

The “displacement effect” in the growth of the Italian general government expenditure.

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Abstract

The purpose of this paper is to critically analyse and empirically assess the Peacock-Wiseman’s hypothesis of a displacement effect, as a determinant of the growth of governments, emphasising its revenue-expenditure character. Less known, but equally important phenomena associated with the displacement are the “inspection” and the “concentration” effects, which expand public sector size by undertaking new governmental activities and by reducing local government autonomies. These hypotheses will be empirically tested on Italian time-series data for the period 1866-1980, in order to verify their contribution to the explanation of the growth of government driven by the demand-side.

Keywords: general government expenditure, displacement effect, war economy

JEL classification: H11, H50, C22

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1. Introduction

The purpose of this paper is to critically analyse and empirically test the Peacock-Wisemans' displacement effect on the growth of government, by using Italian data on the general government expenditure for the period 1866-1981.

The displacement effect did not receive sufficient attention within the analysis of the growth of governments. However, it is of particular interest, since it introduces important public choice considerations, by considering the elector's willingness to pay taxes as a constraint against a growth of public expenditure favoured by bureaucrats and politicians interests.

The displacement effect can explain the remarkable government growth in the post-war period in most developed countries, by focusing attention to the increases in public activities and the crowding-out of private expenditures that result as a consequence of major social upheavals. This is explained in terms of the diminished importance, during such periods, of the constraint imposed on government growth by the electors' willingness to pay taxes beyond what is perceived as a tolerable burden of taxation.

Less known, but equally important forces operate in the Peacock and Wiseman's theory of government growth, namely the inspection and concentration effect. The former relates to increases in state activities resulting from new demands originated after wars (in terms of war pensions, but as well as to deeper interventions in the social field). The latter remarks the concentration to the state of competencies formerly belonging to local governments, that takes place during war periods, and that can not be easily reversed.

The paper is organised as follows, after a brief survey of the economic literature on the displacement effect, we will discuss the two related models of "inspection" and "concentration" and the differences and similarities with Wagner's law approach. The following part will be devoted to the empirical analysis of the Italian data on general government expenditure, taxation and gross domestic product aimed at combining Wagner's law and Peacock-Wiseman hypotheses.

Finally, we will analyse the short-run adjustments of these variables, formally testing for the existence of a displacement effect within this framework.

2. The development of the displacement theory.

The theories on the growth of government are traditionally divided into the two main categories of demand-side and supply-side explanations, insofar as they consider bureaucrats and politicians neutral or non neutral towards the size and composition of the public expenditure. In the case of the displacement effect, this separation will result somewhat arbitrary, since it both considers the demand for publicly provided goods and services, and the electors' willingness to pay taxes, that acts as a constraint for an excessive development of the public sector, driven by the supply-side.

The starting point of Peacock-Wiseman's displacement theory relies on the Wagnerian approach to government growth, named after the German economist Adolph Wagner and his "law of the increasing state activities". Within this approach, government size is expected to grow more than proportionally to domestic income, for a series of reasons ranging from the superior income elasticity of publicly provided goods and services to the increasing complexity of the economy, that requires new functions and activities from the public sector¹.

Wagner's model results therefore in a deterministic model of government growth, where the general government expenditure adjusts to changes in domestic income, explaining its secular trend.

Peacock and Wiseman (1961) suggested the opportunity of considering the dependence of governments upon revenues raised by taxation, and therefore the relevance of the constraints imposed on public expenditure by the electors' willingness to pay taxes, and encouraged further research on government growth, more focused on empirical data. In particular, from their analysis of the time-pattern of the British general government expenditure, Peacock and Wiseman (1961), elaborated their "*displacement theory*". It is important to notice that they do not deny the importance of many of the characteristics of government expenditure to which Wagner's law draws attention, but they are more interested in yearly changes, rather than in the secular behaviour of the public sector size and the permanent influences on government expenditures.

The starting point of their analysis relies in the consideration that "while government expenditure has clearly grown (at least in money terms) over the period as a

whole for all countries for which adequate statistics are available, the time pattern of growth is less regular than, and quite different from, the corresponding pattern of growth in the size of community output” (Peacock and Wiseman 1961, p. 25). Unlike Wagner’s law predictions, the observed pattern of government growth is less regular, with high peaks for the war periods, followed by steady paths.

This observation is explained on the grounds that government expenditure depends broadly on the revenues raised by taxation, and, when societies are not being subjected to unusually violent pressures or disturbances, people’s ideas about the “tolerable” burden of government taxation tend to be fairly stable. Governments may have plan to increase their expenditure, nevertheless “their implementation, and thus the rate of growth of government expenditure, will depend upon the view taken by the government as to the revenues that it is (politically) able to raise as well as upon its own views as to the desirability of increasing government expenditures in any direction”. Consequently, government expenditure may rise in such periods, but at a steady rate, being curbed by economic factors such “the disincentive effects of high marginal rates of tax and also by popular notions of tolerable tax burdens and by the degree of political control exercised by the citizens over their government, but encouraged by a rising output per head”. Also, as well summarised by P-W, “*both citizens and government [...] hold divergent views about the desirable size of public expenditures and the possible level of government taxation. This divergence can be adjusted by social disturbances that destroy established conceptions and produce a displacement effect. People will accept, in a period of crisis, tax levels and methods of raising revenue that in quieter times would have though intolerable, and this acceptance remains when the disturbance itself has disappeared. As a result, the revenue and expenditure statistics of the government show a displacement after periods of social disturbance. Expenditures may fall when the disturbance is over, but they are less likely to return to the old level. The state may begin doing some of the things it might formerly have wanted to, but for which it had hitherto felt politically unable to raise the necessary revenues.*” [Peacock-Wiseman 1961; p.26].

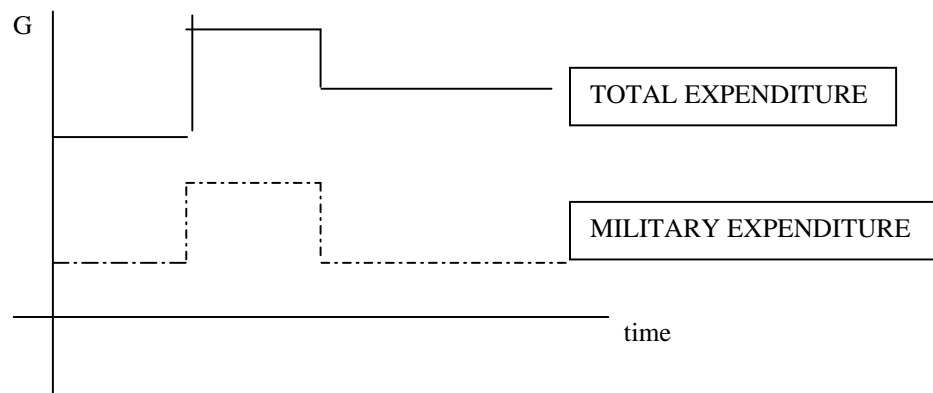
The consequence of the above on the time pattern of the general government expenditure is that public sector dimensions will tend to be constant over time, rather

¹ It is important to notice that the Wagnerian approach to the growth of governments is rather different

than increasing, unless some major crisis periods occur, which require an increase in government intervention. The corresponding expansion of the public sector will not be just temporary, since the new levels of government expenditure and taxation will be accepted by the electors, and therefore public sector size will remain stable at an higher level until the next shock.

According to PW model, therefore, the time-pattern of government expenditure is expected to increase step-wise, rather than linearly, as in the figure below.

Figure 1. Peacock-Wiseman's displacement effect.



From the graph above we can notice that, according to PW hypothesis, public expenditure rises stepwise during war times, due to the higher military expenditures, which after the critical period return to the previous values. On the contrary, public expenditure does not return to its previous levels: although it decreases after the war, nevertheless it stabilises at an higher value compared with the pre-war period. This happens because a new level of taxation has now been accepted by the public, easing therefore this constraint on government expenditure.

with respect to the empirical testing it received: see the discussion in Peacock and Scott 2000.

3. Other issues in war economies: inspection and concentration effect.

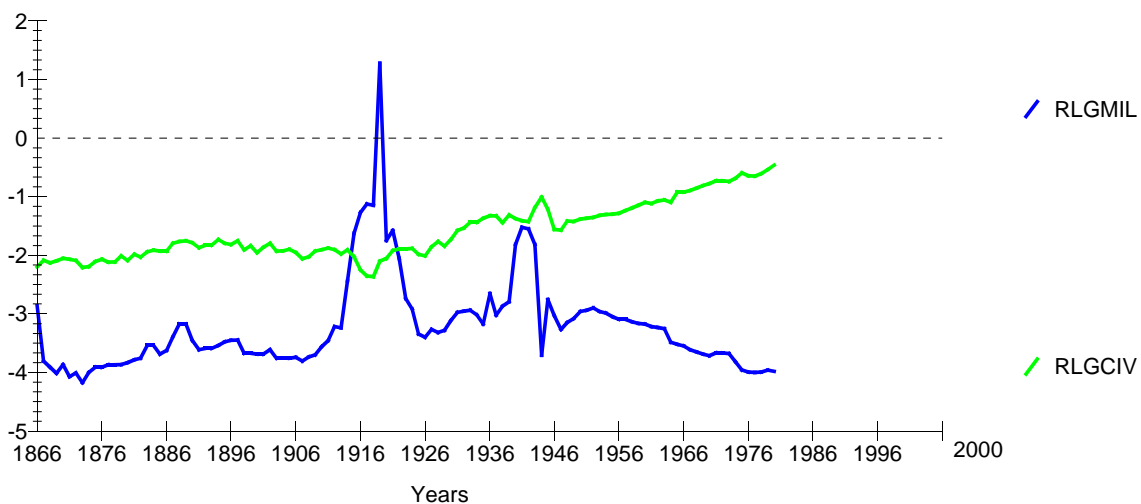
The displacement effect is probably the most well-known consequence of wars and other periods of major social disturbances, but other aspects of PW analysis shall not be ignored.

PW consider as well, within their analysis, the “inspection effect”, which operates from the demand-side: a war brings into focus problems which were not identified before and which require further government spending. In their description:

“at the same time, social disturbances may themselves impose new and continuing obligations upon a government, as the aftermath of the disturbance (for example, the provisions by a government of war pensions), as the result of government being obliged by the disturbance to assume functions that it cannot easily return to others (for example, the wartime provision by government of services formerly financed by private charity), and as a consequence of changed ideas induced or encouraged by the disturbance itself”.

A possible empirical interpretation of the inspection effect relies on the consideration of the time pattern of the series of civil and military expenditure, as in figure 2.

Figure 2: civil and military expenditure in percentage of GDP.



From figure 2, we can notice that military expenditure (RLGMIL) tends to be fairly stable, with the exception of the two world wars, where it jumps upwards. After the second world war military expenditure actually decreases over time. Civil expenditure (RGCIIV) has a rather different pattern: it decreases in correspondence of

WW1, and then starts to increase considerably, especially after WW2, providing some evidence to the inspection effect.

P-W also describe the existence of a “concentration process”, that is associated loosely with the displacement effect and more closely to economic growth.

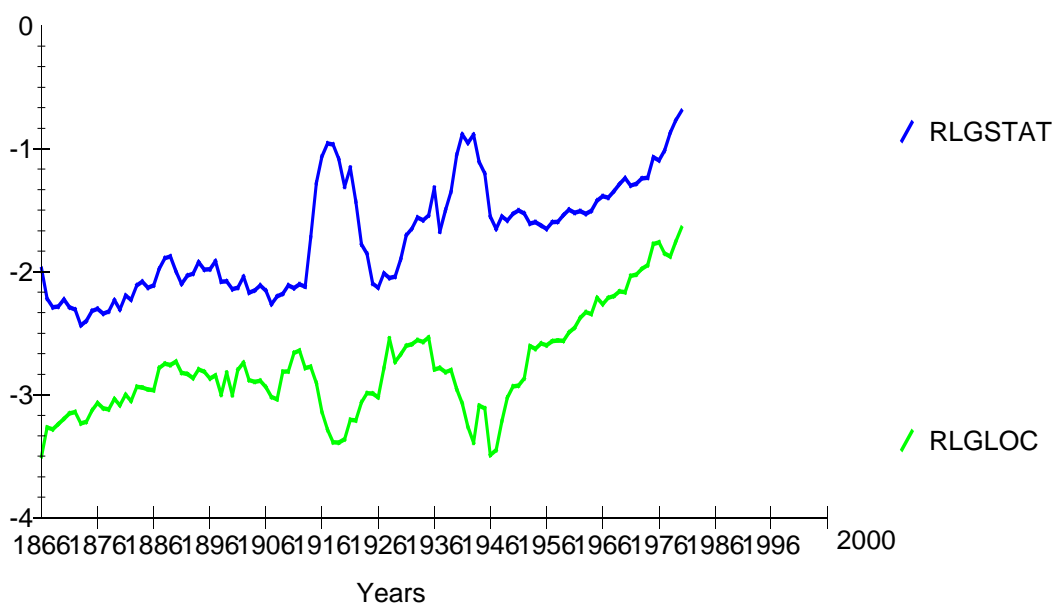
According to P-W analysis, economic growth improves transports and communications, increasing therefore the knowledge on local public services, and the possibility of exploiting scale economies. This increasing knowledge “is likely to generate pressures for improved and uniform standards of public services, and these pressures may only be capable of satisfaction by greater centralisation of control over the size and character of public spending” (P-W 1961, p.28).

P-W nevertheless do not deny the importance of local governments, for their history and tradition as political unities, and admit the difficulties in reaching a consent to reduce their autonomy. The concentration process can occur independently of any displacement, although there could be a relationship between the two: in presence of wars and other social upheavals, political opposition towards centralisation is weakened by the prevailing importance of sustaining the war expenditures.

P-W consider the “concentration effect” as a permanent influence on public expenditure, since once the change towards centralisation has been made, it is easier to render it permanent².

Figure 3. Concentration process in the Italian State and local expenditure (in percentage of domestic product)

Source: elaborations on Brosio-Marchese (1986).



The figure above describes the time trend of the Italian State and local expenditure, both expressed as ratios to GDP and in their log form³.

In correspondence of the two world wars we can notice a relevant increase in State expenditure that is accompanied by a considerable reduction in local expenditures, confirming the existence of a “concentration effect”. Unlike P-W hypothesis, nevertheless the “concentration effect” results only temporary, and both State and local expenditure increase at a rapid pace after the two World Wars.

It is important to notice that this analysis of the “concentration effect” has been based on the attribution to local or State government of the allocation of public expenditure. Official statistics therefore can not discern between expenditure locally planned and allocated, and expenditure centrally planned and locally allocated.

3. The empirical testing of the displacement effect

The analysis of the displacement effect is necessarily based on a long sample of time-series observations, in order to establish pre-war and post-war patterns in government spending. These long series will difficulty result homogeneous, due to different factors, as changes in the statistical definition of the variables, and territorial changes of the nation.

For the case of Italy, Brosio and Marchese (1986) present a dataset on general government expenditure that results particularly useful for our purposes, since they reconstruct a homogenous series for the general government expenditure and other variables. Particular caution has nevertheless to be used when interpreting the results obtained with these data, since probability of contamination is still possible.

As far as the empirical testing of PW is concerned, there are different procedures that have been followed in the empirical literature, which nevertheless could be biased by the non-stationary nature of the time-series data on the general government expenditure.

Most of the empirical studies on the displacement effect do not consider the revenue-expenditure nature of this process, but simply regress the general government expenditure on its past values and test for possible structural breaks. Indeed, the most common approach, following Diamond (1977), is to consider the displacement

³ As before, the ratio to GDP is preferred in order to approximate the real value of the series without using

hypothesis as a theory of a structural break in the public expenditure series (see, also Diamond-Tait 1988; p.3). This can be therefore empirically verified through a standard Chow (1960) test. Following these lines, Nomura (1995) finds evidence for the displacement hypothesis for Japan, observing two possible structural breaks in relation to the two oil crises.

It is important to notice that these models consider WL and the displacement as two mutually exclusive theories, and therefore generally test WL versus PW. A further problem with the models described above is that, by regressing general government expenditure on its past values and testing for the existence for a structural break, they implicitly assume that the growth of the general government expenditure can be entirely explained in terms of its past values. This is in clear contradiction with both WL and the P-W approach, which both consider the relevance of domestic product in explaining the growth of government.

An alternative approach, followed by Kozumi and Hasegawa (2000) is to analyse the displacement within a Bayesian framework. They find evidence for the existence of two structural breaks in the Japanese government expenditure series, before and after the first oil crisis.

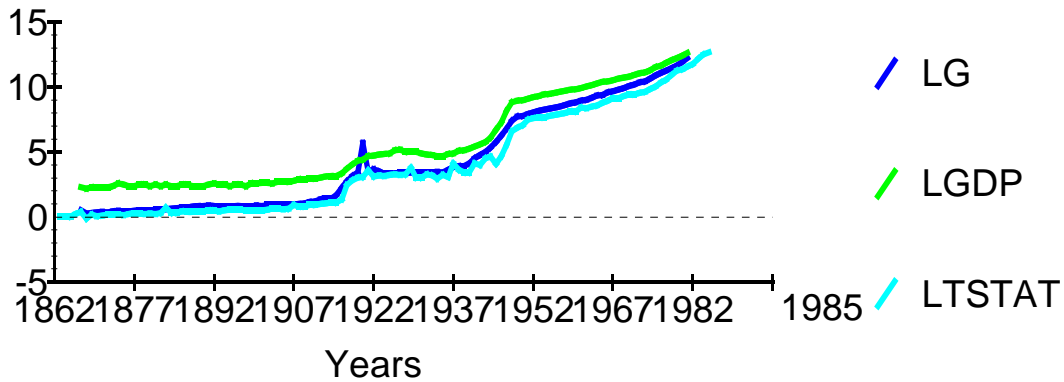
More recent work on the displacement effect includes Goff (1999), who identifies the displacement in terms of persistence to temporary shocks via the impulse response function. Although this method is in principle more promising, nevertheless, the impulse response approach assumes that shocks will occur every period with small variance, and, therefore, is unable to examine the importance of infrequent large shocks (Bohl 1999).

Our approach is rather different. First, we consider the revenue/expenditure nature of the displacement, together with its complementarity rather than substitutability with WL. Within this approach, therefore, WL will describe the long-run, whereas the constraint imposed by the elector's willingness to pay taxes will be binding in the short-run.

On the other hand, we can also notice relevant similarities in the time trend path of the series of gross domestic product, general government expenditure and taxation revenues, as plotted in figure 4.

a deflator, that, in a period of 113 years, will result arbitrary and risk to contaminate the data.

Figure 4: plot of the level of the series



The above considerations lead us to assume that WL could be an appropriate explanation for the growth of government when considering a long time-horizon, in which financial stringency will not constrain the growth of the general government expenditure. To explain the short-run movements of the general government expenditure, we will add to the expenditure equation an extra explanatory variable, namely taxation revenues.

Following Johansen (1988, 1995), we write a p -dimensional VAR model error correction form as:

$$\Delta y_t = \sum_{i=1}^{k-1} \Gamma_i \Delta y_{t-i} + \Pi y_{t-1} + \mu + \Psi D_t + \varepsilon_t, t = 1, \dots, T, \quad (1)$$

where y_t is the set of non-stationary (i.e. $I(1)$) variables discussed above, $\varepsilon_t \sim niid(0, \Sigma)$, μ is a drift parameter⁴, and Π is a $(p \times p)$ matrix of the form $\Pi = \alpha\beta'$, where α and β are $(p \times r)$ matrices of full rank, with β containing the r cointegrating vectors and α carrying the corresponding loadings in each of the r vectors. The dummy variables D_t (assumed to have only short-run effects) are added in order to capture serious normality failures in 1915, 1916, 1920, 1921 and 1924.

Preliminary analysis of the data using the Augmented Dickey-Fuller (ADF) tests suggested that all series are $I(1)$ in levels⁵. The levels of the two equations in the

⁴ In a cointegrating vector that involves output, inclusion of a linear deterministic trend may capture slowly evolving stocks of knowledge as well as human and physical capital. In our case, however, the deterministic trend turned out to be insignificant and was therefore excluded from the subsequent analysis.

⁵ This result is also confirmed by the analysis of the correlograms of the series.

unrestricted VAR model (1) are estimated using a lag length of $k = 3$.⁶ The determination of the number of cointegrating vectors is based on the maximal eigenvalue (λ -max) and the trace (λ -trace) tests (see Johansen, 1988, 1995). Allowing for the drift parameter to enter model (1) unrestrictedly, cointegration results are shown in Table 1, which reports the λ_i eigenvalues, the λ -max and the trace statistics, and the 95 percent critical values. The critical values are taken from Pesaran and Pesaran (1997). Both the λ -max and the trace statistics support the existence of $r = 1$ cointegrating vector⁷. Normalizing on G , we get the following long-run relationship:

$$LG = 1.0888 LGDP$$

$$(s.e. = .013)$$

This relationship confirms WL: the two series of general government expenditure and gross domestic product are cointegrated and the income-elasticity of general government expenditure is superior to unity.

This confirms our hypothesis that, when considering a long time-horizon, WL holds. As anticipated, therefore domestic income has a positive permanent effect on general government expenditure. The following section considers the short-run adjustments of the general government expenditure.

4. Short-run adjustments of the general government expenditure.

As anticipated above, we interpret the P-W hypothesis as essentially a short-run revenue-expenditure relationship. Our starting point is given by the cointegrating regression we identified, confirming WL for the long-run. Then we consider the short-run adjustments of the general government expenditure towards its long-run equilibrium with GDP, allowing as an additional explanatory variable, the taxation revenues.

Taxation revenues are expected to have, within our model, only short-run effects. This is explained by the fact that year-to-year changes in the level of general government expenditure cannot be operated without obtaining popular consent. If we consider a public choice model in which the general government expenditure is driven up by bureaucratic and politicians interest, who nevertheless find an important

⁶ The lag length is selected in order to eliminate serial correlation. The diagnostic tests (available on request) suggest that all four equations are free from autocorrelation (up to order 2), and heteroscedastic effects. All estimations are done in Microfit (Pesaran and Pesaran, 1997).

constraint in the elector's willingness to pay taxes, we see that the growth of the general government expenditure is constrained by the amount of taxes collected.

The error correction equation for DLG is reported in table 2.

The empirical result confirm the existence of a positive link between general government growth and past economic growth (i.e. coefficient on DGDP(-1) equals 0.26). Taxation revenues also have a positive impact on the growth of government (i.e. coefficient on DLTSTAT equals 0.13). The dummy variables capture abnormal changes in government growth between 1915 and 1922.

As anticipated, we will base our test of the displacement effect within this model of government growth, which has been empirically verified for the Italian data. For this purpose, we apply Chow's second test for predictive failure, by retaining 35 observations (i.e. we estimate our regression up to 1946 and we test for predictive failure onwards). The results do not confirm the existence of a displacement, interpreted as structural break, as shown by the $F_{\text{Chow's2}}(35, 65)$ test reported in table 2.

This result is explainable due to the fact that general government expenditure is not the only series to increase step-wise in correspondence of the two world conflicts. Its explanatory variables, i.e. taxation revenues and gross domestic product also do.

More attention therefore need to be devoted to the empirical testing of the displacement, probably abandoning the idea that influences most of the empirical studies that the displacement is a theory of the structural break of the general government expenditure series. A more promising perspective is therefore to consider the displacement effect within a public choice framework that emphasises its revenue-expenditure character.

⁷ This result is also confirmed by the analysis of the persistence profile of the cointegrating vector, which decays rather fast.

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Table 1. Eigenvalues, test statistics, and critical values

λ_i	λ -max				λ -trace			
	H ₀	H ₁	Stat.	95%	H ₀	H ₁	Stat.	95%
.1846	$r = 0$	$r = 1$	22.86	14.88	$r = 0$	$r \geq 1$	26.27	17.86
.0299	$r \leq 1$	$r = 2$	3.40	8.07	$r \leq 1$	$r = 2$	3.40	8.07

Table 2. Short-run equation for the general government expenditure.

Variable	ΔLG equation	
	Coeff.	t-value
<i>Constant</i>	.229	3.47
ΔLG_{t-1}	.335	3.53
$\Delta LGDP_{t-1}$	.264	3.40
$\Delta LGDP_{t-2}$	-.099	-1.58
ΔLG_{t-2}	.113	4.20
ECM_{t-1}	-.106	-3.18
<i>D1915</i>	.268	3.95
<i>D1916</i>	.397	5.62
<i>D1920</i>	1.97	27.9
<i>D1921</i>	-3.39	-18.51
<i>D1922</i>	.612	2.43
σ	.067	
$LM_F(1, 99)$	.543	[.463]
$F_{ff}(1, 99)$	.792	[.375]
$\chi^2_{nd}(2)$	9.23	[.010]
$F_{het}(1, 110)$	.565	[.454]
$F_{Chow's2}(35, 65)$	.787	[.777]

Numbers in square brackets are the p -values of the tests. σ is the standard error of the regression.

LM_F is the Lagrange Multiplier test of residual serial correlation (F version); FF_F is the Ramsey's reset test for functional form, χ^2_{nd} is the normality test on residuals, and F_{het} is the heteroscedasticity test. $F_{Chow's2}$ is the Chow's 2nd test for predictive failure.

$$ECM = LG - 1.0888 * LGDP$$

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