1990). This takes care of small-sample properties and simultaneity bias in the relationship between variables. The main constraint in the application of the conventional cointegration techniques is that they require all the variables included in the model to be non-stationary at levels but should be integrated in the same order. The present A.R.D.L. approach to the cointegration method surmounts this problem as it is applicable irrespective of the order of integration of the regressors whether $I(0)$ or $I(1)$ or a mixture of both. Apart from that, the A.R.D.L. model also has advantages in selecting sufficient numbers of lags to capture the data-generating process in a general-to-specific modelling framework. These meritorious features justify the use of A.R.D.L. model to obtain robust estimates. The bounds testing procedure is based on the joint F -statistics or Wald statistics that test the null of no cointegration, $H_0: \delta_r = 0$, against the alternative $H_1: \delta_r \neq 0$, $r = 1, 2, \dots, 4$. If the calculated F -statistic lies above the upper level of the band, the null is rejected, indicating cointegration. If the calculated F -statistic is below the upper critical value, we cannot reject the null hypothesis of no cointegration. Finally, if it lies between the bounds, a conclusive inference cannot be made without knowing the order of integration of the underlying regressors. The next step is to test for the stability of the long-run coefficients as well as the dynamics of the short-run ones, following Pesaran (1997).

Cointegration analysis also considered the Gregory and Hansen (1996) test for cointegration with regime shifts. The null hypothesis (H_0) is no cointegration, against the alternative (H_1) of cointegration with a single shift at an unknown point in time.

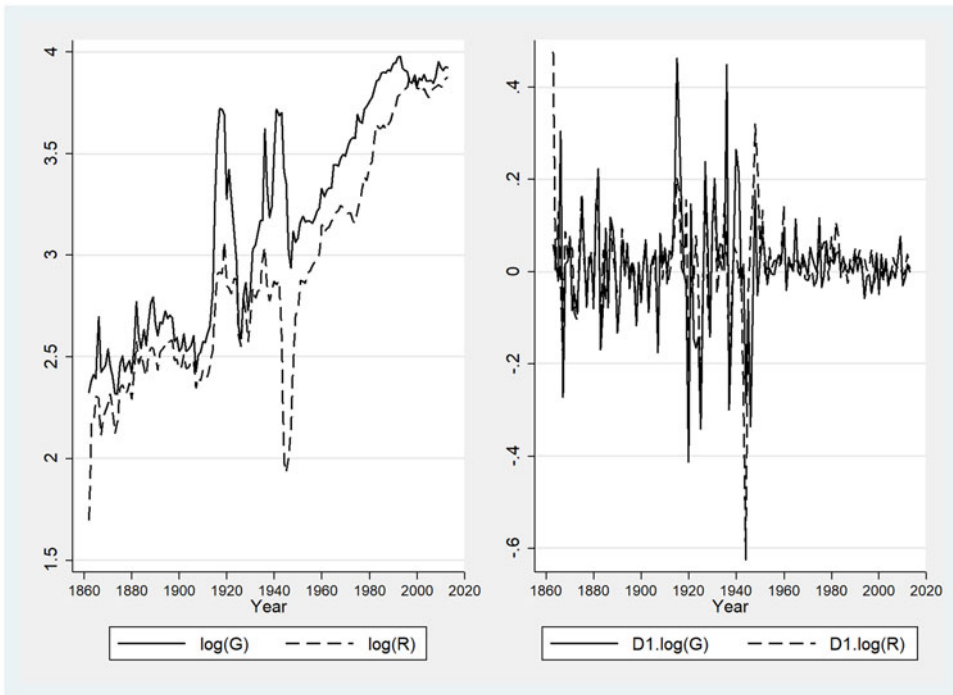


Figure 1. Public expenditure and revenue in Italy, 1862–2013: (a) as a percentage of G.D.P., logarithmic scale; (b) first-differences series. Source: Forte (2011) and I.S.T.A.T.

Finally, previous results were checked by combination procedures developed by Bayer and Hanck (2013). We report the results of the Banerjee, Dolado and Mestre (1998) and Boswijk and Doornik (2005) tests.

In our analysis the log transformations of the variables have been derived. The empirical analysis uses the time-series data of public expenditure (as a percentage of G.D.P., G) and revenue (as a percentage of G.D.P., R) for Italy in the years 1862–2013. We used the data recently reconstructed by Forte (2011).¹ Figure 1 shows the dynamics of our series. In the right-hand side panel, the first-differences series are graphed.

The choice of the sub-periods is in line with studies that cover a similar time span (Balassone et al., 2011; Brady & Magazzino, 2017; Burret, Feld, & Köhler, 2013). Moreover, the sample used in the regression analysis excludes the years 1915–1946 to prevent distortions from the extreme values recorded for most variables over that period because of the two world wars. The partition of the sample is also driven by major facts in Italian history (early unification; world wars and Fascism; Republican period). Structural break analysis also confirms this choice.

A visual inspection of the series in logarithmic form shows that there was a clear upward trend for both series after the Second World War.

Some descriptive statistics are summarised in Table 4 as a preliminary analysis. Both variables have negative value of skewness in the sub-period 1947–2013, indicating that the distributions are skewed to the left.

Table 4. Exploratory data analysis.

Period	Variable	Mean	Median	Standard deviation	Skewness	Kurtosis	Range	I.Q.R.	10-trim
1862–2013	G	3.1726	3.1760	0.5446	0.0066	1.5150	1.6608	1.1027	3.174
	R	2.9109	2.8380	0.5533	0.3431	2.0341	2.1788	0.7949	2.892
1862–1914	G	2.5494	2.5461	0.1197	0.0080	2.3130	0.4784	0.1856	2.549
	R	2.3870	2.4352	0.1586	−1.7616	8.0278	0.8862	0.1800	2.407
1947–2013	G	3.6275	3.7578	0.3055	−0.6052	1.8945	1.0379	0.5642	3.655
	R	3.4065	3.4400	0.4033	−0.6542	2.8381	1.7175	0.6542	3.444

Note: I.Q.R.: Inter-Quartile Range.

Source: our calculations are based on Forte (2011) and I.S.T.A.T. data.

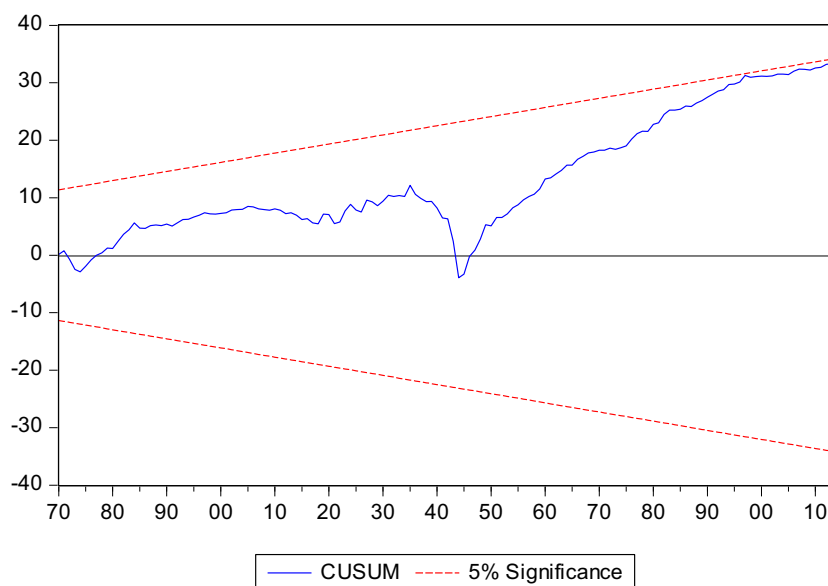


Figure 2. Plot of cumulative sum (CUSUM) of recursive residuals, 1862–2013. Source: Authors.

Correlation analysis shows that public expenditure and revenue are highly correlated in each period (Table 12 in Appendix 1). Moreover, these results are broadly confirmed by cross-correlation analysis.

4. Empirical analysis

The focus of the present section is the analysis of the fiscal policy sustainability for each time period in Italy. In order to test for fiscal sustainability, we test whether the transversality condition is met (Burret et al., 2013) by conducting various stationarity tests on public expenditure and revenues. We have also split our time span into two periods: 1862–1913 and 1947–2013. An additional reason to conduct such an analysis rests on the fact that longer sample periods may actually ‘hide’ unsustainability periods in the series.

Several unit root and stationarity tests are used in an attempt to verify the stability conditions. Since unit roots in fiscal data imply that economic shocks have a

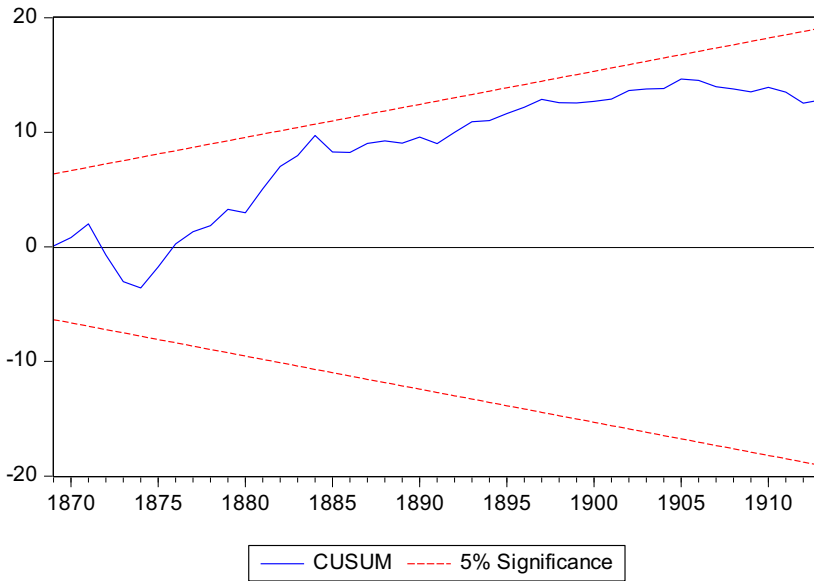


Figure 3. Plot of cumulative sum (CUSUM) of recursive residuals, 1862–1913. Source: Authors.

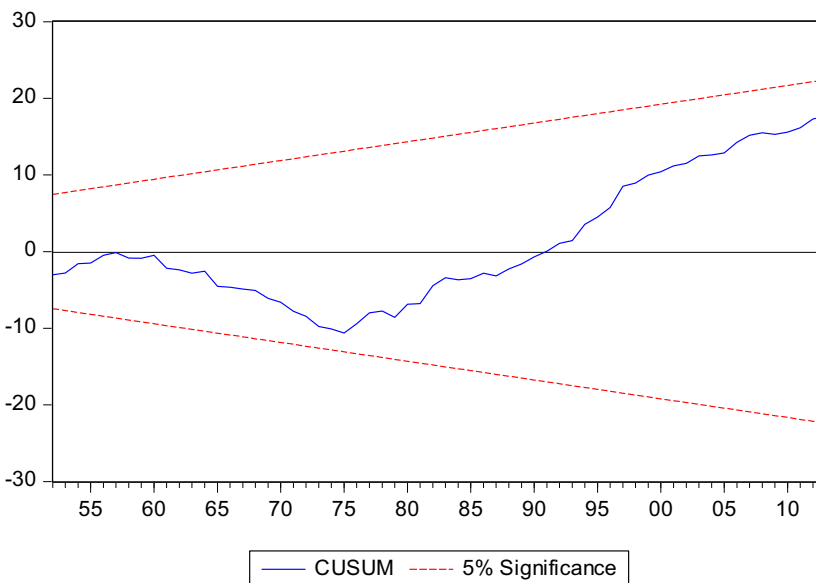


Figure 4. Plot of cumulative sum (CUSUM) of recursive residuals, 1947–2013. Source: Authors.

sustaining effect on the data over time, the identification of a unit root denotes a non-stationary (unsustainable) time-series. In order to take a possible distortion of structural breaks into account, we follow a two-fold approach. First, we conduct the unit root and stationarity tests on the entire sample (1862–2013) and on the two sub-samples (1862–1913 and 1947–2013). Second, we additionally apply two tests on unit roots and structural breaks.

The stationarity tests on the years 1862–2013 are only indicative, since the whole period is characterised by large-scale events and structural breaks. If we allow for a constant, the tests indicate that both variables are non-stationary in the levels, but stationary in first differences (integrated first order). If we also include a trend in the estimate, the results for their levels are ambiguous; in fact, expenditures tend to be stationary in levels with trend, as the E.R.S. and P.P. test statistics allow for rejecting the hypothesis of a unit root on the 5% significance level. In contrast, all proposed tests do not reject the hypothesis of stationarity for the differenced series. Given these mixed results, we conclude that the analysis of the whole time-series could not be meaningful. Moreover, the power of standard unit root tests decreases substantially if there are significant structural breaks in the time-series. Therefore, we divide the sample into two sub-periods as discussed above.

With regard to the first sub-period (1862–1913), expenditures and revenues tend to be first-differences stationary, in both specifications. Thus, in this respect, evidence in favour of solvency is found.

Finally, in the last period (1947–2013), as for expenditures, if we allow for a constant, the tests indicate that they are non-stationary in the levels, while the differenced series is stationary. If we also include a trend, expenditures continue to be $I(1)$. On the other hand, the results for revenues are ambiguous, since, allowing for a constant, the A.D.F. (at 10%) and P.P. tests (1%) reject the unit root hypothesis; while including a trend in the deterministic component, the E.R.S. and P.P. test statistics allow for rejecting the non-stationary hypothesis. Nevertheless, all proposed tests clearly indicate the absence of a unit root when the differenced series of revenues is analysed. These findings clearly indicate that Italian fiscal policies have undoubtedly been insolvent in the last sub-period.

In summary, the results allow the rejection of the non-stationarity hypothesis for the entire period as well as for the two selected sub-periods (Table 5).

To further explore unit root properties of the variables, we supplement a Z.A. unit root test that is sensitive to structural breaks: (a) in the intercept; and (b) in the intercept and trend (Table 6).

For the whole period, we find ambiguous results: in the first case, we cannot reject the hypothesis that revenues have a unit root. Yet, if we also allow for a structural break in the trend, the hypothesis is rejected. The first specification test indicates a break point in 1975, the first year in which there were the effects of the Italian tax reform; while the second specification isolates a break at the end of the Second World War, with the need to finance the reconstruction. For expenditure, both tests reject the null hypothesis of unit root only at 10% significance level, with a break at the outbreak of the First World War (1914). For this reason, previous ambiguous results are confirmed. Comparing expenditure and revenue break points, the Z.A. results suggest that the fiscal policy of the 19th century is significantly different from that of the 20th century (Table 6). The significant breakpoint in 1914 is due to the sharp increase of expenditure growth to finance the First World War. The C.M.R. test shows that, both for revenues and expenditures, despite the structural breaks, we are unable to reject the null hypothesis of a unit root in these series. Notwithstanding this, the rejection of the stationarity hypothesis does not mean that public accounts

Table 5. Results for unit roots and stationarity tests.

Period	Variable	Unit root and stationarity tests				
		Deterministic component	A.D.F.	E.R.S.	P.P.	K.P.S.S.
1862–2013						
	G	Constant	−1.4290	−0.1598	−1.4290	1.3706***
	R	Constant	−1.0549	0.3597	−1.5968	1.3243***
	G	Constant, trend	−3.4063*	−3.4309**	−3.8367***	0.0368
	R	Constant, trend	−3.0884	−2.4993	−3.4300*	0.2219***
	ΔG	Constant	−6.6434***	−2.6640***	−11.2386***	0.0217
	ΔR	Constant	−10.8174***	−0.9545	−11.0261***	0.0563
	ΔG	Constant, trend	−6.6207***	−6.4510***	−11.2009***	0.0211
	ΔR	Constant, trend	−10.7720***	−1.5720	−10.9828***	0.0562
1862–1913						
	G	Constant	−2.2051	−1.1322	−3.3304**	0.4682**
	R	Constant	−2.4543	−1.0413	−5.2232***	0.6861**
	G	Constant, trend	−1.2706	−1.1772	−3.6332**	0.1683**
	R	Constant, trend	−0.6916	−1.1933	−5.4742***	0.2742***
	ΔG	Constant	−9.3828***	−1.6348**	−14.3553***	0.1988
	ΔR	Constant	−10.1177***	−1.6606*	−18.7841***	0.3286
	ΔG	Constant, trend	−9.2972***	−9.3446***	−17.4027***	0.1901**
	ΔR	Constant, trend	−9.9661***	−2.9705*	−35.8019***	0.0948
1947–2013						
	G	Constant	−1.8269	0.3349	−2.1533	0.9158***
	R	Constant	−2.8422*	−0.1615	−4.2098***	0.9768***
	G	Constant, trend	−0.3792	−1.0534	−0.4320	0.2219***
	R	Constant, trend	−1.7730	−3.1633**	−5.2981***	0.1320*
	ΔG	Constant	−9.1832***	−9.3629***	−12.8693***	0.4858**
	ΔR	Constant	−4.6307***	−1.7669*	−4.5872***	0.4596*
	ΔG	Constant, trend	−9.2348***	−8.6189***	−14.6196***	0.1107
	ΔR	Constant, trend	−5.1860***	−4.3358***	−5.2588***	0.1243*

Notes: the tests are performed on the log-levels of the variables. A.D.S., augmented Dickey–Fuller test; E.R.S., Elliott, Rothenberg and Stock point optimal test; P.P., Phillips–Perron test; and K.P.S.S., Kwiatkowski, Phillips, Schmidt, and Shin test. When it is required, the lag length is chosen according to the H.Q.I.C. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Lag length based on modified S.B.I.C. for A.D.F. and E.R.S., Bartlett kernel for P.P. and K.P.S.S. Source: Authors.

Table 6. Results for unit root tests with structural breaks and for additive outlier unit root tests (single structural break).

Period	Variable	Z.A. tests						C.M.R. tests			
		(a)			(b)			Optimal break point	k	t-statistic	5% critical value
		T_b	k	t_{min}	T_b	k	t_{min}				
1862–2013											
	G	1914	3	−4.777* (−4.80)	1914	3	−4.984* (−5.08)	1917	6	−1.791	−3.560
	R	1975	3	−4.266 (−4.80)	1943	3	−5.539** (−5.08)	1974	1	−3.403*	−3.560
1862–1913											
	G	1881	1	−5.706*** (−4.80)	1881	1	−5.647*** (−5.08)	1878	6	−4.416***	−3.560
	R	1881	1	−8.548*** (−4.80)	1881	1	−8.762*** (−5.08)	1878	6	−1.869	−3.560
1947–2013											
	G	1994	2	−3.561 (−4.80)	1982	2	−3.605 (−5.08)	1982	2	−3.505*	−3.560
	R	1981	2	−4.311 (−4.80)	1982	2	−5.058* (−5.08)	1982	0	−5.335***	−3.560

Notes: (a) refers to the model allowing for break in intercept; and (b) the model allowing for break in intercept and trend. T_b is the break date endogenously selected. t_{min} is the minimum t-statistic. k denotes the lag length. 5% critical values are given in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Source: Authors.

are not sustainable, as observed by Trehan and Walsh (1991): stationarity rejection does not necessarily imply the absence of sustainability of government accounts.

For the pre-First World War years, if we allow for a structural break in the intercept, we can reject the null hypothesis for both expenditures and revenues; and we

Table 7. A.R.D.L. bounds test estimation results.

Period	Model for estimation	Lag length	<i>F</i> -statistic	Significance level	Critical bound <i>F</i> -statistics	
					<i>I</i> (0)	<i>I</i> (1)
1862–2013	F_R^G	1	4.355	1	6.84	7.84
				2.5	5.77	6.68
	F_G^R	1	1.432	5	4.94	5.73
				10	4.04	4.78
1862–1913	F_R^G	1	7.306**	1	6.84	7.84
				2.5	5.77	6.68
	F_G^R	1	6.456**	5	4.94	5.73
				10	4.04	4.78
1947–2013	F_R^G	1	2.715	1	6.84	7.84
				2.5	5.77	6.68
	F_G^R	1	10.467***	5	4.94	5.73
				10	4.04	4.78

Notes: Asymptotic critical value bounds are obtained from the *F*-statistics table in Pesaran et al. (2001). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Source: Authors.

obtain similar results when we include also the trend in the model. Curiously, all tests indicate as a break point the year 1881, when the Cairoli III government (Historical Left) abolished the fiat of the lira (Forte & Magazzino, 2016b).

As regards the Republican age, for expenditures and revenues we retain the null hypothesis, allowing for both a structural break in the intercept and also for a break in the trend. Both tests indicate for revenues a break point located in the 1980s, related to the effects of the so-called ‘divorce’ between the Bank of Italy and the Italian Ministry of Treasury as well as the effects of the second oil shock. If we allow for a break only in the intercept, the break corresponds to the initial phase of the Second Republic. When including a break in the trend, the date also coincides with that found for revenues (1982).

We therefore can conclude that both our series are integrated of order one, or *I*(1) only in the second sub-period, while inconclusive results are reached for the whole sample period. The lag-order selection has been chosen according to Akaike’s information criterion (A.I.C.), the Schwarz’s Bayesian information criterion (S.B.I.C.), and the Hannan–Quinn information criterion (H.Q.I.C.).

We can now proceed to investigate fiscal sustainability in Italy by testing for the existence of cointegration between public expenditure and revenues. Figure 1 supplies a visual inspection of the time-series and a preliminary idea. One can suspect that in recent years Italy might not pass the sustainability tests. In Table 7, we show the results of the A.R.D.L. bounds cointegration tests.

The empirical findings allow the rejection of the cointegration hypothesis for both equations of the whole period, and only for the equation with public expenditure as a dependent variable in the second sub-period. On the other hand, for the years 1862–1913 a cointegration relation is found for both equations. Therefore, considering the results of the entire sample time period (1862–2013), one can conclude that fiscal policy may not have been sustainable for Italy since Unification.

For the first sub-period, in the revenues equation, the estimated coefficient for public expenditure is less than 1 (Table 8). For each percentage point of G.D.P.

Table 8. Cointegration of government revenues and expenditures.

Time period	Dependent variable	Engle–Granger test		A.R.D.L. bound tests	
		Vector	<i>p</i> -value	Vector	<i>p</i> -value
1862–1913	<i>R</i>	[1–0.9740]***	0.000	[1–0.9343]***	0.001
	<i>G</i>	[1–1.2117]***	0.000	[1–1.3639]***	0.000
1947–2013	<i>R</i>	[1–0.6276]***	0.000	[1–0.8818]***	0.000

Notes: Asymptotic critical value bounds are obtained from the *F*-statistics table in Pesaran et al. (2001). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Only cointegrating vectors with at least a 10% significance level are reported. Source: Authors.

increase in public expenditure in Italy during the years 1862–1913, public revenues only increase by 0.93–0.97. This estimated coefficient is, however, very close to 1 suggesting that, in the abovementioned period of time, public expenditure exhibited a slightly higher growth rate than public revenues, thus not challenging the hypothesis of fiscal sustainability.

On the other side, for the more recent period (1947–2013), the public expenditure's coefficient in the equation where revenues are the dependent variable is less than 1. Here, we can state that for each percentage point of G.D.P. increase in public expenditure in Italy in the period 1947–2013, public revenues only increase by 0.6276. In this case, public expenditure exhibited a growth rate clearly higher than public revenues, suggesting that fiscal sustainability problems emerge.

To allow for the possibility of structural breaks in the long-run cointegrating relationship, however, we applied the Gregory and Hansen (1996) cointegration test with breaks. Briefly, under this procedure, a dummy variable is included to account for a shift in the cointegrating regression. The minimum A.D.F. statistic endogenously determines the breakpoint and is compared to critical values supplied by Gregory and Hansen (1996).

The procedure offers four different models corresponding to the four different assumptions concerning the nature of the shift in the cointegrating vector. Table 9 clearly confirms previous A.R.D.L. bounds tests results, showing the existence of cointegration with a break for the first sub-period.

To strengthen our applied findings, we also report the results of the recent Bayer and Hanck (2013) cointegration tests. In Table 10 the results of Banerjee et al. (1998) tests are shown. The procedure offers three different models, corresponding to the three different underlying assumptions. Again, a long-run relationship is found for the first sub-period (for both specifications), while cointegration emerges for the years 1947–2013 in the revenues equation alone.

Finally, the findings of Boswijk and Doornik (2005) tests are reported in Table 11. They broadly confirm the previous ones, with the existence of a cointegrating relation for both specifications in the 1862–1913 sub-period, as well as a cointegrating relation in the revenues equation for the 1947–2013 sub-period alone.

Furthermore, our empirical findings are in line with previous results by Vanhorebeek and van Rompuy (1995), who found that Italian fiscal policies have undoubtedly been insolvent in the period 1970–1994. Corsetti and Roubini (1991) found, amongst other things, the government finances of Italy to be unsustainable. Caporale (1995) found that the government of Italy is intertemporally insolvent. Payne (1997) showed that in the case of Italy the budget deficits might not be

Table 9. Gregory and Hansen cointegration tests.

Dependent variable	Period	Constant	Constant and trend	Constant and slope	Constant, slope and trend
G	1862–2013	−4.24 (1920)	−4.29 (1908)	−5.15** (1937)	−5.66** (1937)
	1862–1913	−6.85*** (1869)	−6.82*** (1869)	−6.28*** (1872)	−6.37*** (1869)
	1947–2013	−4.12 (1908)	−4.01 (1884)	−4.14 (1908)	−6.25*** (1909)
R	1862–2013	−3.56 (1979)	−4.01 (1979)	−4.36 (1943)	−4.84 (1938)
	1862–1913	−10.47*** (1874)	−10.39*** (1874)	−10.36*** (1874)	−10.57*** (1898)
	1947–2013	−5.58*** (1992)	−5.86*** (1992)	−5.74*** (1990)	−5.58** (1973)

Notes: A.D.F. statistics are reported. Break date in parentheses. 5% critical values: −4.61, −4.99, −4.95, −5.50, respectively. Source: Authors.

Table 10. Banerjee cointegration tests.

Dependent variable	Period	Constant	Trend	None
G	1862–2013	−2.9671* (0.0865)	−2.6165 (0.3758)	−2.8161** (0.0288)
	1862–1913	−3.7144** (0.0128)	−3.7197* (0.0449)	−3.7157*** (0.0019)
	1947–2013	−2.2869 (0.2928)	−2.0332 (0.6652)	−0.9105 (0.5544)
R	1862–2013	−1.7017 (0.5561)	−2.8897 (0.2540)	−1.7112 (0.2479)
	1862–1913	−2.8365 (0.1144)	−2.9117 (0.2454)	−3.0774** (0.0144)
	1947–2013	−4.5057*** (0.0009)	−5.6124*** (0.0001)	−4.6034*** (0.0001)

Notes: Constant: include an unrestricted constant in model. Trend: include a linear trend in the cointegrating equations and a quadratic trend in the undifferenced data. None: does not include a trend or a constant. p -values in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Source: Authors.

Table 11. Boswijk cointegration tests.

Dependent variable	Period	Constant	Trend	None
G	1862–2013	8.8915 (0.1240)	8.8755 (0.2903)	7.9523* (0.0534)
	1862–1913	15.6082*** (0.0096)	14.2400*** (0.0553)	13.9028*** (0.0037)
	1947–2013	5.6977 (0.3518)	5.4165 (0.6374)	3.1072 (0.3885)
R	1862–2013	2.9242 (0.6971)	11.3946 (0.1399)	3.6437 (0.3170)
	1862–1913	9.5198* (0.0994)	8.9165 (0.2873)	9.9408** (0.0222)
	1947–2013	21.9627*** (0.0007)	31.5358*** (0.0001)	22.5748*** (0.0000)

Notes: Constant: include an unrestricted constant in model. Trend: include a linear trend in the cointegrating equations and a quadratic trend in the undifferenced data. None: does not include a trend or a constant. p -values in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Source: Authors.

sustainable due to the lack of cointegration. Moreover, cointegration is present between revenues and expenditures, although the estimated coefficient (0.63–0.88) is significantly less than 1, which suggests that public expenditure was growing faster than public revenues. Such a relationship between public revenues and expenditure questions the issue of sustainability. Papadopoulos and Sidiropoulos (1999) derived that Italy may incur unsustainable deficits, so that its selection in Phase 2 of the E.M.U. is questionable. Uctum and Wickens (2000) found that the market value of the debt-to-G.D.P. ratio for Italy was not mean-reverting (1994–2000), though a general improvement in fiscal stances toward the end of the century could be noted. Moreover, they concluded that fiscal policy in Italy was not sustainable. Bravo and Silvestre (2002) found that cointegration between expenditures and revenues does not emerge in the Italian case, implying that the condition for sustainability does not

hold. In addition, Afonso (2005) found that Italy was one of the majority E.U.-15 member countries with sustainability problems. Contrarily, Afonso and Jalles (2014) concluded that the solvency condition would be satisfied for Italy, since non-stationarity can be rejected, and, therefore, longer-run fiscal sustainability cannot be.

5. Concluding remarks and policy implications

This study has extended the research on the fiscal sustainability of the Italian budgetary policies in the years 1862–2013. Unit root and stationarity tests have been conducted on the entire sample (1862–2013), and on two sub-samples (1862–1913 and 1947–2013). The results of unit root tests allow the rejection of the non-stationarity hypothesis for the entire period as well as for the two selected sub-periods. Unit root tests with structural breaks confirm previous findings. Cointegration analyses reveal that a long-run relationship does not emerge for the whole period. Therefore, considering the results of the entire sample time period (1862–2013), one can conclude that fiscal policy may not be sustainable for Italy since Unification. Moreover, cointegration is present between public expenditure and revenues for the first sub-period (1862–1913), with an estimated coefficient very close to 1 (0.93–0.97), thus not implying problems for fiscal sustainability. On the other hand, for the Republican age (1947–2013), a long-run relationship is discovered, although the estimated coefficient (0.63–0.88) is significantly less than 1, which suggests that public expenditure was growing faster than government revenues, raising some concerns about the issue of sustainability. Therefore, we support a fiscal consolidation strategy and refute the perception that Italian fiscal policy is on a sustainable path. Similar conclusions can be derived from the study of Forte and Magazzino (2011), which shows that the ratio between public expenditure and G.D.P. generally exceeded the value related to the maximisation of G.D.P. growth.

The concept of practical sustainability is most relevant in the framework of the budgetary preconditions of Maastricht. In other words, if Italian fiscal policies were to be conducted in the future as they were in the Republican age (1947–2013), there could emerge some problems. In addition, our results are in line with the empirical findings of Brady and Magazzino (2017).

The Italian economy is characterised by a high public debt, and the decline in productivity observed in the last two decades has raised serious doubts about its sustainability. At a territorial level, the main threats to the well-functioning of the Italian public sector are: (a) an insufficient share of their own revenues for the commons, provinces and regions with respect to their expenditures; (b) the territorial differences in terms of population and area of the local administrations, in contrast with the homogeneity of the functions assigned to them; and (c) the high territorial heterogeneity in the per capita expenditure of the public sector observed at a regional level.

Given the high fiscal pressure, the low productivity, the diffuse tax evasion, the high public debt/G.D.P. ratio and the scarce economic growth rate, the only way for Italy to put order into its public finance is a moderate austerity, via the realisation of a primary budget surplus (Perotti, 2016).

Nevertheless, labour productivity gains should be considered as the most important factor in ensuring long-term fiscal sustainability, and in this respect, the implementation of public policies such as those included in the Lisbon Strategy package is an essential condition to boosting labour productivity and fostering potential growth.

In order to rebalance its public finances, Italy must avoid hasty and questionable solutions such as the abandonment of the euro (the so-called *Italexit*) as well as the repudiation of the debt, instead giving itself credible and effective tax rules, reducing current public expenditures and achieving a balanced budget (Cottarelli, 2016).

Note

1. For years 2009–2013 we used Istituto Nazionale di Statistica (I.S.T.A.T.) data, <http://seriestoriche.istat.it/>.

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Appendix 1

Table 12A. Correlation matrix.

Year		G	R
1862–2013	G	1.0000	
	R	0.9031***	1.0000
1862–1913	G	1.0000	
	R	0.8105***	1.0000
1947–2013	G	1.0000	
	R	0.9526***	1.0000

Notes: Sidak's correction applied. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Source: Authors.