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New Evidence on the Private Saving Offset and Ricardian Equivalence

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ABSTRACT / RESUMÉ

New evidence on the private saving offset and Ricardian equivalence

The ability of discretionary fiscal policy to affect economic activity following shocks depends on how private agents react. This paper re-investigates the extent of possible offsetting private saving behaviour to fiscal policy changes. The results suggest that the private saving offset is around 40% on average across countries in both the short and the long term, which is somewhat lower than found in prior research. However, the estimates vary considerably across countries. Disaggregate analyses of the budget components shows that changes in current revenues are almost fully offset, whereas offsets to current spending are on average around one third to one half depending on the sample. There is no offset for public investment, making it the most potent policy tool. Saving offsets are stronger the higher the level of government debt consistent with the expectation that snowballing debt may ultimately lead to higher taxation. They are also stronger the better developed financial markets are, pointing to the importance of liquidity constraints for the effectiveness of policy.

JEL Codes: E21; H30; C33

Keywords: Fiscal policy; private saving; Ricardian equivalence; asset prices

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Nouveaux éléments concernant l'effet compensatoire de l'épargne privée et l'équivalence ricardienne

L'influence des mesures budgétaires discrétionnaires sur l'activité économique après un choc dépend de la réaction des agents économiques privés. Ce document réexamine, à partir de données allant jusqu'à 2008, l'ampleur d'un éventuel comportement compensatoire d'épargne du secteur privé face à l'évolution de la politique budgétaire. Les résultats montrent que l'effet compensatoire de l'épargne privée est de 40 % en moyenne dans les différents pays, soit un peu moins que la proportion découlant des recherches antérieures. Les estimations sont toutefois extrêmement variables d'un pays à l'autre. Une analyse désagrégée des composantes du budget fait apparaître que les variations des recettes courantes sont presque entièrement compensées, alors que pour les dépenses courantes, la compensation n'est qu'en moyenne d'un tiers à la moitié, en fonction de l'échantillon. Il n'y a pas d'effet compensatoire de l'investissement public, qui est donc l'instrument d'action le plus puissant. L'effet compensatoire de l'épargne est d'autant plus marqué que le niveau de la dette publique est plus élevé, ce qui est conforme à l'attente d'un assainissement ultérieur qui alourdira l'impôt. L'effet compensatoire est en outre d'autant plus prononcé que les marchés de capitaux sont plus développés, ce qui témoigne de l'importance des contraintes de liquidité pour l'efficacité des politiques.

Codes JEL : E21 ; H30 ; C33

Mots clés : Politique budgétaire ; épargne privée ; équivalence ricardienne ; prix des actifs

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NEW EVIDENCE ON THE PRIVATE SAVING OFFSET AND RICARDIAN EQUIVALENCE

By Oliver Röhn[1]

Introduction and findings

1. The large fiscal stimulus in response to the crisis raises questions about the effectiveness of such discretionary fiscal policy measures. The reaction of private agents is crucial for assessing the impact of fiscal policies in response to shocks. If private agents offset major parts of the fiscal stimulus through increased saving the effect on aggregate demand is limited. Various channels can lead to an offsetting private behaviour to fiscal actions. First private saving will rise in response to deficit financed tax reductions as the marginal propensity to consume out of disposable income is less than one. Second private saving is indirectly affected by increasing budget deficits through higher interest rates and/or inflation which cause crowding-out effects. Finally, forward looking agents may anticipate that given a constant government spending path, current increases in budget deficits will have to be financed through higher taxes in the future (Ricardian equivalence). This paper investigates the private/public saving offset with a particular focus on the tax discounting channel.

2. The theoretical backbone to the public/private saving offset due to tax discounting is Barro's (1974) claim that government bonds do not constitute net wealth, implying that government financing decisions have no real effects on consumption and interest rates. In its strict form this so-called Ricardian equivalence proposition implies that reductions in public saving resulting from tax cuts are offset one for one by increases in private saving leaving consumption, national saving and thus interest rates and investment unchanged. The same effect on national saving also holds for deficit financed *permanent* spending increases as private agents cut their consumption exactly by the level of the spending increase in expectation of future tax increases.[2] While a consensus exists that the theoretical assumptions underlying this strong neutrality result are unlikely to hold in reality, Ricardian equivalence might still serve as a first approximation.[3] It is thus important to assess its validity and strengths empirically.

3. In an early survey of the empirical literature Seater (1993) concluded favourably, while Stanley (1998) based on a meta-analysis of the literature strongly refuted the empirical validity of Ricardian

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1. OECD Economics Department. This is one of the background papers for the OECD's project on counter-cyclical economic policy. The main paper was issued as the *OECD Economics Department Working Paper* No. 760. Without implication, the author would like to thank Balázs Égert, Jorgen Elmeskov, Peter Hoeller, Jean-Luc Schneider and Douglas Sutherland for valuable comments and suggestions and Susan Gascard for excellent editorial support. Some of the results in the paper were obtained using econometric codes kindly provided by Balázs Égert.

2. Temporary deficit-financed spending increases can affect the current level of national saving as the fall in private consumption only partially offsets the spending impulse.

3. Among the assumptions necessary for Ricardian equivalence to hold exactly are intergenerational altruism, rational expectations of private agents, absence of credit constraints and non-distortionary taxes.

equivalence. Elmendorf and Mankiw (1999) and Ricciuti (2003) in contrast view the evidence as inconclusive. Table 1 summarises several recent studies that estimate this offset. Most of these studies rely on a dynamic panel setup and employ a variety of different panel estimators. In general, these studies report that the offset is larger (and closer to exact Ricardian equivalence) in the long term than in the short term. However, estimates vary considerably across the studies. Estimates of the offset for OECD countries range from 0.1 to 0.5 in the short run to about 0.3 to as much as 0.9 in the long run.[4,5]

Table 1. **Overview of recent studies on the private/public saving offset**

4. The starting point of this paper is earlier OECD work by de Mello, Kongsrud and Price (2004). De Mello *et al.* found strong evidence of partial yet substantial offsetting movements in aggregate private and public saving. In addition wealth effects were found to reinforce the offset in situations of unsustainable fiscal expansions and subsequent consolidations. The offset was shown to be somewhat smaller at high levels of public debt. No offset was found for public investment. The current work extends the earlier work in several important dimensions. First the empirical approach explicitly allows for cross-country heterogeneity of all short and long run slope coefficients including the offset coefficients. Haque *et al.* (1999) and Sarantis and Stewart (2001), for example, argue that neglecting heterogeneity in saving behaviour can lead to inconsistent estimates and misleading inferences. Second, the investigation of possible non-linearities is conducted in a more sophisticated manner by employing Hansen's (1999) threshold methodology. In addition to non-linearities with respect to public debt, non-linearities due to differences in financial market development as well as distortionary taxes are analysed. Third, the time coverage is extended to cover the years up to 2008. The main findings of the paper are:

- On average across countries the saving offset is estimated to be around 40% both in the long and in the short term, which is also consistent with, albeit at the lower end, of other empirical research. However, there is considerable heterogeneity across countries. Overall the results provide evidence against a strict version of the Ricardian equivalence hypothesis in the long-term (full offset).

mudanças de receita geram crowding-out quase total

- The composition of changes in public saving is important in determining the size of the offset. Changes in current revenue are almost fully offset in the long term, whereas offsets to current spending are on average around one third to one half depending on the sample. Rolling window regressions suggest that the long-term revenue offset has been increasing over time. There is no offset for public investment, perhaps reflecting the expectation of a return on the investment. While the revenue offset is similar in the long and short term, differences exist for spending. The short term offset for spending is estimated to be between one fourth and one third depending on the sample. This suggests that temporary deficit-financed public spending could boost aggregate demand, while tax cuts would have a much smaller effect.

- Offsets may also react in a non-linear way. Private saving reactions to fiscal policy appear to depend on debt levels. Saving offsets are stronger the higher the level of government debt

4. De Castro and Fernandez (2009) test the Ricardian equivalence proposition for Spain using several different approaches. While they reject the strong version of Ricardian equivalence (full offset) they do find evidence of partially offsetting movements between private and public saving. They also find some evidence that agents become more Ricardian with increasing government indebtedness.

5. Hüfner and Koske (2010) investigate household saving determinants for G7 countries. To proxy for Ricardian effects they include the stock of government debt (as opposed to the budget deficit) and find that a reduction of government net financial liabilities of one percentage point, reduces household saving in the United States and France by 0.2 percentage points. The variable is not included in the specifications of the other G7 countries.

dividas maiores levam a mais crowding-out

consistent with the expectation of an increased likelihood of subsequent consolidation or higher interest payments. Both will lead to higher taxation or cutbacks in spending.

- Private saving offsets are stronger when a country's financial markets are more developed. This is consistent with the implication that when borrowing constraints are binding Ricardian equivalence may not hold. Credit constrained households will consume from a deficit-financed stimulus, which makes fiscal policy more potent.

- In terms of the effects that consolidation efforts may have on economic activity the results imply that at least some part of the adverse effects of government restraint will be offset by private savings behaviour and that this effect may be larger in countries facing higher debt levels. Moreover, tax-based consolidation appears to generate a higher offset. However, these positive demand side effects need to be weighed against possible long-term distortionary supply-side effects of tax hikes. Finally, the results suggest that the repair of the financial sector is an important precondition for successful consolidation, as the extent of the offset crucially depends on the ability of agents to shift future income into current consumption.

- Consistent with an interest rate crowding out effect a negative relationship between asset prices (house and stock prices) and private saving exists in some countries. Larger government deficits can put upward pressure on bond rates and thus borrowing costs so that an indirect offset may occur through asset prices.

Estimation issues

Data and time-series properties

5. The dependent variable is gross private saving and is based on OECD National Accounts data for gross national income. From the national income series private and public consumption are deducted to arrive at a series for gross national saving. The difference between national and government saving is then used as the measure for private saving. Cyclically-adjusted net lending as percentage of potential GDP is used as a measure of public saving.[6] The data for the fiscal variables are taken from the OECD Economic Outlook database. The selection of controls follows the recent empirical literature (Table 1) and the following variables were included: the old-age dependency ratio, broad money supply, the real short-term interest rate, the inflation rate, productivity growth, terms of trade changes and equity and house prices as proxies for wealth. De Mello *et al*. (2004), de Serres and Pelgrin (2003) and Hüfner and Koske (2010) provide theoretical discussions about these controls and conclude that there is considerable ambiguity about their predicted signs. The source of most of these control variables is again the Economic Outlook database. In addition, data on the old-age dependency ratio is taken from the OECD Labour Force statistics. House prices are obtained from the OECD house price database (a compilation of national data sources) and from national sources (central banks and statistical offices), and equity prices from the OECD's Main Economic Indicators database. Finally, the private credit data are taken from the IMF International Financial Statistics database.

6. The measurement of private and public saving suffers from a range of conceptual and measurement problems. These include *inter alia* the treatment of capital gains, the effects of inflation, aggregation issues and problems with cyclical and other temporary factors affecting the measurement of public saving. A detailed discussion of these issues can be found in de Mello *et al*. (2004). While it would be preferable to use underlying balances that also correct for one-off items, the Secretariat's time series for the underlying balances are considerably shorter. For the overlapping years the two measures are highly correlated for most OECD countries. A separate adjustment has been made for Germany in 1995.

6. As noted above a specific feature of the estimation approach is that it allows for cross-country heterogeneity of all slope coefficients. To obtain sufficiently high degrees of freedom for all countries, the main empirical specifications rely on quarterly data. The dataset is an unbalanced panel of 16 OECD countries covering at most the period 1970q2 to 2008q4. As data quality of some small countries may pose problems, the results for the largest six countries are reported separately. Hansen's (1999) threshold approach to investigate non-linearities relies on pooled data and thus annual data over the same time period are used in those estimations.

7. To test the time series properties of the underlying series a range of single country and panel unit root tests were carried out. While there was considerable heterogeneity in the results, the tests indicated in general that most of the series are I(1), except for the growth rate of GDP per capita and the terms of trade growth rate, which can be regarded as I(0). In light of these mixed results a conservative approach is chosen and all variables except the growth rates of GDP per capita and terms of trade are treated as non-stationary. The next step involves testing for co-integration relationships of the non-stationary variables. For this purpose a range of heterogeneous panel co-integration tests were carried out (Pedroni, 1999).[7] The results in Table 2 show that the majority of the tests reject the null of no co-integration.

Table 2. **Cointegration tests**

Econometric methodology

8. Despite some of the tests being inconclusive, one cannot exclude the possibility that there exists a co-integrating relationship between the I(1) variables. As a result the private/public saving offset is estimated with an autoregressive distributed lag (ARDL) model in error correction (EC) form. This approach allows to distinguish between the short and long-term dynamics.[8] In particular the following model is estimated:

$$\Delta y_{i,t} = \alpha - \lambda_i y_{i,t-1} + \beta_i Fisc_{i,t-1} + \sum_{k=1}^{K} \gamma_{k,i} X_{k,i,t-1} + \pi_i \Delta y_{i,t-1} + \delta_i \Delta Fisc_{i,t} + \sum_{j=1}^{J} \gamma_{j,i} \Delta Z_{j,i,t} + \varepsilon_{i,t} \quad (1)$$

or after some minor rearrangements

$$\Delta y_{i,t} = -\lambda_i \left(y_{i,t-1} - \frac{\alpha}{\lambda_i} - \frac{\beta_i}{\lambda_i} Fisc_{i,t-1} - \sum_{k=1}^{K} \frac{\gamma_{k,i}}{\lambda_i} X_{k,i,t-1} \right) + \pi_i \Delta y_{i,t-1} + \delta_i \Delta Fisc_{i,t} + \sum_{j=1}^{J} \gamma_{j,i} \Delta Z_{j,i,t} + \varepsilon_{i,t} \quad (2)$$

where $y_{i,t}$ denotes the private saving rate in country i at time t. $Fisc_{i,t}$ is a measure of public saving. In the baseline setup, cyclically-adjusted government net lending as percentage of potential GDP is used. This measure is then further disaggregated into its components, i.e. cyclically adjusted current spending and revenues as well as public investment. $X_{k,i,t}$ are control variables in the co-integration relationship. Based on the time series properties the old-age dependency ratio, the real short-term interest rate, money supply as percentage of GDP, the CPI inflation rate as well as real equity and house prices are included in

7. A technical problem arises in the heterogeneous panel tests. The tests only allows for a maximum of seven variables to be tested for co-integration at the same time while the unit root results above indicate that eight variables are potentially non-stationary in our sample. To circumvent this problem, all combinations of the seven variables are tested for co-integration.

8. An additional advantage of ARDL models is that they are in general more robust to the integration and co-integration properties of the regressors (Pesaran and Shin, 1999).

the co-integration vector. $Z_{j,i,t}$ are control variables in the short-run relationship. Here the variables that have been found to be stationary are included, i.e. the growth rates of GDP per capita and of the terms of trade, the fiscal variables, as well as other control variables from the long-run relationship based on the BIC criterion.

9. The term in parenthesis of equation (2) describes the long-term relationship between private and public saving as well as other control variables. The error correction term λ_i measures the speed of adjustment to the long-run equilibrium after a shock. A significantly negative error correction term provides evidence that a long-run relationship exists. The remaining terms on the right hand side of equation (2) describe the short-run dynamics. The model in equations (1) and (2) is estimated for a heterogeneous panel using the Mean Group (MG) estimator (Pesaran and Smith, 1995), which allows *all* parameters of the model to differ across countries.[9] The model is estimated both for the entire sample of 16 OECD countries as well as for the sub-group of G6 countries (G7 without Canada), as the quality of the data is likely to be superior for the smaller set of large countries.

10. In addition to the linear specifications discussed so far, the analysis also investigates the possibility of non-linearities in the link between private and public saving. Threshold effects for three variables are investigated: public debt, borrowing constraints, and distortionary taxes. High or rising public indebtedness my raise concerns on the part of the private sector about fiscal sustainability. This might lead to expectations of corrective measures such as increased taxes. Hence, in anticipation of a higher tax burden, private agents may increase saving today.[10] In addition, from a theoretical standpoint the presence of binding borrowing constraints might invalidate Ricardian equivalence. In a situation of borrowing constraints, a debt-financed tax cut effectively eases liquidity constraints and induces agents to achieve their desired level of consumption. Thus, the estimated relationship between private and public saving should be weaker in countries and time periods characterized by borrowing constraints. To proxy borrowing constraints, the private credit to GDP ratio is used. Finally, the Ricardian equivalence proposition is based on the assumption of lump-sum taxation. If taxes are distortionary, however, a change in the time path of taxation can affect the optimal intertemporal allocation of consumption. Hence, Ricardian equivalence fails. To investigate the effects of distortionary taxation on the saving offset, we include the ratio of direct to indirect taxes as an additional threshold variable.

11. To test for potential non-linearities in the private/public saving offset, the threshold methodology proposed by Hansen (1999) is employed. For the case of two regimes the threshold model takes the following from:

9. The MG estimator does not explicitly control for endogeneity issues. Therefore also IV estimators were used (difference and system GMM). These estimators, however, are generally designed for large N small T panels, which does not apply to the sample used. In addition these estimators rely on a homogeneous panel. As an intermediate approach we also applied the Pooled Mean Group (PMG) estimator, where long-run coefficients are restricted to be homogeneous whereas short-run parameters are unrestricted. While in all cases the parameter estimates of the fiscal variables were in general comparable, estimates for the controls varied considerably.

10. The theoretical models of Blanchard (1990), Sutherland (1997) and Perotti (1999) formalize the idea that private behaviour becomes more Ricardian the higher the debt to GDP ratio. Empirical evidence is provided *e.g.* by Nicoletti (1988, 1992), Perotti (1999) and Berben and Brosens (2007).

$$\Delta y_{i,t} = \alpha - \lambda\ y_{i,t-1} + \beta_1 Fisc_{i,t-1} + \sum_{k=1}^{K} \gamma_k X_{k,i,t-1} + \pi\ \Delta y_{i,t-1} + \delta_1 \Delta Fisc_{i,t} + \sum_{j=1}^{J} \gamma_j \Delta Z_{j,i,t} + \varepsilon_{i,t} \qquad if \qquad T \le \rho$$

$$\Delta y_{i,t} = \alpha - \lambda\ y_{i,t-1} + \beta_2 Fisc_{i,t-1} + \sum_{k=1}^{K} \gamma_k X_{k,i,t-1} + \pi\ \Delta y_{i,t-1} + \delta_2 \Delta Fisc_{i,t} + \sum_{j=1}^{J} \gamma_j \Delta Z_{j,i,t} + \varepsilon_{i,t} \qquad if \qquad T > \rho$$

where ρ is the threshold variable and T the threshold value that separates the two regimes. The threshold value is determined endogenously as follows: First the linear model and the two-regime model are estimated. A grid search with steps of 1% of the distribution is carried out to find the value of the threshold variable that minimizes the sum of squared residuals of the estimated two-regime model. Hansen (1999) shows that $\beta_1 = \beta_2$ can be tested using a likelihood ratio test and he proposes to derive the distribution of the test statistic via bootstrapping with repeated random draws with replacements (Hansen, 1999), as it does not follow a standard asymptotic distribution.[11]

Results

Linear specification

12. The results of the baseline linear specification displayed in the first two columns of Table 3 show that the average private saving offset for the 16 OECD countries as well as the G6 countries is about 40%. The difference between the estimated short and long-term coefficients is negligible, which suggests that most of the offset is already felt in the short run. Hence, all else equal a fiscal stimulus of for example 5% would lead to an immediate increase in private saving of 2% and a decrease in national saving of 3%. The results of the control variables suggest that inflation decreases private saving in the long run for the entire sample. This effect however is insignificant in the G6 sample. In contrast in that sample house prices and the stock market index affect private saving negatively. This may limit the ability of discretionary fiscal policy even more as an indirect offset may occur to the extent that government actions put upward pressure on bond rates and thus borrowing costs. Moreover, GDP growth affects private saving positively in the short term in both samples, while a positive short-term effect of the terms of trade is only found for the G6 countries.

13. Turning to the country specific results in the remaining columns of Table 3, a great degree of heterogeneity in the saving offset across countries is found. The estimated long-term coefficient of the budget deficit varies from -1.4 (Greece) to +0.23 (Belgium). Within the G6 the coefficient varies from -0.77 (United Kingdom) to -0.09 (Japan). The short-term effect varies from -0.95 (Finland) to +0.5 (Ireland) in the entire sample, and between -0.91 (France) to -0.2 (Japan) for the G6 countries. However, some of the country-specific results should be interpreted with caution as the error correction term for some countries is not significant (Finland, Greece and Korea). This may point to a misspecification of the long-term relationship for these countries. To assess if one of the countries is driving the average results in a significant way, a jack-knifing exercise is conducted for both samples (Table 4). The results show that both the long-term and the short-term coefficients are reasonably stable.

14. Overall the results provide evidence against a strict version of the Ricardian equivalence hypothesis in the long term (full offset). Wald tests of the null of full long-run Ricardian offsetting, i.e. a long run coefficient of the budget balance variable equal to minus one, is rejected at conventional significance levels for the average offset in both the full and the G6 sample. A full offset can also be rejected for 10 out of the 16 countries with Australia being a borderline case, in which the null can only be

11. A fuller treatment of Hansen's (1999) threshold methodology can be found in Box 1 of Egert *et al*. (2009).

rejected at the 10% significance level.[12] In Germany and Ireland the point estimates are markedly larger than minus one. However, the null hypothesis cannot be rejected due to large standard errors.

Table 3. **Saving offset: aggregate budget deficit**
Table 4. **Jackknifing results: aggregate budget deficit**

15. As discussed above, the composition of changes in public saving might be important in determining the size of the offset (Table 5). The average long-term spending offset is significant at around 47% (OECD16) and 37% (G6). The average long-term revenue offset is significantly larger at over 100% (OECD16) and 86% (G6). The revenue offset appears high. It is, however, broadly consistent with the estimate of de Mello *et al*. (2004) of about 80%. These results imply that deficit financed tax cuts are almost fully offset while spending increases can have a considerable impact on aggregate demand. The differences in the short-term and long-term impacts, which are similar for revenues but not for spending, suggest that deficit-financed public spending could boost aggregate demand by more in the short run. In contrast to current revenues and spending the offset to public investment is insignificantly different from zero. This is in line with the expectation of a real return on public investment mitigating the need for future tax increases.

16. The country-specific results (Table 5) again show a great variation in the estimated coefficients. Especially in some of the smaller member countries as well as in the in the United Kingdom the offset estimates appear large. Again the insignificance of the error correction term points to possible misspecifications in some of the countries (Belgium, Finland and Greece). The results of the jack-knifing exercise show that the coefficients are relatively stable for the whole sample (Table 6, Panel A). Within the G6 sample (Table 6, Panel B) the United Kingdom has a sizeable impact on the average results driving the estimated offset upwards.

Table 5. **Saving offset: disaggregate results**
Table 6. **Jackknifing results: disaggregate results**

17. To investigate possible trends of the offsets over time, rolling window regressions are conducted for the G6 countries.[13] The results for the budget balance show an upward trend in the short-term coefficient, *i.e.* a smaller short-term offset over time. There is no clear long-term trend**.** The long-term offset appears to have increased somewhat starting in the middle of the period and then declined again towards the very end of the period. There is also no clear trend for the current spending offset. Both short-term and long-term offsets appear to be highest (and significant) in the middle of the period and smallest (and insignificant) at the beginning and end of the period. Finally, the short-term current revenue offset appears to be relatively stable over the period. However, there is evidence that the long-term offset increased over time (Table 7).

Table 7**. Detailed rolling window regression results**

12. The remaining 9 countries for which the null hypothesis can be rejected are Austria, Belgium, Denmark, France, Italy, Japan, the Netherlands, Portugal and the United States.

13. Three different window sizes were applied: 10, 15 and 20 years. The results for the different window sizes are qualitatively similar and only the results of the 15-year window are reported.

Testing for non-linearities

18. To test for possible non-linearities in the public/private saving offset, threshold effects for three variables are investigated (public debt, private credit and distortionary taxes). Annual data for 18 EU countries over the period 1970 to 2008 are used.[14] The existence of both two and three regimes are tested.

19. Tables 8 to 10 display the results for the three different threshold variables. Columns 2 and 3 of each table display the results when only the long-term offset is allowed to vary across regimes whereas in columns 4 and 5 the long and short-term offset is allowed to differ. In all three cases, the two-regime model is preferred over the linear and the three-regime case. For public debt, the results show that both the short-term and the long-term offset is larger in the upper regime (above a debt to GDP ratio of 76%), which is consistent with the theoretical prior discussed above and previous empirical findings (*e.g.* Nicoletti, 1988 and 1992; Perotti, 1999; and Berben and Brosens, 2007). It is also noteworthy that the results imply a full offset of changes in the public deficit in the upper regime.[15] The results are similar when the credit to GDP ratio is used as a threshold. In the upper regime (above a credit to GDP ratio of 62%), the long-term offset is estimated to be larger and close to unity, which is consistent with Ricardian behaviour. The results in Table 10 show that the offset is larger, when the share of distortionary taxes is higher.[16]

20. Overall the evidence on non-linearities implies that the effectiveness of discretionary fiscal policy as a stabilisation tool is limited for countries entering a downturn with high debt levels. On the other hand, subsequent consolidation efforts are also likely to have less of a negative impact on aggregate demand in these countries. In addition, the evidence suggests that fiscal policy might be more potent in financial crisis as the saving offset is smaller the more credit constrained the economy. However, this effect might be counteracted by the need for households and firms to repair balance sheets. Finally, there also exists some evidence that countries that rely more strongly on distortionary taxation might limit the effectiveness of discretionary stabilisation policy.

Table 8. **Non-linearities in saving offset: Public debt threshold**

Table 9. **Non-linearities in saving offset: Credit threshold**

Table 10. **Non-linearities in saving offset: Distortionary taxes threshold**

14. Results for a larger set of OECD countries remained largely inconclusive and are not reported here.

15. Nickel and Vansteenkiste (2008) report that above a debt to GDP ratio threshold of 90% (22 industrialised countries) or 80% (11 euro countries) an increase in the public deficit does not result in a rise in the current account deficit. This implicitly suggests that private consumers have become more Ricardian with raising debt to GDP ratios.

16. Disaggregated results for current revenue and spending are broadly consistent with the aggregate results. However, the non-linearities appear more complex with indications of three regimes and are in general less clear cut.

Table 1. **Overview of recent studies on the private/public saving offset**

Study	Country coverage	Time period	Approach (baseline specification)	Controls	Estimated private public saving offset
Brittle (2010)	Australia	1960-2008	ARDL bounds approach (Pesaran *et al*., 2001)	Household gross disposable income, social assistance benefits, unemployment rate, real interest rate, inflation rate, terms of trade, net foreign liabilities, house and equity price indices	About 0.5 long term and ¼ to 0.5 short term
Feyrer and Shambaugh (2009)	United States	1973-2005	OLS time series	No (exogenous tax shocks as explanatory variable)	About 1/3 (implied)
Ferrucci and Miralles (2007)	48 (26 emerging market economies, 22 OECD countries)	1980-2005	Pooled Mean Group (PMG) estimator	Dependency ratio, government consumption, GDP growth, inflation, terms of trade, bank credit to GDP	*Emerging market sample*: about 0.3 long term. *OECD sample*: about 0.85 long term
De Mello *et al.* (2004)	21 OECD countries	1970-2002	Difference GMM (ECM and partial equilibrium)	Old age dependency, real interest rate, CPI inflation, terms of trade changes, broad money (M2) to GDP, growth rate of per capita GDP, equity and house price indices (proxy for wealth effects)	About ½ short term and ¾ long term (ECM), 1/3 short term and 0.9 long term (partial equilibrium)
De Serres and Pelgrin (2003)	15 OECD countries	1970-2000	Pooled Mean Group (PMG) estimator	Old age dependency, real interest rate, CPI inflation, terms of trade changes, growth rate of labour productivity	About 0.7 (long term)
Loayza *et al.* (2000)	69 (20 industrial, 49 developing countries)	1966-1995	System GMM	Log level and growth of real per capita income, terms of trade, M2 to GNP, private credit flow to income, real interest rate, old age and young age dependency ratio, inflation rate, urbanization ratio	*Global sample:* About 0.3 short term and about 0.7 long term *OECD sample:* About 0.11 short term and 0.34 long term
Haque *et al.* (1999)	20 OECD countries	1972-1993	Mean Group estimator	Real interest rate, inflation rate, change in terms of trade, GDP relative to USA, dependency ratio, private wealth (cumulated saving) to GDP	0.9 (long term)

Table 2. **Cointegration tests**

	Pedroni: Country specific constant													
	Panel v		Panel rho		Panel PP		Panel ADF		Group rho		Group PP		Group ADF	
	statistic	p-value	statistic	p-value	statistic	p-value	statistic	p-value	statistic	p-value	statistic	p-value	statistic	p-value
gpsav, nlgqa, qmoney, oldage, equity, house, dcpi	**3.466**	**0.000**	3.178	0.999	**-9.669**	**0.000**	-2.548	0.000	4.898	1.000	**-9.093**	**0.000**	**-1.966**	**0.000**
gpsav, nlgqa, qmoney, oldage, equity, house, irsrc	**4.840**	**0.000**	2.951	0.998	**-9.988**	**0.000**	-2.885	0.000	4.616	1.000	**-9.671**	**0.000**	**-2.451**	**0.000**
gpsav, nlgqa, qmoney, oldage, equity, dcpi, irsrc	**2.829**	**0.002**	2.884	0.998	**-8.724**	**0.000**	-6.316	0.000	4.404	1.000	**-9.418**	**0.000**	**-5.699**	**0.000**
gpsav, nlgqa, qmoney, oldage, house, dcpi, irsrc	**2.399**	**0.008**	3.304	1.000	**-7.827**	**0.000**	-4.558	0.000	4.992	1.000	**-6.792**	**0.000**	**-3.801**	**0.000**
gpsav, nlgqa, qmoney, equity, house, dcpi, irsrc	1.062	0.144	3.722	1.000	**-7.441**	**0.000**	-5.604	0.000	5.228	1.000	**-7.817**	**0.000**	**-4.806**	**0.000**
gpsav, nlgqa, oldage, equity, house, dcpi, irsrc	**1.761**	**0.039**	5.165	1.000	**-4.680**	**0.000**	-4.087	0.000	5.049	1.000	**-9.015**	**0.000**	**-6.785**	**0.000**

Note: The null hypothesis is no cointegration. Pedroni's (1999) tests allow individual (heterogeneous) cointegration relationships. Gpsav, nlgqa, ypgqa, yrgqa, ginvest, qmoney, oldage, equity, house, dcpi, irsrc, denote private saving (%GDP), cyclically adjusted government net lending (% of pot. GDP), cyclically adjusted government current spending (% of pot. GDP), cyclically adjusted government current revenue (% of pot. GDP), government net capital outlays (% of GDP), broad money supply (M2 or M3 as %of GDP), old age dependency ratio (ratio of above 65 olds to population 15-64), stock price index, house price index, CPI inflation, real short-term interest rate, respectively. Statistically significant statistics at the 10% level or below are in boldface.

Table 3. **Saving offset: aggregate budget deficit**
Average and country specific results

Dependent variable: Private saving (per cent of GDP)									
	ALL	**G6**	**AUS**	**AUT**	**BEL**	**DEU**	**DNK**	**FIN**	**FRA**
LONG RUN									
Gov. net lending (cycl. adj)	-0.413***	-0.386***	-0.606***	-0.083	0.226	-0.379	-0.107	-0.946	-0.293
	(0.114)	(0.094)	(0.204)	(0.180)	(0.228)	(0.460)	(0.335)	(1.521)	(0.195)
Old age ratio	0.192	0.503	-1.807***	0.273	-2.955***	0.223	0.230	1.785	0.455**
	(0.472)	(0.747)	(0.517)	(1.141)	(0.591)	(0.457)	(1.178)	(4.834)	(0.190)
House prices	3.595	-2.420**	4.506	-0.657	7.312	-7.460	6.738	-9.831	-0.865
	(2.257)	(1.169)	(2.749)	(4.520)	(5.278)	(13.862)	(4.461)	(11.899)	(1.045)
Stock prices	-0.549	-1.763**	4.972**	-0.776	-2.283	-1.367	-7.058**	7.121	-0.979
	(1.084)	(0.726)	(2.083)	(3.068)	(1.785)	(1.422)	(3.433)	(6.800)	(0.929)
Money supply	0.024	-0.067	-0.090	-0.110	0.138	-0.242	-0.141	0.157	0.084**
	(0.068)	(0.059)	(0.126)	(0.088)	(0.137)	(0.158)	(0.134)	(1.205)	(0.042)
Inflation (CPI)	-0.421**	-0.187	-0.629*	-1.003**	0.085	0.082	0.398	-2.411	-1.177***
	(0.188)	(0.209)	(0.333)	(0.444)	(0.608)	(0.852)	(0.809)	(2.457)	(0.396)
Real interest rate (short)	-0.059	-0.011	-0.111	-0.377***	-0.058	-0.063	-0.063	0.203	-0.286***
	(0.050)	(0.064)	(0.074)	(0.143)	(0.128)	(0.260)	(0.128)	(0.386)	(0.107)
SHORT RUN									
Error correction term	-0.444***	-0.400***	-0.365***	-0.454***	-0.421**	-0.356**	-0.456***	-0.143	-0.219***
	(0.064)	(0.072)	(0.080)	(0.097)	(0.169)	(0.147)	(0.159)	(0.112)	(0.060)
Priv. saving (lagged)	-0.028	-0.129**	-0.146*	0.554***	-0.139	-0.364***	-0.323**	-0.094	0.010
	(0.060)	(0.055)	(0.077)	(0.134)	(0.168)	(0.139)	(0.149)	(0.134)	(0.057)
Gov. net lending (cycl. adj)	-0.377***	-0.421***	-0.507***	-0.184	0.099	-0.032	-0.669**	-0.953***	-0.914***
	(0.099)	(0.129)	(0.089)	(0.120)	(0.168)	(0.090)	(0.292)	(0.295)	(0.060)
House prices	-0.268	-5.455	-1.437	2.832	7.710**	-24.193	-7.718	6.849	-0.962
	(3.118)	(4.545)	(4.824)	(3.466)	(3.743)	(21.054)	(7.035)	(7.194)	(2.141)
Terms of trade (growth)	0.020	0.026**	-0.016	0.219	-0.136**	-0.024	0.054	0.010	0.053**
	(0.019)	(0.013)	(0.024)	(0.249)	(0.065)	(0.148)	(0.081)	(0.043)	(0.023)
GDP p.c. growth	0.100**	0.060*	-0.061	-0.139	0.066	0.087	-0.049	0.272*	-0.068
	(0.050)	(0.034)	(0.060)	(0.338)	(0.140)	(0.141)	(0.092)	(0.162)	(0.056)
Observations	1 348	728	150	47	50	150	72	73	121

Table 3. (continued)

Dependent variable: Private saving (per cent of GDP)									
	GBR	**GCR**	**IRL**	**ITA**	**JPN**	**KOR**	**NLD**	**PRT**	**US**
LONG RUN									
Gov. net lending (cycl. adj)	-0.766***	-1.461	-0.303	-0.509***	-0.088	-1.025	-0.190	0.213	-0.284
	(0.263)	(1.374)	(0.435)	(0.061)	(0.066)	(0.995)	(0.168)	(0.446)	(0.230)
Old age ratio	4.064	3.799	0.580	-0.620***	-0.060	-2.254	0.781	-0.374	-1.043***
	(3.236)	(4.314)	(2.487)	(0.218)	(0.118)	(3.463)	(0.883)	(0.457)	(0.402)
House prices	-1.907	10.980	13.283	-1.588	-3.581**	24.815	-0.079	14.968	0.879
	(2.227)	(40.095)	(9.567)	(1.065)	(1.478)	(25.326)	(3.894)	(16.123)	(3.171)
Stock prices	-0.777	2.284	-4.639***	-2.784***	0.152	8.588	-2.774**	-3.641***	-4.824**
	(2.702)	(1.771)	(1.654)	(0.518)	(0.531)	(10.073)	(1.176)	(1.395)	(2.147)
Money supply	0.067	0.862	0.185	-0.107*	0.015	-0.332	0.001	0.125*	-0.220*
	(0.083)	(1.560)	(0.283)	(0.057)	(0.031)	(0.405)	(0.071)	(0.074)	(0.112)
Inflation (CPI)	-0.189	-0.021	-0.073	-0.128	0.259	-0.994	-1.197*	0.220	0.032
	(0.390)	(0.293)	(0.384)	(0.198)	(0.251)	(1.780)	(0.672)	(0.910)	(0.454)
Real interest rate (short)	0.102	-0.249	0.230*	-0.041	0.145	-0.452	-0.022	0.020	0.076
	(0.154)	(0.263)	(0.121)	(0.049)	(0.093)	(0.417)	(0.128)	(0.276)	(0.085)
SHORT RUN									
Error correction term	-0.434***	-0.478	-1.256***	-0.705***	-0.446***	-0.276	-0.568***	-0.294**	-0.241***
	(0.113)	(0.387)	(0.328)	(0.098)	(0.100)	(0.186)	(0.123)	(0.137)	(0.056)
Priv. saving (lagged)	-0.092	0.464	0.064	-0.212***	-0.067	0.034	-0.054	-0.029	-0.053
	(0.104)	(0.339)	(0.198)	(0.082)	(0.101)	(0.277)	(0.116)	(0.180)	(0.070)
Gov. net lending (cycl. adj)	-0.555***	-0.792**	0.511	-0.279***	-0.196***	-0.022	-0.649***	-0.340	-0.551***
	(0.125)	(0.401)	(0.505)	(0.088)	(0.072)	(0.269)	(0.173)	(0.230)	(0.078)
House prices	8.563*	3.634	9.610	-8.475***	-8.170	-9.723	30.932	-14.241	0.506
	(4.714)	(12.692)	(9.608)	(3.040)	(6.113)	(10.312)	(19.188)	(15.102)	(4.083)
Terms of trade (growth)	0.056	0.017	0.025	0.018	0.009	0.019	-0.097	0.078	0.041
	(0.055)	(0.026)	(0.247)	(0.030)	(0.017)	(0.043)	(0.097)	(0.065)	(0.025)
GDP p.c. growth	0.170	0.537	0.170	0.107	0.068	0.452***	-0.186	0.175	-0.001
	(0.253)	(0.340)	(0.147)	(0.105)	(0.045)	(0.142)	(0.220)	(0.130)	(0.043)
Observations	81	28	32	113	110	30	86	52	153

Note: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. Standard errors in parenthesis.

Table 4. **Jackknifing results: aggregate budget deficit**

Panel A. OECD-16 sample

Dependent variable: Private saving (per cent of GDP)								
		Country excluded from regression						
	ALL	**AUS**	**AUT**	**BEL**	**DEU**	**DNK**	**FIN**	**FRA**
LONG RUN								
Gov. net lending (cycl. adj)	-0.413***	-0.400***	-0.435***	-0.455***	-0.415***	-0.433***	-0.377***	-0.420***
	(0.114)	(0.121)	(0.120)	(0.113)	(0.122)	(0.120)	(0.116)	(0.122)
Old age ratio	0.192	0.326	0.187	0.402	0.190	0.190	0.086	0.175
	(0.472)	(0.485)	(0.505)	(0.453)	(0.505)	(0.505)	(0.492)	(0.505)
House prices	3.595	3.534	3.878	3.347	4.332*	3.385	4.490**	3.892
	(2.257)	(2.412)	(2.394)	(2.398)	(2.281)	(2.402)	(2.215)	(2.392)
Stock prices	-0.549	-0.917	-0.534	-0.433	-0.495	-0.115	-1.060	-0.520
	(1.084)	(1.090)	(1.159)	(1.152)	(1.158)	(1.062)	(1.022)	(1.159)
Money supply	0.024	0.032	0.033	0.017	0.042	0.036	0.016	0.021
	(0.068)	(0.072)	(0.072)	(0.072)	(0.070)	(0.072)	(0.072)	(0.073)
Inflation (CPI)	-0.421**	-0.408**	-0.383*	-0.455**	-0.455**	-0.476**	-0.289**	-0.371*
	(0.188)	(0.201)	(0.197)	(0.198)	(0.198)	(0.193)	(0.143)	(0.194)
Real interest rate (short)	-0.059	-0.056	-0.038	-0.059	-0.059	-0.059	-0.077	-0.044
	(0.050)	(0.053)	(0.048)	(0.053)	(0.053)	(0.053)	(0.050)	(0.051)
SHORT RUN								
Error correction term	-0.444***	-0.450***	-0.444***	-0.446***	-0.450***	-0.444***	-0.465***	-0.459***
	(0.064)	(0.068)	(0.069)	(0.069)	(0.068)	(0.069)	(0.065)	(0.067)
Priv. saving (lagged)	-0.028	-0.020	-0.067	-0.020	-0.005	-0.008	-0.023	-0.030
	(0.060)	(0.064)	(0.049)	(0.064)	(0.060)	(0.061)	(0.064)	(0.064)
Gov. net lending (cycl. adj)	-0.377***	-0.369***	-0.390***	-0.409***	-0.400***	-0.358***	-0.339***	-0.341***
	(0.099)	(0.106)	(0.105)	(0.101)	(0.103)	(0.104)	(0.098)	(0.099)
House prices	-0.268	-0.190	-0.474	-0.799	1.327	0.229	-0.742	-0.221
	(3.118)	(3.332)	(3.326)	(3.284)	(2.864)	(3.290)	(3.294)	(3.333)
Terms of trade (growth)	0.020	0.023	0.007	0.031*	0.023	0.018	0.021	0.018
	(0.019)	(0.020)	(0.015)	(0.017)	(0.020)	(0.020)	(0.021)	(0.020)
GDP p.c. growth	0.100**	0.111**	0.116**	0.102*	0.101*	0.110**	0.089*	0.111**
	(0.050)	(0.052)	(0.050)	(0.053)	(0.053)	(0.052)	(0.051)	(0.052)
Observations	1 348	1 198	1 301	1 298	1 198	1 276	1 275	1 227
Countries	16.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000

Panel A. OECD-16 sample (continued)

Dependent variable: Private saving (per cent of GDP)									
	Country excluded from regression								
	GBR	**GCR**	**IRL**	**ITA**	**JPN**	**KOR**	**NLD**	**PRT**	**US**
LONG RUN									
Gov. net lending (cycl. adj)	-0.389***	-0.343***	-0.420***	-0.406***	-0.434***	-0.372***	-0.427***	-0.454***	-0.421***
	(0.119)	(0.097)	(0.122)	(0.122)	(0.120)	(0.114)	(0.121)	(0.114)	(0.122)
Old age ratio	-0.066	-0.048	0.166	0.246	0.209	0.355	0.153	0.230	0.275
	(0.423)	(0.435)	(0.504)	(0.502)	(0.505)	(0.474)	(0.503)	(0.503)	(0.497)
House prices	3.961*	3.102	2.949	3.940*	4.073*	2.180	3.840	2.836	3.776
	(2.381)	(2.355)	(2.312)	(2.384)	(2.358)	(1.880)	(2.399)	(2.273)	(2.405)
Stock prices	-0.534	-0.738	-0.276	-0.400	-0.596	-1.158	-0.401	-0.343	-0.264
	(1.159)	(1.141)	(1.122)	(1.148)	(1.158)	(0.959)	(1.148)	(1.138)	(1.118)
Money supply	0.022	-0.031	0.014	0.033	0.025	0.048	0.026	0.018	0.041
	(0.073)	(0.041)	(0.072)	(0.072)	(0.073)	(0.068)	(0.073)	(0.072)	(0.071)
Inflation (CPI)	-0.437**	-0.448**	-0.445**	-0.441**	-0.467**	-0.383*	-0.370*	-0.464**	-0.452**
	(0.201)	(0.199)	(0.200)	(0.200)	(0.196)	(0.197)	(0.194)	(0.196)	(0.199)
Real interest rate (short)	-0.070	-0.046	-0.078	-0.060	-0.073	-0.033	-0.062	-0.064	-0.068
	(0.052)	(0.051)	(0.049)	(0.053)	(0.051)	(0.045)	(0.053)	(0.053)	(0.052)
SHORT RUN									
Error correction term	-0.445***	-0.442***	-0.390***	-0.427***	-0.444***	-0.456***	-0.436***	-0.454***	-0.458***
	(0.069)	(0.069)	(0.037)	(0.066)	(0.069)	(0.068)	(0.068)	(0.068)	(0.067)
Priv. saving (lagged)	-0.024	-0.061	-0.034	-0.016	-0.025	-0.032	-0.026	-0.028	-0.026
	(0.064)	(0.054)	(0.064)	(0.063)	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)
Gov. net lending (cycl. adj)	-0.365***	-0.350***	-0.436***	-0.384***	-0.389***	-0.401***	-0.359***	-0.380***	-0.366***
	(0.106)	(0.102)	(0.085)	(0.106)	(0.106)	(0.103)	(0.105)	(0.106)	(0.106)
House prices	-0.856	-0.528	-0.926	0.280	0.259	0.363	-2.348	0.664	-0.319
	(3.273)	(3.321)	(3.258)	(3.281)	(3.285)	(3.264)	(2.483)	(3.181)	(3.333)
Terms of trade (growth)	0.018	0.021	0.020	0.021	0.021	0.021	0.028	0.017	0.019
	(0.020)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.019)	(0.020)	(0.020)
GDP p.c. growth	0.095*	0.071*	0.095*	0.100*	0.102*	0.076	0.119**	0.095*	0.107**
	(0.053)	(0.043)	(0.053)	(0.053)	(0.053)	(0.047)	(0.049)	(0.053)	(0.052)
Observations	1 267	1 320	1 316	1 235	1 238	1 318	1 262	1 296	1 195
Countries	15.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000

Note: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. Standard errors in parenthesis.

Panel B. G6 sample

Dependent variable: Private saving (per cent of GDP)							
		Country excluded from regression					
	G6	DEU	FRA	GBR	ITA	JPN	US
LONG RUN							
Gov. net lending (cycl. adj)	-0.386***	-0.388***	-0.405***	-0.311***	-0.362***	-0.446***	-0.407***
	(0.094)	(0.116)	(0.113)	(0.069)	(0.112)	(0.090)	(0.113)
Old age ratio	0.503	0.559	0.513	-0.209	0.728	0.616	0.812
	(0.747)	(0.912)	(0.915)	(0.275)	(0.872)	(0.904)	(0.832)
House prices	-2.420**	-1.412*	-2.731**	-2.523*	-2.587*	-2.188	-3.080***
	(1.169)	(0.726)	(1.380)	(1.426)	(1.417)	(1.403)	(1.182)
Stock prices	-1.763**	-1.842**	-1.920**	-1.960**	-1.559*	-2.146***	-1.151**
	(0.726)	(0.884)	(0.869)	(0.856)	(0.854)	(0.756)	(0.479)
Money supply	-0.067	-0.032	-0.097	-0.094	-0.059	-0.083	-0.037
	(0.059)	(0.058)	(0.062)	(0.064)	(0.071)	(0.069)	(0.061)
Inflation (CPI)	-0.187	-0.240	0.012	-0.186	-0.198	-0.276	-0.230
	(0.209)	(0.247)	(0.080)	(0.255)	(0.255)	(0.231)	(0.250)
Real interest rate (short)	-0.011	-0.001	0.044	-0.034	-0.005	-0.042	-0.029
	(0.064)	(0.078)	(0.041)	(0.074)	(0.078)	(0.069)	(0.076)
SHORT RUN							
Error correction term	-0.400***	-0.409***	-0.436***	-0.394***	-0.339***	-0.391***	-0.432***
	(0.072)	(0.088)	(0.076)	(0.088)	(0.047)	(0.088)	(0.079)
Priv. saving (lagged)	-0.129**	-0.083**	-0.157***	-0.137**	-0.113*	-0.142**	-0.145**
	(0.055)	(0.036)	(0.059)	(0.067)	(0.065)	(0.066)	(0.065)
Gov. net lending (cycl. adj)	-0.421***	-0.499***	-0.323***	-0.395**	-0.450***	-0.466***	-0.395**
	(0.129)	(0.126)	(0.102)	(0.155)	(0.154)	(0.148)	(0.155)
House prices	-5.455	-1.708	-6.354	-8.259*	-4.851	-4.912	-6.647
	(4.545)	(3.150)	(5.457)	(4.382)	(5.518)	(5.527)	(5.372)
Terms of trade (growth)	0.026**	0.036***	0.020	0.020	0.027*	0.029**	0.023
	(0.013)	(0.009)	(0.014)	(0.013)	(0.015)	(0.015)	(0.015)
GDP p.c. growth	0.060*	0.055	0.086***	0.038	0.051	0.059	0.073*
	(0.034)	(0.042)	(0.028)	(0.032)	(0.040)	(0.042)	(0.039)
Observations	728	578	607	647	615	618	575
Countries	6.000	5.000	5.000	5.000	5.000	5.000	5.000

Note: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. Standard errors in parenthesis.

Table 5. **Saving offset: disaggregate results**
Average and country specific results

Dependent variable: Private saving (per cent of GDP)									
	ALL	**G6**	**AUS**	**AUT**	**BEL**	**DEU**	**FIN**	**FIN**	**FRA**
LONG RUN									
Gov. spending (cycl. adj)	0.473**	0.373*	0.904***	0.387**	2.033	-0.160	-0.132	0.716	0.254*
	(0.216)	(0.209)	(0.294)	(0.172)	(1.520)	(0.504)	(0.340)	(1.574)	(0.132)
Gov. revenues (cycl. adj)	-1.195***	-0.861***	-1.119***	-0.992***	0.392	-0.589	-0.492	-3.480	-0.519***
	(0.259)	(0.181)	(0.378)	(0.279)	(1.868)	(0.573)	(0.301)	(2.537)	(0.180)
Gov. investment	-0.157	-0.484	-0.732	0.213*	-0.438	-0.948	2.778	-0.404	-0.061
	(0.242)	(0.320)	(0.606)	(0.114)	(0.448)	(0.604)	(2.246)	(1.783)	(0.465)
Old age ratio	-0.083	-0.267	-2.187**	-0.539	-1.754	0.077	0.054	2.617	0.762***
	(0.311)	(0.318)	(0.898)	(0.529)	(1.412)	(0.374)	(1.111)	(5.332)	(0.140)
House prices	1.959	-1.510	5.147	4.812*	-2.483	-4.800	2.836	-5.338	-0.843
	(1.523)	(0.966)	(3.498)	(2.657)	(7.083)	(13.017)	(4.161)	(10.589)	(0.804)
Stock prices	0.442	-0.102	7.205**	-1.423	5.225	-0.808	-6.252**	6.666	-0.571
	(0.917)	(0.879)	(2.857)	(1.204)	(5.769)	(1.166)	(3.057)	(5.430)	(0.711)
Money supply	0.048	-0.076	-0.009	-0.156**	-0.071	-0.168	-0.054	0.860	0.103***
	(0.091)	(0.053)	(0.144)	(0.075)	(0.287)	(0.162)	(0.108)	(1.556)	(0.039)
Inflation (CPI)	-0.252	0.090	-0.663	-0.451*	0.201	-0.051	0.056	-2.156	-0.450**
	(0.164)	(0.140)	(0.458)	(0.271)	(0.722)	(0.571)	(0.669)	(1.829)	(0.215)
Real interest rate (short)	0.010	0.089	-0.165	-0.077	-0.137	-0.005	-0.109	0.202	-0.058
	(0.042)	(0.056)	(0.109)	(0.098)	(0.156)	(0.199)	(0.113)	(0.313)	(0.072)
SHORT RUN									
Error correction term	-0.469***	-0.400***	-0.243***	-0.571***	-0.431	-0.528***	-0.548***	-0.166	-0.303***
	(0.069)	(0.051)	(0.070)	(0.125)	(0.341)	(0.173)	(0.167)	(0.104)	(0.083)
Priv. saving (lagged)	-0.073*	-0.144***	-0.159**	0.085	-0.064	-0.297**	-0.251*	-0.158	0.015
	(0.037)	(0.052)	(0.066)	(0.150)	(0.245)	(0.146)	(0.145)	(0.135)	(0.052)
Gov. spending (cycl. adj)	0.333*	0.237*	0.275**	1.068***	0.334	-0.262	0.474	0.442	0.021
	(0.185)	(0.131)	(0.132)	(0.253)	(0.399)	(0.412)	(0.431)	(0.417)	(0.170)
Gov. revenues (cycl. adj)	-1.091***	-0.910***	-0.836***	-1.641***	-0.623	-0.307	-0.816**	-1.384***	-0.956***
	(0.191)	(0.142)	(0.086)	(0.377)	(0.536)	(0.545)	(0.356)	(0.343)	(0.056)
Gov. investment	0.165	0.030	-0.034	0.063	-0.076	-0.420	-0.026	-0.277	0.880***
	(0.155)	(0.215)	(0.112)	(0.109)	(0.202)	(0.364)	(3.117)	(0.805)	(0.291)
Terms of trade (growth)	0.006	0.020**	-0.005	0.120	-0.166***	-0.009	0.068	0.022	0.022
	(0.016)	(0.009)	(0.020)	(0.151)	(0.061)	(0.150)	(0.083)	(0.042)	(0.021)
GDP p.c. growth	0.052	0.061	0.012	-0.208	-0.050	0.107	-0.041	0.275*	-0.033
	(0.039)	(0.048)	(0.053)	(0.284)	(0.153)	(0.200)	(0.099)	(0.157)	(0.051)
Observations	1 371	734	151	50	50	150	74	74	122

Table 5. (continued)

Dependent variable: Private saving (per cent of GDP)	GBR	GCR	IRL	ITA	JPN	KOR	NLD	PRT	US
LONG RUN									
Gov. spending (cycl. adj)	1.271***	2.077	0.302	0.546***	-0.049	0.567	-0.025	-1.502*	0.377
	(0.367)	(1.991)	(0.760)	(0.103)	(0.196)	(1.925)	(0.394)	(0.879)	(0.366)
Gov. revenues (cycl. adj)	-1.717**	-2.749*	-0.869	-0.678***	-0.727***	-2.786	-0.245	-1.609***	-0.933**
	(0.757)	(1.461)	(0.598)	(0.116)	(0.178)	(1.721)	(0.369)	(0.607)	(0.382)
Gov. investment	-0.070	0.022	-1.097	0.151	-0.095	-0.156	0.003	0.202	-1.881**
	(0.374)	(0.906)	(0.858)	(0.169)	(0.075)	(0.968)	(0.228)	(0.627)	(0.869)
Old age ratio	-1.294	1.726	-0.209	-1.080***	0.102	0.229	1.079	-0.747**	-0.171
	(5.367)	(2.729)	(2.120)	(0.297)	(0.101)	(2.333)	(0.843)	(0.357)	(0.823)
House prices	0.343	5.994	7.498	-0.653	-4.062**	15.992	-4.730	10.670	0.953
	(2.174)	(25.864)	(6.779)	(1.441)	(1.783)	(15.040)	(5.410)	(11.093)	(2.922)
Stock prices	3.517	1.555	-1.866	-2.116***	1.302***	1.035	-2.076*	-2.381*	-1.934
	(3.416)	(1.609)	(1.878)	(0.632)	(0.474)	(6.301)	(1.107)	(1.444)	(2.188)
Money supply	-0.021	0.753	0.047	-0.270***	-0.033	0.458	-0.018	-0.587*	-0.065
	(0.080)	(1.097)	(0.223)	(0.081)	(0.030)	(0.920)	(0.095)	(0.304)	(0.117)
Inflation (CPI)	0.237	-0.134	-0.007	-0.018	0.278	0.277	-0.911	-0.776	0.543
	(0.439)	(0.207)	(0.297)	(0.282)	(0.229)	(1.384)	(0.646)	(0.554)	(0.434)
Real interest rate (short)	0.246	-0.119	0.174*	-0.037	0.181**	0.167	0.019	-0.328*	0.209**
	(0.174)	(0.221)	(0.102)	(0.058)	(0.083)	(0.266)	(0.147)	(0.180)	(0.094)
SHORT RUN									
Error correction term	-0.351***	-0.560	-1.342***	-0.552***	-0.429***	-0.209**	-0.633***	-0.399***	-0.237***
	(0.115)	(0.446)	(0.269)	(0.096)	(0.102)	(0.100)	(0.140)	(0.154)	(0.055)
Priv. saving (lagged)	-0.068	0.056	0.187	-0.289***	-0.164*	0.173	-0.022	-0.142	-0.065
	(0.098)	(0.359)	(0.176)	(0.078)	(0.087)	(0.170)	(0.124)	(0.156)	(0.065)
Gov. spending (cycl. adj)	0.666***	1.308***	-1.730*	0.286	0.307	1.318	0.854*	-0.442	0.405**
	(0.230)	(0.490)	(1.042)	(0.199)	(0.219)	(1.088)	(0.448)	(0.505)	(0.158)
Gov. revenues (cycl. adj)	-1.130***	-2.752**	0.603	-1.014***	-1.305***	-2.334***	-0.957**	-1.253**	-0.750***
	(0.175)	(1.134)	(0.826)	(0.160)	(0.188)	(0.544)	(0.392)	(0.499)	(0.084)
Gov. investment	-0.104	-0.057	2.067	0.369**	-0.001	-0.083	0.324	0.558	-0.546***
	(0.110)	(0.524)	(1.790)	(0.181)	(0.060)	(0.212)	(0.256)	(0.451)	(0.176)
Terms of trade (growth)	0.056	-0.006	0.038	0.017	0.005	0.012	-0.073	-0.039	0.032
	(0.048)	(0.021)	(0.194)	(0.027)	(0.015)	(0.023)	(0.100)	(0.066)	(0.023)
GDP p.c. growth	0.260	0.160	0.380**	0.096	-0.039	0.046	-0.158	0.055	-0.025
	(0.214)	(0.346)	(0.171)	(0.097)	(0.040)	(0.130)	(0.231)	(0.152)	(0.039)
Observations	82	34	34	114	110	30	86	54	156

Notes: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. Standard errors are in parenthesis.

Table 6. **Jackknifing results: disaggregate results**
Panel A. OECD-16 sample

Dependent variable: Private saving (per cent of GDP)								
		Country excluded from regression						
	ALL	**AUS**	**AUT**	**BEL**	**DEU**	**DNK**	**FIN**	**FRA**
LONG RUN								
Gov. spending (cycl. adj)	0.473**	0.444*	0.479**	0.369*	0.515**	0.513**	0.457**	0.487**
	(0.216)	(0.229)	(0.231)	(0.202)	(0.226)	(0.227)	(0.230)	(0.230)
Gov. revenues (cycl. adj)	-1.195***	-1.200***	-1.208***	-1.300***	-1.235***	-1.241***	-1.042***	-1.240***
	(0.259)	(0.276)	(0.276)	(0.252)	(0.273)	(0.272)	(0.223)	(0.272)
Gov. investment	-0.157	-0.119	-0.182	-0.138	-0.104	-0.353**	-0.141	-0.163
	(0.242)	(0.255)	(0.257)	(0.257)	(0.252)	(0.151)	(0.258)	(0.258)
Old age ratio	-0.083	0.057	-0.053	0.028	-0.094	-0.093	-0.264	-0.140
	(0.311)	(0.296)	(0.330)	(0.310)	(0.332)	(0.332)	(0.271)	(0.327)
House prices	1.959	1.746	1.768	2.255	2.409	1.900	2.445	2.145
	(1.523)	(1.612)	(1.616)	(1.597)	(1.555)	(1.627)	(1.543)	(1.616)
Stock prices	0.442	-0.008	0.567	0.124	0.526	0.889	0.028	0.510
	(0.917)	(0.854)	(0.971)	(0.919)	(0.976)	(0.856)	(0.874)	(0.978)
Money supply	0.048	0.052	0.062	0.056	0.062	0.055	-0.006	0.044
	(0.091)	(0.097)	(0.096)	(0.097)	(0.096)	(0.097)	(0.078)	(0.097)
Inflation (CPI)	-0.252	-0.224	-0.238	-0.282	-0.265	-0.272	-0.125	-0.238
	(0.164)	(0.173)	(0.175)	(0.173)	(0.175)	(0.174)	(0.112)	(0.175)
Real interest rate (short)	0.010	0.022	0.016	0.020	0.011	0.018	-0.003	0.015
	(0.042)	(0.043)	(0.045)	(0.044)	(0.045)	(0.044)	(0.043)	(0.045)
SHORT RUN								
Error correction term	-0.469***	-0.484***	-0.462***	-0.471***	-0.465***	-0.464***	-0.489***	-0.480***
	(0.069)	(0.072)	(0.073)	(0.074)	(0.073)	(0.073)	(0.070)	(0.073)
Priv. saving (lagged)	-0.073*	-0.067*	-0.083**	-0.073*	-0.058	-0.061	-0.067*	-0.079**
	(0.037)	(0.040)	(0.038)	(0.040)	(0.037)	(0.038)	(0.040)	(0.040)
Gov. spending (cycl. adj)	0.333*	0.337*	0.284	0.333*	0.372*	0.323	0.325*	0.353*
	(0.185)	(0.198)	(0.190)	(0.198)	(0.193)	(0.197)	(0.197)	(0.196)
Gov. revenues (cycl. adj)	-1.091***	-1.108***	-1.054***	-1.122***	-1.143***	-1.109***	-1.071***	-1.100***
	(0.191)	(0.204)	(0.201)	(0.202)	(0.197)	(0.203)	(0.203)	(0.204)
Gov. investment	0.165	0.178	0.172	0.181	0.204	0.178	0.194	0.117
	(0.155)	(0.165)	(0.165)	(0.165)	(0.160)	(0.165)	(0.162)	(0.157)
Terms of trade (growth)	0.006	0.007	-0.002	0.017	0.007	0.002	0.005	0.005
	(0.016)	(0.017)	(0.015)	(0.012)	(0.017)	(0.016)	(0.017)	(0.017)
GDP p.c. growth	0.052	0.055	0.070*	0.059	0.049	0.058	0.037	0.058
	(0.039)	(0.042)	(0.038)	(0.041)	(0.042)	(0.041)	(0.039)	(0.042)
Observations	1 371	1 220	1 321	1 321	1 221	1 297	1 297	1 249
Countries	16.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000

Panel A. OECD-16 sample (continued)

Dependent variable: Private saving (per cent of GDP)									
	Country excluded from regression								
	GBR	**GCR**	**IRL**	**ITA**	**JPN**	**KOR**	**NLD**	**PRT**	**US**
LONG RUN									
Gov. spending (cycl. adj)	0.420*	0.366*	0.484**	0.468**	0.508**	0.467**	0.506**	0.605***	0.479**
	(0.224)	(0.200)	(0.230)	(0.231)	(0.228)	(0.231)	(0.228)	(0.183)	(0.231)
Gov. revenues (cycl. adj)	-1.160***	-1.091***	-1.216***	-1.229***	-1.226***	-1.088***	-1.258***	-1.167***	-1.212***
	(0.274)	(0.253)	(0.276)	(0.274)	(0.275)	(0.252)	(0.268)	(0.275)	(0.276)
Gov. investment	-0.163	-0.169	-0.094	-0.178	-0.161	-0.157	-0.168	-0.181	-0.042
	(0.258)	(0.258)	(0.249)	(0.257)	(0.258)	(0.258)	(0.258)	(0.257)	(0.227)
Old age ratio	-0.003	-0.204	-0.075	-0.017	-0.096	-0.104	-0.161	-0.039	-0.078
	(0.321)	(0.306)	(0.332)	(0.324)	(0.332)	(0.331)	(0.322)	(0.329)	(0.332)
House prices	2.066	1.690	1.589	2.133	2.360	1.023	2.405	1.378	2.026
	(1.624)	(1.603)	(1.580)	(1.618)	(1.571)	(1.285)	(1.557)	(1.505)	(1.627)
Stock prices	0.237	0.368	0.596	0.613	0.385	0.403	0.610	0.631	0.601
	(0.956)	(0.977)	(0.966)	(0.963)	(0.978)	(0.979)	(0.964)	(0.960)	(0.966)
Money supply	0.053	0.001	0.048	0.069	0.053	0.021	0.052	0.090	0.056
	(0.097)	(0.083)	(0.097)	(0.094)	(0.097)	(0.093)	(0.097)	(0.086)	(0.097)
Inflation (CPI)	-0.284*	-0.259	-0.268	-0.267	-0.287*	-0.287*	-0.208	-0.217	-0.305*
	(0.172)	(0.176)	(0.175)	(0.175)	(0.172)	(0.172)	(0.169)	(0.172)	(0.166)
Real interest rate (short)	-0.005	0.019	-0.001	0.013	-0.001	-0.000	0.010	0.033	-0.003
	(0.042)	(0.044)	(0.043)	(0.045)	(0.043)	(0.044)	(0.045)	(0.038)	(0.043)
SHORT RUN									
Error correction term	-0.477***	-0.463***	-0.411***	-0.463***	-0.472***	-0.486***	-0.458***	-0.474***	-0.484***
	(0.073)	(0.073)	(0.039)	(0.073)	(0.074)	(0.071)	(0.073)	(0.073)	(0.072)
Priv. saving (lagged)	-0.073*	-0.081**	-0.090**	-0.058	-0.067*	-0.089**	-0.076*	-0.068*	-0.073*
	(0.040)	(0.039)	(0.035)	(0.037)	(0.039)	(0.036)	(0.040)	(0.040)	(0.040)
Gov. spending (cycl. adj)	0.310	0.268	0.470***	0.336*	0.334*	0.267	0.298	0.384**	0.328*
	(0.196)	(0.185)	(0.132)	(0.198)	(0.198)	(0.185)	(0.194)	(0.190)	(0.198)
Gov. revenues (cycl. adj)	-1.088***	-0.980***	-1.204***	-1.096***	-1.077***	-1.008***	-1.100***	-1.080***	-1.114***
	(0.204)	(0.167)	(0.165)	(0.204)	(0.204)	(0.184)	(0.204)	(0.204)	(0.203)
Gov. investment	0.183	0.180	0.038	0.151	0.176	0.181	0.154	0.139	0.212
	(0.164)	(0.165)	(0.095)	(0.165)	(0.165)	(0.165)	(0.165)	(0.163)	(0.158)
Terms of trade (growth)	0.003	0.007	0.004	0.005	0.006	0.005	0.011	0.009	0.004
	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.016)	(0.017)	(0.017)
GDP p.c. growth	0.038	0.045	0.030	0.049	0.058	0.053	0.066*	0.052	0.057
	(0.039)	(0.041)	(0.035)	(0.042)	(0.042)	(0.042)	(0.039)	(0.042)	(0.042)
Observations	1 289	1 337	1 337	1 257	1 261	1 341	1 285	1 317	1 215
Countries	15.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000

Note: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. Standard errors are in parenthesis.

Panel B. G6 sample

Dependent variable: Private saving (per cent of GDP)							
		Country excluded from regression					
	G6	DEU	FRA	GBR	ITA	JPN	US
LONG RUN							
Gov. spending (cycl. adj)	0.373*	0.480**	0.397	0.193	0.338	0.457*	0.372
	(0.209)	(0.220)	(0.254)	(0.131)	(0.253)	(0.234)	(0.256)
Gov. revenues (cycl. adj)	-0.861***	-0.915***	-0.929***	-0.689***	-0.897***	-0.887***	-0.846***
	(0.181)	(0.211)	(0.205)	(0.071)	(0.217)	(0.219)	(0.221)
Gov. investment	-0.484	-0.391	-0.569	-0.567	-0.611*	-0.562	-0.205
	(0.320)	(0.375)	(0.378)	(0.379)	(0.360)	(0.380)	(0.191)
Old age ratio	-0.267	-0.336	-0.473	-0.062	-0.105	-0.341	-0.286
	(0.318)	(0.380)	(0.297)	(0.298)	(0.335)	(0.379)	(0.389)
House prices	-1.510	-0.852	-1.644	-1.881*	-1.682	-1.000	-2.003**
	(0.966)	(0.867)	(1.172)	(1.093)	(1.165)	(1.005)	(1.018)
Stock prices	-0.102	0.040	-0.008	-0.825	0.301	-0.382	0.265
	(0.879)	(1.063)	(1.071)	(0.612)	(0.957)	(1.021)	(0.979)
Money supply	-0.076	-0.057	-0.111**	-0.087	-0.037	-0.084	-0.078
	(0.053)	(0.060)	(0.047)	(0.063)	(0.043)	(0.064)	(0.064)
Inflation (CPI)	0.090	0.118	0.198*	0.061	0.112	0.052	-0.000
	(0.140)	(0.168)	(0.109)	(0.167)	(0.169)	(0.165)	(0.130)
Real interest rate (short)	0.089	0.108*	0.119**	0.058	0.115*	0.071	0.065
	(0.056)	(0.065)	(0.058)	(0.057)	(0.061)	(0.065)	(0.062)
SHORT RUN							
Error correction term	-0.400***	-0.374***	-0.419***	-0.410***	-0.370***	-0.394***	-0.433***
	(0.051)	(0.054)	(0.058)	(0.062)	(0.051)	(0.062)	(0.048)
Priv. saving (lagged)	-0.144***	-0.114**	-0.176***	-0.160***	-0.116**	-0.141**	-0.160***
	(0.052)	(0.052)	(0.051)	(0.061)	(0.053)	(0.064)	(0.061)
Gov. spending (cycl. adj)	0.237*	0.337***	0.280*	0.151	0.227	0.223	0.204
	(0.131)	(0.104)	(0.152)	(0.121)	(0.160)	(0.160)	(0.155)
Gov. revenues (cycl. adj)	-0.910***	-1.031***	-0.901***	-0.866***	-0.890***	-0.831***	-0.942***
	(0.142)	(0.092)	(0.174)	(0.166)	(0.172)	(0.145)	(0.170)
Gov. investment	0.030	0.119	-0.140	0.056	-0.038	0.036	0.145
	(0.215)	(0.240)	(0.162)	(0.262)	(0.250)	(0.264)	(0.223)
Terms of trade (growth)	0.020**	0.026***	0.020*	0.013*	0.021*	0.024**	0.018*
	(0.009)	(0.009)	(0.011)	(0.007)	(0.011)	(0.011)	(0.011)
GDP p.c. growth	0.061	0.051	0.079	0.021	0.054	0.081	0.078
	(0.048)	(0.058)	(0.054)	(0.033)	(0.058)	(0.053)	(0.055)
Observations	734	584	612	652	620	624	578
Countries	6.000	5.000	5.000	5.000	5.000	5.000	5.000

Note: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. Standard errors are in parenthesis.

Table 7. **Detailed rolling window regression results**

Panel A. Budget balances

Dependent variable: Private saving (per cent of GDP)							
	1980-1994	1981-1995	1982-1996	1983-1997	1984-1998	1985-1999	1986-2000
Long run							
Gov. net lending (cycl. adj)	-0.209	-0.245	-0.245	-0.260	-0.234	-0.204	-0.121
	(0.218)	(0.204)	(0.198)	(0.175)	(0.223)	(0.238)	(0.259)
Old age ratio	-0.257	0.125	-0.167	0.387	0.168	0.012	0.048
	(0.226)	(0.422)	(0.230)	(0.653)	(0.412)	(0.251)	(0.348)
House prices	-8.902	-9.070*	-7.383**	-4.848*	-6.064	-6.709	-10.181*
	(10.070)	(5.100)	(2.899)	(2.724)	(3.734)	(4.550)	(6.169)
Stock prices	2.010	1.321	0.668	0.159	-0.102	-0.605	-0.689
	(2.145)	(1.202)	(1.044)	(1.072)	(1.251)	(1.711)	(1.660)
Money supply	0.149	0.023	-0.043	-0.062	-0.063	-0.078	-0.015
	(0.166)	(0.050)	(0.043)	(0.039)	(0.054)	(0.073)	(0.082)
Inflation (CPI)	-0.448**	-0.251*	-0.199	-0.102	-0.234	-0.316	-0.083
	(0.223)	(0.135)	(0.158)	(0.171)	(0.214)	(0.268)	(0.217)
Real interest rate (short)	-0.085	-0.032	-0.026	-0.026	-0.053	-0.053	-0.023
	(0.065)	(0.052)	(0.061)	(0.063)	(0.053)	(0.061)	(0.049)
Short run							
Error correction term	-1.028*	-0.831**	-0.904***	-0.847***	-0.773***	-0.609***	-0.640***
	(0.565)	(0.323)	(0.291)	(0.262)	(0.225)	(0.117)	(0.123)
Priv. saving (lagged)	0.308	0.130	0.156	0.142	0.080	0.005	0.041
	(0.283)	(0.162)	(0.135)	(0.092)	(0.087)	(0.046)	(0.032)
Gov. net lending (cycl. adj)	-0.694***	-0.626***	-0.684***	-0.584***	-0.558***	-0.554***	-0.385***
	(0.086)	(0.108)	(0.117)	(0.129)	(0.155)	(0.149)	(0.143)
Terms of trade (growth)	-0.034	0.057***	0.024	-0.026	-0.017	0.041***	0.030***
	(0.071)	(0.021)	(0.017)	(0.061)	(0.057)	(0.013)	(0.011)
GDP p.c. growth	-0.150	-0.091*	-0.097*	-0.056	-0.058	-0.043	-0.038
	(0.119)	(0.056)	(0.056)	(0.084)	(0.071)	(0.057)	(0.063)
House prices	3.910	-1.571	-1.028	3.203	-0.341	-3.896	-4.132
	(10.366)	(7.608)	(3.510)	(3.999)	(4.366)	(4.923)	(4.336)
Observations	322	330	334	338	342	346	350
Countries	6.000	6.000	6.000	6.000	6.000	6.000	6.000

Panel A. Budget balances (continued)

Dependent variable: Private saving (per cent of GDP)								
	1987-2001	1988-2002	1989-2003	1990-2004	1991-2005	1992-2006	1993-2007	1994-2008
Long run								
Gov. net lending (cycl. adj)	-0.241*	-0.283**	-0.339**	-0.376***	-0.360***	-0.344***	-0.318***	-0.280**
	(0.129)	(0.144)	(0.132)	(0.099)	(0.073)	(0.080)	(0.119)	(0.123)
Old age ratio	-0.602*	0.171	1.300	2.499	2.304	1.909	1.688	1.169
	(0.326)	(0.608)	(0.920)	(1.726)	(2.214)	(1.902)	(2.391)	(1.562)
House prices	-8.493	-5.104***	-2.387	-1.600	-3.065	-6.054	-7.337*	-8.723
	(5.260)	(1.442)	(2.311)	(4.043)	(3.195)	(4.339)	(4.294)	(5.670)
Stock prices	-0.702	-1.930*	-1.533**	-1.531***	-1.844***	-1.665***	-1.683***	-1.654***
	(1.112)	(1.082)	(0.686)	(0.427)	(0.299)	(0.383)	(0.415)	(0.321)
Money supply	0.016	0.003	0.007	-0.012	-0.069***	-0.123**	-0.220*	-0.226**
	(0.043)	(0.035)	(0.022)	(0.022)	(0.023)	(0.048)	(0.113)	(0.096)
Inflation (CPI)	-0.334	-0.407	-0.256	-0.018	0.047	-0.070	-0.167	-0.124
	(0.238)	(0.360)	(0.290)	(0.275)	(0.211)	(0.202)	(0.149)	(0.239)
Real interest rate (short)	-0.057*	-0.010	0.062	0.103	0.090	-0.001	0.028	0.061
	(0.034)	(0.036)	(0.057)	(0.077)	(0.068)	(0.051)	(0.083)	(0.132)
Short run								
Error correction term	-0.565***	-0.558***	-0.546***	-0.463***	-0.497***	-0.517***	-0.531***	-0.509***
	(0.089)	(0.090)	(0.100)	(0.095)	(0.110)	(0.102)	(0.097)	(0.085)
Priv. saving (lagged)	0.005	-0.044	-0.031	-0.108**	-0.100	-0.071	-0.077	-0.098
	(0.022)	(0.029)	(0.031)	(0.051)	(0.068)	(0.063)	(0.082)	(0.072)
Gov. net lending (cycl. adj)	-0.436***	-0.435***	-0.434***	-0.448***	-0.386***	-0.397***	-0.381***	-0.371***
	(0.145)	(0.144)	(0.140)	(0.149)	(0.129)	(0.122)	(0.118)	(0.111)
Terms of trade (growth)	0.064***	0.086***	0.066***	0.077***	0.060***	0.043***	0.016	0.022
	(0.007)	(0.023)	(0.009)	(0.012)	(0.006)	(0.015)	(0.013)	(0.014)
GDP p.c. growth	-0.030	-0.021	0.012	0.041	0.118	0.097	0.154	0.184
	(0.057)	(0.052)	(0.056)	(0.062)	(0.112)	(0.079)	(0.109)	(0.135)
House prices	-4.785	-1.087	-3.558	-6.275	-11.138*	-12.734	-9.695	-7.770
	(5.164)	(5.048)	(5.532)	(5.586)	(6.335)	(8.694)	(7.906)	(9.877)
Observations	354	358	360	360	360	360	360	348
Countries	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000

Note: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. Standard errors are in parenthesis.

Panel B. Current spending and revenues

Dependent variable: Private saving (% of GDP)							
	1980-1994	1981-1995	1982-1996	1983-1997	1984-1998	1985-1999	1986-2000
LONG RUN							
Gov. spending (cycl. adj)	0.287	0.379	0.275	0.329	0.539**	0.472***	0.390***
	(0.431)	(0.398)	(0.380)	(0.324)	(0.233)	(0.101)	(0.088)
Gov. revenues (cycl. adj)	-0.309	-0.410	-0.460**	-0.585***	-0.424	-0.293	-0.219
	(0.328)	(0.265)	(0.188)	(0.130)	(0.274)	(0.415)	(0.414)
Gov. investment	-0.272	-0.194	0.067	-0.083	-0.655	-0.553	-0.722
	(0.252)	(0.143)	(0.150)	(0.079)	(0.605)	(0.501)	(0.701)
Old age ratio	-3.582	-2.764	-1.052	-0.973	-0.733	0.116	0.292
	(3.152)	(2.639)	(1.011)	(0.700)	(0.604)	(0.307)	(0.333)
House prices	-5.813*	-9.887**	-9.482***	-4.451***	-8.211**	-9.619**	-11.881*
	(3.347)	(3.908)	(3.611)	(1.012)	(4.057)	(4.675)	(6.965)
Stock prices	3.484	3.020	1.445	0.930	0.904	0.004	-0.393
	(2.862)	(2.465)	(1.342)	(1.379)	(1.413)	(1.045)	(0.955)
Money supply	0.126	0.067	-0.004	-0.062	0.003	-0.022	0.067
	(0.108)	(0.100)	(0.046)	(0.061)	(0.105)	(0.114)	(0.145)
Inflation (CPI)	-0.302**	-0.213	-0.204	-0.099	0.001	-0.044	0.089
	(0.137)	(0.151)	(0.154)	(0.133)	(0.199)	(0.202)	(0.249)
Real interest rate (short)	-0.078	-0.041	-0.035	-0.035	0.018	0.056*	0.095***
	(0.049)	(0.048)	(0.037)	(0.056)	(0.030)	(0.029)	(0.036)
SHORT RUN							
Error correction term	-1.224*	-0.957**	-1.017***	-0.912***	-0.874***	-0.770***	-0.710***
	(0.660)	(0.383)	(0.345)	(0.288)	(0.256)	(0.182)	(0.153)
Priv. saving (lagged)	0.521	0.086	0.129	0.129	0.080	0.065	0.070
	(0.587)	(0.188)	(0.140)	(0.104)	(0.106)	(0.054)	(0.046)
Gov. spending (cycl. adj)	0.057	0.236	0.321	0.448***	0.509***	0.395***	0.401***
	(0.318)	(0.201)	(0.204)	(0.135)	(0.112)	(0.126)	(0.098)
Gov. revenues (cycl. adj)	-0.049	-0.882***	-1.023***	-0.957***	-1.020***	-0.990***	-0.878***
	(0.886)	(0.087)	(0.150)	(0.168)	(0.194)	(0.220)	(0.274)
Gov. investment	0.120	0.154	0.295**	0.026	-0.028	0.014	0.049
	(0.232)	(0.190)	(0.149)	(0.062)	(0.173)	(0.154)	(0.184)
Terms of trade (growth)	0.293	0.068	0.062	0.012	0.008	0.060**	0.059*
	(0.272)	(0.049)	(0.039)	(0.014)	(0.014)	(0.028)	(0.033)
GDP p.c. growth	-0.091	-0.080	-0.098	-0.050	-0.073	-0.025	-0.044
	(0.075)	(0.058)	(0.062)	(0.089)	(0.071)	(0.072)	(0.069)
Observations	322	330	334	338	342	346	350
Countries	6.000	6.000	6.000	6.000	6.000	6.000	6.000

Panel B. Current spending and revenues (continued)

Dependent variable: Private saving (per cent of GDP)								
	1987-2001	1988-2002	1989-2003	1990-2004	1991-2005	1992-2006	1993-2007	1994-2008
LONG RUN								
Gov. spending (cycl. adj)	0.551***	0.575	0.573**	0.385**	0.279	0.169	0.230	0.292
	(0.195)	(0.379)	(0.264)	(0.194)	(0.191)	(0.234)	(0.195)	(0.284)
Gov. revenues (cycl. adj)	-0.484***	-0.660***	-0.710***	-0.872***	-0.834***	-0.862***	-0.857***	-0.970***
	(0.178)	(0.164)	(0.156)	(0.145)	(0.127)	(0.134)	(0.189)	(0.300)
Gov. investment	-0.221	0.127	0.152	0.064	0.034	0.150	-0.227	0.056
	(0.292)	(0.191)	(0.224)	(0.217)	(0.218)	(0.363)	(0.194)	(0.114)
Old age ratio	-0.736*	-1.067	0.697	2.425	2.796	2.448	1.770	-0.046
	(0.397)	(0.711)	(0.787)	(1.561)	(1.758)	(1.679)	(1.840)	(0.768)
House prices	-7.314	-4.462**	-0.494	3.900	3.204*	0.231	-3.460	-4.308
	(5.449)	(1.778)	(2.153)	(2.731)	(1.801)	(2.623)	(3.375)	(4.511)
Stock prices	-0.102	-0.935	-0.620	-0.738	-0.826***	-0.891**	-0.724	-0.177
	(1.110)	(1.800)	(1.102)	(0.486)	(0.292)	(0.419)	(0.694)	(0.854)
Money supply	0.029	-0.030	-0.043	-0.058	-0.110*	-0.126**	-0.197*	-0.255***
	(0.075)	(0.069)	(0.056)	(0.061)	(0.063)	(0.050)	(0.102)	(0.091)
Inflation (CPI)	-0.142	-0.309	-0.159	-0.034	-0.044	0.010	-0.180	-0.247
	(0.208)	(0.429)	(0.322)	(0.289)	(0.374)	(0.282)	(0.218)	(0.200)
Real interest rate (short)	0.046	0.043	0.109**	0.151**	0.160*	0.112	0.076	0.103
	(0.031)	(0.052)	(0.048)	(0.066)	(0.091)	(0.092)	(0.107)	(0.133)
SHORT RUN								
Error correction term	-0.642***	-0.593***	-0.580***	-0.454***	-0.443***	-0.463***	-0.510***	-0.534***
	(0.130)	(0.138)	(0.129)	(0.065)	(0.058)	(0.066)	(0.075)	(0.075)
Priv. saving (lagged)	0.032	-0.051	-0.046	-0.144***	-0.133**	-0.130**	-0.140**	-0.133**
	(0.044)	(0.049)	(0.035)	(0.050)	(0.058)	(0.058)	(0.064)	(0.064)
Gov. spending (cycl. adj)	0.476***	0.434***	0.475***	0.399**	0.433***	0.385***	0.319	0.194
	(0.125)	(0.088)	(0.128)	(0.176)	(0.167)	(0.145)	(0.219)	(0.283)
Gov. revenues (cycl. adj)	-0.950***	-0.860***	-0.884***	-0.997***	-0.921***	-0.993***	-1.091***	-1.042***
	(0.275)	(0.251)	(0.209)	(0.185)	(0.159)	(0.107)	(0.119)	(0.113)
Gov. investment	0.184	0.126	0.184	0.236	0.063	0.098	-0.024	0.039
	(0.168)	(0.101)	(0.179)	(0.191)	(0.195)	(0.237)	(0.243)	(0.278)
Terms of trade (growth)	0.070**	0.077*	0.061***	0.067***	0.065***	0.036**	0.007	0.009
	(0.031)	(0.040)	(0.019)	(0.016)	(0.012)	(0.017)	(0.025)	(0.030)
GDP p.c. growth	-0.045	-0.007	0.003	0.013	0.088	0.068	0.121	0.202
	(0.068)	(0.059)	(0.072)	(0.064)	(0.106)	(0.071)	(0.092)	(0.133)
Observations	354	358	360	360	360	360	360	352
Countries	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000

Notes: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. Standard errors are in parenthesis.

Table 8. **Non-linearities in saving offset: Public debt threshold**

Dependent variable: Private saving (per cent of GDP). Unbalanced panel of 18 EU OECD countries over the period 1970-2008.										
	(1)		**(2)**		**(3)**		**(4)**		**(5)**	
	Linear		**2-regime**		**3-regime**		**2-regime**		**3-regime**	
	coeff	**p-value**	**coeff**	**p-value**	**coeff**	**p-value**	**coeff**	**p-value**	**coeff**	**p-value**
Long term										
Old age ratio	-0.047	0.407	-0.028	0.626	-0.030	0.596	-0.022	0.699	-0.022	0.697
Money supply	0.007	0.304	0.006	0.363	0.006	0.386	0.006	0.394	0.005	0.457
Stock prices	**0.500**	**0.062**	**0.441**	**0.096**	**0.449**	**0.082**	0.428	0.106	**0.431**	**0.096**
House prices	-0.066	0.837	-0.112	0.726	-0.126	0.694	-0.100	0.755	-0.147	0.645
Inflation (CPI)	-0.003	0.928	-0.012	0.731	-0.014	0.678	-0.013	0.709	-0.015	0.652
Real short-term interest rate	**-0.098**	**0.002**	**-0.109**	**0.000**	**-0.116**	**0.000**	**-0.109**	**0.000**	**-0.118**	**0.000**
Short term										
Error correction	**-0.239**	**0.000**	**-0.268**	**0.000**	**-0.274**	**0.000**	**-0.274**	**0.000**	**-0.275**	**0.000**
Priv. saving (lagged)	0.046	0.298	0.061	0.158	0.064	0.135	0.063	0.144	0.066	0.123
House prices	**-2.185**	**0.003**	**-2.321**	**0.001**	**-2.273**	**0.002**	**-2.489**	**0.001**	**-2.354**	**0.001**
Terms of trade growth	0.011	0.592	0.010	0.587	0.010	0.588	0.009	0.651	0.008	0.658
GDP growth	**0.161**	**0.000**	**0.159**	**0.000**	**0.158**	**0.000**	**0.158**	**0.000**	**0.155**	**0.000**
Fiscal variable										
Gov. net lending (lagged level)	**-0.201**	**0.000**								
Low			**-0.154**	**0.000**	**-0.195**	**0.000**	**-0.144**	**0.001**	**-0.197**	**0.000**
Med(3-regime)/high(2-regime)			**-0.281**	**0.000**	**-0.132**	**0.004**	**-0.299**	**0.000**	**-0.115**	**0.015**
High(3-regime)					**-0.286**	**0.000**			**-0.300**	**0.000**
Short term										
Gov. net lending (difference)	**-0.452**	**0.000**	**-0.439**	**0.000**	**-0.440**	**0.000**				
Low							**-0.401**	**0.000**	**-0.500**	**0.000**
Med(3-regime)/high(2-regime)							**-0.513**	**0.000**	**-0.353**	**0.000**
High(3-regime)									**-0.512**	**0.000**
Implied long term	**-0.841**									
Low			**-0.575**		**-0.712**		**-0.526**		**-0.716**	
Med(3-regime)/high(2-regime)			**-1.049**		**-0.482**		**-1.091**		**-0.418**	
High(3-regime)					**-1.044**				**-1.091**	
Threshold value			75.795		52.117		75.795		52.117	
(Public debt)					75.795				75.795	
Threshold p-value			**0.016**		0.239		**0.023**		0.165	

Note: Low and med/high are the lower and upper regime in the 2-regime model. Low, med/high and high are the low, middle and upper regimes in the 3-regime model, respectively. Threshold P-values lower than 0.1, 0.05, 0.01 indicate that the null hypothesis of the linear (2-regime) model can be rejected against the alternative hypothesis of the 2-regime (3-regime) model. The implied long-term offset is calculated by dividing the coefficient of the lagged level of the fiscal variable by the coefficient of the error correction term. Statistically significant coefficients at the 10% level or below are in boldface.

Table 9. **Non-linearities in saving offset: Credit threshold**

Dependent variable: Private saving (per cent of GDP). Unbalanced panel of 18 EU OECD countries over the period 1970-2008.										
	(1)		**(2)**		**(3)**		**(4)**		**(5)**	
	Linear		**2-regime**		**3-regime**		**2-regime**		**3-regime**	
	coeff	**p-value**	**coeff**	**p-value**	**coeff**	**p-value**	**coeff**	**p-value**	**coeff**	**p-value**
Long term										
Old age ratio	-0.047	0.407	-0.065	0.246	-0.053	0.340	-0.065	0.251	-0.052	0.361
Money supply	0.007	0.304	0.003	0.635	0.005	0.492	0.003	0.633	0.005	0.487
Stock prices	**0.500**	**0.062**	**0.578**	**0.027**	**0.586**	**0.025**	**0.578**	**0.026**	**0.593**	**0.021**
House prices	-0.066	0.837	-0.022	0.946	0.084	0.798	-0.018	0.956	0.110	0.738
Inflation (CPI)	-0.003	0.928	0.003	0.926	0.006	0.879	0.003	0.935	0.006	0.879
Real short-term interest rate	**-0.098**	**0.002**	**-0.096**	**0.001**	**-0.097**	**0.001**	**-0.095**	**0.001**	**-0.095**	**0.002**
Short term										
Error correction	**-0.239**	**0.000**	**-0.230**	**0.000**	**-0.234**	**0.000**	**-0.231**	**0.000**	**-0.235**	**0.000**
Priv. saving(lagged)	0.046	0.298	0.024	0.596	0.023	0.601	0.024	0.589	0.024	0.586
House prices	**-2.185**	**0.003**	**-2.152**	**0.002**	**-2.175**	**0.002**	**-2.157**	**0.002**	**-2.190**	**0.002**
Terms of trade growth	0.011	0.592	0.009	0.628	0.009	0.643	0.010	0.621	0.009	0.633
GDP growth	**0.161**	**0.000**	**0.164**	**0.000**	**0.164**	**0.000**	**0.163**	**0.000**	**0.165**	**0.000**
Fiscal variable										
Gov. net lending (lagged level)	**-0.201**	**0.000**								
Low			**-0.176**	**0.000**	**-0.184**	**0.000**	**-0.178**	**0.000**	**-0.188**	**0.000**
Med(3-regime)/high(2-regime)			**-0.275**	**0.000**	**-0.309**	**0.000**	**-0.272**	**0.000**	**-0.310**	**0.000**
High(3-regime)					**-0.221**	**0.000**			**-0.211**	**0.000**
Short term										
Gov. net lending (difference)	**-0.452**	**0.000**	**-0.460**	**0.000**	**-0.455**	**0.000**				
Low							**-0.474**	**0.000**	**-0.477**	**0.000**
Med(3-regime)/high(2-regime)							**-0.443**	**0.000**	**-0.459**	**0.000**
High(3-regime)									**-0.413**	**0.000**
Implied long term	**-0.841**									
Low			**-0.765**		**-0.786**		**-0.771**		**-0.800**	
Med(3-regime)/high(2-regime)			**-1.196**		**-1.321**		**-1.177**		**-1.319**	
High(3-regime)					**-0.944**				**-0.898**	
Threshold value (Credit/GDP)			62.076		62.076 86.509		62.076		62.076 86.509	
Threshold p-value			**0.011**		0.100		**0.045**		0.266	

Note: low and med/high are the lower and upper regime in the 2-regime model. Low, med/high and high are the low, middle and upper regimes in the 3-regime model, respectively. Threshold P-values lower than 0.1, 0.05, 0.01 indicate that the null hypothesis of the linear (2-regime) model can be rejected against the alternative hypothesis of the 2-regime (3-regime) model. The implied long-term offset is calculated by dividing the coefficient of the lagged level of the fiscal variable by the coefficient of the error correction term. Statistically significant coefficients at the 10% level or below are in boldface.

Table 10. **Non-linearities in saving offset: Distortionary taxes threshold**

Dependent variable: Private saving (per cent of GDP). Unbalanced panel of 18 EU OECD countries over the period1970-2008.										
	(1)		**(2)**		**(3)**		**(4)**		**(5)**	
	Linear		**2-regime**		**3-regime**		**2-regime**		**3-regime**	
	coeff	**p-value**	**coeff**	**p-value**	**coeff**	**p-value**	**coeff**	**p-value**	**coeff**	**p-value**
Long term										
Old age ratio	-0.047	0.407	-0.057	0.325	-0.058	0.320	-0.035	0.522	-0.045	0.423
Money supply	0.007	0.304	0.005	0.446	0.006	0.422	0.009	0.188	0.008	0.275
Stock prices	**0.500**	**0.062**	**0.529**	**0.046**	**0.509**	**0.061**	**0.478**	**0.071**	**0.504**	**0.051**
House prices	-0.066	0.837	-0.070	0.829	-0.046	0.887	-0.102	0.746	-0.109	0.730
Inflation (CPI)	-0.003	0.928	-0.001	0.974	-0.003	0.930	-0.009	0.801	-0.008	0.830
Real short-term interest rate	**-0.098**	**0.002**	**-0.094**	**0.002**	**-0.096**	**0.002**	**-0.111**	**0.000**	**-0.109**	**0.001**
Short term										
Error correction	**-0.239**	**0.000**	**-0.238**	**0.000**	**-0.239**	**0.000**	**-0.237**	**0.000**	**-0.238**	**0.000**
Priv. saving (lagged)	0.046	0.298	0.041	0.357	0.041	0.351	0.048	0.268	0.042	0.965
House prices	**-2.185**	**0.003**	**-2.164**	**0.003**	**-2.132**	**0.003**	**-2.497**	**0.001**	**-2.461**	**0.001**
Terms of trade growth	0.011	0.592	0.012	0.538	0.012	0.559	0.014	0.486	0.015	0.440
GDP growth	**0.161**	**0.000**	**0.166**	**0.000**	**0.164**	**0.000**	**0.163**	**0.000**	**0.169**	**0.000**
Fiscal variable										
Gov. net lending (lagged level)	**-0.201**	**0.000**								
Low			**-0.221**	**0.000**	**-0.170**	**0.021**	**-0.137**	**0.065**	**-0.148**	**0.047**
Med(3-regime)/high(2-regime)			**-0.181**	**0.000**	**-0.231**	**0.000**	**-0.211**	**0.000**	**-0.235**	**0.000**
High(3-regime)					**-0.186**	**0.000**			**-0.194**	**0.000**
Short term										
Gov. net lending (difference)	**-0.452**	**0.000**	**-0.458**	**0.000**	**-0.456**	**0.000**				
Low							**-0.275**	**0.002**	**-0.279**	**0.002**
Med(3-regime)/high(2-regime)							**-0.553**	**0.000**	**-0.538**	**0.000**
High(3-regime)									**-0.608**	**0.000**
Implied long term	**-0.841**									
Low			**-0.929**		**-0.711**		**-0.578**		**-0.622**	
Med(3-regime)/high(2-regime)			**-0.761**		**-0.967**		**-0.890**		**-0.987**	
High(3-regime)					**-0.778**				**-0.815**	
Threshold value			130.394		87.690		104.208		104.208	
(Direct/indirect tax revenue)					130.394				143.821	
Threshold p-value			0.231		0.348		**0.005**		0.294	

Note: Low and med/high are the lower and upper regime in the 2-regime model. Low, med/high and high are the low, middle and upper regimes in the 3-regime model, respectively. Threshold P-values lower than 0.1, 0.05, 0.01 indicate that the null hypothesis of the linear (2-regime) model can be rejected against the alternative hypothesis of the 2-regime (3-regime) model. The implied long-term offset is calculated by dividing the coefficient of the lagged level of the fiscal variable by the coefficient of the error correction term. Statistically significant coefficients at the 10% level or below are in boldface.

References

Barro, R.J. (1974), "Are Government Bonds Net Wealth?", *Journal of Political Economy*, Vol. 82.

Berben, R.-P. and T. Brosens (2007), "The Impact of Government Debt on Private Consumption in OECD Countries", *Economics Letters*, Vol. 94.

Blanchard, O.J. (1990), "Comment on Francesco Giavazzi and Marco Pagani, Can Severe Fiscal Contractions Be Expansionary?", in O. Blanchard and S. Fischer (eds.): *NBER Macroeconomics Annual*, MIT Press, Cambridge, Massachusetts.

Brittle, S. (2010), "Ricardian Equivalence and the Efficacy of Fiscal Policy in Australia", *Australian Economic Review*, forthcoming.

Castro, F. de, and J.L. Fernandez (2009), "The Relationship between Public and Private Saving in Spain: Does Ricardian Equivalence Hold?", *Bank of Spain Working Paper*, No. 0923.

Egert, B., T. Kozluk and D. Sutherland (2009), "Infrastructure and Growth: Empirical Evidence," *OECD Economics Department Working Papers*, No. 685, OECD, Paris.

Elmendorf, D.W. and G. Mankiw (1999), "Government Debt", in J.B. Taylor and M. Woodford (eds.) *Handbook of Macroeconomics*, North Holland, Amsterdam.

Ferrucci, G. and C. Miralles (2007), "Saving Behaviour and Global Imbalances: The Role of Emerging Market Economies", *ECB Working Paper*, No. 842.

Feyrer, J. and J.C. Shambaugh (2009), "Global Savings and Global Investment: The Transmission of Identified Fiscal Shocks", *NBER Working Papers*, No. 15113.

Hansen, B. (1999), "Threshold Effects in Non-Dynamic Panels: Estimation, Testing, Interference", *Journal of Econometrics*, Vol. 93.

Haque, N.U., M.H. Pesaran and S. Sharma (1999), "Neglected Heterogeneity and Dynamics in Cross-Country Savings Regressions", *IMF Working Paper*, No. 99/128.

Hüfner, F. and I. Koske (2010), "Explaining Household Saving Rates in G7 Countries: Implications for Germany", *OECD Economics Department Working Papers*, No. 754, OECD, Paris.

Loayza, N., K. Schmidt-Hebbel and L. Serven (2000), "What Drives Private Saving across the World?", *Review of Economics and Statistics*, Vol. 82.

Mello, L. de, M. Kongsgrud and R. Price (2004), "Saving Behaviour and the Effectiveness of Fiscal Policy", *OECD Economics Department Working Papers*, No. 397, OECD, Paris.

Nickel, C. and I. Vansteenkiste (2008), "Fiscal Policies, the Current Account and Ricardian Equivalence", *ECB Working Paper*, No. 935.

Nicoletti, G. (1988), "A Cross-Country Analysis of Private Consumption, Inflation and the "Debt Neutrality Hypothesis"", *OECD Economic Studies*, No. 11, OECD, Paris.

Nicoletti, G. (1992), "Is Tax-Discounting Stable over Time?", *Oxford Bulletin of Economics and Statistics*, Vol. 54, No. 2.

Pedroni, P. (1999), "Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors", *Oxford Bulletin of Economics and Statistics*, Vol. 61, No. 4.

Perotti, R. (1999), "Fiscal Policy in Good Times and Bad", *Quarterly Journal of Economics*, Vol. 114, No. 4.

Pesaran, M.H and Y. Shin (1999), "An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis", in S. Strom, A. Holly, and P. Diamond (eds.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, Cambridge University Press, Cambridge.

Pesaran, M.H and R.P. Smith (1995), "Estimating Long-Run Relationships from Dynamic Heterogeneous Panels", *Journal of Econometrics*, Vol. 68.

Pesaran, M.H., Y. Shin and R. J. Smith (2001), "Bounds Testing Approaches to the Analysis of Level Relationships", *Journal of Applied Econometrics*, Vol. 16.

Ricciuti, R. (2003), "Assessing Ricardian Equivalence", *Journal of Economic Surveys*, Vol.17.

Sarantis, N. and C. Stewart (2001), "Saving Behaviour in OECD Countries: Evidence from Panel Cointegration Tests", *The Manchester School*, Vol. 69.

Seater, J.T. (1993), "Ricardian Equivalence", *Journal of Econometric Literature*, Vol. 26.

Serres, A. de and F. Pelgrin (2003), "The Decline in Private Saving Rates in the 1990s in OECD Countries: How Much Can be Explained by Non-Wealth Determinants?", *OECD Economics Studies*, No. 36, OECD, Paris.

Stanley, T.D. (1998), "New Wine in Old Bottles: A Meta-Analysis of Ricardian Equivalence", *Southern Economic Journal*, Vol. 64.

Sutherland, A. (1997), "Fiscal Crises and Aggregate Demand: Can High Public Debt Recers the Effect of Fiscal Policy?", *Journal of Public Economics*, Vol. 65.

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