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Government spending and its components in Italy, 1862-2009: drivers and policy implications

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Abstract

Using a new historical dataset over the time period 1862-2009, this paper tests the validity of Wagner’s Law of public spending (WL) in Italy. To this aim, cointegration and Granger causation are used to investigate the long run relationship between GDP and government expenditure. Moreover, DOLS method is applied to estimate consistent long run elasticity between these two variables. In contrast to previous studies, we evaluate WL for both total government expenditure and some specific items of spending. Our main findings are that WL does not hold in the long run for total government expenditure. However, we find strong support for WL in the shorter time span from 1862 to the end of the 19th century. Here WL is confirmed as regards both total government expenditure and all the specific items of spending we have considered. Conversely, in the post-Second World War years, WL holds only for capital expenditure, compensation of employees, justice and national security, welfare and redistribution by the state. Thus, it seems that Italy invested a great deal and for a long period in infrastructures, justice, national security, and welfare, and less in items such as education and culture that play a paramount role in the formation of human capital.

Keywords: Wagner’s Law, government expenditure, economic development, cointegration, Granger causation, DOLS.

JEL classification: H1, H5, I00, N43, N44

1. Introduction*

In the last century, government expenditure underwent constant growth in Western countries. Today in Western Europe the public sector absorbs around fifty percent of the national product, and in the United States around thirty percent. This growth in government's involvement in market economies is one of the most debated topics in public economics (Atkinson and Stiglitz 1980; Lindert 1994, 1996, 2004a, 2004b; North and Wallis 1982, Tanzi and Schuknecht 2000).

A number of explanations have been provided to identify the drivers of growth in public sector. Among these, Wagner's Law of public spending (henceforth WL) has drawn widespread attention. WL suggests three main reasons for increased government involvement in the long run (Wagner 1883, 1893). Firstly, the increasing complexity of the economy generates increased demand for government intervention. The urbanization and greater division of labour accompanying industrialization required more government regulation and higher expenditure on contractual enforcement and law and order. Another reason is the supposed superior income-elasticity of publicly provided goods and services (such as cultural and welfare expenditures). Lastly, the growing need to finance large-scale investments with public good characteristics (i.e., infrastructures) also boosted public spending.

In this perspective, the growth of government expenditure is considered to be a consequence of the expansion of the state produced by a country's social and economic progress.¹ Wagner was the first to attempt an empirical verification of his hypothesis. He did so for some European countries² that underwent industrialization in the late 19th century. Subsequent studies tried to verify whether this "empirical uniformity" also existed in more recent periods, and whether it has been maintained in other contexts: for example, the developing countries in the 20th century.

Up until the early 1990s, WL received strong support with few exceptions. Since then, however, according to a recent review of over forty studies (Durevall and Henrekson 2011), the evidence is more controversial: around 35 percent of these studies fail to find support for WL, while around 30 percent provide indirect support by controlling for other variables or focusing on specific expenditure items, and around 35 percent provide direct support.

However, there are very few studies that analyse very long time spans and all of them reject WL. Henrekson (1993) and Bohl (1996) find no support for WL in Sweden from 1861 to 1990 and in the UK from 1870 to 1995. Ghate and Zak (2002) do not find any empirical evidence in the USA from 1929 to 2000. Durevall and Henrekson (2011) find that in both the UK and Sweden WL does not hold in the long run (i.e., in the years 1800-2006 for Sweden and 1830-2006 for the UK); there are, however, two shorter time spans during which WL holds: approximately 1860-1913 and 1920-1975 for both countries. Kuckuck (2014) finds that WL can be rejected in five European countries in the period 1850-2010; nevertheless, he finds evidence that WL has a higher validity during early stages of development, but becomes weaker at an advanced stage of development.

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¹ The major alternative approaches are the displacement effect (Peacock and Wiseman 1961) and the ratchet effect (Bird 1971) which claim that in a downturn public expenditure declines more slowly than percapita GDP so that public expenditure as a share of GDP rises, whereas the reverse occurs in upturns.

² Prussia, Bavaria, England and Switzerland.

Some explanations have been provided to account for the stronger support WL receives in early stages of development and especially in the 40-50 years prior to the First World War. Economic growth in the late 19th century made it possible for several countries to introduce a system of income tax collection more cost-efficient than a system based on custom and excise taxes, which allowed an expansion of fiscal capacity that was not possible before (Levi 1988). Moreover, Meltzer and Richard (1983) and Lindert (1994, 2004a) argue that government spending grows when the franchise is extended to include more voters below the median income level. This led to a distribution of income less equal than the distribution of votes, so that voters with the lowest incomes pushed the policy-maker to implement redistributive programmes in their own favour.

Some hypotheses have been put forward also to explain the fading of WL in recent years, especially since the mid-1970s. Technological and institutional innovation has increased the scope for market-based production of social services, i.e., private agents can use insurance and financial markets to handle many desired redistributions across individuals and over the life cycle (Durevall and Henrekson 2011). This change has been spurred by the resurgence of neoliberalism that induced governments to cut government spending and carry out massive privatization programmes. Furthermore, since the early 1990s, globalization has increased the competition between governments to cut taxes in order to create a business-friendly environment, thereby undermining their fiscal capacity and scope for government spending (Sinn 1998; Bergh and Karlson 2010).

This paper analyses WL in Italy from 1862 to 2009. It differs from existing studies on this country because it relies on a new dataset recently provided by Italy's State General Accounting Department containing data on both total government expenditure and some specific items of spending over a long time span of about one and a half century. This allows to address the evolution of the composition of government expenditure in response to the changing demands and needs of the society.³ Our dataset also makes use of the most recent series of Italy's national accounts that have been recently produced by the Bank of Italy.

To this aim, we use cointegration analysis to investigate the long run relationship between government expenditure and GDP also taking into account the evolution of population structure. Moreover, we test two conditions implicit in WL: the unidirectional Granger causation from GDP to government spending and the superior income-elasticity of government spending.

This paper shows that WL holds for total government expenditure only from 1862 to the end of the nineteenth century. Here, WL is confirmed for both total government expenditure and all the specific items of spending we have considered. This suggests that the national income, and therefore the development process, appears to have played a fundamental role in the creation of a more evolved and modern central state.

Evidence with regard to WL changed for the years after the Second World War, where WL is no longer valid for total government expenditure. Now WL only holds for expenditure on economic affairs and environmental protection; and expenditure on health and social protection in the late 1950s- early 1990s.

There is strong evidence in favour of WL for expenditure on education in the period 1862-1939, when reducing illiteracy was on top of the agenda of state's policy, but afterward investment in education seems to fade away.

Furthermore, there three items of spending – capital expenditure, compensation of employees, and justice, public order and safety – for which WL is verified for the whole period 1862-2009.

³ Kolluri, Panik and Wahab (2000) study the relationship between GDP and three different items of government spending for the shorter time span 1960-93.

Overall, our results suggest that investment in infrastructures, justice, national security, and welfare (to which WL applies for large part of the period under consideration) seems to have permanently played a central role in the action of the Italian state. However, this was not the case for investment in education and culture, that was substantial only until 1939.

The paper is structured as follows. Section 2 presents the sources and data we have used in our analysis. Section 3 illustrates the evolution of Italy's government spending from 1862 to 2009. Section 4 provides a theoretical framework for the empirical analysis, whose results are displayed in Section 5. The subsequent Section 6 discusses the results of the empirical analysis, and Section 7 concludes.

2. Sources and data

We use annual time series data of Italy's central government spending that comprise the years 1862-2009. Data on total government expenditure and on the specific economic and functional items of spending are at current prices and are drawn from the series that have recently been provided by Italy's State General Accounting Department (Ragioneria Generale dello Stato 2011).⁴ Spending refers to the total payments disbursed in the year and have been obtained from the final budget of the state.⁵ Different items of government spending have been selected, according to their economic and functional nature, in order to reveal any empirical evidence in favour of WL, as shown in Table 1:

Items have calculated by aggregating various chapters of Italy's state budget according to the procedure described in the Appendixes A, B, and C.

Our data differ from those of the two most recent papers that test WL for Italy. In fact, Magazzino (2012) relies on the Informative Public Base (IBP), a database developed by the Bank of Italy that covers the shorter 1960-2008 time span and refers to the expenditure of the Italian public administration as a whole, i.e., it includes not just the expenditure of Italy's central government but also the expenditure of local governments (regional, provincial and municipal administrations). Our series differ also from that of Kuckuck (2014) who uses data drawn from Mitchell (2007) for the years 1850-1995 and from Eurostat for the years 1996-2010. These data are also provided by Italy's State General Accounting Department, but, differently from ours, they refer to the expenses accrued and not to the actual payments in the fiscal year.

For GDP at current prices and real per capita GDP (2010 prices) we rely on the new series of Italy's national accounts that have been recently provided by the Bank of Italy (Baffigi 2011).⁶ These new

⁴ Our series stops in 2009 because since then the General Accounting Department has not updated the database of the specific economic and functional items of spending.

⁵ From 1884 to 1964 Italy's fiscal year ran from July 1st to June 30th. Data have been attributed to the solar years by adding half of the expenditures disbursed in two consecutive fiscal years and assuming an equidistribution of the expenditure over each fiscal year.

⁶ Thus, our GDP data differ from those of Kuckuck (2014), who for the years 1850-1995 relies on the GDP series published by Mitchell (2007). The latter are drawn from Istat's (1957) first series of Italy's national accounts, that were only partially improved by a team of scholars led by the economist Giorgio Fuà (1969). These series are heavily flawed (Cohen and Federico 2001) so that on the occasion of the 150th anniversary of Italy's political unification, the Bank of Italy launched the project for a thorough reconstruction of the nation's national accounts, on which we rely.

series were the basis of the recently published *Oxford Handbook of the Italian Economy since Unification* (Toniolo 2013).

Population data are from the *Ricostruzione della popolazione residente e del bilancio demografico* database (Istat 2012).

3. The evolution of Italy's government spending

In the first fifty years after Unification, Italy's total government spending in real terms increased slowly. On average, total spending growth did not exceed that of national income. However, as it can be seen in Figure 1, there were drastic swings from one year to the next, with peaks in the mid-1860s and in the latter half of the 1880s. Between 1862 and the mid-1890s, the share of total government spending to GDP and the growth in real per-capita GDP show very similar trends. Subsequently, the two series diverge considerably: the per-capita GDP begins to grow at much faster rates compared to previous years,⁷ while total spending as a share of GDP drops constantly until the outbreak of the First World War.

On average, between 1862 and 1913 total government spending was around 10 percent of GDP and was mostly destined for defence and interest payments on public debt. In the first decade after Unification, the share of government spending for public works was around 10 percent of the total, and increased to 20 percent after 1870, staying on those levels until 1904, when it began a new surge to above 30 percent in 1909. The majority of spending for public works (around three-quarters) was destined for railway construction.⁸ Spending for education and culture also increased constantly from Unification to the First World War, both as a percentage of total state spending (from 1.6 to 5 percent) and as a share of GDP.

Participation in the First World War led to a drastic increase of total government spending, from just over 10 percent to more than 35 percent of GDP. In the years after the conflict, it dropped again and in 1926 it settled to the pre-war values compared to the GDP. Spending returned to its pre-war composition: defence costs dropped, whereas investments in public works and other economic interventions resumed. Investment in the railways was particularly significant, with the construction of the express lines and the electrification of the main lines, as well as the first toll motorways (Felice 2015).

Between the end of the Second World War and 1963, total government spending increased drastically in real terms. Despite this, it remained well below 25 percent of GDP that was growing at its fastest rates in the whole Italian history (Figure 2). The state budget began to suffer in the second half of the 1960s. However, in 1970, despite a relevant deficit (3.7 percent) the total public spending (33 percent) was, compared to the GDP, below the average of the EEC countries (Ciocca 2007).

From the 1950s a substantial change occurred in the composition of government spending. After the defeat of the Second World War, Italy was prohibited from reconstructing its own independent

⁷ An econometric analysis conducted by Ciccarelli and Fenoaltea (2007) underlines a structural break in the dynamics of per-capita GDP in Italy around 1895.

⁸ Italy's railway network expanded from 1,829 km prior to Unification to 16,210 km in 1913 (Cohen and Federico 2001).

military power. This led to a drastic reduction in defence spending, both compared to GDP and as a share of overall government spending (De Cecco 2003). On the other hand, the social components of spending increased: infrastructures, welfare, and redistributing action. Most social spending increases concerned pensions, for seniority, old age and invalidity (Franco 1993).

From the mid-1970s state spending began to grow more rapidly than the GDP, reaching a 44 percent peak in 1986 (Figure 2). In 1983 Italy reached the EEC average in the ratio of government spending to GDP, and from that moment on systematically exceeded it (Ciocca 2007).

In 1978, the creation of a universalistic welfare system and the redistributing action of public spending – driven by the social conflicts of the 1960s and 1970s – contributed to a rapid reduction in the inequality of income distribution and poverty in Italy. From 1968 to 1982 the percentage of poor people fell from 20 to 3.6 percent, while in absolute terms their number fell from 11 to 2 million (Felice 2015).

From 1993, with a view to Italy's signing up to the single European currency, the imbalance of the national accounts began to be tackled, and clear results were seen in 1995, making decisive progress in 1997, when the deficit dropped to 2.7 percent of GDP, below the 3 percent target laid down in the Maastricht Treaty. However, after Italy joined the Euro, public spending began to increase again in absolute terms, with frequent swings compared to the GDP (Ciocca 2007).

4. Theoretical framework and empirical analysis

As originally formulated by Musgrave (1969) and recently proposed by Shelton (2007) and Durevall and Henrekson (2011), we employ the following specification to model WL:

$$g_t = \alpha + \beta y_t \quad (1)$$

where g is the log of total government expenditure in nominal terms as a share of nominal GDP, and y is the log of real per capita GDP.

Eq. (1) is a long run relationship between government spending and national income and β is a long run coefficient that according to WL should be higher than 0. In this case, government expenditure increases faster than GDP, i.e. government expenditure is income elastic, or in other words it is a superior good.⁹ As stressed by Durevall and Henrekson (2011), Eq. (1) is probably the most common specification for modelling WL, and most models in the literature are reformulations of it. Contrary to the alternative specification that considers real total government expenditure and real GDP, it has the advantage, by using real per capita GDP, of better considering a nation's prosperity and spending capacity of its citizens. In fact, the latter is the crucial variable to model the evolution of the demand for public services. Moreover, the use in Eq. (1) of total government expenditure as a share of GDP instead of real total government expenditure considers the possibility that differences in productivity growth between the government and the private sector production lead to an increase in government spending due to "Baumol's disease".¹⁰

⁹ The elasticity ε of total government expenditure to GDP is linked to the β parameter in Eq. (1) by the following relationship: $\varepsilon = (1 + \beta)$. This is the reason why $\varepsilon > 1$ (implicit in WL) requires $\beta > 0$ in Eq. (1).

¹⁰ "Baumol's disease" involves a rise of wages in jobs – i.e., in the government sector – that have experienced no increase of labour productivity in response to rising wages in other jobs – i.e., in private sector production – which experienced such labour productivity growth. The rise of wages in jobs without productivity gains is caused by the

To test for the existence of a long run relationship between g and y , we reformulate Eq. (1) as follows

$$g_t = \alpha + \beta y_t + u_t \quad (2)$$

Eq. (2) is a simple econometric model to estimate the long run parameter β . But, if g and y are non-stationary variables, i.e. they contain a unit root, this invalidates conventional statistical inferences and hypothesis tests on β . Hence, we need to analyse the integration properties of government expenditure (and all its items) and national income performing ADF test (OLS/GLS) and KPSS tests. From these tests, we are unable to reject the null hypothesis of non-stationarity for the levels and stationarity for the first differences of all the series: they are $I(1)$. The ADF and KPSS results are not presented here for space consideration.¹¹

Although $I(1)$ series tend to wander over time without returning to a constant mean, economic forces should not allow these variables to wander apart in a permanent way. In this case, these series share a common path of growth and at least one of the two variables has to adjust to deviations from this long run path. In other words, if there is a long run relationship between g and y , movements in the former must respond to a disequilibrium in the latter, or vice versa, and the disequilibrium from the long run path is transitory. Cointegration offers one method to check whether WL holds. If there is a positive long run path between g and y , WL would require at least that the estimated residual u_t in Eq. (2) be stationary, i.e. $I(0)$. In this case, g and y share a common stochastic and deterministic trend, and this is the so-called *deterministic cointegration*.

We also check for a less stringent concept of long run relationship implicit in the definition of *stochastic cointegration*. If stochastically cointegrated, g and y share a common stochastic trend but different deterministic trends. It is useful when government expenditure and national income are not deterministically cointegrated (Eq. 2). We test for stochastic cointegration by using the following specification:

$$g_t = \alpha + \beta y_t + \phi trend + u_t \quad (3)$$

If g and y are not cointegrated as stated by Eq. (2), we additionally test for cointegration by augmenting Eq. (2) by the Dependency ratio, i.e. controlling for the age structure of population as in Durevall and Henrekson (2011)¹²

$$g_t = \alpha + \beta y_t + \phi DR_t + u_t \quad (4)$$

where the Dependency ratio is $DR = \frac{POP_{0-14} + POP_{+65}}{POP_{15-64}}$. That is, the DR is defined as those aged 0-14

and 65+, divided by those aged 15-64. This measure should capture spending connected to policy reforms that should have substantially strengthened the link between government expenditure and the age structure of population, such as expenditures on child care, schooling, pensions, and health care.

requirement to compete for employees with jobs that experienced gains and hence can naturally pay higher salaries (Baumol 1967).

¹¹ The results of these tests are reported in a preliminary version of this paper. See Pistoiesi, Rinaldi and Salsano (2015).

¹² Including the Dependency ratio increases the probability to find cointegration among the series. Moreover it is possible to imagine the Dependency ratio to work like the “particular trend” in the stochastic cointegration framework.

For all these cases (Eq. 2, 3, 4), we test cointegration by Engle and Granger (1987) procedure performing ADF tests on the estimated residual u_t with the asymptotic p-values for cointegration proposed by MacKinnon (1996).

Note that WL firstly requires that a long run relationship exists, i.e. that g and y are cointegrated and then that g Granger-causes y in the long run and not vice versa (unidirectional long run causality). To this aim, we estimate the Error Correction Models in Eq. (5) and Eq. (6). We test that the error correction parameter δ in Eq. (5) be statistically significant (one side t-test), while $\tilde{\delta}$ in Eq. (6) be not suggesting that only g adjusts to the long run equilibrium. In fact, WL suggests that government expenditure reacts to a change in national income in the long run and this is driven, for example, by a change in the demand for public goods consequent on increasing prosperity.

$$\Delta g_t = \sum_{i=1}^m a_i \Delta g_{t-i} + \sum_{j=1}^n b_j \Delta y_{t-j} + \delta ECT_{t-1} + \varepsilon_t \quad (5)$$

$$\Delta y_t = \sum_{i=1}^m a_i \Delta g_{t-i} + \sum_{j=1}^n b_j \Delta y_{t-j} + \tilde{\delta} ECT_{t-1} + \eta_t \quad (6)$$

Hence, WL requires cointegration between g and y , unidirectional causality from y to g , and also that β be greater than zero. The statistical inference on the long run parameter β may be problematic if levels representation of g and y contains a unit root and even if g and y are cointegrated. In fact, the OLS estimator of the coefficient in the cointegration regression is consistent, but the OLS estimator has a non-normal distribution and the inference based on its t-statistics is misleading. To avoid this problem, we use DOLS (Dynamic Ordinary Least Square) estimator suggested by Stock and Watson (1993). The DOLS is based on a modified version of Eq. (2) that includes past, present and future values of changes in y :

$$g_t = \alpha + \beta y_t + \sum_{j=-p}^p \kappa \Delta y_{t-j} + u_t \quad (7)$$

If g and y are cointegrated, DOLS is efficient in large samples and statistical inference about β based on HAC standard errors has a standard normal distribution in large samples.¹³ Hence, thanks to this efficient estimator, on Eq. (5) we can consistently test the superior income elasticity of government spending implicit in WL: $H_0 : \beta^{dols} = 0, H_1 : \beta^{dols} > 0$. Moreover, we also study the degree of income elasticity of government expenditure testing $H_0 : \beta^{dols} = 1, H_1 : \beta^{dols} > 1$.

5. Results

In this section we present the result of our empirical analysis with regard to both total government expenditure and to the selected items of economic and functional categories of spending as defined in Table 1.

¹³ The first efficient estimator was developed by Johansen (1988) in a multivariate framework. Having only two variables, just one cointegrating vector is possible and bivariate VAR models are not necessary to test for cointegration. Moreover, in our case the Johansen (1988) procedure produces the same cointegration results as the Engle-Granger test. Results are available on request.

Tables 2 and 3 present the cointegration results according to the long run regression stated by Eqs. (2), (3) and (4). Only for cointegrated series, Tables 4 and 5 outline the findings about Granger causation from the estimated ECM in Eq. (5) and (6).

We stress that the Granger causation result is always unidirectional from y to g in all the cases considered, as suggested by WL. For this reason, in the remainder of this section, we will not return to comment the Granger causality results again. Finally, Tables 4 and 5 also present the inference on the long run parameter β estimated by DOLS.

Note that in all the Tables, findings are presented for the whole period 1862-2009 and for the two shorter sub-periods 1862-1939 and 1948-2009. There are two main reasons for this periodization:¹⁴

- 1) The Second World War represents the most significant watershed in post-unification Italy. For a certain period (from September 1943 to April 1945), the unified Italian state disappeared, with the partition of the country between the Kingdom of the South (allied to the Anglo-Americans) and the Italian Social Republic (allied to Nazi Germany). The conflict also led to the sharper institutional break-up in the country's recent history: the abolition of the monarchy and the establishment of the republic in 1946. For the purposes of this study, therefore, there is justification for breaking the analysis down into the periods prior to (1862-1939) and following (1948-2009) the Second World War.
- 2) Disaggregation of the analysis into shorter sub-periods is often present in the literature on other countries, and several authors have suggested it is an effective method of investigation. When Durevall and Henrekson (2011) were unable to obtain significant results from their analysis of co-integration over the long period 1800-2006 with regard to the UK and Sweden, they examined the two sub-periods 1800-1913 and 1920-2006, and subsequently also the four even shorter sub-periods 1800-1859, 1860-1913, 1920-1973, and 1974-2006. An approach of this kind was also adopted by Kuckuck (2014), who evaluated WL for five countries (the UK, Denmark, Sweden, Finland, and Italy) between 1850 and 2010 in relation to their various stages of development approximated by three classes of per capita GDP.

Table 2 shows that total government spending and national income are not co-integrated over the entire 1862-2009 time span. These results confirm the claim made in the literature on other European countries that WL does not hold in the long run.¹⁵

The analysis in sub-periods (Tables 2 and 4) suggests that WL holds for total government expenditure between 1862 and 1897, with $\beta^{dols} = 1.90$, while as regards the post-Second World War period it holds in the years 1980-2009 with a negative $\beta = -0.46$. The latter result implies an elasticity of total government expenditure to GDP that is less than unity. In other words, total government spending during that period grew less than proportionally to national income.

¹⁴ Apart from a historical viewpoint or that of the quality of the data discussed above, the sub-periods selected are consistent with an analysis of the breaks. We find that in 1946 there was a structural break in the historical series of GDP that already justifies this periodization. Moreover, the various historical series of expenditure show other significant breaks at times that are not always uniform but consistent with our periodization. The breaks we find are consistent with those that are found for Italy in Kuckuck (2014). Our results are available on request.

¹⁵ Thus, Durevall and Henrekson (2011) do not support WL in the years 1800-2006 for Sweden and 1830-2006 for the UK. Similarly, Kuckuck (2014) rejects WL for the UK, Finland, Sweden, Denmark and Italy over the period between 1850 and 2010.

These results are in line with those of other studies on other countries for the years from the mid-19th century to the outbreak of the First World War, which also find strong support for WL (although in our case, evidence in favour of WL ends in 1897).¹⁶

Conversely, Italy seems to diverge from some major European nations in the post-Second World War years. In fact, Durevall and Henrekson (2011) find evidence in favour of WL during the “Golden Age” – i.e., the 30 to 35 years after the Second World War – which was not the case in Italy.

The absence of a relation *à la* Wagner with regard to total government expenditure over the entire period 1862-2009 is due to the behaviour of current expenditure, which only co-integrates with GDP until the beginning of the 20th century, and to that of the expenditure on interests, which only co-integrates with the national income until 1939. However, Tables 2 and 3 show that WL is verified over the entire period 1862-2009 with regard to other significant items of government spending: capital expenditure ($\beta = 0.59$) and compensation of employees ($\beta = 0.32$) among the economic categories; and justice, public order and safety among functional categories ($\beta = 0.17$).

Detailed examination of items of spending by functional category (Tables 3 and 5) shows that WL holds over the entire sub-period 1862-1939 for all of them, with the exception of expenditure on defence, for which the relationship is valid only until 1913. The reason for this result is that the explosion of military expenditure during the First World War and its rapid reduction in the years immediately after the conflict gave to this item a dynamics significantly different from that of real per capita GDP in the years 1914-1939.

Expenditure on economic affairs and on environmental protection and expenditure on health and on social protection do not co-integrate with national income over the entire period 1862-2009. However, they moved with GDP from 1862 to 1939, and subsequently from the early 1960s to the early 1990s. In particular, WL holds for the expenditure on health and social protection with $\beta^{dols} > 1$ in both sub-periods ($\beta = 7.09$ in the years 1862-1939 and $\beta = 1.57$ in the years 1960-1992).

Table 5 also shows that investment in education and culture at an early stage of development – from 1862 to 1939 – was very high, with $\beta^{dols} = 3.24$, but then it seems to fade away and β^{dols} falls to 0.22 from 1980 to 2009.

¹⁶ See Thornton (1999) for Denmark, Germany, Italy, Norway, Sweden, and the UK, Durevall and Henrekson (2011) for Sweden and the UK, and Kuckuck (2014) for Denmark, Finland, Italy, Sweden, and the UK.

6. Discussion

The overall results of our econometric analysis show a strong support for WL in the years from Italy's political unification in 1861 to the end of the 19th century. Here WL holds for both total government expenditure and all the specific items of spending we have selected, whether economic or functional. One gains the impression that the increasing incidence of government expenditure on GDP was a consequence of the efforts made by Italian governments to construct the framework of the new state, endowing it with indispensable infrastructures both organisational (a functioning central and peripheral administration) and physical (roads, ports, a rail network and a national telegraph service) (Cohen and Federico 2001). A similar purpose was served by the power strategy precociously adopted by the Italian state in order to ensure its survival in the European geopolitics of the time (De Cecco 2003).

Also expenditure on education and culture at that time seems to have been part of a nation-building strategy. In fact, one of the greatest issues the Italian ruling class had to address when Italy became a nation-state was the creation of a unitary conscience among its citizens. In this respect, reduction of illiteracy was of a paramount importance and this task was largely assigned to government schools. The Coppino Law of 1877¹⁷ was a turning-point that ensured that in the future closer attention and greater resources would be devoted to the educational and institutional problems of the younger generation. Growing expenditure on health and social protection was also instrumental to the construction of the infrastructure of the new state.

Thus, the case of Italy in the years from political unification to the outbreak of the First World War seems to be principally referable to the theory of independent action of the state, defined on the basis of the internal and international political objectives conceived by state policy-makers, and not as a response to a growing demand by its citizens for higher-category goods, as Wagner theorised (Mann 1984). With regard to this period, one finds unconvincing the explanations offered by the literature to account for the increase in government spending in the principal European countries in correspondence with the early stage of industrialisation – between mid-19th and early-20th century – and especially the extension of electoral suffrage to low-income voters. The latter induced median voters to prefer an increase in taxes, which would principally affect the segment of voters with incomes higher than theirs, in order to yield the resources to be used to finance new social programmes with strong redistributive content (Meltzer and Richard 1981; Persson and Tabellini 1990; Lindert 1994). However, suffrage in Italy during this period was extremely limited: 2 percent of the population in 1861, that was increased to 7 percent in 1880 and to 23 percent only in 1913, at which time the evidence in favour of WL had already weakened (Ballini 1988).

One interpretation that might be considered for this period is the one offered by Douglass North to explain the growth of government expenditure in the USA over the same period. He associates the demand for greater government expenditure with technological changes: “Technological changes have led to an enormous increase in specialisation and division of labour, and therefore a radical change in relative prices which fundamentally altered the traditional structure of the polity, the family, and economic organisation. The variety of interest groups that emerged from this expanded

¹⁷ This law imposed sanctions on those who evaded their educational obligations. In fact, the commitment to rendering school attendance compulsory, at least for a three-year period between the ages of six and nine, brought improvements not only in terms of the resources allocated to the educational sector, but also in terms of the independence of teachers, and closer attention was paid to the problems of technical and professional training. The law also reorganised elementary school attendance, which was extended from four to five years, the first three of which were compulsory. See Sarracino and Corbi (2004).

division of labour led to political pluralism. The demand for new institutional forms of organisation to replace functions previously undertaken by the family and traditional economic organisation could not be completely realized by voluntary organisations because of moral hazard, adverse selection, and the demand for public goods.” (North 1985: 392).

The years 1914-1939 constitute a particularly crisis-ridden period with the First World War, the post-war downturn, and the Great Depression. Thus, it is not surprising that in these years we find not support for WL for total government expenditure, even if, as we have seen, it holds for some specific items of spending: capital expenditure; economic affairs and environmental protection; health and on social protection; justice and national security; education and culture. This was principally consequent on the effort in nation-building and social control by the Fascist regime.

Evidence with regard to WL changed in the years after the Second World War. In this period, WL is no longer valid for the entirety of government expenditure. However, WL holds for some specific items of spending. Amongst them, capital expenditure stands out. In fact, capital expenditure meant that the state intervened in the economy far more decisively than it had done with transfers. The latter, in that they consisted of the redistribution of monetary resources, did not affect the relative magnitudes of the public and private sectors in terms of production. The intervention of the Italian state began after the First World War and culminated in the 1933 with the creation of the big state-owned holding IRI (Istituto per la Ricostruzione Industriale) that took over Italy’s three largest universal banks and their industrial securities.¹⁸ State intervention further expanded after the Second World War with a massive provision of subsidized credit and grants to enterprises. In face of the weakness of the private sector, the state-owned enterprises (the energy giant ENI was added to IRI in 1953, and EFIM followed in 1961 in the mechanical engineering industry) played a crucial role in the development of capital-intensive sectors – steel, heavy industry, energy, motorways, and telephony – in which the investments required were too high and profitability too long deferred to be within the capacities of private investors. They therefore acted as a “substitution factor” *à la* Gerschenkron for the missing prerequisites for the country’s industrialisation (Gerschenkron 1962; Amatori 2000; Toninelli 2004). As a result, the influence of state-owned enterprises in Italy grew constantly and only diminished with the privatisations of the 1990s.¹⁹

In the post-Second World War years WL holds also for compensation on employees, and justice and national security. The former is somehow a necessary consequence of the expansion of state administration. The latter is a fundamental service required of the state, whose expansion is driven by the growing demand for regulation and the enforceability of contracts that arises as a society becomes more complex and the division of labour increases (Kuznets 1967; North and Wallis 1982). Moreover, Italy’s pro-American stance during the Cold War and the possibility that the Italian Communist Party (the largest Communist party in the Western world) might organise a revolution meant that a large proportion of government expenditure was allocated to national security. In the 1970s, this expenditure was further increased to tackle political terrorism.

As we have seen, from the late 1950s to the late 1980s there is evidence in support of WL also for the expenditure on economic affairs and on environmental protection and, from the early 1960s to the early 1990s, for the expenditure on health and on social protection. This seems to reflect the growth of the economic and social components of expenditure: infrastructure, welfare, and redistribution by the state. Under pressure from the expansion of suffrage (universal suffrage was

¹⁸ At the time when IRI was created, the companies comprising it possessed 83% of the share capital of joint-stock companies operating in Italy in the telephone sector, 56% in shipping, 39% in the banking sector, 38% in steel works, 29% in the electricity sector, and 21% in the machinery industry (Cianci 1977, pp. 278-79).

¹⁹ The percentage of the total of share capital of Italian joint stock companies held by IRI, ENI and EFIM rose from 12.5% in 1936 to 22.7% in 1952, to 32.1% in 1972, and to 40.2% in 1983 (Toninelli and Vasta 2010, Table 3.4).

introduced in 1946), and, from the end of the 1960s, from an unprecedented wave of social struggles, a progressive expansion of welfare services to new social categories took place in Italy until a universalistic welfare system was introduced in 1978 (Franco 1993).

WL, however, no longer holds in recent years. Between 1980 and 2009, total government expenditure actually grew less than proportionately to GDP. From the beginning of the 1990s – the period during which budget deficits were reduced in anticipation of adherence to the single European currency – there is no support for WL even for expenditure on economic affairs and on environmental protection and for expenditure on health and on social protection. Nonetheless, WL returns to be verified for spending in education and culture, even though evidence is much weaker than in the period prior to 1939.

7. Conclusions and policy implications

This paper has found a strong evidence in favour of WL in Italy in the years immediately after national unification, between 1862 and the end of the 19th century. Here WL is confirmed for both total government expenditure and all the specific items of spending we have considered. The national income, and therefore the development process, appear to have played a fundamental role in the creation of a more evolved and modern central state.

Our impression is that, in the post-unitary period, the increasing incidence of state expenditure on GDP was a consequence of the efforts made by Italian governments to construct the framework of the new state, with the creation of indispensable organisational and physical infrastructures, the reduction of illiteracy and the formation of a national conscience among its citizens. A similar purpose was served by the power strategy precociously adopted by the Italian state in order to ensure its survival in the European geopolitics of the time. Thus, maybe paradoxically, evidence for WL seems to have been principally the consequence of an independent action of the Italian state, defined by the political objectives autonomously conceived by state policy-makers, and not of a response to a growing demand by its citizens for higher-category goods, as Wagner hypothesized.

Evidence for more recent years is different. In the post-Second World War years we find no support for WL for total government expenditure. Now WL holds only for some specific items of spending: capital expenditure, compensation of employees, and justice and national security. The former seems to stress the persisting strategic role of public investment in an economy, such as Italy, in which private big business is weaker than in the other major industrialized nations. Compensation of employees is a necessary consequence of the expansion of state administration. Justice and national security are fundamental services whose expansion is driven by the growing demand for regulation and the enforceability of contracts that arises as a society becomes more complex and the division of labour increases. Moreover, Italy's pro-American stance during the Cold War and the fear that the Communist Party might organise a revolution pushed the government to allocate a large proportion of government expenditure to national security. From the late 1950s to the early 1990s WL holds also for major economic and social components of expenditure: infrastructure, welfare and redistribution by the state, and only this latter evidence seems in line with Wagner's argument that public spending was boosted by the supposed superior income-elasticity of publicly provided goods and services.

Overall, investment in infrastructures, justice, national security, and welfare (to which WL applies for large part of the period under consideration) seems to have permanently played a central role in the action of the Italian state. However, this was not the case for investment in education and culture, that was substantial only until 1939. Although this may have served to strengthen the Italian state in the face of potential external and internal threats and to respond to the growing demand on the part of society for public services, it might not be true that it also was the most effective way to prompt economic growth. In fact, it is controversial whether welfare has an expansionary effect on the economy, while investment in education and human capital is one of the fundamental drivers of long term economic growth.

Certainly, as highlighted by Magazzino (2012), the relationship between economic development and long-term public spending is influenced by a number of variables, which are not considered in the Wagnerian perspective. For example, factors such as political decision-making mechanisms, the behaviour of stakeholder groups working within the economic system and the main features of Italy's economic development – a late-comer nation which has created an industrial structure in many respects unique amongst the most industrialized economies, with a dominance of small firms and a nearly total absence of large firms – may be considered elements explaining the evolution and the dimension of the Italian public sector.

In the light of our analysis, some policy implications could be suggested. Italy's public expenditure seems unbalanced. In particular, social spending (health and pensions) grew massively on the wake of the social struggles and the electorate's demand in the 1960s and 1970s and is very high compared to spending for education and scientific research. As a result, despite Italy's human capital has grown dramatically over the past thirty years²⁰, in terms of both secondary and tertiary education the country has not managed to close the long-standing gap separating it from the other OECD economies (Sestito 2014).

The Italian state should find the capacity to set both objectives and strategies to prompt the long-term term growth of the economy (Mazzucato 2013). The creation of a national innovation system and massive investments in schools and university to improve the quality of human capital should play a key role in it. These must be complemented by a review of incentives for learning and teaching, the appreciation and reward of merit, a better system of continuous assessment, the adaptation of curricula, more attractive school settings (Visco 2014).

From a quantitative point of view, public investments in research and development must be increased, as these represent a fundamentally decisive lever for economic growth through technical progress, which generates and is incorporated in capital assets used in production processes. The component that has not yet been incorporated in these assets – innovation – reflects on the overall productivity of production factors. This can be said generally for all countries, but even more so for Italy, where the presence of small and medium enterprises often leads to an avoidance of investments in Research and Development, and more often than not their innovations are merely incremental, generating new assets for the companies but not for the market; ultimately this weakens the effect on the potential for growth (Visco 2014).

All of this leads to an important issue, which perhaps represents the most serious problem today, underlined by the choices made for Italian public spending, and that is the lack of close links

²⁰ In the 1990s the average number of years of education per employed person increased from 9 to 11 years, having grown from 7.5 to 9 years in the 1980s. The percentage of high school leavers and graduates has drastically increased both among younger and older employed people. Other indicators such as the use of computers, knowledge of foreign languages and the number of books sold also confirm this trend of growth of Italian human capital (Draghi 2006).

between resources, priority and objectives, as well as the scarce accountability of the Italian political classes.

References

- Amatori, F. (2000), “Beyond State and Market: Italy’s Futile Search for a Third Way”, in P.A. Toninelli (ed.), *The Rise and Fall of State-Owned Enterprises in the Western World*, Cambridge University Press, Cambridge, 128-156.
- Atkinson, A.B., and Stiglitz, J.E. (1980), *Lectures on public economics*, MacGraw-Hill, New York.
- Baffigi, A. (2011), “Italian national accounts, 1861-2011”, Quaderni di Storia Economica. Economic History Working Papers No. 18, Banca d’Italia, Roma.
- Ballini, P.L. (1988), *Le elezioni nella storia d’Italia dall’Unità al fascismo. Profilo storico-statistico*, Il Mulino, Bologna.
- Baumol, W., J. (1967) “Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis”, *American Economic Review*, 57, (3) 415-26.
- Bergh, A., and Karlson, M. (2010), “Government size and growth: accounting for economic freedom and globalization”, *Public Choice* 142 (1–2), 195–213.
- Bird, R.M. (1971), “Wagner’s ‘Law’ of expanding state activity”, *Public Finance* 26(1), 1-26.
- Bohl, M.T., (1996), “Some international evidence on Wagner’s Law”, *Public Finance* 51 (2), 185–200.
- Ciccarelli, C., and Fenoaltea, S. (2007), “Business Fluctuations in Italy, 1861-1913: The New Evidence”, *Explorations in Economic History* 44 (3), 432-451.
- Cianci, E. (1977), *Nascita dello Stato Imprenditore in Italia*, Mursia, Milano.
- Ciocca, P. (2007), *Ricchi per sempre? Una storia economica d’Italia (1796-2005)*, Bollati Boringhieri, Torino.
- Cohen, J., and Federico, G. (2001), *The Development of the Italian Economy, 1820-1960*, Cambridge University Press, Cambridge.
- De Cecco, M. (2003), “L’Italia grande potenza: la realtà del mito”, in P. Ciocca e G. Toniolo (a cura di), *Storia economica d’Italia*, vol. 3: *Industrie, mercati, istituzioni*, t. 2: *I vincoli e le opportunità*, Laterza, Roma-Bari, 3-36.
- Draghi, M. (2006), *Istruzione e crescita economica*, Banca d’Italia, Roma.
- Durevall, D., and Henrekson, M. (2011), “The futile quest for a grand explanation of long-run government expenditure”, *Journal of Public Economics* 95, 708-722.
- Engle, R.F., and Granger, C.W.J. (1987), “Cointegration and error correction: representation, estimation and testing”, *Econometrica* 55 (2) , 251-276.
- Felice, E. (2015), *Ascesa e declino. Storia economica d’Italia*, Il Mulino, Bologna.
- Franco, D. (1993), *L’espansione della spesa pubblica in Italia. Un’analisi rigorosa e sistematica dello sviluppo della spesa pubblica in Italia dal 1960 al 1990, nelle sue interne articolazioni*, Il Mulino, Bologna.
- Fuà, G. (1969) *Lo sviluppo economico in Italia: Storia dell’economia italiana negli ultimi cento anni, vol. II. Gli aspetti generali*, Franco Angeli , Milano.
- Gerschenkron, A. (1962), *Economic Backwardness in Historical Perspective: A Book of Essays*, Harvard University Press, Boston.
- Ghate, C., and Zak, P. J. (2002), “Growth of government and the politics of fiscal policy”, *Structural Change and Economic Dynamics* 13 (4), 435–455
- Henrekson, M. (1993), “Wagner’s Law—A spurious relationship?” *Public Finance* 48 (3), 406–415.
- Istat (1957) “Indagine statistica sullo sviluppo del reddito nazionale dell’Italia dal 1861 al 1956” *Annali di Statistica* VIII s., IX.

- Istat (2012), “Ricostruzione della popolazione residente e del bilancio demografico” (https://www.seriistoriche.istat.it/Tavola_2.3.1.xls).
- Johansen, S., (1988), “Statistical analysis of cointegration vectors”, *Journal of Economic Dynamics and Control*, 12 (2-3), 231-254.
- Kolluri, B.R., Panik, M.J., and Wahab, M.S. (2000), “Government expenditure and economic growth: evidence from G7 countries”, *Applied Economics* 32 (8), 1059-1068.
- Kuckuck, J. (2014), “Testing Wagner’s Law at Different Stages of Economic Development”, *FinanzArchiv / Public Finance Analysis* 70 (1), 128-168.
- Kuznets, S.S. (1967), *Modern Economic Growth*, Yale University Press, New Haven.
- Levi, M., (1988), *Of Rule and Revenue*. University of California Press, Berkeley, CA.
- Lindert, P.H. (1994), “The rise of social spending, 1880-1930”, *Explorations in Economic History* 33(1), 1-34.
- Lindert, P.H. (1996), “What limits social spending?”, *Explorations in Economic History*, 33(1), 1-34.
- Lindert, P. H. (2004a) Growing Public: Volume 1, *The Story: Social Spending and Economic Growth since the Eighteenth Century*. Cambridge University Press, Cambridge and New York.
- Lindert, P.H. (2004b), Growing public: Volume 2, *Further evidence: Social Spending and Economic Growth since the Eighteenth century*, Cambridge University Press, Cambridge and New York.
- MacKinnon, J.G. (1996), “Numerical distribution functions for unit root and cointegration tests”, *Journal of Applied Econometrics* 11, 601-618.
- Magazzino, C. (2012), “Wagner versus Keynes: public spending and national income in Italy”, *Journal of Policy Modeling* 34, 890-905.
- Mann, A.S. (1980), “Wagner’s Law: an econometric test for Mexico”, *National Tax Journal* 33, 189-201.
- Mazzucato, M. (2013), *The Entrepreneurial State: debunking public vs. private sector myths*, Anthem Press: London.
- Meltzer, A.H., and Richard, S.F. (1981), “A rational theory of the size of the government”, *Journal of Political Economy* 89, 914-917.
- Meltzer, A. H., and Richard, S. F. (1983), “Tests of a rational theory of the size of government”, *Public Choice* 41 (3), 403-418.
- Mitchell, B. R. (2007), *International Historical Statistics 1750–2005, Vol. 3*, 6th ed. Palgrave Macmillan, New York.
- Musgrave, R.A. (1969), *Fiscal Systems*, Yale University Press, New Haven and London.
- North D.C., (1985), “The growth of government in the United States: An economic historian’s perspective” *Journal of Public Economics* 28, 383-399.
- North, D.C., and Wallis, J.J. (1982), “American government expenditures: a historical perspective”, *American Economic Review*, 72(2), 336-340.
- Pistoresi B., Rinaldi A., and Salsano, F. (2015), “La spesa pubblica in Italia: una crescita senza limiti?”, DEMB Working Paper Series n. 59.
- Persson, T., and Tabellini, G. (1990), *Macroeconomics Policy, Credibility and Politics*, Harwood Academic, London.
- Peacock, A.T., and Wiseman, J. (1961), *The Growth of Public Expenditure in the United Kingdom*, Princeton University Press, Princeton.
- Ragioneria Generale dello Stato (RGS) (1969), *Il bilancio dello Stato Italiano dal 1862 al 1967*, Vol. I, Istituto Poligrafico dello Stato P. V., Roma.

- Ragioneria Generale dello Stato (RGS) (2011), *La spesa dello Stato dall'Unità d'Italia. Anni 1862-2009*, Ragioneria Generale dello Stato, Roma.
- Sarracino, V., and Corbi, E. (2004), *Storia della scuola e delle istituzioni educative*, Liguori Editore, Napoli.
- Sestito P. (2014), *La scuola imperfetta*, Il Mulino, Bologna.
- Sinn, H.W.(1998), “European integration and the future of the welfare state”. *Swedish Economic Policy Review* 5 (1), 113–132.
- Shelton, C.A. (2007), “The size and composition of government expenditure”, *Journal of Public Economics* 91 (11-12), 2230-2260.
- Stock, J.H., and Watson, M.W. (1993), “A simple estimator of cointegrating vectors in higher-order integrated system”, *Econometrica* 61 (4), 783-820.
- Tanzi, V., and Schuknecht, L. (2000), *Public Spending in the 20th century*, Cambridge University Press, Cambridge.
- Thornton, J. (1999), “Cointegration, causality and Wagner’s Law in the 19th century Europe”, *Applied Economic Letters* 6 (7), 413-416.
- Toninelli, P.A. (2004), “Between State and Market. The Parabola of Italian Public Enterprise in the 20th Century”, *Entreprises et histoire*, no. 37, 53-74.
- Toninelli, P.A. and Vasta, M. (2010), “State-owned enterprises (1936-1983)”, in A. Colli and M. Vasta (eds), *Forms of Enterprises in 20th Century Italy. Boundaries, Structures and Strategies*, Edward Elgar, Cheltenham, UK-Northampton, MA, 52-86.
- Toniolo, G. (ed.) (2013), *The Oxford Handbook of the Italian Economy since Unification*, Oxford University Press, Oxford.
- Visco I. (2014), *Investire in conoscenza*, Il Mulino, Bologna.
- Wagner A. (1883), *Finanzwissenschaft*, 3rd edition, Leipzig. Partly reprinted in *Classics in the Theory of Public Finance*, edited by R.A. Musgrave and A.T. Peacock (1958), Macmillan, London.
- Wagner A. (1893), *Grundlegung der Politischen Okonomie*, 3rd ed., C. F. Winter, Leipzig.

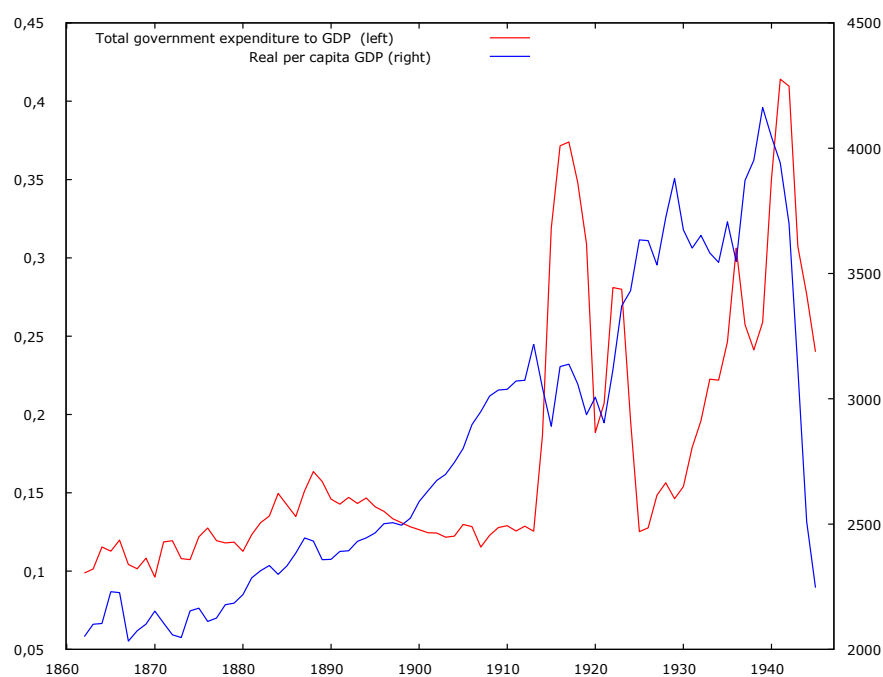


Fig. 1. Total government expenditure as a share of GDP and real per capita GDP (1862-1945)

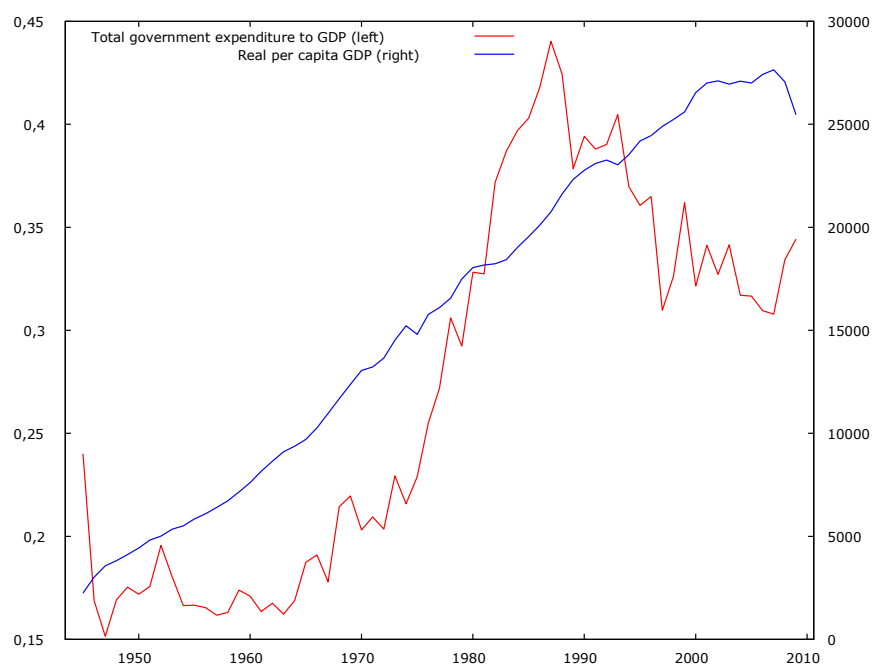


Fig. 2. Total government expenditure as a share of GDP and real per capita GDP (1946-2009)

Table 1. Economic and functional categories of government expenditure

Economic categories:	Functional categories:
Capital expenditure	Defence
Current expenditure	Justice, public order and safety
Compensation of employees	Expenditure on economic affairs and on environmental protection
Expenditure on interests	Expenditure on health and on social protection
	Education and culture

Table 2. Engle - Granger residual based cointegration test results

Economic categories	Period	Deterministic cointegration. Pvalue	Deterministic cointegration + dependency ratio. Pvalue	Stochastic cointegration. Pvalue
Total government expenditure	1862-2009	0.15	0,28	0.30
Capital expenditure	1862-2009	0.0007***		
Current expenditure	1862-2009	0.21	0.21	0.21
<i>of which</i> compensation of employees	1862-2009	0.002**		
Expenditure on interests	1862-2009	0.75	0,88	0.76
1862-1939				
Total government expenditure	1862-1939	0.17	0.34	0.40
Total government expenditure	1862-1897	0.027**		
Current expenditure	1862-1939	0.29	0.50	0.50
Current expenditure	1862-1901	0.09*		
Expenditure on interests	1862-1939	0.06*		
1948-2009				
Total government expenditure	1948-2009	0.37	0.74	0.46
Total government expenditure	1980-2009	0.01**		
Current expenditure	1948-2009	0.51	0.76	0.70
Expenditure on interests	1948-2009	0.84	0.80	0.98

Note: Asymptotic pvalues for cointegration from MacKinnon (1996). ***, **, * indicate that the null of no cointegration is rejected at the 1%, 5%, 10% significance level, respectively.

Table 3. Engle - Granger residual based cointegration test results

Functional categories	Period	Deterministic cointegration. Pvalue	Deterministic cointegration + dependency ratio. Pvalue	Stochastic cointegration. Pvalue
Defense	1862-2009	0,33	0,52	0,21
Justice, public order and safety	1862-2009	0,003***		
Expenditure on economic affairs and on environmental protection	1862-2009	0,106	0,24	0,30
Expenditure on health and on social protection	1862-2009	0,70	0,85	0,13
Education and culture	1862-2009	0,58	0,76	0,64
1862-1939				
Defense	1862-1939	0.35	0.58	0.54
Defense	1862-1913	0,02**		
Expenditure on economic affairs and on environmental protection	1862-1939	0,02**		
Expenditure on health and on social protection	1862-1939	0,08*		
Education and culture	1862-1939	0,01**		
1948-2009				
Defense	1948-2009	0.14	0.25	0.23
Defense	1980-2009	0,03**		
Expenditure on economic affairs and on environmental protection	1948-2009	0.87	0.96	0.39
Expenditure on economic affairs and on environmental protection	1957-1987	0,06*		
Expenditure on health and on social protection	1948-2009	0.37	0.52	0.57
Expenditure on health and on social protection	1960-1992	0,07*		
Education and culture	1948-2009	0.30	0.33	0.37
Education and culture	1980-2009	0,03**		

Note: Asymptotic pvalues for cointegration from MacKinnon (1996). ***, **, * indicate that the null of no cointegration is rejected at the 1%, 5%, 10% significance level, respectively.

Table 4. Granger causality test results. Estimated consistent cointegration parameter results (DOLS) and tests of $H_0 : \beta^{dols} = 0, H_1 : \beta^{dols} > 0$ or $H_0 : \beta^{dols} = 1, H_1 : \beta^{dols} > 1$

Economic categories	Period	y→g Test on δ^a	\bar{R}^2 from ECM in Eq.3	g→y Test on $\tilde{\delta}^b$	\bar{R}^2 from ECM in Eq.4	β^{DOLS}	Test on β^{DOLS}
Capital expenditure	1862-2009	-0.17*** (0.005)	0.14	-0.007 (0.006)	0.29	0.59*** [0.073]	$\beta > 0$
Compensation of employees	1862-2009	-0.30*** (0.058)	0.17	-0.012 (0.008)	0.25	0.32*** [0.02]	$\beta > 0$
1862-1939							
Total government expenditure	1862-1897	-0.56** (0.01)	0.32	0.059 (0.37)	0.053	1.90*** [0,27]	$\beta > 1$
Current expenditure	1862-1901	-0.31** (0.01)	0.29	0.003 (0.94)	0.14	1.77*** [0,425]	$\beta > 1$
Expenditure on interests	1862-1939	-0.15** (0.01)	0.33	0.005 (0.88)	-0.07	1.13** [0,474]	$\beta > 0$
1948-2009							
Total government expenditure	1980-2009	-0.71*** (0.001)	0.33	0.11*** (0.002)	0.46	-0.46** [0,17]	$\beta < 0$

Note: All the Granger causality t-tests reported above are from ECM (1,1). The number of lags of the ECMs is chosen by information criteria. Results are available on request. The letters a and b indicate the test of significance of the error correction terms, δ^a and $\tilde{\delta}^b$, their p-values in parentheses (.). \bar{R}^2 indicates the adjusted R-squared. Values in parentheses [.] are HAC standard errors for the long run parameter, β^{DOLS} .

Table 5. Granger causality test results. Estimated consistent cointegration parameter results (DOLS) and tests of $H_0 : \beta^{dols} = 0, H_1 : \beta^{dols} > 0$ or $H_0 : \beta^{dols} = 1, H_1 : \beta^{dols} > 1$

Functional categories	Period	$y \rightarrow g$ Test on δ^a	\bar{R}^2 from ECM in Eq.3	$g \rightarrow y$ Test on $\tilde{\delta}^b$	\bar{R}^2 from ECM in Eq.4	β^{DOLS}	Test on β^{DOLS}
Justice, public order and safety	1862-2009	-0.26*** (0.00)	0.14	-0.005 (0.37)	0.16	0.17*** [0.021]	$\beta > 0$
1862-1939							
Defense	1862-1913	-0.20* (0.07)	0.46	-0.013 (0.58)	0.18	0.904*** [0,330]	$\beta > 0$
Expenditure on economic affairs and on environmental protection	1862-1939	-0.30*** (0.001)	0.13	0.042* (0.08)	0.05	1.03*** [0.268]	$\beta > 0$
Expenditure on health and on social protection	1862-1939	-0.13*** (0.004)	0.13	-0.05*** (0.003)	-0.01	7.09*** [0,522]	$\beta > 1$
Education and culture	1862-1939	-0.20*** (0.005)	0.11	0.09*** (0.005)	0.11	3.24*** [0,187]	$\beta > 1$
1948-2009							
Defense	1980-2009	-0.43*** (0.005)	0.20	-0.03 (0.18)	0.37	-0.25 [1.00]	---
Expenditure on economic affairs and on environmental protection	1957-1987	-0.50*** (0.002)	0.32	0.01 (0.55)	0.05	1.08*** [0,157]	$\beta > 0$
Expenditure on health and on social protection	1960-1992	-0.44*** (0.009)	0.19	0.003 (0.87)	-0.04	1.57*** [0,163]	$\beta > 1$
Education and culture	1980-2009	0.27** (0.01)	0.27	0.02 (0.51)	0.39	0.225** [0,09]	$\beta > 0$

Note: All the Granger causality t-tests reported above are from ECM (1,1). The number of lags of the ECMs is chosen by information criteria. Results are available on request. The letters a and b indicate the test of significance of the error correction terms, δ^a and $\tilde{\delta}^b$, their p-values in parentheses (.). \bar{R}^2 indicates the adjusted R-squared. Values in parentheses [.] are HAC standard errors for the long run parameter, β^{DOLS} . ---means that the parameter is not statistically significant.

Appendix A. Government spending by economic category

Economic category	Economic categories in the budget documents from 2000 to 2009	Economic categories in the budget documents from 1968 to 2000	Reconstruction of the RGS (General Accounting Office) volume (1969) for the years from 1862 to 1967
1 Current expenditure in the production of services			
	Production taxes	Category III – Retired staff	
	Intermediate consumption	Category IV – Purchase of goods and services	Purchase of goods and services
		Category I – Constitutional body services	
2 of which: Compensation of employees	Employee income	Category II – Staff in active service	Staff expenditure
	Production taxes	Category III – Retired staff	
3 Capital expenditure in the production of services	Fixed gross investments and purchase of land	Category X – Goods and building works paid directly by the State	Goods and building works paid directly by the State
		Category XI – Moveable goods, machinery and technical-scientific equipment paid directly by the State	Moveable goods, machinery and technical-scientific equipment paid directly by the State
4 Current transfers within general government, to enterprises and to households	Own EEC resources	Category V – Transfers	Current transfers
	Transfers to businesses		Retired staff
	Current transfers abroad		
	Current transfers to families and social institutions		
	Current transfers to families and private social institutions		
	Current transfers to businesses		
	Current transfers to public administrations		
5 Capital transfers to general government, to enterprises and to households	Other capital transfers		Capital transfers
	Investment funding	Category XII – Transfers	
	Investment funding abroad	Category XIV- Granting of loans and advances for production purposes	Granting of loans and advances for production purposes
	Investment funding for families and institutions	Category XV – Granting of loans and advances for non-production purposes	Granting of loans and advances for non-production purposes

	Investment funding for families and private social institutions		
	Investment funding for businesses		
6 Interest	Interest expenses and income from capital	Category VI – Interests	Interests
7 Loan repayments	Title III – Loan repayments	Title III – Loan repayments	Loan repayments
8 Other expenses			Non-attributable current and capital expenditure
	Amortizations	Category VIII – Amortizations	Amortizations
	Other current expenditure		
	Purchase of financial assets	Category XIII – Shares and contributions	Shares and contributions
	Adjusting and offsetting entries	Category VII – Adjusting and offsetting income entries	Adjusting and offsetting income entries
			Miscellaneous expenditure

Source: RGS (2011). From 1862 to 1967, the reconstructions by economic category are based on the RGS volume (1969). From 1968, the data was taken from the General Financial Statement of the Italian State and from 2003, from the general “statements” of the RGS data warehouse.

Appendix B. Government spending by functional category

Functional category	Functional categories in the budget documents from 1998 to 2009	Functional categories in the budget documents from 1968 to 1997	Reconstruction of the RGS (General Accounting Office) volume (1969) for the years from 1862 to 1967
9 National defence	National defence	Section II - National defence	National defence
		Section XVII – Civil protection and public disasters	
10 Justice and Public safety	Public order and safety	Section IV – Public safety	Public safety
		Section III - Justice	Justice
11 Economic actions and interventions	Economic affairs	Section XVI – Economic works and interventions not attributable to specific areas etc.	Economic interventions
		Section XIV – Trade and industry	
	Environmental protection	Section XIII – Agriculture and food	
		Section XV – Interventions in depressed areas	

		Section XVII – Regional and local finance	
		Section XII - Transport, navigation and communications	Transport and communications
12 Social actions and interventions	Social protection	Section IX - Work and social security	Social interventions
		Section X – Public assistance	
	Health	Section XI – Health and hygiene	
13 Education and culture	Recreational, cultural and religious activities	Section VI – Education and culture	Education and culture (excluding religion)
	Education	Section VII – Universities and scientific research	

Source: RGS (2011). From 1862 to 1967, the reconstructions by functional category are based on the RGS volume (1969). From 1968, the data was taken from the General Financial Statement of the Italian State and from 2003, from the general “statements” of the RGS data warehouse.

Appendix C. Ratio between the definition of economic and functional categories of government spending used in the empirical analysis and the expenditure categories used in the State budget.

Economic and functional categories used in the empirical analysis	References to the expenditure categories used in the State budget (Appendices B and C)
Public current spending	1 + 4
Public capital spending	3 + 5
Total public spending	1 + 3 + 4 + 5+6+8
Public spending for staff	2
Public spending for interests	6
Public spending for national defence	9
Public spending for justice and public safety	10

Public spending for economic interventions	11
Public spending for social interventions	12
Public spending for education and culture	13