Government response to increased demand for public services: the cyclicality of government health expenditures in the OECD

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ABSTRACT

The more that health care expenditures are financed by general taxation, the greater the discretion governments are likely to exercise when timing increases in health care expenditures. Vote-maximising governments time increases in health care expenditures to occur in economic upturns, when voters are not as aware of the required increase in taxation. In recessions, they have an incentive to sustain expenditures on health care by diverting expenditures from other public expenditure programmes that voters perceive as low priority. In this way, government pursuit of a political agenda is likely to exert a systematic influence on the cyclicality of government expenditure. Predictions are tested with reference to the cyclicality of government health expenditures, for a sample of OECD countries from 2000 to 2012.

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1. Introduction.

Buchanan (1965) explored the inconsistency in citizens' choices created when health care is financed by taxation. If public sector services are provided 'free' (or heavily subsidized) at the point of delivery, citizens (as 'consumers') have an incentive to increase demand for health care. The inconsistency occurs when citizens (as *'taxpaying voters'*) are reticent to approve collectively the taxation required to finance the increase in demand. Buchanan argued that 'tax-paying voters' would not have the same incentive to increase general taxation.[1]

In the market an increase in demand is *automatically* accompanied by an increase in the availability of finance (Buchanan, 1965). The price mechanism ensures that increases (decreases) in demand are automatically linked to increases (decreases) in finance. But when services are financed by general taxation, individuals face the prospect of having to approve the required increases in taxation.

Buchanan (1965) concluded that, in the UK, the *"...observed failures of the NHS…"* (p. 4) arise because citizens demand services individually as 'consumers' but make decisions to provide finance collectively (in a political forum). He predicted excess demand and severe shortages. Critics of Buchanan argue that the crises that have occurred in the UK National Health Service have never been as severe as Buchanan predicted (Bosanquet, 1986). They argue that cost containment measures and growing affinity amongst voters for the NHS have averted the severity of NHS crises. But are other considerations also relevant?

In this paper, the objective is to explore the way that a vote-maximising government (as described by Downs (1957) might respond. The analysis focuses on the *discretion* created when finance does not automatically accompany an increase in the demand for a service. With a divorce between demand and payment for services, governments might exercise discretion when timing increases in taxation. With reliance on general taxation, governments are also able to exercise

[1] Buchanan (1965) noted that general taxation is likely to cover many services (e.g. health, education) and that taxpayers are likely to question the use that they will make of health care in the coming fiscal year. He also argued that taxpayers are unlikely to approve as much expenditure for others as for themselves.

discretion when allocating tax revenues across different public expenditure programmes (Buchanan, 1965; Wagner, 2007).

Vote-maximising governments have a strategic incentive to time tax increases when voters are *not aware* of the tax increases. They also have an incentive to minimise any loss of support by allocating tax revenues more closely to higher priority public expenditure programmes when voters are *aware* of deficiencies in expenditures on government services. Culyer (1989) commented that in the public sector: *"Financing is not as automatic, as it would be under a full market system in which price both brought supply and demand into equilibrium and provided the funding via the care supplied"* (p. 26). He refers to the absence of an automatic link between demand and finance as the *"…public element in the finance of health care…"* (p. 26).[2]

The proposition in this paper is that vote-maximising governments are able to act strategically (i) in economic upturns, to minimise voter awareness of tax increases and (ii) in recessions, to minimise the loss of support that would otherwise accompany severe shortages and excess demand. Vote-maximising governments respond to changes in voter awareness over the economic cycle:

(i) *In economic upturns,* voters are likely to underestimate taxation (Dell'Anno and Dollery, 2014; Dell'Anno and Mourao, 2011; Dollery and Worthington, 2006). In the first instance, there *is* automatic finance in economic upturns to the extent that government revenues increase *automatically* with income. In the same vein, voters are also not aware of the increase in taxation because there is no need to introduce new taxes, or to increase existing tax rates. There is an incentive to *time* increases in taxation to occur in economic upturns.

(ii) In *economic downturns* (as in any social crisis) voters are far more aware of the under provision of government services. Peacock and Wiseman (1961) refer to the *inspection effect* (p. xxiv). When there is a social crisis (e.g. a recession) voters question whether the government spends enough on domestic government programmes (e.g. health care, education). In economic downturns, governments are under pressure to sustain expenditure across domestic programmes and, with falling

[2] The element of prepayment for services is not the important consideration. As Culyer (1989) notes, when focusing on prepayment, *"…the same may be argued of health care financed by private insurance"* (p. 26). The important consideration is the *"…splitting of the … decision…"* to demand and to finance health care (Buchanan, 1965: 12).

tax revenues and more difficulties to borrow, the incentive is to be far more sensitive to voters' priorities across the portfolio of public expenditure programmes. Governments now have an incentive to rely on an 'implicit tax' (Prest, 1985). The incentive is to *divert* spending from lower priority programmes to mitigate the excess demand for health care.

The predictions formed in section two of the paper are premised on the way in which these interventions (in economic upturns and in recessions) will impact on the cyclicality of government health expenditures. Economists usually anticipate countercyclical government expenditure (Alesina et al., 2008) but there is growing evidence that government expenditure is procyclical (Gavin et al., 1996; Kaminsky et al., 2005; Talvi and Végh, 2005; Woo, 2009). Public expenditure is procyclical if it increases as national income increases and decreases as national income decreases.[3] There is a growing consensus that systematic changes in political pressures over the economic cycle are determinants of procyclical public expenditure (e.g. Lane and Tornell, 1996; Tornell and Lane, 1999). In this paper, the proposition is that political pressures increase the procyclicality of government health expenditure in economic upturns and reduce the procyclicality of government health expenditure in recessions.

Section three of the paper presents the model and the data that have been employed to test the predictions formed in section two of the paper. The results are presented in section four. The final section of the paper considers the policy implications and concludes.

[3] While there are circumstances in which procyclical expenditure can maximise a community's welfare (Lane, 2003), these circumstances are very specific and extremely unlikely (Halland and Bleaney, 2011). When markets are working perfectly and when public-sector goods and private-sector goods are complements, there are circumstances in which beneficent politicians might spend procyclically to maximise welfare e.g. Lane (2003).

2. The impact of vote-maximising government responses on the cyclicality of government expenditure on health care.

In this section, the objective is to consider the way that vote-maximising governments influence the cyclicality of government health care expenditures in economic upturns and in economic downturns.

2.1. Economic Upturns.

Downs (1957) argued that vote-maximising politicians have incentives to increase government spending and reduce taxation. For governments, the 'holy grail' is the opportunity to increase health care expenditure without alerting taxpayers to an increase in taxation. In questionnaire studies, voters call for increases in expenditure but not for increases in taxation (e.g. Appleby and Roberts, 2013).[4] It follows that vote-maximising governments have an incentive to minimise voter awareness of the *costs* of measures taken to manage excess demand.

This paper explores governments' incentive to time increases in taxes to occur in economic upturns. If voters are reticent to approve tax increases, governments have an incentive to rely on 'fiscal illusion' (to avoid drawing voters' attention to an increase in taxation). An established literature describes the circumstances in which voters systematically underestimate taxation. In the literature on 'fiscal illusion' (see Dell'Anno and Mourao, 2011; Dollery and Worthington, 2006; Oates, 1988), voters are not as aware of taxation when national income is increasing. In economic upturns, tax revenues increase automatically. There is no need to announce new taxes, or to announce new tax rates (e.g. Abbott and Jones, 2013; Oates, 1988). With progressive taxation, voters underestimate taxation when national income is increasing (Craig and Heins, 1980).[5] In economic upturns, voters are more likely to underestimate taxation the higher the income elasticity of tax revenue (Abbott and Jones, 2016).

[4] Questionnaire studies have shown that, if voters *appear* willing to increase taxation, closer analysis indicates that they are willing to increase *other citizens' taxes* (Brook et al., 1998).

[5] We are grateful for the suggestion of an anonymous reviewer, that governments have an incentive to institute progressive taxation (to experience the advantage of this form of 'fiscal illusion' in economic upturns).

Downs (1957) also argued that vote-maximising governments are myopic. Incumbents are inclined to make decisions with reference to a four- to five-year electoral horizon. With a motivation to retain office, *"...governing parties are never interested per se in future return from actions; they are always concerned only about the next election and the vote they receive therein"* (Downs, 1957: 174). If governments have an incentive to increase taxation in economic upturns (when voters are less aware of any increase in taxation), there is every likelihood that, in a recession, they will be unable to sustain the commitments that they made in the upturn. With political myopia, the likelihood is that health care expenditures will be procyclical.[6]

The more that governments rely on 'fiscal illusion' in economic upturns, the greater the likelihood that:

(i) Government current health care expenditures are likely to be procyclical.

With a growing consensus that mental and physical health deteriorate in recessions (see Ariizumi and Schirle (2012) and Modrek et al. (2013) for literature reviews) the implication is that demand is higher in economic downturns. However, Ruhm (2003) argues that health deteriorates more in upturns than in downturns. If this is the case, governments might spend more in upturns just to finance the increases in demand. On the other hand, if governments *also* rely on timing increases in expenditure in upturns (to take advantage of fiscal illusion) then:

(ii) Government current health care expenditures are likely to be more procyclical than changes in demand (as measured by consultations per capita).

The proposition is that governments have an incentive to time increases in health care expenditures to occur in economic upturns because voters are less aware of increases in taxation in

[6] If myopia is relevant when vote-maximising governments make decisions to change taxation (Buchanan and Lee, 1982a, b), it is also relevant when vote-maximising governments increase expenditure.

economic upturns. In this context, governments have a strong incentive to rely on sources of finance that increase *automatically* as national income increases and these sources of finance are likely to be a determinant of procyclical expenditure.[7] The UK National Health Service has been funded almost entirely from general taxation, with only a small supplementation from National Insurance contributions and user charges (e.g. for prescriptions and dental treatment). Other OECD countries also rely heavily on taxation, e.g. Australia, Canada, New Zealand and the Nordic countries (McKenna et al., 2017). However, many other OECD countries rely more heavily on a classic social insurance model to finance health care expenditure. In this case, citizens pay a compulsory social insurance contribution, e.g. in 2016 the basic flat rate insurance contribution for employees in Germany was 14.6 per cent of their gross income (with an annual upper limit of €52,200). The more that governments rely on compulsory social insurance, the more that *revenues* are likely to be procyclical. The second prediction is therefore that:

(iii) The more that governments finance health care with compulsory social insurance contributions, the more government current health expenditures are likely to be procyclical in economic upturns.

Focussing on *'the public element in financing'*, Culyer (1989) argued that *"…the finance of health care is special in that decisions about spending are quintessentially political…"* (p. 26). If governments strategically rely on fiscal illusion in economic upturns there will be evidence of this when focussing on governments' pursuit of their own political goals.

Government strategy is likely to reflect: (i) government responses to voters' preferences and (ii) government pursuit of their own political preferences (e.g. Cusack, 1997; Keech, 1995; Wittman,

[7] The emphasis is on 'fiscal illusion' in economic upturns. The more governments spend in upturns, the more difficult it is for them to sustain expenditure in downturns. Kau and Rubin (1981) consider the impact that technology exerts on the costs of revenue-raising and on the *growth* of government (see e.g. Henrekson and Lybeck, 1988). However, this paper focuses on the impact of fiscal illusion on the *cyclicality* of government expenditure.

1983). If governments have discretion to increase taxation to raise health care expenditures in economic upturns, they are also likely to rely on 'fiscal illusion' to increase expenditure on programmes that they might prioritise more than voters prioritise. Everything depends on the absence of voter awareness in economic upturns.

To test this, the next prediction focuses on the government response when voters become more fiscally aware. If governments have another agenda and do not increase expenditure on health care (in comparison with expenditure on other programmes) by as much as voters would want (if they were more fiscally aware), governments will respond by increasing the procyclicality of government expenditure when there is a forthcoming election in an economic upturn.[8] Voters are likely to become more fiscally aware when there is a forthcoming election, when governments are more likely to attach greater weight to voters' spending priorities. With evidence (to be discussed later in this section) that voters attach greater priority to government health expenditure than to expenditure on other government programmes, the fourth prediction is that:

(iv) Government current health care expenditures are likely to be more procyclical in economic upturns if there is an election in an economic upturn.

If governments exercise discretion to time increases in taxation (to finance health care) that occur when voters are least aware of the costs of taxation, they are more likely to rely on this discretion when they have a small electoral majority. A literature indicates that governments are more responsive to the preferences of the median voter, the smaller the size of their majority (Frey and Schneider, 1978, 1981). The greater the share of votes that a government feels that it is able to rely on, the greater the government's sense of electoral security and the less it is likely to rely on economic upturns to finance the provision of health care. The fifth prediction is therefore that:

[8] Empirical studies have reported evidence that governments increase expenditures in election years. Potrafke (2010) and Herwartz and Theilen (2014) have shown (for the OECD) that governments have increased health expenditure ahead of forthcoming elections. In this paper, the emphasis is on the likelihood that this increase in expenditure will take place in an economic upturn. The emphasis is on the impact that this creates for the cyclicality of government health expenditures.

(v) Government current health care expenditures are more likely to be procyclical in economic upturns the smaller the government's vote share.

The more that political considerations are relevant when governments accommodate pressures to increase government expenditure, the more they are also likely to be relevant when assessing the *different* ways that politicians accommodate pressures from *producers* and pressures from *consumers*. Producer groups (as 'small' groups) are more effective lobbyists than consumers (Becker, 1983, 1985; Olson, 1971). When Becker (1983) analysed political competition for government subsidies, he argued that "*...politically successful groups tend to be small relative to the size of the groups taxed to pay their subsidies*" (p. 385). Peltzman (1976) argued that politicians act as brokers when accommodating different pressures from producer lobby groups and from consumer-voters. They maximise votes by choosing to accommodate rent-seeking pressures from producers when the costs to consumer-voters are not so apparent.

One implication is that governments are more likely to accommodate pressures to increase *capital* expenditures in economic upturns when consumers are not likely to be as aware of any diversion from current expenditure to capital expenditure. If both consumers and producers press for increases in *current* expenditures, producers are more likely (than consumers) to press for increases in *capital* expenditures.[9] As there is greater scope to satisfy producer pressures in economic upturns (when the loss of the full 'potential increase' in current expenditures is not obvious), capital expenditures are more likely to be procyclical than current expenditures. The sixth prediction is that:

(vi) Government capital health care expenditures are likely to be more procyclical than government current health care expenditure in an economic upturn.

[9] Producer groups are interested in increases in remuneration and increases in remuneration raise current expenditures. However, producers are relatively more likely to be interested in capital expenditures since "*....individual voters…care most about public consumption goods or transfers… (and) business interests… (care most about) …the infrastructure....*" (Lane, 2003: 2665).

2.2. Economic Downturns.

In recessions, voters are more likely to become concerned about the adequacy of government expenditure. As taxpayers struggle to pay taxation, the apathy (created by automatic increases in tax revenues in economic upturns) is replaced by a concern that governments will not be able to sustain *all* expenditure programmes. Governments have the *motivation* to be more sensitive to voters' spending priorities. With falling tax revenues and difficulties borrowing, governments find it difficult to accommodate pressure to increase aggregate government expenditure. In recessions, the opportunity exists to *divert* expenditure from some public-sector programmes to others.

An established empirical literature supports the proposition that voters attach far greater importance to *domestic* government expenditure (e.g. health, education) than to *overseas* government expenditure (e.g. defence, international aid). Downs (1960) argued that governments spend 'too little' on all international programmes because they prioritise domestic expenditures, which deliver *private benefits* that are more *tangible* and *immediate* in voters' day-to-day lives. He noted that complexity and remoteness of benefits from government expenditure is obvious "*... in international affairs where economic and technical progress have spread a web of interdependency over the whole world"* (p. 561). However, if there is generally a priority for domestic government expenditure programmes, this priority increases in recessions (Abbott and Jones, 2019a). Peacock and Wiseman (1961) report that, in a recession (as in any social crisis), the weight that voters attach to domestic programmes (e.g. health, education) is even greater.

When focusing on domestic government expenditure, it is also the case that voters attach greater priority to expenditures on health care than to expenditures on other domestic expenditures. By 2013 it was clear that in *"…every year since 1983 the public put health at the top of its priority list for extra government spending…"* in the UK, and *"…since 1985 at least 70 per cent of the public had prioritised the NHS (as either their first, or second, choice)…"* (Appleby and Roberts, 2013: 99). A similar pattern of priority for health care is evident in other member states of the OECD.[10]

[10] For example, in 2007, 90 percent of respondents in Australia expressed a preference for increased expenditure on health (Wilson et al., 2012). In the USA, between 1960 and 2001, *"...public support for*

One implication is that voters will insist that steps should be taken to sustain expenditure on health care in recessions. In 2015 and in 2017, UK voters revealed their preference that governments should protect expenditures on health care against cuts in recessions, more than they should protect other expenditures.[11]

With falling tax revenues, governments' ability to sustain health care expenditures will depend on the extent to which they are able to borrow. To test this proposition the prediction is that:

(vii) The more governments borrow, the lower the procyclicality of government health care expenditures in recessions.

However, vote-maximising governments are not likely to reduce the cyclicality of each expenditure on each programme *equally*. The electoral incentive is to attempt to sustain *domestic* expenditures (even if this means diverting expenditures from other programmes). The prediction is that, in recessions, the procyclicality of government health care expenditures will be lower than the procyclicality of government non-health care expenditures (because non-health care expenditures include expenditures on overseas programmes). To test the proposition that this diversion of expenditures is quite general, a second prediction is that the cyclicality of other domestic government redistributive expenditures will be lower than the cyclicality of government non-health care expenditures.[12] In this paper, the generality of the same rationale is illustrated by also considering government expenditure on social protection.[13] Taking these two tests together, the prediction is:

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increased health spending … met with increases in health expenditure" (Soroka and Lim, 2003: 576). Ramji and Quiñonez (2012) document the public's prioritization for government health services in Canada.

[11] See Health Foundation (2017) for an analysis of the Ipsos MORI surveys of 1,985 adults in May 2017 and 1,792 adults in March 2015, which indicate that voters' prefer that health expenditures should be protected more than other expenditures.

[12] We are grateful to an anonymous reviewer for this suggestion.

[13] *'Social protection is a measure of the extent to which countries assume responsibility for supporting the standard of living of disadvantaged or vulnerable groups'* (OECD, 2020), through the payment of direct or indirect welfare benefits.

(viii) *In recessions the procyclicality of government current health care expenditures and the procyclicality of government expenditure on social protection are lower than the procyclicality of government non-health care current expenditures.*

In this section, the argument is that pursuit of electoral ambition generates predictable nuances when describing *patterns* of cyclicality of government expenditures. If voters are relatively unaware of taxation in economic upturns, governments have an incentive to increase taxation in economic upturns. In recessions, voters are far more aware of taxation and public expenditure. One implication of this difference is that governments are more likely to increase expenditures on health care when there is an upcoming election because they anticipate that voters will become more aware and (as noted above) they know that voters' spending priority is with health care. In economic recessions, voters are already very aware, and the prediction is that the advent of an election will have no significant impact on the cyclicality of current health expenditures. By comparison with prediction *(iv)* for economic upturns, in recessions:

(ix) *The cyclicality of government current health care expenditures is unlikely to be affected by an election in an economic downturn.*

Finally, consider the relevance of vote share for the response of a government in a recession. If the government has a large share of the vote, then in a recession it is less motivated to sustain current health expenditure. If government current health care expenditures are more likely to be procyclical the smaller the government's vote share in economic upturns, it is now the case that:

(x) *Government current health care expenditures are more likely to be procyclical in recessions the larger the government's vote share.*

The implication of these final predictions is that vote-maximising governments manage excess demand for health care in recessions by changing their portfolio of government expenditures. They rely on voters being unaware of an 'implicit tax'. There is an implicit tax when voters experience a reduction in expenditure on low-priority spending programmes.

3. The Model and Data.

To test the hypotheses presented above we develop an econometric model that estimates the cyclicality of health expenditures, which is derived from the following long-run equation:

$$h_{it} = \alpha_1 y_{it} + \alpha_2 p65_{it} + \alpha_3 le_{it} + \alpha_4 mo_{it} + \alpha_5 tx_{it} + \alpha_6 sc_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Where h denotes the log of government health spending per capita in constant prices, y is the log of real GDP per capita, p65 is the percentage of the total population aged 65 and over, le refers to life expectancy at birth for the whole population, mo is the infant mortality rate, while tx and sc are the proportion of health financing that derives from domestic government transfers and social insurance contributions respectively. Unobservable heterogeneity is accounted for by including time effects λ_t and country-specific individual effects μ_i. The white noise error term is ε_{it}. This specification allows us to control for potential drivers of health care expenditure beyond economic output and is based on variables commonly used in the literature (see e.g. Xu et al., 2011). All series are formed as a panel for country i at time period t with data used from 2000 to 2014, the longest consistent available sample period. There is data on current health expenditures and capital formation for the General Government sector. The real GDP data for y_{it} is taken from the OECD's Economic Outlook database (OECD, 2018c), with all other series coming from the OECD's Health Statistics (OECD, 2018b).[14]

To estimate the cyclicality of health expenditure we can re-express our long-run equation as an error correction model:

[14] Current expenditure on health includes spending on: inpatient (outpatient) curative and rehabilitative care; long-term health care; ancillary services; medical goods; preventative care; governance & health system and financing administration; other health care services (OECD, 2018b).

$$\Delta h_{it} = \beta_1 \Delta h_{it-1} + \beta_2 \Delta y_{it} + \beta_3 \Delta p65_{it} + \beta_4 \Delta le_{it} + \beta_5 \Delta mo_{it} + \beta_6 \Delta tx_{it} + \beta_7 \Delta sc_{it}$$
$$+\beta_8 h_{it-1} + \beta_9 y_{it-1} + \beta_{10} p65_{it-1} + \beta_{11} le_{it-1} + \beta_{12} mo_{it-1} + \beta_{13} tx_{it-1}$$
$$+\beta_{14} sc_{it-1} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

A similar structure was proposed by Akitoby et al. (2006). We have also added a lagged dependent variable Δh_{it-1} to account for potential persistence in the growth of government health expenditures. The error correction model has the advantage of allowing the simultaneous estimation of the cyclicality of health spending, as well as the long-run relationship defined in (1). Equation (2) allows us to test prediction *(i)* with reference to the statistical significance of the Δy_{it} series and through the sign of the cyclicality coefficient. Therefore, β_2 estimates the cyclicality of current health expenditure, with $\beta_2<0$ indicating countercyclical health spending and $\beta_2>0$ suggesting procyclical current health expenditure. When Δy_{it} is not statistically significant government spending is acyclical. The first difference of real GDP provides a detrended measure of output, while not directly estimating the economy's potential GDP. However, we cannot be assured that the difference between actual output and its trend has been eliminated. Consequently, we replace the first difference of real GDP with estimates of the output gap, taken from the OECD's Economic Outlook database (OECD, 2018c).[15] The estimates of β_8 to β_{14} identify the long run relationship.

The recent literature has also discovered asymmetric responses of government spending over the business cycle. For example, Gavin and Perotti (1997) found that fiscal policy responds asymmetrically in industrial countries but not in developing countries. Arena and Revilla (2009) show that fiscal expenditures for the state governments of Brazil were more procyclical during economic downturns than upturns. To test the robustness of our conclusions regarding hypothesis *(i)* and to identify possible differences in the cyclical response of health spending between upturns and downturns, we replace the series for Δy_{it} with separate series for economic upturns and downturns. Upturns are defined as those periods when the actual level of output is above the trend level i.e. a

[15] For further information regarding the calculation of the OECD's output gap measure see e.g. Beffy et al. (2006).

positive output gap (Δy^{+}), whereas downturns are those periods when the actual output is below trend (Δy^{-}). So $\Delta y_{it}^{+} \neq 0$ and equals Δy_{it}, when Δy_{it} takes a positive value and zero otherwise, while $\Delta y_{it}^{-} \neq 0$ (and equals Δy_{it}) when Δy_{it} takes a negative value and zero otherwise. Replacing the series for Δy_{it}, with separate series for the economic upturns and downturns, we can derive:

$$\begin{aligned}\Delta h_{it} = {} & \delta_1 \Delta h_{it-1} + \delta_2 \Delta y_{it}^{+} + \delta_3 \Delta y_{it}^{-} + \delta_4 \Delta p65_{it} + \delta_5 \Delta le_{it} + \delta_6 \Delta mo_{it} + \delta_7 \Delta tx_{it} \\ & + \delta_8 \Delta sc_{it} + \delta_9 h_{it-1} + \delta_{10} y_{it-1} + \delta_{11} p65_{it-1} + \delta_{12} le_{it-1} + \delta_{13} mo_{it-1} \\ & + \delta_{14} tx_{it-1} + \delta_{15} sc_{it-1} + \mu_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (3)$$

Separate cyclicality coefficients are obtained through the estimates $\hat{\delta}_2$ and $\hat{\delta}_3$. We can in turn use (2) and (3) to test hypothesis *(vi)* by estimating these equations with data that measures government capital health expenditure (OECD, 2018b). To support this hypothesis the output gap should be statistically significant, and the cyclicality estimates larger in magnitude than those derived using government current health expenditures.

To test our second hypothesis that '*Government current health expenditures are likely to be more procyclical than changes in demand (as measured by consultations per capita)*', we need to compare the cyclicality estimate presented in (3) with that derived for the number of consultations per capita:

$$\begin{aligned}\Delta cn_{it} = {} & \phi_1 \Delta cn_{it-1} + \phi_2 \Delta y_{it}^{+} + \phi_3 \Delta y_{it}^{-} + \phi_4 \Delta p65_{it} + \phi_5 \Delta le_{it} + \phi_6 \Delta mo_{it} + \phi_7 \Delta tx_{it} \\ & + \phi_8 \Delta sc_{it} + \phi_9 cn_{it-1} + \phi_{10} y_{it-1} + \phi_{11} p65_{it-1} + \phi_{12} le_{it-1} + \phi_{13} mo_{it-1} \\ & + \phi_{14} tx_{it-1} + \phi_{15} sc_{it-1} + \mu_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (4)$$

where Δy_{it}^{+} and Δy_{it}^{-} are both anticipated to be statistically significant but the estimated cyclicality coefficients ($\hat{\phi}_2$ and $\hat{\phi}_3$) should be smaller in magnitude than those for government current health expenditure ($\hat{\delta}_2$ and $\hat{\delta}_3$ from (3)). We use data on doctor consultations (in all settings) per capita, which are taken from the OECD's Health Statistics (OECD, 2018b).

To test the relationship between the funding of health care through social insurance contributions and the cyclicality of health care, we extend (3) by adding the interaction terms $(\Delta y^{+} \times sc)_{it}$ and $(\Delta y^{-} \times sc)_{it}$ to give:

$$\begin{aligned}\Delta h_{it} = {} & \eta_1 \Delta h_{it-1} + \eta_2 \Delta y_{it}^{+} + \eta_3 \Delta y_{it}^{-} + \eta_4 (\Delta y^{+} \times sc)_{it} + \eta_5 (\Delta y^{-} \times sc)_{it} + \eta_6 \Delta p65_{it} \\ & + \eta_7 \Delta le_{it} + \eta_8 \Delta mo_{it} + \eta_9 \Delta tx_{it} + \eta_{10} \Delta sc_{it} + \eta_{11} h_{it-1} + \eta_{12} y_{it-1} + \eta_{13} p65_{it-1} \\ & + \eta_{14} le_{it-1} + \eta_{15} mo_{it-1} + \eta_{16} tx_{it-1} + \eta_{17} sc_{it-1} + \mu_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (5)$$

If hypothesis *(iii)* cannot be rejected, the expectation is that $(\Delta y^{+} \times sc)_{it}$ will be statistically significant and $\eta_4 > 0$.

The electoral impact on the cyclicality of health expenditure, suggested by hypotheses *(iv)* and *(ix)*, can be investigated by adding the interaction terms $(\Delta y^{+} \times elec)_{it}$ and $(\Delta y^{-} \times elec)_{it}$ to (3), where $elec_{it}$ denotes a dummy variable that equals one during election years (and zero otherwise) for country i at time period t:

$$\begin{aligned}\Delta h_{it} = {} & \vartheta_1 \Delta h_{it-1} + \vartheta_2 \Delta y_{it}^{+} + \vartheta_3 \Delta y_{it}^{-} + \vartheta_4 (\Delta y^{+} \times elec)_{it} + \vartheta_5 (\Delta y^{-} \times elec)_{it} + \vartheta_6 \Delta p65_{it} \\ & + \vartheta_7 \Delta le_{it} + \vartheta_8 \Delta mo_{it} + \vartheta_9 \Delta tx_{it} + \vartheta_{10} \Delta sc_{it} + \vartheta_{11} h_{it-1} + \vartheta_{12} y_{it-1} + \vartheta_{13} p65_{it-1} \\ & + \vartheta_{14} le_{it-1} + \vartheta_{15} mo_{it-1} + \vartheta_{16} tx_{it-1} + \vartheta_{17} sc_{it-1} + \mu_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (6)$$

Data on election years comes from Scartascini et al. (2018), using information on the years left in the current term for the executive. Election years are those periods with zero years left in the current term. If government current health expenditure is *'likely to be more procyclical in economic upturns if there is an election'*, then we would anticipate that $(\Delta y^{+} \times elec)_{it}$ and $\vartheta_4 > 0$. By contrast, hypothesis *(ix)* implies that $(\Delta y^{-} \times elec)_{it}$ should be statistically insignificant.

Similarly, we can determine the influence of the government's vote share on the cyclicality of government health expenditure, through:

$$\begin{aligned}\Delta h_{it} = {} & \varphi_1 \Delta h_{it-1} + \varphi_2 \Delta y_{it}^{+} + \varphi_3 \Delta y_{it}^{-} + \varphi_4 (\Delta y^{+} \times vote)_{it} + \varphi_5 (\Delta y^{-} \times vote)_{it} + \varphi_6 \Delta p65_{it} \\ & + \varphi_7 \Delta le_{it} + \varphi_8 \Delta mo_{it} + \varphi_9 \Delta tx_{it} + \varphi_{10} \Delta sc_{it} + \varphi_{11} h_{it-1} + \varphi_{12} y_{it-1} + \varphi_{13} p65_{it-1} \\ & + \varphi_{14} le_{it-1} + \varphi_{15} mo_{it-1} + \varphi_{16} tx_{it-1} + \varphi_{17} sc_{it-1} + \mu_i + \lambda_t + \varepsilon_{it_t} \end{aligned} \quad (7)$$

Where the variable 'vote' denotes the total vote share of all parties in the government. Support for hypothesis *(v)* arises when $(\Delta y^{+} \times vote)_{it}$ is statistically significant and $\varphi_4 < 0$, while hypothesis *(x)* can be supported when $(\Delta y^{-} \times vote)_{it}$ is also statistically significant but φ_5>0. Data on the government's total vote share was taken from Scartascini et al. (2018).

We expect that greater government indebtedness will lower the procyclicality of government healthcare expenditures during recessions. We therefore use:

$$\begin{aligned}\Delta h_{it} = {} & \xi_1 \Delta h_{it-1} + \xi_2 \Delta y_{it}^{+} + \xi_3 \Delta y_{it}^{-} + \xi_4 (\Delta y^{+} \times dbt)_{it} + \xi_5 (\Delta y^{-} \times dbt)_{it} + \xi_6 \Delta p65_{it} \\ & + \xi_7 \Delta le_{it} + \xi_8 \Delta mo_{it} + \xi_9 \Delta tx_{it} + \xi_{10} \Delta sc_{it} + \xi_{11} h_{it-1} + \xi_{12} y_{it-1} + \xi_{13} p65_{it-1} \\ & + \xi_{14} le_{it-1} + \xi_{15} mo_{it-1} + \xi_{16} tx_{it-1} + \xi_{17} sc_{it-1} + \mu_i + \lambda_t + \varepsilon_{it_t} \end{aligned} \quad (8)$$

Where dbt denotes the total central government debt as a percentage of GDP (OECD, 2010). Support for hypothesis *(vii)* arises when the interaction term is statistically significant and the estimate for ξ_5 is negatively signed.

Finally, to compare the cyclicality of health expenditure with the cyclicality of all other components of expenditure, as well as social protection expenditure, we estimate:

$$\begin{aligned}\Delta nh_{it} = {} & \theta_1 \Delta nh_{it-1} + \theta_2 \Delta y_{it}^{+} + \theta_3 \Delta y_{it}^{-} + \theta_4 \Delta p65_{it} + \theta_5 \Delta le_{it} + \theta_6 \Delta mo_{it} + \theta_7 \Delta tx_{it} \\ & + \theta_8 \Delta sc_{it} + \theta_9 nh_{it-1} + \theta_{10} y_{it-1} + \theta_{11} p65_{it-1} + \theta_{12} le_{it-1} + \theta_{13} mo_{it-1} \\ & + \theta_{14} tx_{it-1} + \theta_{15} sc_{it-1} + \mu_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (9)$$

$$\begin{aligned}\Delta sp_{it} = {} & \omega_1 \Delta sp_{it-1} + \omega_2 \Delta y_{it}^{+} + \omega_3 \Delta y_{it}^{-} + \omega_4 \Delta p65_{it} + \omega_5 \Delta le_{it} + \omega_6 \Delta mo_{it} + \omega_7 \Delta tx_{it} \\ & + \omega_8 \Delta sc_{it} + \omega_9 sp_{it-1} + \omega_{10} y_{it-1} + \omega_{11} p65_{it-1} + \omega_{12} le_{it-1} + \omega_{13} mo_{it-1} \\ & + \omega_{14} tx_{it-1} + \omega_{15} sc_{it-1} + \mu_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (10)$$

where nh denotes non-health government spending, which is the difference between total government spending and government health expenditure, while sp refers to expenditures on social protection.[16] Both series come from the General Government Accounts, which is part of the OECD's National Account Statistics (OECD, 2018a). To support hypothesis *(viii)*, the expectation is that Δy_{it}^{-} should be statistically significant in both equations and the estimated cyclicality coefficients $\hat{\theta}_3$ and $\hat{\omega}_3$ should be larger in magnitude than $\hat{\delta}_3$ in (3).

4. Estimation Results.

We utilise the System Generalised Methods of Moments (GMM) estimator proposed by Blundell and Bond (1998). We adopt this methodology because of the inclusion of a lagged dependent variable in our econometric specification and relying on conventional panel estimators could produce a finite sample estimation bias (Nickell, 1981). In all cases, predictions are tested with reference to the estimated coefficients and t-ratios, calculated from robust standard errors, which are adjusted for clustering across the countries. SYS-GMM estimators are said to be consistent when there is no second order autocorrelation or higher, and if the instruments are valid according to the robust Hansen test. The Arellano-Bond test for second order serial correlation in first-differenced errors is therefore reported. The first difference of errors is expected to be first order autocorrelated, so rejecting the null hypothesis of no serial correlation at higher orders implies non-valid moment conditions.

Table 1 reports the SYS-GMM estimates of (2) and (3) for per capita current government health expenditure. The test results cannot reject the null hypothesis of no 2nd order serial correlation and whether the over-identifying restrictions are valid. The error correction model also shows the long-run relationship for health expenditures. Some of the long-run coefficients are of particular interest e.g. the long-run relation between income and health expenditures provided by economic theory, such as Wagner's Law (Wagner, 1911), where the long-run income elasticity is shown to have a value of 0.96.

[16] The OECD's definition of Social Protection expenditures includes the payment of benefits to households for: Sickness & Disability; Old Age; Survivors; Family & Children; Unemployment; Housing; Social Exclusion not elsewhere classified; R&D Social Protection; plus Social Protection not elsewhere classified (see (OECD, 2018a)).

< TABLE 1 NEAR HERE >

In support of the first hypothesis, it is clear that Δy_{it} is statistically significant and the corresponding estimated cyclicality coefficient is positively signed, with a magnitude of 0.004, implying that across the economic cycle government current health expenditures are found to be procyclical. The finding of procyclical public health expenditure from our sample is in contrast to the findings of countercyclical health expenditure provided by Darby and Melitz (2008) for a sample of fourteen OECD countries over the period 2000 to 2014.[17] Arze del Granado et al. (2010) find no cyclical relationship for a sample of developed countries but they do discover procyclical health spending for developing countries. They also find evidence of procyclical health expenditure during economic upturns for the full sample of countries but not during economic downturns.

It is important to recognize the differences in cyclical responses that might occur over the business cycle and that the same sized change in output could generate different responses in spending on health, depending upon whether Δy_{it} represents an economic upturn or economic downturn. Equation (3) accounts for this possibility and the results presented in Table 1 indicate a procyclical response of government health spending for both economic upturns and downturns, but the cyclicality coefficient is larger for the economic downturns. We tested whether the cyclicality coefficients are statistically significantly different from one another i.e. $H_0: \delta_2 - \delta_3 = 0$. The difference in the estimated coefficients is only -0.00425 but the associated Z-statistic is -1.98, which implies we can reject the null hypothesis and conclude that the procyclical response of current health expenditures is stronger in economic downturns than in economic upturns.

Hypothesis *(ii)* predicts that *Government current health care expenditures are likely to be more procyclical than changes in demand (as measured by consultations per capita).* The results of estimating (4) are shown in Table 2. Support for the hypothesis comes from the fact that both Δy_{it}^{+} and Δy_{it}^{-} are found not to be statistically significant, in contrast to the evidence of procyclical current health expenditures shown in Table 1.

[17] The countries are Belgium, Canada, Chile, Estonia, Finland, Germany, Hungary, Japan, Republic of Korea, Mexico, Poland, Spain, Switzerland and the United States. The choice of countries was dictated by data availability.

< TABLE 2 NEAR HERE >

Cleeren et al. (2016) identify countries, which have procyclical government health expenditures and argue that countries that rely more heavily on funding via social health insurance are even more likely to spend procyclically because changes in this source of revenue are even more sensitive to changes in national income. Table 3 presents the results from estimating (5), which consider the influence of the proportion of health financing coming from social contributions on the procyclicality of current health spending. Support for hypothesis *(iii)* comes from the fact that $(\Delta y^{+} \times sc)_{it}$ is statistically significant and the estimate of η_4 is 0.005, while $(\Delta y^{-} \times sc)_{it}$ is not statistically significant.

< TABLE 3 NEAR HERE >

To consider the influence of elections and government vote shares on the procyclicality of current health spending, we estimate (6) and (7), the results from which are shown in Tables 4 and 5. Support for hypothesis *(iv)*, that health expenditures are likely to be more procyclical if there is an election during an economic upturn, comes from the fact that in Table 4 $(\Delta y^{+} \times elec)_{it}$ is statistically significant and the estimate of ϑ_4 is positive with a value of 0.004. By contrast, $(\Delta y^{-} \times elec)_{it}$ is not statistically significant, consistent with the prediction of hypothesis *(ix)*. With regard to the influence of government vote shares, in Table 5 we find that during economic upturns government current health expenditures are more procyclical the smaller the government's vote share (consistent with hypothesis *(v)*), since $(\Delta y^{+} \times vote)_{it}$ is statistically significant and the estimate of φ_4 is negatively signed, albeit with a value of -0.0003. By contrast, during the economic downturns, $(\Delta y^{-} \times vote)_{it}$ is also statistically significant but $\varphi_4>0$, consistent with hypothesis *(x)*.

< TABLES 4 & 5 NEAR HERE >

The results of Table 6 provide supporting evidence for hypothesis *(vi)* that government capital expenditures should be more procyclical than government consumption. It is clear that Δy_{it} is statistically significant for government fixed capital formation and is positively signed, implying procyclicality like we found for current health expenditure. However, importantly the estimated cyclicality coefficient is 0.052, which is significantly larger in magnitude than the equivalent estimate

of 0.004 from current health expenditures presented in Table 1. Interestingly, when we estimate separate coefficients for Δy_{it}^{+} and Δy_{it}^{-}, we find that procyclical capital health expenditures are only found in the economic downturns with an estimated cyclicality coefficient of 0.133, whereas Δy_{it}^{+} is not statistically significant.

< TABLE 6 NEAR HERE >

The results presented in Table 7 investigate the influence of the central government debt ratio on the procyclicality of current health expenditure per capita. Consistent with hypothesis *(vii)*, we find that $(\Delta y^{-} \times dbt)_{it}$ from (8) is statistically significant and the estimate of ξ_5 is negatively signed, implying that the more governments borrow the less they need to cut health expenditures (in response to voter priorities) during economic downturns in response to a contraction in economic output.

< TABLE 7 NEAR HERE >

In Table 8, the estimation results for (9) are presented to investigate the cyclicality of non-health government consumption during economic upturns and downturns. It is clear that Δy_{it}^{+} is not statistically significant, indicating no expected cyclical response from positive shocks to real GDP, but Δy_{it}^{-} is statistically significant and the θ_3 estimated coefficient is positive, indicating procyclicality of non-health government spending during economic downturns only. Moreover, consistent with hypothesis *(viii)*, government non-health consumption is found to be marginally more procyclical than health spending. The estimate for the θ_3 coefficient is 0.010 compared to the estimate of 0.007 for δ_3 from (3). The greater relative procyclicality of non-health spending to health expenditures might reflect a stronger preference among the electorate for health spending compared to other government functions. We therefore expect health spending will grow at a faster rate than expenditures on non-health programmes. Figure 1 shows that the ratio of health-to-non-health spending has increased in the OECD over the period 1999 to 2014. It is also interesting to compare the long-run coefficient for non-health spending with that from health expenditures. The long-run coefficient for non-health spending is 1.01, which has a similar value to the one derived for health expenditures (0.96). A long-run coefficient that is greater than one in magnitude would be consistent

with a narrow interpretation of 'Wagner's Law', where government expenditure is expected to rise faster than GDP (Akitoby et al., 2006).

< TABLE 8 & FIGURE 1 NEAR HERE >

Table 8 also reproduces the estimation results for the cyclicality equation using data on government expenditures for social protection. Again, we only find that Δy_{it}^{-} is statistically significant and the estimate for ω_3 has a value of 0.005, which is smaller than the estimate for non-health expenditures.[18]

5. Conclusions

Buchanan (1965) drew attention to an 'inconsistency' when a citizen (as an individual 'consumer') demands subsidized health care and when the same citizen (as a 'taxpaying voter') is reticent to collectively approve the taxation required to provide health care. With the expectation that citizens are reluctant to vote for taxation, Buchanan predicted severe shortages. While there has always been evidence of excess demand in the UK National Health Service, critics have insisted that these shortages have never been as severe as Buchanan predicted (Bosanquet, 1986). The motivation in this paper was to explore *governments'* response to this 'inconsistency'.

How are vote-maximising governments likely to mitigate the electoral costs they would otherwise experience if voters were to experience severe excess demand for health care? How are vote-maximising governments likely to respond to the problem of 'inconsistency'?

If the absence of an automatic link between increases in demand and increases in finance causes *problems* when the public sector supplies services (Buchanan, 1965; Culyer, 1989), the absence of an automatic link between increases in demand and increases in finance also provides governments with

[18] Since the OECD definition of Social Protection includes expenditure on benefits paid to household for 'Sickness & Disability', the estimation results presented in Table 8 might be indirectly influenced by expenditure on Health. We therefore re-estimated (10) for the total spending on Social Protection minus benefits paid for 'Sickness & Disability'. The results, available upon request, show acyclicality in economic downturns, a result which still allows us to support hypothesis *(viii)*.

discretion to rely on strategies that will minimise voters' perceptions of the costs of taxation. In this paper, evidence is consistent with the proposition that vote-maximising governments are able to *time* tax increases and to rely on *implicit taxation* (Prest, 1985), to minimise voters' perceptions of any increase in the costs of financing an increase in demand for health care.

The first observation is that governments strategically rely on 'fiscal illusion' in economic upturns. They rely on the *automatic* increase in finance that exists when *taxation* and *compulsory social contributions* increase with income (in economic upturns). The more that governments rely on these sources of finance, the greater the likelihood that voters will underestimate any increase in the costs they must pay to mitigate excess demand for health care. In the OECD, the more that governments rely on compulsory social contributions, the greater the increase in health care expenditure in economic upturns.

With evidence that vote-maximising governments focus myopically on four- or five-year electoral cycles (e.g. Buchanan and Lee, 1982a, b), governments are likely to find it difficult to sustain health care expenditures in recessions. In this paper, the evidence is consistent with the prediction that health care expenditures in the OECD are procyclical over the entire economic cycle.

Of course, one question is whether governments are relying on increases in health care expenditures *strategically*. Could it simply be the case that health care expenditures increase automatically because tax revenues increase automatically in economic upturns? In this paper, the evidence is that health care expenditures increase by *more* than the demand for health care in economic upturns. Health care expenditures are more procyclical than the demand for health care in economic upturns because governments rely more heavily on economic upturns to finance provision of health care (i.e. finance to mitigate excess demand). They are relying on economic upturns *strategically* because voters are not aware of the automatic increase in the costs of health care in economic upturns.

Governments exercise their discretion in pursuit of political objectives. If incumbent political parties have discretion, they are more likely to exercise it the more they are focused on electoral objectives. In the OECD, vote-maximising governments are more inclined to rely on 'fiscal illusion'

in economic upturns the lower their share of votes. The more that incumbents feel they are at risk at the next election, the greater the incentive to rely on 'fiscal illusion'.

If there is any question that governments in the OECD are relying on 'fiscal illusion', consider their response to elections in economic upturns. The more that voters are aware in economic upturns, the more that governments must increase expenditures on high-priority programmes. As voters are more fiscally aware when they participate in an election, governments in the OECD make an even greater increase in health care expenditures in economic upturns when there is an election.

When attention focuses on economic downturns, the evidence is also consistent with the proposition that vote-maximising governments are using their discretion. With general taxation, governments can choose how *they* will allocate revenues across competing public expenditures programmes (Buchanan, 1965; Wagner, 2007). In recessions, voters are far more critical of inadequacies in *domestic* government expenditure. With difficulty raising revenues and with difficulty borrowing, governments rely on an 'implicit tax' (Prest, 1985). The 'implicit tax' is the reduction of expenditure on low-priority programmes. In recessions, the evidence in the OECD is that there is a lower reduction of current expenditures on health care than on non-health-care programmes (current health care expenditures are not as procyclical as current non-health expenditures). It is also the case that domestic social protection expenditures are not as a procyclical as non-health care expenditures. Voters are unlikely to be aware that they are paying more to attempt to sustain health care expenditures in recessions (the 'implicit tax' being the reduction in spending on low-priority programmes).

In the OECD, capital expenditures on health care are more procyclical in recessions than current health care expenditures because voters are more sensitive to excess demand. If governments must protect health care expenditures, the incentive is to attempt to sustain expenditures that are more visible to voters. Lobby groups that press for increases in capital health care expenditure will find it more difficult in economic recessions, because voters are more aware of the inadequacies in current health care expenditures.

When focusing on the political objectives of incumbents, the governments' share of votes is important. In the OECD, there is even greater reason to increase health care expenditures in economic upturns the lower the government share of votes (and the more that incumbents feel at risk). Also, consistent with the prediction in this paper, vote-maximising governments respond differently to elections in recessions. In recessions, they have very little impact on health care. In recessions, voters are already sensitive to the inadequacies of expenditures on health care. Governments already recognise the importance of voters' demand for this high-priority programme.

With this evidence, this paper makes an important contribution to the literature on 'fiscal illusion'. In the existing literature on 'fiscal illusion', governments are simply *reactive* to changes in 'fiscal illusion'. The literature focuses on changes in the *level* of revenue governments receive when there is 'fiscal illusion'. In this paper, governments are *proactive*. They act strategically to time changes in taxation (when voters are unaware of the costs of taxation) and to disguise 'taxation' in recessions (by diverting public spending from low-priority programmes). In this way, governments respond to excess demand (and the loss of popularity they would otherwise experience as a result of excess demand for health care).

While some of the individual results in this paper resonate with results in other studies, e.g. Cleeren et al. (2016) and with results in studies of procyclical *aggregate* government expenditure, (e.g. Abbott and Jones, 2011; Lane, 2003), many are new.[19] *Collectively*, the results describe patterns of cyclicality that are consistent with the proposition that governments act strategically (when they exercise discretion to minimise voters' perceptions of the increased taxation required to finance increased demand for health care). Liang and Tussing (2019) estimate the negative impact of reductions in government health expenditures in recessions on the health of the population (e.g. in terms of life expectancy). Our evidence is consistent with the proposition that vote maximising governments strive to sustain health expenditures in recessions. The policy implication is that their

[19] Some of the results are consistent with results reported by Abbott and Jones (2019b) in their analysis of the patterns of expenditure in the UK National Health Service.

response to excess demand for health care in recessions has a very positive impact on the health of the population.

A second insight from the evidence in this paper is that it is important to consider the *relationship* that exists between different forms of *government failure*. Wolf (1993) presents a taxonomy of 'government failures' that includes the divorce between 'receipt' and 'payment' for publicly-provided services. The conclusions in this paper indicate that the presence of one 'government failure' (divorce between 'receipt' and 'payment' for publicly provided services) increases the likelihood of reliance on other forms of government failure (e.g. 'fiscal illusion').

A third insight informs the established literature on 'political business cycles' (e.g. Nordhaus, 1975). Governments have an incentive to increase expenditures ahead of elections to create a 'feel good' factor (to increase their support at the ballot box). Potrafke (2010) and Herwartz and Theilen (2014) report evidence that governments increase expenditure on health care in election years. If, however, governments are more likely to increase these expenditures in *economic upturns* (because elections have a greater impact on voters' fiscal awareness in economic upturns), the increase in expenditures ahead of elections will be greater in economic upturns. The implication is that differences in voter awareness (in economic upturns and recessions) mean that an increase in spending prior to an election in an economic upturn is likely to have a greater impact on the cyclicality of the political business cycle.

If citizens (as 'taxpaying voters') are reticent to finance increasing demand for health care, the threat to a vote-maximising government is loss of electoral support (as citizens experience excess demand for health care). Buchanan (1965) focused on *citizens*' choices. This paper focuses on *governments'* responses. If the absence of automatic finance for the provision of increased demand for health care means that citizens are likely to make 'inconsistent' decisions, the same absence of automatic finance means that vote-maximising governments are likely to rely on strategies that minimise citizens' perceptions of increases in taxation (in 'good' times and in 'bad'). Governments are more inclined to rely on these strategies the more they feel vulnerable at the next election.

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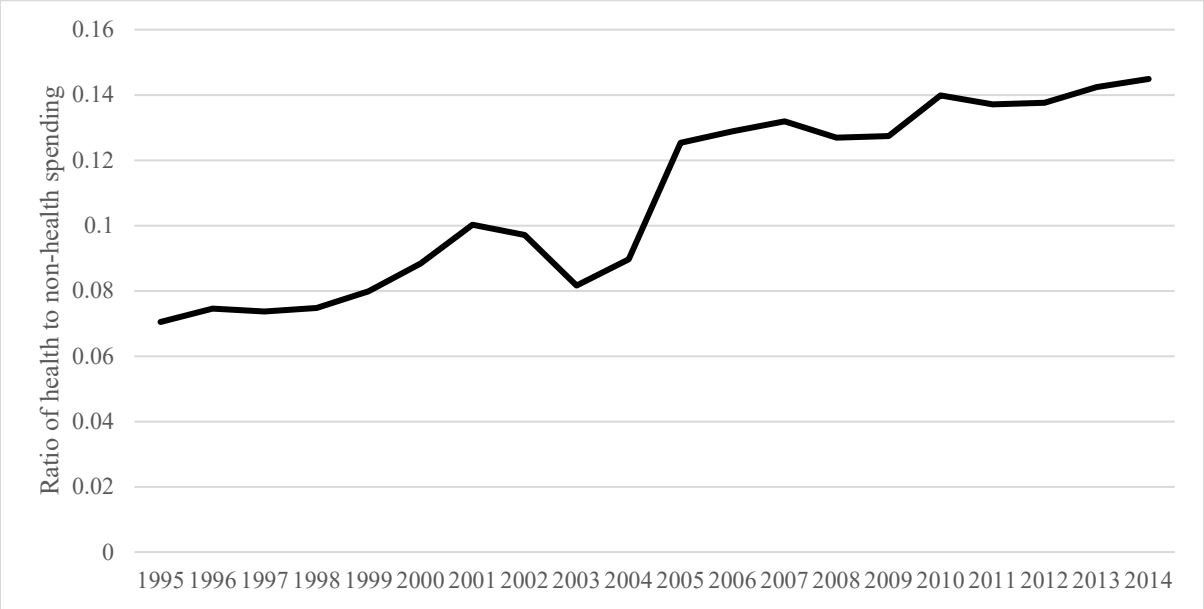
Fig 1. Ratio of health to non-health spending in the OECD



Note.— Source: OECD Health Statistics

Table 1
The cyclicality of current health expenditures

Variables		
constant	-1.821*	-1.907*
	(-2.83)	(-2.78)
Δh_{it-1}	-0.029	-0.049
	(-0.86)	(-1.31)
Δy_{it}	0.004*	-
	(4.40)	
Δy_{it}^{+}	-	0.002*
		(1.98)
Δy_{it}^{-}	-	0.007*
		(3.79)
$\Delta p65_{it}$	0.018	0.017
	(1.00)	(0.98)
Δle_{it}	-0.006	-0.005
	(-0.56)	(-0.44)
Δmo_{it}	-0.054	-0.047
	(-1.40)	(-1.23)
Δtx_{it}	0.017*	0.016*
	(6.79)	(5.95)
Δsc_{it}	0.015*	0.015*
	(4.40)	(4.24)
h_{it-1}	-0.207*	-0.216*
	(-3.48)	(-3.78)
y_{it-1}	0.199*	0.208*
	(3.53)	(3.83)
$p65_{it-1}$	0.002	0.003
	(0.52)	(0.72)
le_{it-1}	0.015*	0.015*
	(2.19)	(2.19)
mo_{it-1}	-0.005	-0.004
	(-0.68)	(-0.51)
tx_{it-1}	0.003	0.003
	(1.36)	(1.44)
sc_{it-1}	0.002	0.003
	(1.14)	(1.22)
No. of observations (N×T)	128	128
$\overline{T}$	9.9	9.9
No. of instruments	49	50
2nd order serial correlation	-1.47	-1.50
Hansen: χ^2(m-k)	0	0

Note.— T-ratios, calculated from heteroscedastic consistent standard errors, are reported in parenthesis. N×T refers to the total number of observations, while $\overline{T}$ indicates the average number of observations per country. The symbol * indicates significance at the 5% level. The Hansen test for over-identifying restrictions is reported under the null that the over-identifying restrictions are valid The Arellano-Bond test for 2nd order serial correlation is reported under the null of no autocorrelation.

Table 2
Cyclicality of doctor consultations

Variables	
constant	4.952
	(1.11)
Δcn_{it-1}	-0.289*
	(2.80)
Δy_{it}^{+}	-0.005
	(-1.01)
Δy_{it}^{-}	0.009
	(0.86)
$\Delta p65_{it}$	-0.127
	(-1.21)
Δle_{it}	-0.079*
	(-2.04)
Δmo_{it}	-0.048
	(-0.37)
Δtx_{it}	-0.008
	(-0.76)
Δsc_{it}	-0.008
	(-0.99)
cn_{it-1}	-0.340
	(-1.73)
y_{it-1}	0.009
	(0.19)
$p65_{it-1}$	0.034
	(1.28)
le_{it-1}	-0.060
	(-1.21)
mo_{it-1}	-0.019
	(-0.54)
tx_{it-1}	-0.008
	(-1.87)
sc_{it-1}	0.0009
	(0.26)
No. of observations (N×T)	87
$\overline{T}$	7.91
No. of instruments	47
2nd order serial correlation	0.12
Hansen: χ^2(m-k)	0

Note.— see table 1

Table 3
Cyclicality of current health expenditures and the influence of financing through social insurance contributions

Variables	
constant	-1.563*
	(-2.19)
Δh_{it-1}	-0.071
	(-1.85)
Δy_{it}^{+}	0.001
	(0.85)
Δy_{it}^{-}	0.006*
	(4.35)
$(\Delta y^{+} \times sc)_{it}$	0.005*
	(2.04)
$(\Delta y^{-} \times sc)_{it}$	0.001
	(1.30)
$\Delta p65_{it}$	0.011
	(0.79)
Δle_{it}	-0.004
	(-0.36)
Δmo_{it}	-0.033
	(-0.93)
Δtx_{it}	0.016*
	(8.55)
Δsc_{it}	0.017*
	(8.51)
h_{it-1}	-0.173*
	(-2.40)
y_{it-1}	0.167*
	(2.47)
$p65_{it-1}$	-0.0002
	(-0.06)
le_{it-1}	0.012
	(1.79)
mo_{it-1}	-0.003
	(-0.41)
tx_{it-1}	0.003
	(1.48)
sc_{it-1}	0.003
	(1.34)
No. of observations (N×T)	128
$\overline{T}$	9.85
No. of instruments	52
2nd order serial correlation	-1.31
Hansen: χ^2(m-k)	0

Note— see table 1

Table 4
Cyclicality of current health expenditures and the influence of elections

Variables	
constant	-1.922*
	(-3.12)
Δh_{it-1}	-0.043
	(-1.12)
Δy_{it}^{+}	-0.0009
	(-0.45)
Δy_{it}^{-}	0.007*
	(3.72)
$(\Delta y^{+} \times elec)_{it}$	0.004*
	(2.71)
$(\Delta y^{-} \times elec)_{it}$	-0.0007
	(-0.40)
$\Delta p65_{it}$	0.017
	(1.00)
Δle_{it}	-0.002
	(-0.18)
Δmo_{it}	-0.036
	(-0.98)
Δtx_{it}	0.017*
	(6.81)
Δsc_{it}	0.016*
	(5.25)
h_{it-1}	-0.212*
	(-3.88)
y_{it-1}	0.204*
	(3.92)
$p65_{it-1}$	0.003
	(0.81)
le_{it-1}	0.015*
	(2.45)
mo_{it-1}	-0.003
	(-0.41)
tx_{it-1}	0.003
	(1.40)
sc_{it-1}	0.003
	(1.25)
No. of observations (N×T)	128
$\overline{T}$	9.85
No. of instruments	52
2nd order serial correlation	-0.76
Hansen: χ^2(m-k)	0

Note— see table 1

Table 5
Cyclicality of current health expenditures and the influence of vote share

Variables	
constant	-1.387*
	(-2.03)
Δh_{it-1}	-0.072*
	(-3.47)
Δy_{it}^{+}	0.021*
	(4.30)
Δy_{it}^{-}	-0.003
	(-1.45)
$(\Delta y^{+} \times vote)_{it}$	-0.0003*
	(-4.15)
$(\Delta y^{-} \times vote)_{it}$	0.0002*
	(4.19)
$\Delta p65_{it}$	0.017
	(1.04)
Δle_{it}	-0.005
	(-0.56)
Δmo_{it}	-0.070
	(-1.67)
Δtx_{it}	0.016*
	(5.87)
Δsc_{it}	0.014*
	(4.62)
h_{it-1}	-0.183*
	(-3.38)
y_{it-1}	0.175*
	(3.40)
$p65_{it-1}$	0.0005
	(0.15)
le_{it-1}	0.011
	(1.58)
mo_{it-1}	-0.009
	(-1.14)
tx_{it-1}	0.002
	(1.22)
sc_{it-1}	0.002
	(1.08)
No. of observations (N×T)	128
$\overline{T}$	9.85
No. of instruments	52
2nd order serial correlation	-1.42
Hansen: χ^2(m-k)	0

Note— see table 1

Table 6
The cyclicality of capital health expenditures

Variables		
constant	-27.362*	-12.456
	(-2.52)	(-0.74)
Δh_{it-1}	-0.096	-0.147
	(-0.86)	(-1.16)
Δy_{it}	0.052*	-
	(3.06)	
Δy_{it}^{+}	-	0.010
		(0.92)
Δy_{it}^{-}	-	0.133*
		(2.13)
$\Delta p65_{it}$	0.049	-0.104
	(0.18)	(-0.36)
Δle_{it}	0.262	0.235
	(1.23)	(1.42)
Δmo_{it}	1.013	0.857*
	(1.90)	(2.20)
Δtx_{it}	0.114	0.067
	(1.86)	(1.71)
Δsc_{it}	0.096	0.060
	(1.57)	(1.57)
h_{it-1}	-0.787*	-0.618*
	(-7.56)	(-4.72)
y_{it-1}	0.941*	0.723*
	(5.07)	(4.49)
$p65_{it-1}$	0.019	0.021
	(0.10)	(0.17)
le_{it-1}	0.161	0.039
	(1.24)	(0.22)
mo_{it-1}	0.475*	0.219
	(2.58)	(0.96)
tx_{it-1}	0.100*	0.059*
	(2.70)	(2.37)
sc_{it-1}	0.053*	0.020
	(2.02)	(0.85)
No. of observations (N×T)	84	84
$\overline{T}$	9.3	9.3
No. of instruments	49	50
2nd order serial correlation	0.87	1.51
Hansen: χ^2(m-k)	0	0

Note— see table 1. The results are produced from a sub-sample of nine countries due to the availability of data. The countries are Chile, Estonia, Finland, Germany, Hungary, Japan, Republic of Korea, Spain and United States.

Table 7
Cyclicality of current health expenditures and the influence of the central government debt ratio

Variables	
constant	-4.209*
	(-2.26)
Δh_{it-1}	-0.043
	(-0.79)
Δy_{it}^{+}	-0.001
	(-1.00)
Δy_{it}^{-}	0.009
	(1.52)
$(\Delta y^{+} \times dbt)_{it}$	0.003*
	(2.83)
$(\Delta y^{-} \times dbt)_{it}$	-0.0002*
	(-2.59)
$\Delta p65_{it}$	0.077
	(1.65)
Δle_{it}	-0.002
	(-0.07)
Δmo_{it}	-0.059
	(-1.64)
Δtx_{it}	0.016*
	(3.22)
Δsc_{it}	0.015*
	(3.15)
h_{it-1}	-0.496*
	(-7.90)
y_{it-1}	0.465*
	(8.04)
$p65_{it-1}$	0.009
	(0.93)
le_{it-1}	0.034
	(1.66)
mo_{it-1}	-0.013
	(-0.66)
tx_{it-1}	0.008
	(1.93)
sc_{it-1}	0.003
	(0.75)
No. of observations (N×T)	86
$\overline{T}$	7.17
No. of instruments	40
2nd order serial correlation	-1.29
Hansen: χ^2(m-k)	0

Note— see table 1

Table 8
Cyclicality of non-health current spending per capita and social protection spending per capita

Variables		Variables	
constant	-0.334	constant	0.362
	(-0.35)		(0.41)
Δnh_{it-1}	-0.116	Δsp_{it-1}	0.123
	(-1.52)		(1.16)
Δy_{it}^{+}	0.0007	Δy_{it}^{+}	-0.004
	(0.26)		(-1.92)
Δy_{it}^{-}	0.010*	Δy_{it}^{-}	0.005*
	(3.75)		(2.84)
$\Delta p65_{it}$	0.073	$\Delta p65_{it}$	0.022
	(1.47)		(1.13)
Δle_{it}	-0.023	Δle_{it}	0.004
	(-1.82)		(0.32)
Δmo_{it}	0.043	Δmo_{it}	-0.018
	(0.85)		(0.42)
Δtx_{it}	-0.003	Δtx_{it}	-0.001
	(-0.29)		(-0.30)
Δsc_{it}	0.0006	Δsc_{it}	0.006
	(0.06)		(1.09)
nh_{it-1}	-0.449*	sp_{it-1}	-0.212*
	(-6.25)		(-4.04)
y_{it-1}	0.454*	y_{it-1}	0.216*
	(6.22)		(3.63)
$p65_{it-1}$	0.019	$p65_{it-1}$	0.023*
	(1.41)		(1.97)
le_{it-1}	-0.005	le_{it-1}	-0.013
	(-0.36)		(-1.75)
mo_{it-1}	-0.026	mo_{it-1}	-0.017
	(-1.10)		(-0.99)
tx_{it-1}	0.0008	tx_{it-1}	0.0004
	(0.14)		(0.34)
sc_{it-1}	0.0006	sc_{it-1}	-0.0003
	(0.15)		(-0.32)
No. of observations (N×T)	92	No. of observations (N×T)	101
$\overline{T}$	9.20	$\overline{T}$	9.18
No. of instruments	50	No. of instruments	50
2nd order serial correlation	-1.12	2nd order serial correlation	0.02
Hansen: χ^2(m-k)	0	Hansen: χ^2(m-k)	0

Note.— see table 1