

PRUDENT BUDGETARY POLICY WITH UNCERTAIN REVENUES, INVESTMENT PROJECTS AND LABOUR MARKET REFORMS

Frederick van der Ploeg
Oxford University and University of Amsterdam*

Summary

We first present the traditional theory of tax smoothing and the optimal determination of public debt and show how to allow for public investment and structural reforms. The government runs a deficit to finance public investment projects with a market rate of return and temporary high levels of public consumption while taxes are used to finance permanent public spending levels and losses on public investment. Deficit financing is used to offset some of the short-run costs of structural reforms.

We then introduce uncertain future national income to allow for prudent decision making. We show that a prudent government deliberately downplays future national income and the tax base, especially if the variance and persistence of shocks hitting the tax base are large and the tax rate is high. As a precaution, the minister of finance sets the tax rate higher and the level of public spending lower. As a result, income and the tax base turn out to be bigger than budgeted, so that the finance minister enjoys windfall revenues and can gradually reduce debt and debt service over time. This permits, depending on political preferences, either gradual cuts in the tax rate, gradual increases in government spending or a combination of both.

We also take account of uncertainty about the costs of and returns on public investment projects. A prudent minister of finance exaggerates project costs and downplays future returns on public investment, hence borrows less. He also downplays long-run gains of structural reforms, so is less inclined to relax budgetary policy.

We subsequently offer political reasons why it makes sense to appoint a strong and pessimistic minister of finance. In particular, we show that prudence can offset the *intertemporal* spending, tax and debt biases resulting from well-known common-pool distortions. If the minister of finance and the prime minister are given as many voting rights as the spending ministers combined, the *intratemporal* common-pool distortions of an excessively large public sector are eliminated as well. A strong and pessimistic minister of finance can thus control the impatient profligacy of squabbling spending ministers.

Finally, we warn that, if voters care about outcomes on election eve, prudence may be abused for short-run electoral gains. If opportunistic manipulation of election results is not too severe, it may dampen intertemporal common-pool distortions.

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Address for correspondence:

OxCarre, Department of Economics, Oxford University
 Manor Road, Oxford, England
 Email: rick.vanderploeg@economics.ox.ac.uk

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1. Introduction

The reputation of a good minister of finance is based on prudence and caution. During every Council of Ministers there is the danger that his spending colleagues will claim more money to spend on their pet projects without taking into account the full direct and indirect costs of the higher taxes needed to pay for these projects. But every Euro can only be spent once. If it is spent on one of those pet projects, it cannot be spent on debt reduction, other perhaps socially more desirable projects or reduction of the tax burden. The minister of finance is often a lone crusader for sound government finances who needs all the support it can get to make sure government makes sound trade-offs between various spending plans, tax rates and the national debt. It is therefore in the interest of society to have a prudent, rather than spend-thrift keeper of the national budget. A good minister of finance will be forgiven if unexpected windfall revenues appear, but will be scorned if the budget turns out year after year worse than expected. Just as it can be shown that the electorate rationally prefers to appoint an ultraconservative central banker to tie itself against the mast and avoid inflationary finance of pet political projects (Rogoff, 1985), the electorate prefers a conservative minister of finance. While a central banker should be curbed to prevent renegeing on previous announcements to keep the money supply in check, a minister of finance is under perennial pressure from the spending ministers to relax budgetary discipline.

Intuitively, it thus makes sense to appoint a pessimistic rather than an optimistic minister of finance. This insight inspired the practice in the Netherlands since 1994 of deliberately underestimating next year's growth in the national income by say a quarter or half percent in order to err on the safe side and to avoid having to take harsh measures to cope with unexpected worsening of the public finances.¹ Our main objective is to formalize this notion of prudent budgetary policy and develop an alternative theory of the cautious determination of taxes and government debt. We do this by discussing and extending Barro's (1979) famous and well-tryed theory of tax smoothing and optimal debt management to allow for prudence. We also offer two important extensions. First, we show how to deal with public investment with and without a market rate of return. Second, we discuss at some length what deficit policy and debt management is prudent when the government is trying to implement structural reforms (e.g., labour market reforms, competition policy) with unknown future benefits but uncertain short-run costs. Finally, we provide a political economy rationale for the prudent approach to budgetary policy.

¹ The new government has in 2007 abandoned prudent forecasts of national income and tax bases. Instead, it claims to be prudent by pursuing a more ambitious target for the final financial surplus.

We thus allow for *precautionary* behaviour of the minister of finance and offer a rationale for such behaviour. Technically, we achieve this by introducing prudence into a standard intertemporal welfare loss criterion which trades off minimizing quadratic tax distortions against minimizing the distance of public consumption and public investment from their bliss levels and minimizing the short-run costs of structural reforms. Prudence implies that the policy maker plays a min-max game against nature. Effectively, the policy maker hedges against undesirable outcomes by postulating that shocks damage its objectives even though, from a purely statistical point of view, they do not hurt on average.

Our key insight is thus that a prudent minister of finance deliberately downplays future forecasts of national income and the tax base. As a precaution the tax rate is set higher and the level of public spending lower than without prudence. As a result, even though budgeted tax rates are smoothed over time, expected values of the tax rate gradually fall and/or expected levels of governments spending increase over time as the inevitable windfall revenues materialize and the level of government debt and thus debt service fall over time. We show that the extent to which this happens is greater if the degree of prudence of the minister of finance, the variance and persistence of shocks hitting the national income and the tax base, and the tax rate is relatively high. In the very long run the government builds up assets to generate sufficient interest revenue to pay for public spending, so that the expected tax rate asymptotically goes to zero.

If the government also engages in public investment, a prudent minister of finance deviates from the golden rule of finance if future returns on investment are uncertain. Normally, if a project is expected to break even exactly, it makes sense to borrow for the project and run a deficit. If the returns do indeed materialize, they will be sufficient to cover principal and interest on the loans for the project. A prudent minister of finance, however, deliberately exaggerates project costs and downplays future returns on public investment and therefore engages in *precautionary* taxation to finance part of the initial outlays for public investment. This part will be greater if the variances of project costs and the future return on public investment and the degree of prudence are higher. Consequently, the minister of finance runs a smaller deficit and accumulates less debt. If eventually the project does, in fact, deliver higher returns than assumed by the cautious minister of finance and budgets are not overrun, he will use those to reverse the rise in taxes. If spending for public consumption purposes is endogenous, the minister of finance will also engage in some precautionary cuts in public consumption which may be reversed if costs and returns turn out as expected.

We also analyze what the appropriate response for the government is when the short- and medium-run costs and the long-run benefits of structural reforms are uncertain. This is

particularly relevant for structural labour market reforms, since these typically are associated with short-run costs. In the absence of prudence, the government finds it optimal to have a higher short-run deficit to finance the short-run costs of reform and make structural reforms both feasible and politically acceptable. We argue furthermore that a *prudent* government deliberately underestimates the future long-run benefits of reforms and overestimates the short-run costs of reform. As a result, a prudent government is somewhat less likely to implement structural reforms as it is slightly less prepared to relax the budget for the short-run costs of reform.

We also offer insights into *why* a minister of finance wants to implement a *prudent* budgetary policy. One reason is based on the reality of cabinet decision making. If unexpected falls in public revenue appear, spending ministers spend lots of time and energy fighting over which one of them has to implement the spending cuts to balance the budget and the minister of finance is under great pressure to relax the budgetary rules. This is not conducive to good government. Too much time and energy is wasted on squabbling rather than on necessary reforms and cracking necessary tough political decisions. It is thus desirable to have a prudent budgetary policy, so that on average unexpected windfall revenues are more likely than shortfalls in expected revenues. Another justification of why a minister of finance should have more prudent preferences than the electorate is that *ex ante* the minister of finance realizes that *ex post* it will be hard to discipline the spending ministers in his cabinet. Profligate spending ministers and a weak minister of finance give rise to a common-pool problem. This results in an upward bias in public spending claims, a tilt of the government spending profile from the future towards the present and of the tax profile from the present to the future, and thus excessive accumulation of government debt (Persson and Tabellini, 2000, Chapter 13; Velasco, 2000). We show that it is in the interest of society to appoint a relative prudent minister of finance, which can offset the *intertemporal* spending, tax and debt biases resulting from the common-pool problem.² If in addition the minister of finance has unequivocal backing of the prime minister and has at least as many votes in the cabinet as the spending ministers combined, he also has sufficient power to overcome the *intratemporal* biases resulting in an excessively large public sector.

The organization of this paper is as follows. Section 2 presents the traditional theory of tax smoothing and determination of public debt. It also discusses how to cope with public investment and the short-run costs and long-run benefits of structural reforms. Section 3 discusses the Dutch experience with cautious and trend-based budgeting during 1994-2007. Section 4

² We show that prudence offsets the intertemporal distortions caused by wanting public spending now rather than tomorrow and postponing taxation, but not the intratemporal distortions leading to a too large public sector.

extends the traditional theory of public budgeting to allow for prudence and derives our key insight about underestimating the tax base and the principle of precautionary taxation. Government borrowing is still warranted for temporary government spending and to cover the temporary loss of revenues in a recession. We show that public spending is set lower as a precaution. It also addresses whether windfall revenues should be used for debt reduction, tax cuts or public spending hikes. We argue that precautionary taxation and under-spending is also warranted if there is public investment with uncertain project costs and future financial returns. We also discuss the prudent approach to structural reforms with uncertain returns. Section 5 demonstrates that with a fragmented government, ministers spend too much and too soon and tax too little and too late. As a result of this dynamic common-pool problem, there is excessive accumulation of government debt. We offer political reasons why it is desirable to appoint a pessimistic minister of finance and to give the minister of finance more voting rights in the cabinet. We also heed a warning that prudence can be abused for short-term electoral gains. Section 6 concludes compares our guidelines for prudent budgetary policy with the standard ones.

2. The Traditional Theory of Public Budgeting

2.1. Tax Smoothing and the Optimal Determination of Public Debt

Here we present the simplest version of Barro's (1979) theory of tax smoothing and debt management. We thus ignore prudence and postpone the discussion of public investment and structural reforms. We thus set the scene for our discussion of prudent budgetary policy rules in section 4. The government budget constraint is given by:

$$(1) \quad D_t = (1+r^*) D_{t-1} + G_t - \tau_t Y_t, \quad D_0 \text{ given,}$$

where D_t , G_t and Y_t denote, respectively, government debt, government spending and national income at time t , and r^* is the exogenous real interest rate. With γ indicating the trend rate of real economic growth, we can rewrite (1) in terms of fractions of the trend level of national income:

$$(1') \quad d_t = \beta d_{t-1} + g_t - \tau_t y_t, \quad d_0 = D_0/Y_0 \text{ given,} \quad \beta \equiv (1+r^*)/(1+\gamma) > 1,$$

where $d_t \equiv D_t/[(1+\gamma)^t Y_0]$, $g_t \equiv G_t/[(1+\gamma)^t Y_0]$, $y_t \equiv Y_t/[(1+\gamma)^t Y_0]$ and $\beta \approx 1 + r^* - \gamma$ is the (gross) growth-corrected real interest rate. The (uncorrected) financial deficit f_t is given by the excess of government spending including nominal interest payments on debt over tax revenues, so that the increase in the debt-GDP ratio can be written as:

$$(1'') \quad d_t - d_{t-1} = (r^* - \gamma) d_{t-1} + g_t - \tau_t y_t = f_t - (\gamma + \pi) d_{t-1}, \quad \text{where } f_t \equiv (r^* + \pi) d_{t-1} + g_t - \tau_t y_t$$

and π is the inflation rate. A constant debt-GDP ratio is thus only feasible if the financial debt-GDP ratio equals the growth-cum-inflation tax on outstanding public debt. The Maastricht rules were designed to bring government finances into equilibrium again. The Maastricht rules thus demanded a 3% target for the deficit-GDP ratio and a 60%-target for the debt-GDP ratio. If inflation is 2% per annum and real growth 3% per annum and the debt-GDP ratio is 0.6, the growth-cum-inflation tax is 3% of GDP. A deficit-GDP ratio of 3% would then indeed ensure a stable debt-GDP ratio. However, if a debt-GDP ratio of, say, 0.8 would have been acceptable, a deficit-GDP ratio of 4% would have done the trick as well. The problem is that the Maastricht rules lacked a theory of what the optimal level of government debt should be. In this sense, the Maastricht rules are entirely ad hoc. This is why it has been referred to as “voodonomics” (Buiter, 1985). To get a better grasp of this point, it is useful to understand the traditional theory of tax smoothing and determination of public debt.

The no-Ponzi condition ensures that the government remains solvent. It requires that the present value of future primary surpluses must at least cover the outstanding government debt:

$$(2) \quad \lim_{s \rightarrow \infty} \beta^{-s} d_{t-1+s} = 0 \quad \Rightarrow \quad \sum_{s=1}^{\infty} \beta^{-s} (\tau_{t-1+s} y_{t-1+s} - g_{t-1+s}) \geq d_{t-1}.$$

Tax distortions are assumed to be proportional to the square of the tax rate. An increase in the tax rate from zero to 0.2 thus yields a welfare loss three times smaller than the welfare loss resulting from an increase in the tax rate from 0.2 to 0.4. The government minimizes the expected value of the following discounted sum of welfare losses:

$$(3) \quad \Gamma \equiv \sum_{t=1}^{\infty} \frac{1}{2} (1 + r^*)^{-t} \tau_t^2 Y_t = \sum_{t=1}^{\infty} \frac{1}{2} (1 + r^* - \gamma)^{-t} \tau_t^2$$

subject to the present-value budget constraint (2). The optimality conditions imply that tax rates are smoothed over time, i.e., $\tau_t = \tau_{t-1}$. This together with (2) yields the following familiar expressions for the government financial deficit and the tax rate:

$$(4) \quad d_t - d_{t-1} = (g_t - g_t^P) - \tau_t (y_t - y_t^P) \quad \text{and} \quad \tau_t = [g_t^P + (r^* - \gamma) d_{t-1}] / y_t^P,$$

where the permanent values of detrended government spending and national income are given by, respectively, $g_t^P \equiv (r^* - \gamma) \sum_{s=t}^{\infty} (1 + r^* - \gamma)^{t-s-1} g_s$ and $y_t^P \equiv (r^* - \gamma) \sum_{s=t}^{\infty} (1 + r^* - \gamma)^{t-s-1} y_s$.

We thus see that temporary increases in public spending (e.g., caused by a war, a flood or other disaster, or a temporary recession) are financed by running up a government debt. The tax rate increases only by a fraction of the temporary increase in public spending. In contrast, permanent increases in public spending are financed by an increase in the tax rate. Future increases in government spending (e.g., a higher public pension bill due to graying of the population) imply that the permanent level of public spending exceeds the current level of government spending, so that it is optimal for the government to bring down debt and debt service to pay for higher public spending in the future. Also, a recession corresponds to a temporary fall in national income induces the government to run up public debt. Permanent increases in national income imply sustained increases in the tax base and thus allow for a cut in the tax rate. Finally, the outstanding level of government debt does not in itself have any implications for deficit policy. A high debt-GDP ratio thus does not provide any reason for bringing it down swiftly as many politicians seem to suggest. The temporary tax hike needed to achieve this, results in unnecessary welfare losses. In other words, one has to put up with a high debt-GDP ratio by raising the permanent level of taxes just enough to pay for the interest service on government debt. Interestingly, this insight offers policy recommendations that are the converse of the Maastricht rules and the Stability and Growth Pact (SGP). In contrast, if the deficit-GDP ratio is out of balance, budgetary measures (e.g., tax hikes or spending cuts) *should* be undertaken to realize fiscal consolidation.

2.2. Public Investment, Public Consumption and the Fiscal Stance

A crucial part of the critique of the Maastricht rules and the SGP is that they originally did not allow for a proper treatment of public investment. In a sense, the Maastricht rules and the early SGP treat public investment projects as if they were public consumption. All initial outlays are immediately written off in the current budget and all future outlays are ignored. If a company were run on this basis, it would not undertake any investment at all. It also provided an incentive for many governments wishing to join EMU to engage in substantial financial gimmickry and accounting tricks to reduce the deficit and the debt by selling off public sector assets. The proceeds would then go straight into the coffers of the minister of finance, but any future financial returns would be forsaken. Although there may be efficiency reasons for privatization,

there are no public accounting reasons for doing that. To get a better understanding of these issues, it is helpful to extend the traditional theory of public budgeting for public investment. At the same time, we also allow for endogenous public consumption. We abstract from deviations of output from its permanent value, since the policy implications are the same as in section 2.1.

We introduce public sector investment i_t and public sector capital k_t (both detrended) and modify the government budget constraint as follows:

$$(1''') \quad d_t - d_{t-1} = (r^* - \gamma) d_{t-1} + g_t + i_t - \tau_t + (r - \gamma) k_t, \quad d_0 = D_0/Y_0 \text{ given,}$$

where r indicates the (growth-corrected) financial return on public sector capital (e.g., tolls, entrance fees or higher tax revenues resulting from public investments in education, R&D and public infrastructure). If δ denotes the depreciation rate of public sector capital, we can write the dynamics of net worth of the public sector $v_t \equiv k_t - d_t$ as:

$$(5) \quad v_t - v_{t-1} = (r^* - \gamma) v_{t-1} + \tau_t - g_t - l_t, \quad l_t \equiv (r^* + \delta - r) k_{t-1}, \quad v_0 = (K_0 - D_0)/Y_0 \text{ given,}$$

where losses on public sector capital l_t indicate the amount by which the financial return (net of depreciation) on those assets falls short of the return on government bonds (i.e., the growth-corrected real interest rate). If the government plays no Ponzi games, the present-value budget constraint of the public sector implies that outstanding net worth of the public sector must be sufficient to cover the present discounted value of *primary* deficits (i.e., public consumption *plus* losses on public investment *minus* tax revenues):

$$(2') \quad \sum_{s=t}^{\infty} \beta^{t-s-1} [g_s + (r^* + \delta - r) k_{s-1} - \tau_s] \leq k_{t-1} - d_{t-1} = v_{t-1}.$$

If public sector capital earns a market rate of return, losses on public investment are zero and public sector capital can be de-budgeted from the flow and present-value budget constraints. More typically, the financial return on public sector capital net of depreciation is less than the market rate of interest, so that losses are made on public investment (i.e., $l_t > 0$). In that case, public sector capital must contribute to social welfare for otherwise there would be no reason to invest in it. We thus suppose that the government trades off public consumption versus public capital against the costs of tax distortions. The government thus minimizes the expected value of the following welfare loss criterion:

$$(3') \quad \Gamma \equiv \sum_{t=1}^{\infty} \frac{1}{2} (1+r^*-\gamma)^{-t} [\tau_t^2 + \chi(\bar{g}_t - g_t)^2 + \xi(\bar{k}_t - k_t)^2],$$

where $\bar{g}_t > 0$ denotes the bliss level of public consumption, $\bar{k}_t > 0$ stands for the bliss level of public sector capital and $\chi, \xi > 0$ are the priorities attached to reaching these bliss values, subject to the present-value budget constraint of the government (2'). It is still optimal to smooth the tax rates over time. Furthermore, it is optimal to smooth the shortfalls of public consumption from their bliss levels over time:

$$(6) \quad \tau_s = \tau_t \quad \text{and} \quad \bar{g}_s - g_s = \bar{g}_t - g_t, \quad \forall s \geq t.$$

Efficiency of public policy also implies an inverse relationship between the tax rate and the level of public consumption, since the marginal cost of a higher tax rate must equal the marginal benefit of a higher level of public consumption:

$$(7) \quad \tau_t = \chi(\bar{g}_t - g_t).$$

In other words, a high tax rate and high cost of public funds imply a low demand for public goods. Finally, the optimal level of the capital stock follows from the efficiency condition:

$$(8) \quad k_s = \bar{k}_s - \xi^{-1}(r^* + \delta - r)\tau_t, \quad s \geq t.$$

The optimum public sector capital stock is thus high if the tax rate and the cost of funds are low. It is also high if the return on public sector capital r and the political priority attached to public capital ξ are high. Upon substitution of the dynamic and static efficiency conditions (6)-(8) into the present-value budget government constraint, we obtain the expressions for the optimal tax rate, level of public consumption and change in public sector net worth:

$$(9) \quad \tau_t = \frac{\bar{g}_t^P + (r^* + \delta - r)\bar{k}_{t-1}^P + (r^* - \gamma)(d_{t-1} - k_{t-1})}{\left[1 + \chi^{-1} + (r^* + \delta - r)^2 \xi^{-1}\right]} \quad \text{and} \quad g_t = \bar{g}_t - \frac{\tau_t}{\chi}$$

$$(10) \quad v_t - v_{t-1} = -(\bar{g}_t - \bar{g}_t^P) - (r^* + \delta - r)(\bar{k}_t - \bar{k}_t^P).$$

What can we learn from these expressions? First, tax rates and short-falls of public consumption and public capital from their bliss values are smoothed over time. It does not make sense to rapidly bring down the tax rate for its own sake. Second, there is no reason to bring down the current level of government debt or to restore the net worth of the public sector. Third, permanent increases in public consumption and losses on public investment must be financed by a higher tax rate or a lower level of public consumption. A high public debt or low net worth of the public sector implies a bigger debt burden and necessitates a higher level of the tax rate or a lower level of public consumption. Fourth, temporary increases (or decreases) in the desired and actual levels of public consumption and public capital like temporary recessions (booms) require government deficits (surpluses) and accumulate (bringing down) of government debt. Fifth, that part of public investment that generates a market rate of return can be financed by government deficits and running up a government debt. The future return on public capital is then sufficient to pay for the interest and principal on the accumulated debt. Sixth, expected future increases in public consumption or public capital demands running down government debt or building up assets by running a surplus to generate sufficient interest revenues to pay for the increase in future public spending. The net worth of the public sector thus increases if the target is to increase public consumption and (to the extent that public investment is loss-making) increase public capital in the future. Finally, whether the government uses any budgetary slack for cutting down tax rates or raising public consumption and capital depends on political preferences.

The Maastricht focus on the gross government debt position is thus clearly misleading. A better picture is painted by the net worth of the public sector. It is instructive to point this out with the aid of Dutch public sector data (Bos, 2007). The net worth of the Dutch public sector includes net present value of natural gas revenues, which declined from 90% of GDP in 1970 to about 20% of GDP today. Net worth of the public sector also needs to include the value of the fixed capital stock of the government (infrastructure, buildings, computers, etc.). This rose from 55% of GDP in 1970 to 74% of GDP in 1983 and then gradually declined to about 60% of GDP today despite gradual reductions in the ratio of gross government debt to GDP from over 70% of GDP during the eighties to below 50% of GDP today (after a gradual rise from 38% of GDP in 1977). The Dutch have brought down government debt since the eighties but suffered during the same period

a deterioration of the net worth position of the public sector. The picture is not that dissimilar for much of the other European countries.

One reason is that the Maastricht rules and the Stability and Growth Pact elicited many European governments to engage in accounting gimmickry. Countries are tempted to shift expenditure below the line and use creative accounting, fiscal gimmickry, privatisation and other one-off operations to meet the fiscal targets especially if the deficit is in danger of rising above its target (e.g., Dafflon and Rossi, 1999; Easterly, 1999; Milesi-Ferretti, 2003; Miles-Ferretti and Moriyama, 2004; Alt and Lassen, 2005; Von Hagen and Wolf, 2005; Koen and van den Noord, 2006; Buti, Martins and Turrini, 2006). There may be good efficiency grounds for privatisation but meeting tough deficit targets is a bad rationale for privatisation. Furthermore, the Maastricht rules and the subsequent Stability and Growth Pact may have had the undesirable effect of reducing public investment relatively more than unproductive government spending (e.g., Blanchard and Giavazzi, 2004; Beetsma and Debrun, 2004, 2007), but the empirical evidence that the Pact has crowded out public investment is not very convincing (Galí and Perotti, 2003; Turrini, 2004). If the targets are too loose and make an exception for public investment, countries will try to push all kinds of so-called investment projects with dubious financial returns under this heading. In that case, an independent fiscal council or a committee of wise persons may be called upon to take on the task of a more comprehensive fiscal surveillance comprising both government assets and liabilities and to reduce the incentives to manipulate the data to meet the targets. It also helps if the minister of finance is given the power to set the agenda (e.g., Hallerberg and von Hagen, 1999).

2.3. Structural Reforms and the Short-Run Fiscal Stance

A big issue in the debate on the most appropriate budgetary policy is whether it is appropriate to relax the budget deficit in order to make possible structural reforms and increase the likelihood of their success. Many reforms lead to short-run unemployment and output losses before leading to a long-run boost in employment and output. The government may then find it sensible to boost aggregate demand by temporarily raising spending or cutting taxes to soften the short-run blow to unemployment. This argument gains more weight if the boost to potential output occurs fairly quickly while actual output only adjusts gradually to potential output. Structural reforms such as reducing the progressivity of the tax system or cutting welfare benefits tend to lower the effectiveness of automatic stabilizers and thus may require discretionary fiscal policy as well.

Of course, it may be necessary to compensate the “losers” of reforms in order to get political support for structural reforms such as a tough competition policy and reducing trade

protection (e.g., Pierson, 2001). This may require some short-run leeway in the government budget as well. Since politicians only have limited “political capital” to enact unpopular measures, they may find it worthwhile to compensate the “losers” in order to have more political capital left for other reforms (Eichengreen and Wyplosz, 1998). If structural reforms are costly in the short run, the government has a partisan character and discounts the future heavily; there is a bias towards public sectors deficits and against structural reforms (Beetsma and Debrun, 2004). Fiscal constraints like those imposed by the Maastricht rules and the Stability and Growth Pact reduce the deficit bias, but accentuate the bias against reform. According to this view, there may thus be a case for an escape clause in the Maastricht rules and the SGP for structural reforms with short-run budgetary costs. Excessively tight fiscal rules would harm the implementation of the structural reforms of the Lisbon agenda. Hence, the elements of flexibility introduced in the Stability and Growth Pact in 2005 should be fully utilized for this purpose.

Within the normative framework of budgetary policy set out in sections 2.1 and 2.2, we can allow for structural reforms by treating it as a public investment with short-run costs and a positive long-rate of return (i.e., an increase in the bliss level of the stock of “public sector capital” with $r > r^* + \delta$). Indeed, structural reforms typically have a positive effect on economic activity in the medium and long run but a negative effect on output in the short run at least for labour market reforms (IMF, 2004). Evidence from cross-country studies also suggests that fiscal tightening reduces the chance of implementing labour market reforms, although there does not seem to be such an effect from product market or financial reforms (IMF, 2004; Annet and Debrun, 2004; Duval and Elmeskov, 2005; Duval, 2006; Heinemann, 2006). Labour market reforms also seem to be associated with short-run budgetary deterioration (Deroose and Turrini, 2005).

A glance at the expressions for the optimal tax rate, level of public consumption and net worth of the public sector (8)-(10), suggests that it is optimal to immediately lower the tax rate and boost the level of public consumption in anticipation of the fruits of structural reform. A modest begin with reforms should be made as well. This is made possible by running down the net worth of the public sector, which is achieved by running a deficit and accumulating government debt to cope with the short-run costs of structural reforms. In other words, a looser short-run fiscal stance can help to offset some of the short-run costs of structural reforms. In fact, this contradicts empirical evidence which suggests that reforms are generally followed by a cut in government spending (Hoeller et al., 2006). This may, however, be due to many countries having to grapple with the double task of fiscal consolidation and structural reforms.

3. The Dutch Fiscal Policy Framework: Towards Cautious and Trend-Based Budgeting³

Before we proceed to a discussion of the principles of prudent budgetary policy in section 4, we motivate this adaptation of the traditional theory of budgetary policy with the Dutch practice with prudent and trend-based budgeting during the period 1994-2007. This gives the inspiration for our revised set of guidelines for cautious budgetary policies. Section 5 discusses some political implications and pitfalls of prudent budgetary policy making.

3.1. Historical Precedents Up To 1994

Three periods can be distinguished in the history of Dutch fiscal policy making. During the long period of 1814-1956, the balanced budget appeared as an official principle. It was accompanied by the objective of no or at most a limited increase in taxation and, in case of excessive debt, the priority was to reduce the debt to a sustainable level. This *classical* fiscal policy norm stressed the importance of limited government in order not to hinder entrepreneurship and saw no role for fiscal policy in stimulation aggregate demand. During 1860-89 new loans were allowed for rail infrastructure and other extraordinary expenditure while during 1890-1906 new loans were only allowed for specific temporary peaks in expenditures. The *golden rule of government finance* was used during 1907-39, so that new loans were permitted for expenditures that generated revenues at least equal to the foregone interest plus redemption of the loans. New loans were allowed for all *capital* expenditures and high levels of public debt had to be gradually eliminated by surpluses.

N.G. Pierson, President of the Dutch Central Bank, Finance Minister and Prime Minister during the long period 1868-1901 and respected by contemporaries like Marshall, Hayek, Edgeworth and Bohm Bawerk, was in favour of both the golden rule of finance for productive public investment and low and stable tax rates (i.e., tax smoothing). For investments with a very *uncertain* rate of return, Pierson preferred temporary increases in the tax rate. Temporary budget deficits were allowed in situations of war and temporary recessions. More details can be found in his classic textbook (Pierson, 1890).

During the period 1957-79 the Netherlands shifted its policy and employed *Keynesian* deficit norms. The objective was to better manage the national economy using a bigger government deficit to pump prime the economy and cut unemployment while using a smaller deficit to dampen inflationary pressures. Anti-cyclical deficit norms were employed during 1957-1960 while a trend-based deficit norm to match the surplus of private saving was used during

³ This section is based on Bos (2007), who presents a clear and useful historical overview of the Dutch fiscal framework and pays ample attention to the practice of cautious and trend-based budgeting.

1960-79. During 1975-79 it was agreed to limit the increase in the tax burden to 1%-point of national income per year.

From 1980 onwards the Netherlands has moved to norms for reducing the government deficit and debt. The main reason for this shift in policy was the realization that the rapid rise of public spending and tax and social security contributions had become a drag on economic growth. There was a maximum on the actual deficit during 1980-82 followed by a time path for gradually reducing the actual deficit during 1983-1994. From 1993 onwards European norms for actual deficit and debt were imposed.

3.2. The Zalm Norms for the Public Budget 1994-2007

During 1994-2007 there was a shift towards trend-based budgeting with strict expenditure ceilings and a priority for reducing government debt. From 2002 onwards this has been embedded in a forward-looking approach to public finance. Gerrit Zalm who was Minister of Finance during this long period, thus supplemented the Maastricht norms and the Stability and Growth Pact for the deficit and government debt designed to focus on curbing government debt with a policy of trend-based budgeting with the following features:

- cautious macroeconomic assumptions;
- net real expenditure ceilings for the whole four-year term of government;
- one main decision-making moment each year;
- additional measures are taken and the expenditure ceilings no longer apply if a signal value for the government deficit of 2 or 2.5% of GDP is exceeded;
- an investment fund was filled with 40% of the Dutch natural gas revenues and the remaining gas revenues were used for debt reduction;
- incentives and cost-benefit analysis were used as important official tools for controlling, managing and reorganizing public expenditures.

The combination of cautious budgets, medium-run real expenditure ceilings and only one political decision-making moment each year gives less risk of budgetary turmoil from economic setbacks and thus more peace and quiet in the budget process. Hence, more political time and energy can be used for important matters. The automatic stabilizers on the income side of the budget were allowed to operate freely. Income setbacks (e.g., in the budgeted revenues from income or corporation taxes) thus do not necessitate any spending cuts or tax hikes, but are accommodated by a higher deficit. In order to obtain a better insight into the sustainability of the financial position of the government, the minister of finance first started using the *structural* budget balance (corrected for the business cycle) and the *primary* budget balance (excluding

interest payments but including interest receipts and dividend revenues) and then moved on to using the *robust* budget balance (excluding interest payments, dividend revenues and changes in natural gas revenues). The primary budget balance gave an inaccurate picture. For example, selling public assets to reduce government debt typically changes the primary budget balance but not the robust budget balance. Of course, as long as the discounted value of dividends on public assets corresponds to the interest payments saved by reducing debt, privatization should not affect the sustainability of government finances. Apart for a bigger focus on sustainable budgetary policies, Minister Zalm employed cautious assumptions about the budgeted growth in national income, the tax base and tax revenues.

4. Principles of Prudent Public Budgeting

Here we extend the traditional principles of public budgeting to allow for prudence. This is meant to give the analytical framework for the cautious and trend-based budgeting procedures used and implemented in the Netherlands during the period 1994-2007. To do this, we must depart from the certainty-equivalent framework of section 2. We thus explicitly allow for a stochastic framework with uncertainty about future national income and thus uncertainty about the future tax base and future tax revenues. We will also allow for uncertainty about the returns on public investment and uncertainty about the short-run impact of structural reforms. To allow for prudence, the government does not minimize the expected value of the welfare loss function Γ but maximizes the criterion (Whittle, 1990):

$$(11) \quad \Phi(\theta) \equiv \ln\left(\mathbb{E}\left[-\exp(\theta\Gamma)/d_0, y_0\right]\right)/\theta, \quad \text{where} \quad \Gamma \equiv \sum_{t=1}^{\infty} \frac{1}{2}(1+r^*-\gamma)^{-t} \tau_t^2$$

and $\theta > 0$ indicates the degree of prudence or caution of the government. The risk-neutral case corresponds to $\Phi(\theta) \rightarrow -\mathbb{E}[\Gamma/d_0, y_0]$ as $\theta \rightarrow 0$. Two governments may share the same welfare criterion under certainty, but their aversion to risk may differ. To capture this, the government maximizes (11). The coefficient of absolute risk aversion with respect to the criterion Γ , that is $\theta \equiv -U''/U' > 0$, also captures prudence, since $U''' = \theta^3 \exp(\theta \Gamma) > 0$ (Kimball, 1990). Prudence implies the willingness to avoid shocks with *adverse* consequences. The parameter θ thus captures the degree of *prudence* or *pessimism*. Problem (11) can alternatively be solved as a deterministic problem with either increased ambition as in (14) below or with a prudent adjustment to national income (cf., Don, 2007 for the static case).

4.1. Precautionary Taxation and Prudent Fiscal Policy with Uncertain Future Revenues

As in section 2.1, we first consider the situation where there is exogenous public spending and no public capital formation and no structural reforms. We work with a first-order Taylor-series expansion of the government budget constraint (1')

$$(12) \quad d_t - d_{t-1} = (r^* - \gamma) d_{t-1} + g_t - \tau_t - \bar{\tau}_t (y_t - 1), \quad d_0 = D_0/Y_0 \text{ given,}$$

where $\bar{\tau}_t$ indicates the tax rate around which the government budget constraint is linearized. We assume an AR(1) process for deviations of national income from trend where ρ is the autoregressive parameter and the long-run expected value of y_t is rigged to unity:

$$(13) \quad y_t = 1 - \rho + \rho y_{t-1} + \varepsilon_t, \quad \varepsilon_t \square \text{IN}(0, \sigma_t^2), \quad |\rho| < 1, \quad \beta = 1 + r^* - \gamma \text{ and } \sigma_t^2 = \sigma^2 \beta^t.$$

Temporary shocks to national income correspond to $\rho = 0$ and permanent shocks to $\rho = 1$. One can easily allow for more general ARMA-processes for national income and the tax base than (4). The government maximizes (11) subject to the government budget constraint (12) and the stochastic process generating deviations of national income from trend (13). The government effectively plays a game against nature and solves the min-max problem:

$$(14) \quad \text{Min}_{\tau_1, \tau_2, \dots} \text{Max}_{\varepsilon_1, \varepsilon_2, \dots} \sum_{t=1}^{\infty} \frac{1}{2} (\beta^{-t} \tau_t^2 - \varepsilon_t^2 / \theta \sigma_t^2) \text{ subject to (12), (13) and } \beta = 1 + r^* - \gamma.$$

The government thus assumes the worst by postulating that the national income disturbances are drawn in a way that maximizes this criterion. The optimality conditions for this min-max problem are from the perspective of time t onwards:

$$(15) \quad \tau_s^B = \tau_{s-1}^B \quad \text{and} \quad \rho \varepsilon_{s+1}^B = \beta \varepsilon_s^B + (\theta \sigma^2 \beta^2 \bar{\tau}_t) \tau_t^B, \quad \forall s \geq t,$$

where the superscript B denotes the budgeted rather than mathematically expected outcomes. The second difference equation for the budgeted shocks is unstable, since $|\beta/\rho| > 1$. Given that (15) also requires that the budgeted tax rates are smoothed over time, the budgeted underestimation of the error in the data generating process of the national income and the tax base must be given by:

$$(16) \quad \varepsilon_s^B = -\left(\frac{\theta\sigma^2\beta\bar{\tau}_t}{\beta-\rho}\right)\tau_t^B < 0, \quad \forall s \geq t.$$

Hence, the extent by which the government underestimates/downplays shocks to the data generating process for the tax base is large if it is relatively prudent, variances and persistence of shocks are large, and the tax rate is high. We thus depart from the certainty equivalence principle which sets $\varepsilon_s^B = 0, \forall s \geq t$ and is valid only if $\theta = 0$. Substituting (16) into (13) and solving for the budgeted national income and tax base yields the dynamics of national income:

$$(17) \quad y_{t-1+s}^B = 1 + \rho^s(y_{t-1} - 1) + \sum_{s'=1}^s \rho^{s-s'} \varepsilon_{t-1+s'}^B = 1 + \rho^s(y_{t-1} - 1) - \left(\frac{\theta\sigma^2\beta\bar{\tau}_t}{\beta-\rho}\right)\left(\frac{1-\rho^s}{1-\rho}\right)\tau_t^B, \quad \forall s \geq 1.$$

Upon substitution of (17) into the present-value budget constraint (2), we solve for the tax rate:

$$(18) \quad \tau_t = \tau_t^B = \left[(\beta-1)d_{t-1} + g_t^P - \rho\bar{\tau}_t \left(\frac{\beta-1}{\beta-\rho} \right) (y_{t-1} - 1) \right] / \left[1 - \theta\sigma^2\bar{\tau}_t^2 \left(\frac{\beta}{\beta-\rho} \right)^2 \right],$$

where $g_t^P \equiv (\beta-1)\sum_{s=t}^{\infty} \beta^{t-s-1} g_s$ indicates the permanent level of public spending. Using (18) in the government budget constraint (12) yields the expected mutation in the debt-GDP ratio (i.e., the expected growth-corrected public sector deficit):

$$(19) \quad E_{t-1}(d_t - d_{t-1}) = \left[g_t - g_t^P - \beta \left(\frac{1-\rho}{\beta-\rho} \right) \bar{\tau}_t (y_{t-1} - 1) \right] - \theta\sigma^2\bar{\tau}_t^2 \left(\frac{\beta}{\beta-\rho} \right)^2 \tau_t.$$

The key insights follow from expressions (16), (18) and (19). A prudent minister of finance underestimates future GDP and thus underestimates the future tax base and tax revenues. As a consequence, the minister sets a higher tax rate just to be on the safe side. This may be referred to as the principle of *precautionary taxation*. The statistically speaking inevitable future windfall revenues permit gradual reductions in public debt and thus also gradual reductions in debt service and the tax rate (on top of any gradual debt reductions necessary to finance efficiently projected

increases in government spending). Hence, prudence implies a departure from the principle of tax smoothing.

CASE: TEMPORARY SHOCKS

With temporary shocks ($\rho = 0$ and $y_t = 1 + \varepsilon_t$), the government deliberately budgets future levels of national income and the tax base that are lower than the statistically expected value of national income and the tax base:

$$(17') \quad y_t^B = 1 - (\theta\sigma^2\bar{\tau}_t)\tau_t^B < 1 \quad \text{if } \theta\sigma^2 > 0.$$

The expected deficit is thus less than temporary public spending or the expected surplus is greater than is warranted by projected hikes in public spending, especially if the degree of prudence, the variance of shocks to the tax base and the tax rate are relatively large:

$$(19') \quad E_{t-1}(d_t - d_{t-1}) = g_t - g_t^P - \bar{\tau}_t(y_{t-1} - 1) - \theta\sigma^2\bar{\tau}_t^2\tau_t < g_t - g_t^P - \bar{\tau}_t(y_{t-1} - 1).$$

The optimal tax rate for a prudent minister of finance facing temporary shocks becomes:

$$(18') \quad \tau_t = \left(\frac{(\beta - 1)d_{t-1} + g_t^P}{1 - \theta\sigma^2\bar{\tau}_t^2} \right) > (\beta - 1)d_{t-1} + g_t^P \quad \text{if } \theta\sigma^2 > 0.$$

A temporary recession and fall in the tax base or a temporary increase in public spending (e.g., due to a war) are accommodated by a higher deficit, not by a higher tax rate.

CASE: PERMANENT SHOCKS

With permanent shocks ($\rho = 1$ and $y_t = y_{t-1} + \varepsilon_t$), we have:

$$(18'') \quad \tau_t = \left(\frac{(\beta - 1)d_{t-1} + g_t^P - \bar{\tau}_t(y_{t-1} - 1)}{1 - \theta\sigma^2\bar{\tau}_t^2 \left(\frac{\beta}{\beta - 1} \right)^2} \right) > (\beta - 1)d_{t-1} + g_t^P - \bar{\tau}_t(y_{t-1} - 1) \quad \text{if } \theta\sigma^2 > 0.$$

$$(19'') \quad E_{t-1}(d_t - d_{t-1}) = g_t - g_t^P - \theta \sigma^2 \bar{\tau}_t^2 \left(\frac{\beta}{\beta - 1} \right)^2 \tau_t < g_t - g_t^P.$$

In contrast to temporary shocks, permanent shocks to the national income and the tax base or to public spending are accommodated by the tax rate. A permanent fall in national income (or increase in public spending) thus induces a permanent increase in the tax rate and no change in the deficit. The correction for prudence is much greater for permanent than temporary shocks, so that the precautionary level of taxation is much higher.

In general, we see from (18) and (19) that future increases in government spending (e.g., due to graying of the population) imply that permanent public spending exceeds current spending, so the government brings down debt and debt service to pay for higher public spending in the future. Unless one anticipates higher public spending or a recession in the future, there is no reason to cut an initially high level of public debt. Instead, they necessitate a high tax rate to cover debt service. More importantly, we see from (16) that a higher degree of persistence of stochastic shocks to national income implies that the budgeted underestimation of the tax base is larger. Persistent shocks thus make a minister of finance more prudent. A high persistence of shocks to national income and the tax base (high value of ρ) implies more precautionary taxation and bigger reductions in government debt.

4.2. Prudent Budgetary Policy with Endogenous Public Spending

Government have to decide whether windfall revenues arising from prudent budgetary policy should be used for debt reduction, tax cuts or public spending hikes. We therefore now introduce endogenous public spending by including pure public consumption goods in social welfare. The government now trades off high levels of public spending versus small tax distortions. It does this by maximizing the following welfare function modified for caution:

$$(11') \quad \Phi(\theta) \equiv \ln \left(E \left[-\exp \left(\theta \sum_{t=1}^{\infty} \frac{1}{2} \beta^{-t} [\tau_t^2 + \chi(\bar{g}_t - g_t)^2] \right) / d_0, y_0 \right] \right) / \theta,$$

where $\bar{g}_t > 0$ indicates the bliss level of public spending and $\chi > 0$ the priority attached to higher public spending, subject to the government budget constraint (12) and the data generation process for the national income (13). As before, the expressions (15), (16) and (17) must hold. The

government also smoothes the shortfall of public spending from its bliss value and ensures that the marginal benefit of public spending equals the cost of public funds, i.e., the tax rate:

$$(20) \quad \bar{g}_s - g_s^B = \bar{g}_t - g_t \quad \text{and} \quad \chi(\bar{g}_s - g_s^B) = \tau_s^B = \tau_t, \quad \forall s \geq t.$$

A high tax rate or cost of public funds thus implies a low demand for public goods. Upon substituting (17) and (20) into the present-value government budget constraint and solving for the optimal tax rate and deficit, we obtain:

$$(18''') \quad \tau_t = \tau_t^B = \frac{(\beta-1)d_{t-1} + \bar{g}_{pt} - \rho\bar{\tau}_t \left(\frac{\beta-1}{\beta-\rho} \right) (y_{t-1} - 1)}{1 + \chi^{-1} - \theta\sigma^2\bar{\tau}_t^2 \left(\frac{\beta}{\beta-\rho} \right)^2}$$

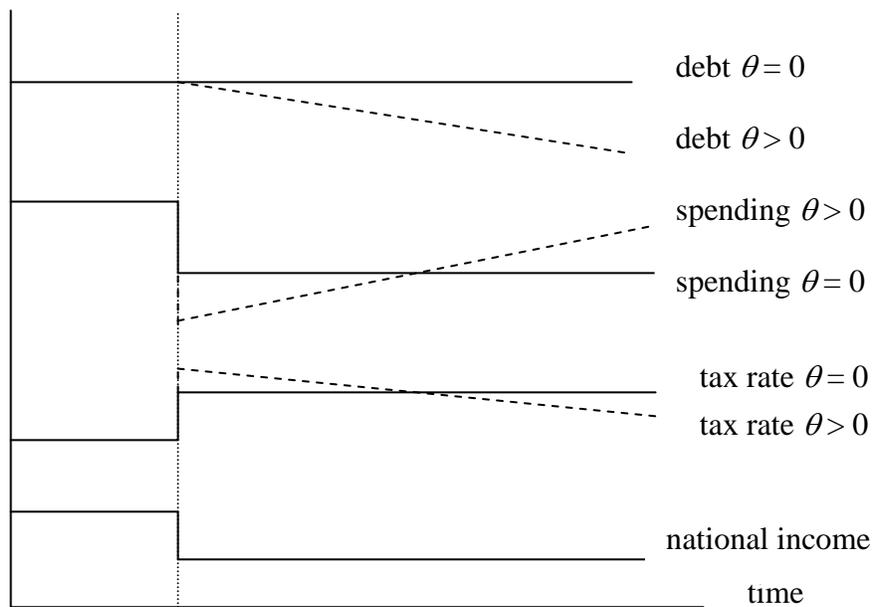
$$(19''') \quad E_{t-1}(d_t - d_{t-1}) = \left[\bar{g}_t - \bar{g}_{pt} - \beta \left(\frac{1-\rho}{\beta-\rho} \right) \bar{\tau}_t (y_{t-1} - 1) \right] - \theta\sigma^2\bar{\tau}_t^2 \left(\frac{\beta}{\beta-\rho} \right)^2 \tau_t.$$

More right-wing governments with a lower priority to public spending (lower value of χ) have lower tax rates and thus their correction term for prudence is smaller as well. As a precautionary measure, the government sets a higher tax rate and also a lower level of public spending. Over time inevitably windfall revenues appear, so the tax rate gradually falls and public spending gradually increases as debt service diminishes. Figure 1 illustrates what happens with a permanent fall in national income.

On impact the tax rate is higher and the level of public spending is lower than without prudence. On average the government can thus expect windfall revenues that enable debt to be paid off. The accompanying fall in interest payments permit a gradual rise in public spending and fall in the tax rate. In the very long run the government builds up sufficient interest-bearing assets to generate just sufficient interest revenue to pay for each period for the long-run level of public spending and to compensate for the fall in the tax base. In contrast to Barro's tax smoothing result, the tax rate converges asymptotically to zero. In addition, public spending slowly climbs to its bliss value.

Summing up, we have established that a prudent government engages in precautionary taxation and under-spending and thus lowers government debt (or accumulate assets) to safeguard itself against future adverse shocks to national income and the tax base. Permanent windfall revenues are used to lower the tax rate and boost public spending while temporary windfall revenues are used to cut public debt. In the long run a prudent government accumulates sufficient assets and interest income to fully pay for the bliss level of public spending, so that in the long run there is no need for distortionary labour taxation.

Figure 1: Prudent Reaction to Permanent Fall in the Tax Base



It is straightforward to extend our analysis to allow for spending on unemployment benefits. With unemployment given by Okun's law, we find that the degree of underestimation of the tax base is larger if the unemployment benefit is higher. Effectively, the higher the tax rate and the unemployment benefit, the more sensitive tax revenues and the benefit bill are to business cycle variations and the more prudent the government has to be.

The result that governments should optimally accumulate claims on the private sector rather than build up debt and use the interest revenue to get rid of tax distortions in labour markets is well known from the micro-founded optimal taxation literature. In representative-agent models with government commitment, this result holds irrespective of whether there is capital accumulation or not and of whether asset markets are *complete* (Chari, Christiano and Kehoe, 1994) or *incomplete*

(Aiyagari et al., 2002). However, with complete markets this requires the planner to be able to set an initial tax on debt in order to obtain an instantaneous and non-distortionary wealth transfer. With incomplete markets the same effect can be obtained in the long run through precautionary saving of the government. Note that in our case the government does something similar by precautionary taxation and under-spending. With heterogeneous agents households accumulate government debt as buffer against individual idiosyncratic shocks while the planner prefers to accumulate private debt as buffer against aggregate risk (Aiyagari, 1995; Aiyagari and McGrattan, 1998). In that case, only if idiosyncratic risk is more important than aggregate risk and no other assets that allow self-insurance, government debt will be positive on the long run (Shin, 2006).

4.3. Prudent Budgetary Policy with Public Investment with Uncertain Returns

Investment is fraught with uncertainties and public investment is certainly no exception. The main reason is that the return on investment projects is seldom known precisely when the decision has to be made to undertake them or not. In that case, it is straightforward to show that it is prudent to overestimate project costs and underestimate future returns on public investment projects. This follows directly from the principle of precautionary behaviour. In fact, there are also many political, bureaucrats and business reasons why political decision makers, civil servants and project developers tend to over-estimate future returns and under-estimate project costs. This way they hope to ensure that investment projects get accepted in the first place. In this sense, a prudent approach to public investment can also be seen as correction on such “distortions to succeed”. It thus follows that, even for public investment projects that are expected from a statistical point of view to satisfy the golden rule of public finance, it is prudent to deviate from the golden rule and borrow less than the outlays of the investment project. Effectively, a prudent minister of finance makes sure to err on the safe side and overestimates costs and underestimates returns. The implication of this approach is that part of the investment projects have to be financed by taxation and possibly cutting government consumption. N.G. Pierson already made the point that investments with a very *uncertain* rate of return call for temporary increases in the tax rate (Pierson, 1890). If once the project is completed, costs turn out to be less than budgeted and returns are larger than budgeted, the minister of finance is able to gradually bring down debt and debt service. This would make then room for some modest cuts in the tax rate and possible rise in public consumption.

The key insight is that prudence induces precautionary taxation and under-spending on public consumption and investment goods. As a result, net worth of the public sector increases over time and the government can be expected to gradually lower the tax burden and gradually increase spending on consumption goods and capital.

4.4. Prudent Budgetary Policy with Uncertainty about Impact of Structural Reforms

In section 2.3 we argued that the successful implementation of structural reforms may require some relaxation of the budget deficit in the short run. However, not everybody agrees with the idea that structural reforms require budgetary lenience in the short run. The main proponents of this critique can be grouped under the heading of the *Brussels-Frankfurt consensus* as coined by the Sapir Report (Sapir et al., 2004). The structural reforms demanded by the Lisbon objectives should, according to this view, go together with a tight implementation of the Maastricht rules and the Stability and Growth Pact. A tight fiscal straightjacket and structural forms are thus seen to be compatible. A recent analysis of the tradeoffs and complementarities between fiscal discipline and structural reforms (Buti, Röger and Turrini, 2007) highlights these two positions on whether structural reforms should be associated with short-run fiscal loosening or tightening. Sometimes there simply is no alternative and structural forms needed to boost long-run growth must be implemented at the same time that budgetary imbalances need to be redressed (e.g., Rodrik, 1996; Calmfors, 2001). Fiscal tightening may also serve as a signal that government are tough and serious about reform (Deroose and Turrini, 2005). In any case, reforms of tax and benefit systems may not necessarily weaken automatic stabilizers anyway (Buti et al., 2003). The Brussels-Frankfurt consensus would argue that structural reforms need not require compensation of losers or pork barrel money to muster political support and, even if it did, the funds would have to be found by seeking budget cuts elsewhere in countries with unsustainable budget positions. Of course, unsustainable deficits need to be tackled anyway. If reforms need money to soften things up, the job of fiscal consolidation is extra tough, but the principle of aiding and increasing the probability of success of reforms remains.

From the point of view of our analysis of prudent budgetary policy, it thus makes sense to allow for uncertainty about the short-run effects of structural reforms. It also makes sense to allow for uncertainty about the long-run benefits of structural reforms, because it is not clear whether the promised benefits actually materialize. Any upswing may be due to cyclical factors as well as structural reforms. Clearly, then a prudent minister of finance errs on the safe side and downplays the long-run benefits of reform and exaggerates the short-run costs of reform. This

does not mean that a prudent minister of finance resists structural reform all together, but that he will allocate fewer funds to soften the short-run impact of reforms. In fact, in March 2005 the Stability and Growth Pact of the EMU has indeed been revised to take account of structural reforms in the sense that EU member states are allowed to deviate from the medium-term budgetary objective and the adjustment towards it if they undertake structural reforms with clear long-run cost-saving effects including raising the potential growth rate of the economy. Special attention was paid to pension reforms that introduce multi-pillar systems which include a mandatory, fully funded pillar. The revision of the Pact also takes account of implicit liabilities.

COMMENT ON SWEDISH REFORMS

What can we say about prudent budgetary policy in the Swedish context? Although the Swedish economy has a well-educated labour force and substantially deregulated product and labour markets, it has a relatively high replacement rate, substantial employment protection, active labour market policy, high degrees of unionization and extended coverage, high share of government employment, high national income share of government spending, and high average and marginal tax rates on labour (EEAG, 2007). Sweden has also been society with a high degree of equity in terms of gross income and household income, but inequality has risen since 1994. Sweden has enjoyed a cyclical recovery from the slowdown of growth and dramatic deterioration of their fiscal positions during the early 1990s. Still, some commentators argue that the recent good growth performance of the Swedish economy is due to implemented structural reforms. There is thus some dispute about whether the Swedish gains in output are temporary or permanent and whether they are induced by demand-side policies (e.g., in response to the currency depreciations after the crisis of the early 1990s) or supply-side reform. Clearly, this makes a lot of difference about what should be prescribed for the fiscal stance. The acute fiscal crises with a whopping fiscal deficit of 12% of GDP in 1994 induced a new consensus on the need for fiscal discipline in Sweden (much more so than in countries with creeping fiscal crises). In fact, fiscal consolidation with numerical targets for deficits and government debt, expenditure ceilings and the tough practice of financing “new for old” became the top concern of the social-democratic government that took office in 1994. An important motivation was the fear that fiscal profligacy would lead to currency crises and inflation. It thus may not make sense to make less speedy progress with fiscal consolidation for Sweden unless substantial progress is made with structural reforms, but these reforms may not be undertaken unless losers are compensated and opposition to reforms are pacified. In any case, it is prudent to undertake structural reforms that are likely to lead to long-lasting gains in economic activity and cost savings.

5. Political Considerations

We now consider some political considerations of prudent budgetary policy. To focus our mind, we abstract from public investment and structural reforms but the extensions to allow for these are straightforward. We first argue that spending ministers fighting for a share of the cake will lead to *intratemporal* distortions with a too much spending and too high tax rates. There will also be *intertemporal* distortions generating a bias towards excessive public debt and a tendency to postpone taxes and spending cuts. In a more general framework, there would also be a tendency to postpone and not to undertake sufficient levels of public investment and structural reforms. We then show that a *strong* minister finance with at least as much voting rights as the spending ministers combined can overcome the intratemporal distortions while a *prudent* minister of finance can offset the intertemporal distortions. Finally, we warn against too much prudence as this can be used for short-run manipulation of election outcomes.

5.1. Squabbling Spending Ministers

Section 5.2 will show that a political economy case can be made for prudent budgetary policy in a setting where the minister of finance has to fend off lots of spending ministers. First, we discuss the dynamic common-pool problem for budgetary policies with fragmented government. Each of the spending ministers wants a large share of revenues and is not particularly interested in balancing the budget. *Ex ante* the minister of finance realizes that *ex post* it is tougher to discipline the spending ministers in his cabinet. If the minister of finance is not in firm control, the unfettered claims of the spending ministers give rise to a common-pool problem. This implies an upward bias in public spending and excessive accumulation of government debt as discussed in Persson and Tabellini (2000, Chapter 13.1 and 13.2).⁴ It also induces a departure from tax smoothing, since spending ministers try to defer taxation and spending cuts. Such biases occur as each spending minister tries to get its hands on scarce public revenue before the other spending ministers get a chance to do so. To make the point, we allow for N spending ministers. To keep matters simple, we consider only two time periods. If there is no inherited debt and the rate of

⁴ The spending bias resulting from fiscal illusion (i.e., the overestimation of the benefit of a particular activity) may be contained by appropriate budgetary processes, which depend on what kind of uncertainty dominates the budget process (Von Hagen and Harden, 1995). Another way to constrain profligate spending ministers is to delegate authority to monitor and punish to the minister of finance. This may work better in countries with non-proportional representation and one-party states (Hallerberg and Von Hagen, 1997). Appointment of a spending-averse minister of finance is better than binding budget targets imposed by the prime minister, because it induces spending ministers to propose less ambitious budgets and appoint less spending-prone bureaucrats (Swank, 2002).

interest and the discount rate are zero, we have $\varepsilon_t = d_0 = d_2 = 0$ and $\beta = 1$. The present-value government budget constraint thus simplifies to:

$$(21) \quad d_1 = \sum_{i=1}^N g_{1i} - \tau_1 = \tau_2 + \bar{\tau}\varepsilon_2 - \sum_{i=1}^N g_{2i}, \quad \varepsilon_2 \square \text{IN}(0, \sigma^2),$$

where g_{it} is spending by minister i at time t . We focus on symmetric outcomes and assume that priorities and bliss values are time-invariant and the same for each public spending category, so that minister i minimizes the expected welfare loss:

$$(22) \quad L_i \equiv \text{E} \left[\frac{1}{2} \sum_{t=1}^2 \left(\tau_t^2 + \chi (\bar{g} - g_{it})^2 \right) \right].$$

We first consider the cooperative outcome, where the minister of finance and the spending ministers jointly minimize the expected value of the social welfare loss $L_1 + \dots + L_N$ subject to (21) in the absence of prudence. We then contrast this with the non-cooperative outcome in the absence of prudence where spending ministers *lead* in their spending claims and the minister of finance *follows* in setting the tax rate and public debt. We show that the non-cooperative outcome leads to the following distortions: a tilt towards future rather than present taxation, a tilt towards present rather than future public consumption, excessive accumulation of government debt, and an upward bias in total public spending and the average tax rate.

COOPERATIVE OUTCOME

The cooperative outcome in the absence of prudence is characterized by:

$$(23) \quad \begin{aligned} g_{1i}^C = \text{E} \left(g_{2i}^C \right) &= \left(\frac{\chi}{\chi + N^2} \right) \bar{g} < \bar{g}, \quad g_{2i}^C = g_{1i}^C + \left(\frac{N}{\chi + N^2} \right) \tau \varepsilon_2, \quad i = 1, \dots, N, \quad d_1^C = 0, \\ \tau_1^C = \text{E}(\tau_2^C) &= \left(\frac{\chi}{\chi + N^2} \right) N \bar{g}, \quad \text{and} \quad \tau_2^C = \tau_1^C - \left(\frac{\chi}{\chi + N^2} \right) \tau \varepsilon_2, \end{aligned}$$

where superscript C indicates the cooperative outcome. Ex ante the social planner smooths levels of public spending and the tax rate over time. Since there are no changes in the targets for government spending or the tax base over time, there is no need for government debt. A bigger priority to public goods χ leads to higher spending and tax rates.

NASH OUTCOME WITH PRE-COMMITMENT

The non-cooperative outcome with pre-commitment of each spending minister to future spending levels leads to the Nash equilibrium with pre-commitment (indicated by superscript P):

$$(24) \quad g_{ii}^c = E(g_{2i}^c) < g_{ii}^p = E(g_{2i}^p) = \left(\frac{\chi}{\chi + N} \right) \bar{g} < \bar{g}, \quad d_1^p = 0, \quad \tau_1^c = E(\tau_2^c) < \tau_1^p = E(\tau_2^p) = \left(\frac{\chi}{\chi + N} \right) N\bar{g},$$

In the non-cooperative outcome with pre-commitment, we see that spending and tax rates are higher than in the cooperative outcome. Since spending ministers are only concerned with their own budget, they do not take fully account of the tax distortions caused by the total budget. Tax rates and public spending levels are smoothed, so there is no need for government debt. Hence, there are no *intertemporal* distortions, only *intra-temporal* distortions in the Nash outcome with pre-commitment. If the minister of finance and the prime minister together get just as much votes as the spending ministers combined, the Nash outcome with pre-commitment becomes the cooperative outcome and the intra-temporal distortions leading to an excessively large public sector are eliminated.

SUBGAME-PERFECT NASH OUTCOME

It is more realistic to assume that there is no pre-commitment in which case the subgame-perfect Nash outcome is appropriate. Working backwards each spending minister takes past government debt and spending plans of his colleagues as given. Minister i thus solves in the second period:

$$(25) \quad L_{2i} \equiv \text{Min}_{g_{2i}} \frac{1}{2} \left[\tau_2^2 + \chi (\bar{g} - g_{2i})^2 \right] = \frac{1}{2} \left[\left(d_1 - \tau \varepsilon_2 + \sum_{j=1}^N g_{2j} \right)^2 + \chi (\bar{g} - g_{2i})^2 \right], \quad i = 1, \dots, N,$$

where we have substituted the second-period budget constraint from (21). The optimal reaction function for minister i is thus given by:

$$(26) \quad g_{2i} = \frac{\chi \bar{g} - d_1 + \tau \varepsilon_2 - \sum_{j \neq i} g_{2j}}{1 + \chi}, \quad i = 1, \dots, N,$$

so that he spends more if there is a small outstanding debt and a positive income shocks. If his colleagues spend more, the cost of funds goes up and he spends less. The resulting symmetric Nash equilibrium for the second-period level of spending and the tax rate is given by:

$$(27) \quad g_{2i}^N = \frac{\chi \bar{g} - d_1 + \tau \varepsilon_2}{N + \chi}, \quad i = 1, \dots, N \quad \text{and} \quad \tau_2^N = \left(\frac{\chi}{N + \chi} \right) (N \bar{g} + d_1 - \tau \varepsilon_2),$$

where superscript N indicates the subgame-perfect Nash outcome. Turning to the first period, minister i chooses first-period spending to minimize its welfare loss L_i while the finance minister chooses the tax rate τ_i to minimize $L_1 + \dots + L_N$. The resulting first-order conditions require that the marginal cost of taxation must equal the marginal benefit of public goods in the first period and also equal the marginal cost of public debt (i.e., the marginal cost of lower spending and higher taxes in the future). It follows that the symmetric subgame-perfect Nash equilibrium outcomes are:

$$(28) \quad g_{1i}^N = \left[\frac{(N + \chi)^2 + (\chi - N)(1 + \chi)}{(N + \chi)(N + 2\chi + 1)} \right] \bar{g}, \quad i = 1, \dots, N, \quad \tau_1^N = \left[\frac{2\chi(1 + \chi)}{(N + \chi)(N + 2\chi + 1)} \right] N \bar{g},$$

$$d_1^N = \left[\frac{(N + \chi)^2 - (\chi + N)(1 + \chi)}{(N + \chi)(N + 2\chi + 1)} \right] N \bar{g} > 0,$$

$$(27') \quad g_{2i}^N = \left[\frac{\chi(N + 2\chi + 1) - N(N - 1)}{(N + \chi)(N + 2\chi + 1)} \right] \bar{g} + \left(\frac{\tau \varepsilon_2}{N + \chi} \right), \quad i = 1, \dots, N,$$

$$\text{and} \quad \tau_2^N = \left[\frac{2\chi}{(N + \chi)(N + 2\chi + 1)} \right] N \bar{g} - \left(\frac{\chi}{N + \chi} \right) \tau \varepsilon_2.$$

As long as $N > 1$, we establish:

$$(29) \quad g_{1i}^N > \mathbf{E}(g_{2i}^N), \quad g_{1i}^N > g_{1i}^P > g_{1i}^C = \mathbf{E}(g_{2i}^C), \quad \mathbf{E}(g_{2i}^N) < \mathbf{E}(g_{2i}^P),$$

$$g_{1i}^N + \mathbf{E}(g_{2i}^N) = g_{1i}^P + \mathbf{E}(g_{2i}^P) > g_{1i}^C + \mathbf{E}(g_{2i}^C), \quad L_i^N > L_i^C > L_i^P, \quad i = 1, \dots, N,$$

$$\mathbf{E}(\tau_2^N) > \tau_1^N > \tau_1^C = \mathbf{E}(\tau_2^C) \quad \text{and} \quad d_1^N > 0.$$

From (29) and (27') we see that the subgame-perfect Nash outcome suffers from two types of distortions. First, the sum of spending levels and of the tax rate over the two periods is the same as in the Nash equilibrium with pre-commitment and thus higher than in the cooperative outcome. This is the familiar *intratemporal* distortion towards an excessive public sector. Second, government consumption is tilted towards the first period, taxation is tilted towards the second period, and, as a consequence, there is excessive government debt. These are the *intertemporal* distortions. In fact, spending in the first period is bigger in the subgame-perfect Nash than in the cooperative outcome. Since each spending minister (or group of a coalition) decides part of the budget and nobody controls the aggregate budgetary outcome, ministers spend too much and too soon and postpone taxation so that borrowing is too high. These two types of common-pool distortions arise from the lack of a proper definition of property rights to tax revenues.

The common-pool distortions worsen when the number of spending ministers increases. More claims on the common budget worsen the biases to spend too much and too soon and postpone taxation. The expected welfare loss is obviously greater in the subgame-perfect Nash than in the Nash outcome with pre-commitment and *a fortiori* than in the cooperative outcome.

Summing up, we have established that a fragmented government leads to a dynamic common-pool problem. The government spends too much and too soon while it postpones taxation. Consequently, there is too much government debt. Since eventually debts have to be paid off, the tax rate rises and the spending level falls over time. These intertemporal and intertemporal distortions become more severe when there are many spending ministers.

5.2. Warning: Prudence May be Manipulated for Short-Run Electoral Gains

A key question is how the common-political distortions arising from fragmented decision making can be offset. We conjecture that this can be done if the minister of finance is strong and pessimistic enough. A strong minister of finance may help to overcome the *intratemporal* distortions of spending and taxing too much. A pessimistic, prudent minister of finance deliberately underestimates the tax base and thus ensures that government spending occurs later than sooner while taxation occurs earlier rather than later. As a result, a pessimistic finance minister can offset the debt bias and the *intertemporal* distortions of the common-pool problem. We are thus searching for a relatively strong priority of avoiding tax distortions, i.e., a weight χ^* lower than the weight χ given by the spending ministers to reaching the spending target, and a level of prudence θ^* that will offset the intertemporal biases of fragmented policy making.

Of course, if the electorate itself is prudent, it makes sense for a benevolent government to be prudent as well. However, even if the electorate and the spending ministers are not prudent, it may be attractive to appoint a minister of finance with more pessimistic preferences than the electorate and his spending colleagues. More precisely, a minister of finance can strengthen his position in the cabinet by implementing a pessimistic budgetary policy to offset the biases resulting from the common-pool problem. It is thus in the interest of society to appoint a prudent minister of finance which deliberately underestimates the future tax base and enforces precautionary taxation and under-spending. In as far as a strong and prudent minister of finance is able to off-set the distortions of the dynamic common-pool problem and control the squabbling spending ministers, social welfare will be increased to its socially optimal level.

Consider therefore a strong and prudent finance minister with $\chi^* < \chi$ and $\theta > 0$ and examine how this affects the subgame-perfect Nash outcome of section 5.1 and see whether this can improve social welfare. The cabinet will then deliberately depress forecast of future national income and the tax base. The finance minister is pessimistic and solves the min-max problem:

$$(30) \quad \text{Min}_{\tau_1} \text{Max}_{\varepsilon_2} \frac{1}{2} \left[\sum_{i=1}^N \left(\tau_1^2 + \chi^* (\bar{g} - g_{1i})^2 + \left(\frac{\chi^* (1 + \chi^*)}{(N + \chi^*)} \right) \left[N\bar{g} + \left(\sum_{j=1}^N g_{1j} \right) - \tau_1 - \tau \varepsilon_2 \right]^2 \right) - \left(\frac{\varepsilon_2^2}{\theta \sigma^2} \right) \right].$$

This gives rise to the following expressions for the first-period tax rate and level of spending, public debt and the future budgeted income shock:

$$(31) \quad \varepsilon_2^B = - \left(\frac{2\theta\sigma^2\tau N\chi^*(1+\chi^*)}{(N+\chi^*)(N+2\chi^*+1) - \theta\sigma^2\tau^2 N\chi^*(1+\chi^*)} \right) N\bar{g} < E(\varepsilon_2) = 0,$$

$$g_{1i}^F = \left[\frac{(N+\chi^*)^2 + (\chi^*-N)(1+\chi^*) - \theta\sigma^2\tau^2 N\chi^*(1+\chi^*)}{(N+\chi^*)(N+2\chi^*+1) - \theta\sigma^2\tau^2 N\chi^*(1+\chi^*)} \right] g^*, \quad i=1, \dots, N,$$

$$(29') \quad \tau_1^F = \left[\frac{2\chi^*(1+\chi^*)}{(N+\chi^*)(N+2\chi^*+1) - \theta\sigma^2\tau^2 N\chi^*(1+\chi^*)} \right] N\bar{g} > 0$$

$$\text{and } d_1^F = \left[\frac{(N+\chi^*)^2 - (\chi^*+N)(1+\chi^*) - \theta\sigma^2\tau^2 N\chi^*(1+\chi^*)}{(N+\chi^*)(N+2\chi^*+1) - \theta\sigma^2\tau^2 N\chi^*(1+\chi^*)} \right] N\bar{g} > 0.$$

where superscript F indicates the outcome with a prudent minister of finance. Expression (31) indicates that the minister of finance deliberately underestimates future income to be on the safe

side. Second-period public spending and the tax rate follow readily from the second-period government budget constraint. We can readily establish that if the minister of finance has as much power as all the spending ministers combined and has enough, but not too much prudence, that is

$$(32) \quad \chi^* = \chi / N < \chi \quad \text{and} \quad \theta = \frac{(N^2 + \chi)(N - 1)}{\chi(N + \chi)\tau^2\sigma^2} \equiv \theta^* > 0 \quad \text{if} \quad N > 1,$$

the intratemporal and intertemporal distortions of the common-pool problem are exactly off-set and the cooperative outcome is attained. If the degree of prudence is less than this critical value ($\theta < \theta^*$), the common-pool distortions dominate the effects of prudence. Hence, government debt will be positive and spending will be too soon and taxation too late. If the degree of prudence is bigger ($\theta > \theta^*$), the government builds up assets and thus spending is too late and taxation too soon. If the minister of finance is less strong ($\chi^* < \chi/N$), the public sector will be too big.

The biases of spending too much and too soon and delaying taxation are thus offset by a sufficiently strong and pessimistic minister of finance. If the minister of finance is not strong enough, it cannot control its profligate and impatient spending colleagues. If the minister of finance effectively has as much power as all his spending colleagues together, it eliminates the intratemporal distortions. Precautionary taxation and under-spending allow for a gradual reduction in government debt. It also leads on average to expected windfall revenues, so that over time the level of public spending can rise and the tax rate can fall. Prudence is thus able to offset the intertemporal distortions arising from the dynamic common-pool problem.

The calculations in Table 1 illustrate these two ways of correcting the biases. The Nash equilibrium with pre-commitment only suffers from *intra-temporal* distortions: government spending levels and tax rates are higher than in the cooperative outcome ($0.4286 > 0.3333$), but there is no excessive debt accumulation ($d_1 = 0$). To get rid of this bias, it suffices to give the minister of finance at least as many votes in the cabinet as the spending ministers combined (i.e., reduce $\chi = 5$ to $\chi^* = \chi/N = 2.5$). The subgame-perfect Nash outcome gives rise to the *inter-temporal* distortions of spending too soon, taxing too late and excessive debt accumulation, but average spending levels and tax rates correspond exactly to the ones in the equilibrium with pre-commitment (i.e., $\frac{1}{2}(0.4418 + 0.4154) = \frac{1}{2}(0.3956 + 0.4615) = 0.4286$). Prudent budgetary policy offsets the bias of spending too much and too soon and the resulting debt bias. By deliberately budgeting the future national income and tax revenues too low, the minister of finance forces his spending colleagues to spend later, to not postpone taxation and accumulate

less debt. As the degree of prudence $\theta\sigma^2\tau$ increases towards 0.8571 as predicted by (26), it is optimal to spend less today and more tomorrow, to borrow less and bring forward taxation. If $\theta\sigma^2$ is about 0.35, the debt bias completely disappears and the subgame-perfect Nash outcome with prudence has become close to the Nash outcome with pre-commitment. The final rows show that with a strong and even more pessimistic minister of finance it is possible to mitigate all the intratemporal and intertemporal welfare losses arising from the common-pool problem.

**Table 1: Strong and Prudent Finance Minister
Mitigates the Common-Pool Problem**

	Ng_{1i}	Ng_{2i}	D_1	τ_1	τ_2	ε_2^B	L_i
Cooperative	0.3333	0.3333	0	0.3333	0.3333	0	0.2
Nash with commitment	0.4286	0.4286	0	0.4286	0.4286	0	0.2204
Subgame-perfect Nash	0.4418	0.4154	0.0462	0.3956	0.4615	0	0.2217
Prudent $\theta\sigma^2\tau = 0.1$	0.4386	0.4186	0.0350	0.4036	0.4536	-0.0807	0.2212
Prudent $\theta\sigma^2\tau = 0.2$	0.4352	0.4219	0.0233	0.4119	0.4452	-0.1648	0.2207
Prudent $\theta\sigma^2\tau = 0.35$	0.4300	0.4272	0.0050	0.4250	0.4321	-0.2975	0.2204
Prudent $\theta\sigma^2\tau = 0.4$	0.4282	0.4292	-0.0014	0.4296	0.4275	-0.3437	0.2204
Strong and prudent $\chi = 2.5, \theta\sigma^2\tau = 0.4$	0.3522	0.3145	0.0425	0.3097	0.3569	-0.2478	0.2010
$\chi = 2.5, \theta\sigma^2\tau = 0.8$	0.3358	0.3308	0.0057	0.3302	0.3365	-0.5283	0.2000

Parameters: $\tau = \bar{g} = 0.3$, $\chi = 5$ and $N = 2$.

The case for a strong and pessimistic minister of finance is strengthened by the following. Governments need to spend as much of their time and energy as possible on important and necessary economic and political reforms and cannot afford to waste political momentum on squabbling. However, whenever there are unexpected falls in public revenues, ministers taking care of the spending departments fight over who must implement the spending cuts to balance the budget and the minister of finance is pressurized to relax the budgetary rules. In contrast, if there are windfall revenues, cabinet members find it easier to agree on what to do with them. The government may thus find it attractive to have a prudent budgetary policy, so that on average

unexpected windfall revenues occur more frequently than shortfalls in expected revenues and more time and energy is left for important political matters.

5.3. Warning: Prudence may be Manipulated for Short-Run Electoral Gains

Many governments adopt a “first-sour-then-sweet” policy whereby unpopular policies such as raising tax rates and trimming public spending are implemented immediately upon election into office while popular policies of cutting tax rates and boosting public spending occur just before the next election. There may be short-run political benefits from loosening budgetary discipline just before an election, but only if citizens are myopic.⁵ Such opportunistic political manipulation is made possible by the assets accumulated from precautionary taxation. By reducing government debt and accumulating assets, the minister of finance builds up a buffer that can be used to cut taxes and boost public spending towards election eve. As long as this is not overdone, electoral cycle motivations may help to offset the intertemporal common-pool distortions of spending too soon and taxing too late. However, there is the danger that excessively large buffers are accumulated by the minister of finance in order to dish out excessively big tax cuts and spending hikes on election eve for short-run political gains.⁶ Short-run political manipulation of election results may thus lead to an excessively prudent budgetary policy. To see this, we change the weight on second-period welfare losses in (22) from 1 to $1+\pi$ with $\pi>0$ and recalculate the outcomes of Table 1. It is easy to show that this induces an electoral business cycle with higher taxes and lower spending upon moving into office and lower taxes and higher spending just before the next election. The government thus has an incentive to build up assets towards election eve in order to dish out favours to the voters. Table 2 confirms these results and indicates that for small values of π it is possible to have a welfare improvement, but for large values of π

⁵ The pioneering work of Nordhaus (1976) on the political business cycle is based on myopic citizens. Opportunistic, pre-election manipulation of the expectations-augmented Phillips curve creates jobs on election eve while the inflationary effects appear after the election. Apart from not fitting the empirical facts very well (Drazen, 2000), it is unlikely that people are foolish and irrational enough to be manipulated in such a way. Also, electoral cycles seem to be driven more by fiscal policy than monetary policy. Such opportunistic, pre-electoral manipulation can be rationalized when there is imperfect information about an incumbent’s competence (Rogoff, 1990). In such a context expansionary policy before an election indicates high competence. Partisan differences about the size of the public sector or the nature of public goods can also induce a pre-election debt bias (e.g., Persson and Tabellini, 2000, Chapter 13.3).

⁶ Indeed, the ‘prudent’ finance minister Gerrit Zalm has been accused of being tough in post-election years but exuberant and irresponsible in each pre-election year. Critics argue that under his reign the structural deficit and volatility of output and consumption have increased, but that he was ‘saved’ by the extra gas revenues resulting from temporary high oil prices (Jacobs, 2007; Beetsma and van Wijnbergen, 2007). Minister Zalm may thus have abused his ‘prudent’ budgetary policy for short-run electoral gains. The same critics complain that minister Zalm has in election years immediately converted *temporary* windfall revenues in *permanent* tax cuts (1998, 2005) or public spending hikes (2001).

opportunistic political manipulation is excessive and leads a deterioration of welfare. In other words, if the electorate “forgets” past outcomes quickly, electoral budget cycles are more likely to reduce welfare. Short-run manipulation of election outcomes ensures, like prudence, more effective political decision making and makes it possible to control squabbling spending ministers, but not if the reduction of public debt or the accumulated assets induce excessive electoral budget cycles to the detriment of social welfare. If the effective discount rate of the past by the electorate equals $1/1.1666 = 0.857$, the opportunistic electoral outcome exactly reproduces the Nash outcome with pre-commitment. In that case, the intertemporal common-pool distortions are exactly offset by opportunistic manipulation of election results.

Table 2: Opportunistic Manipulation of Election Outcomes

	Ng_{1i}	Ng_{2i}	D_1	τ_1	τ_2	L_i
Nash with commitment	0.4286	0.4286	0	0.4286	0.4286	0.2204
Subgame-perfect Nash	0.4418	0.4154	0.0462	0.3956	0.4615	0.2217
Electoral $\pi = 0.1$	0.4336	0.4235	0.0176	0.4160	0.4412	0.2206
Electoral $\pi = 0.5$	0.4071	0.4500	-0.0750	0.4821	0.3750	0.2239
Electoral $\pi=0.1666$	0.4286	0.4286	0.0000	0.4286	0.4286	0.2204

Parameters: $\tau = \bar{g} = 0.3$, $\chi = 5$ and $N = 2$.

We can summarize our results with the following proposition. If the electorate suffers from memory loss and weighs outcomes on election eve more heavily than outcomes in the early part of the incumbency, politicians are encouraged to cut taxes and raise spending financed by running up government debt just before an election. The resulting business cycles harm welfare in as far they do not offset the intertemporal distortions arising from squabbling spending ministers. The danger is that too much prudence is abused by opportunistic ministers of finance.

6. Summing Up: Guidelines for Prudent Budgetary Policy

Principles of sound prudent budgetary policy require that the minister of finance deliberately underestimates the future level of the national income and the tax base. The degree to which this should be done is bigger if the minister of finance is more prudent, the variance and persistence of shocks hitting national income and the tax base are large, and the level of the tax rate (and the unemployment benefit) are large. The principle of precautionary taxation thus requires that the tax rate is set higher than it would have been done otherwise. Similarly, as a precaution the level

of public spending is set lower. As a result, the government is more likely to enjoy windfall revenues rather than a shortfall of revenues. The government debt is therefore likely to fall over time. The associated reduction in debt service permits, depending on political preferences, either a gradual reduction in the tax rate, an increase in the public spending or a combination of both. In the long run the tax rate converges to zero as public spending is financed by interest income on government assets. This contrasts with traditional principles of tax smoothing.

An important advantage of prudent budgetary policy is that it generates peace and quiet in the council of ministers. Without prudent forecasts of national income and the tax base, the likelihood of unexpected falls in tax receipts and consequent budgetary fights is much bigger. The ministers then waste a lot of time and energy on squabbling to try to offload the costs of further cuts on their colleagues. That time and energy would have been much better spent on important policy issues and reforms. With spending ministers squabbling over a common pool of public revenues, it is attractive to give the minister of finance at least as much voting rights in the cabinet as all the spending ministers combined. This eliminates the *intratemporal* common-pool distortions of an excessively large public sector. The minister of finance should also adopt a prudent budgetary policy to avoid spending too soon and taxing too late. This gets rid of the *intertemporal* common-pool distortions. A strong and pessimistic minister of finance can thus control the claims of his spending colleagues and avoid excessive debt accumulation.

It is straightforward to allow for uncertainty about future projections in the actual or desired levels of public spending, the costs of investment projects, the future returns on public sector capital or the future interest on public debt and to allow for more general data generating processes for national income and the tax base. It is then prudent for the minister of finance to budget for slightly higher levels of future government spending, investment outlays and the market rate of interest and for slightly lower levels of future financial returns on public sector capital than the mathematically expected levels.⁷ Again, the minister of finance will on average enjoy less ambitious spending desires and higher returns on public sector assets than budgeted as well as windfall revenues as time proceeds and is thus able to gradually cut debt service and the tax rate and increase the level of public consumption and public investment. It is also possible to introduce quadratic costs of adjustment for the stock of public sector capital or the level of government spending. One can also allow for adverse effects of the tax rate on the tax base. The marginal cost of taxation is then likely to increase in recessions and fall during booms. This strengthens the case for a prudent counter-cyclical policy. Also, the structural unemployment rate

⁷ In general equilibrium models with incomplete markets, the government also builds a war chest of assets as precaution against the unpredictable necessities of war (Aiyagari, et al., 2002).

may be positively affected by taxation. This also strengthens the case for such a prudent policy, because one does not want to increase tax rates in a recession as this would increase unemployment even further. Finally, a prudent minister of finance will deliberately downplay the potential benefits of structural reforms and exaggerate the short-run costs of structural reforms. This does not mean that a prudent minister of finance will not be a fervent supporter of structural reforms, but it does mean that less priority is given to compensation of losers of reform.

Prudence favours the accumulation of assets to cope with future risk, but then it is optimal to spend less on actions to prevent risk with adverse consequences (e.g., Eeckhoudt and Collier, 2005)). Similarly, a prudent minister of finance who has accumulated a big buffer is less likely to take actions to prevent the tax base from shrinking and is more likely to dish out favours towards election eve. It is therefore interesting to further develop the rationale for a strong and prudent minister of finance within the context of a political business cycle framework with finite election horizons. The key question is under what conditions prudent budgetary policy improves welfare. We have shown that this occurs if the electorate does not ‘forget’ too quickly and gives sufficient weight to outcomes immediately upon entering office. It should be realized that, if the electorate ‘forgets’ quickly, the adverse welfare effects of short-run political manipulation are likely to dominate the beneficial welfare effects of offsetting the intertemporal biases of the common-pool problem. Indeed, there is the danger that the minister of finance is deliberately acting in a too prudent fashion in order to have a bigger budget for pacifying and gratifying voters on the evening of the election. One must thus avoid the finance minister deliberately underestimating future tax revenues, returns on public investment and benefits of structural reforms while overestimating investment outlays to have scope for an upswing on election eve.

We summarize our conclusions with Table 3 which compares and contrasts our guidelines for prudent budgetary policy with the more traditional guidelines for budgetary policy and sums up our warning about electoral abuse of precautionary taxation and under-spending. The electoral abuse was the reason why the new Dutch minister of finance, Wouter Bos, abandoned the principles of prudent budgetary policy cherished by his predecessor Gerrit Zalm:⁸

“Cautious economic assumptions do not serve stability, because it creates windfalls on papers .. and seduces politicians to play for Santa Claus during election years. They also stimulate procyclical policy: during an economic boom windfalls gains on the revenue side can be used for reducing taxes and in economic bad times there will be a rising deficit and a need for additional budget cuts. This is economically not very

⁸ The newly elected Dutch government adopted a finite horizon, the period to the next election, and set itself a target for the final financial deficit or surplus.

meaningful and only serves the political agenda of conservatives and liberals for a smaller government. .. My alternative is a fiscal policy based on realistic but not cautious estimate of economic growth.” (translation: Bos, 2007).

Hence, the choice for a prudent budgetary policy or not is to a large extent a political one.

Table 3: Guidelines for Prudent Budgetary Policy

	<i>Traditional Approach</i>	<i>Prudent Approach</i>
<i>Budget forecasts</i>	Use most accurate forecasts of national income, project costs and investment returns	Deliberately underestimate national income, tax revenues and returns on investment and reforms and overestimate investment and short-run reform costs
<i>Taxation</i>	Smooth taxes over time, so taxes adjust immediately to the permanent value of expected spending (net of expected investment returns)	Precautionary over-taxation and if things do not turn out badly slowly lower burden of taxation
<i>Public Consumption</i>	Smooth deviations of public spending from bliss level over time	Precautionary under-spending and expect to gradually raise spending over time
<i>Public Investment</i>	Correctly estimate costs and returns on investment	Under-investment due to overestimation of costs and underestimation of returns
<i>Structural Labour Market Reforms</i>	Allow temporary deficit to fight temporary unemployment, compensate losers of reform and build support for structural reforms, especially if reforms weaken automatic stabilizers	Downplay long-run benefits and exaggerate short-run costs of reform; allocate fewer funds to soften short-run impact of reforms
<i>Government Debt</i>	Debt is issued to cope with temporary increases and future cuts in spending and to finance public investment with a market rate of return	Precautionary build-up of government assets to deal with outcomes worse than forecasted; if forecasts turn out to be accurate, debt burden gradually falls which gives room for future tax cuts and increases in spending
<p><i>Warning About Abuse for Short-Run Electoral Gains:</i> The right amount of prudence can offset the intratemporal distortions arising from an otherwise too weak minister of finance, but one must avoid politicians being too prudent and engage in too much precautionary taxation and under-spending in order to engineer a boom on election eve. Similarly, one must avoid politicians deliberately going to far in underestimating future returns on investment and overestimating investment outlays and underestimating the benefits of structural reforms in order to have more scope for an upswing on election eve.</p>		

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