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Structural reforms, public  
investment and the fiscal stance:  
A prudent approach\*

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The views expressed in this report are those of the author and do not necessarily represent those of the Swedish Fiscal Policy Council.

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## Abstract

The standard theory of tax smoothing says that the government runs a deficit to finance investment projects with a market rate of return and temporary high levels of public consumption. Taxes are used to finance permanent spending and losses on public investment. Deficit financing is used to offset some of the short-run costs of structural reforms.

A prudent government deliberately downplays expected future national income and the tax base. 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 or gradual increases in government spending. A prudent finance minister 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.

Prudence can offset the *intertemporal* spending, tax and debt biases resulting from common-pool distortions. If the minister of finance has 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. We warn that, if voters care about outcomes on election eve, prudence may be abused for short-run electoral gains.



## 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 has been shown by Rogoff (1985) 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, 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.<sup>1</sup> 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-tried 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.

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

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<sup>1</sup> 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.

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 as has been demonstrated by Persson and Tabellini (2000, Chapter 13) and 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.<sup>2</sup> 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 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

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<sup>2</sup> 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.

abused for short-term electoral gains. Section 6 concludes compares our guidelines for prudent budgetary policy with the standard ones. To keep the exposition at a non-technical level, technical details have been left out. They can be found in the companion paper van der Ploeg (2007).

## 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 says that next year's public debt is given by the primary surplus (i.e., the excess of government spending over tax revenues) plus the interest and principal of this year's public debt. Most economists prefer to express the government budget constraint in terms of fractions of the national income. The resulting constraint then says that next year's debt-GDP ratio equals the ratio of primary surplus to GDP *plus* the interest *plus* principal of this year's debt-GDP ratio. The main difference is that we now use the *growth-corrected* real interest rate rather than the uncorrected real interest rate. It is easy to see that 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 percent target for the deficit-GDP ratio and a 60 percent target for the debt-GDP ratio. If inflation is 2 percent per annum and real growth 3 percent per annum and the debt-GDP ratio is 0.6, the growth-cum-inflation tax is 3 percent of GDP. A deficit-GDP ratio of 3 percent 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 percent 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" by Buiters (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.

In studies on the most appropriate form of public debt management it is also customary to assume that a so-called "no-Ponzi" condition must be satisfied. This 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.

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 discounted sum of these welfare losses in all future years subject to the present-value government budget constraint. The optimality conditions imply that tax rates are smoothed over time. We can thus obtain the optimal expressions for the government financial deficit and the tax rate. The optimal growth-cum-inflation corrected deficit-GDP ratio simply equals temporary (i.e. the difference between current and permanent) de-trended government spending minus temporary tax revenues, where the permanent level of the ratio of government spending to GDP is the amortized value of all future levels of government spending using the growth-corrected real interest rate. The optimal tax rate simply corresponds to the permanent level of government commitments, i.e., the permanent value of the ratio of government spending to GDP plus the growth-corrected debt service on the government debt as a fraction of GDP.

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 and public sector capital (both detrended) and modify the government budget constraint accordingly. We thus allow for a (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). We also allow for a depreciation rate of public sector capital, which allows us to write down the dynamics of the net worth of the public sector (i.e., public sector capital minus public debt). The change in the net worth of the public sector as a fraction of GDP then equals the growth-corrected real return on net worth *plus* the primary surplus net of losses on public sector investment, all as fractions of GDP. The losses on public sector capital indicate the amount by which the financial return (net of depreciation) on those assets actually 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).

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. 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 welfare loss criterion we had before plus terms that penalize deviations of public consumption and public capital from their bliss values. The resulting welfare loss function is minimized with respect to the present-value budget constraint of the government.

It is still optimal to smooth the tax rates over time. Furthermore, it is also optimal to smooth the shortfalls of public consumption from their bliss levels over time. 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. 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 an efficiency condition which implies that the optimum public sector capital stock is high if the tax rate and the cost of funds are low.

The public sector capital stock is also high if the return on public sector capital and the political priority attached to public capital are high.

The dynamic and static efficiency conditions together with the present-value budget government constraint yield expressions for the optimal tax rate, level of public consumption and change in public sector net worth. Without going into the mathematical details of these expressions, what can we learn from them?

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 require government deficits (surpluses) and accumulate (bringing down) of government debt. In this sense, they are not too different from temporary recessions (booms). 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 as has been done by 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 percent 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 percent of GDP in 1970 to 74 percent of GDP in 1983 and then gradually declined to about 60 percent of GDP today despite gradual reductions in the ratio of gross government debt to GDP from over 70 percent of GDP during the eighties to below 50 percent of GDP today (after a gradual rise from 38 percent 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. Discussions of such accounting gimmickry can be found in 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), and Buti et al. (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 as has been argued by Blanchard and Giavazzi (2004) and Beetsma and Debrun (2004, 2007), but Galí and Perotti (2003) and Turrini (2004) show that the empirical evidence that the Pact has crowded out public investment is not very convincing. 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 as argued by 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 employment 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 employment. 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 as discussed by 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 as argued by Eichengreen and Wyplosz (1998). If structural reforms are costly in the short run, the government has a

partisan character and discounts the future heavily. Beetsma and Debrun (2004) then show that there is a bias towards public-sector deficits and against structural reforms. 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”). Indeed, the evidence reported in IMF (2004) indicates that 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. Evidence from cross-country studies also suggests that fiscal tightening reduces the chance of implementing labour market reforms, although the results in IMF (2004), Annet and Debrun (2004), Duval and Elmeskov (2005), Duval (2006) and Heinemann (2006) indicate that there does not seem to be such an effect from product market or financial reforms. Labour market reforms also seem to be associated with short-run budgetary deterioration as demonstrated by Deroose and Turrini (2005).

Remembering our lessons about the optimal tax rate, optimal level of public consumption and net worth of the public sector, we find 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 by Hoeller et al. (2006) which suggests that reforms are generally followed by a cut in government spending. 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 budgeting<sup>3</sup>

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 budg-

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<sup>3</sup> 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.

etary 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, namely 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 1960-79. During 1975-79 it was agreed to limit the increase in the tax burden to one percentage 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 percent of GDP is exceeded;
- an investment fund was filled with 40 percent of the Dutch natural gas revenues and the remaining gas revenues were used for debt reduction; and
- 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 from 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.

### 4.1 Precautionary taxation and prudent fiscal policy with uncertain future revenues

To allow for prudence, the government does not minimize the expected value of a quadratic welfare loss function but maximizes an exponential transformation of the intertemporal quadratic welfare loss criterion familiar from certainty-equivalent policy formulation. There is a parameter  $\theta$  which indicates the degree of prudence or caution of the government. When this parameter is zero, the government is not prudent and is risk neutral and can effectively employ the well-known principle of certainty equivalence. Two governments may share the same welfare criterion under certainty, but their aversion to risk may differ. The coefficient of absolute risk aversion with respect to the criterion to be maximized also captures prudence, since the third derivative of this criterion is positive (see Kimball, 1990). Prudence implies the willingness to avoid shocks with *adverse* consequences. The parameter  $\theta$  thus captures the degree of *prudence* or *pessimism*. The problem of maximizing the expected value of our transformed welfare loss criterion subject to the present-value budget constraint can alternatively be solved as a deterministic problem with either increased ambition, as we will discuss below, or with a prudent adjustment to the budgeted level of national income (cf., Don, 2007, for the static case). There is a semantic issue here. We say that the government deliberately underestimates next year's national income, but in no way do we mean to suggest that the government is ad hoc or irrational. In this sense, we consider rational prudence. This adjustment to the budgetary process can be derived from first principles as shown in van der Ploeg (2007). This adjustment can, alternatively, also be interpreted as an increased ambition of the decision maker.

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. To obtain analytical results, we work with a linearized government budget constraint. We assume an AR(1) process for deviations of national income from trend, where  $\rho$  is the autoregressive parameter. 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. The government maximizes the expected value of the exponential transform of its intertemporal quadratic welfare loss function subject to the government



budget constraint and the stochastic process generating deviations of national income from trend. The government effectively plays a game against nature and solves a min-max problem against nature by choosing the tax rates to minimize the adjusted welfare loss and disturbances to maximize the adjusted welfare loss. 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 from the perspective of time  $t$  onwards imply that budgeted tax rates are smoothed over times and yield a dynamic process for the budgeted error terms in the income-generating process. In fact, it is easy to demonstrate that the government deliberately underestimates the error in the data-generating process of the national income and the tax base.

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 well-known certainty equivalence principle which sets budgeted future error terms to zero and is valid only for quadratic welfare loss function without prudence. Armed with these expressions, van der Ploeg (2007) solves for the budgeted national income and tax base and obtain the dynamics of national income and an expression for the tax rate and the expected change in the debt-GDP ratio (i.e., the expected growth-corrected public sector deficit).

The key insights are as follows. 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 ( $\rho = 0$ ), output in each year is a constant plus a serially correlated distributed error term. The government then 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. In fact, the extent by which the budgeted level of national income is lower than the expected level of national income is bigger if the degree of prudence, the variance of shocks to national income and the tax base and the tax rate itself are all bigger. It follows that the expected deficit is 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. A prudent government thus runs a smaller deficit or a bigger surplus to safeguard itself against unexpected adverse shocks to the tax base. The optimal tax rate for a prudent minister of finance facing temporary shocks is thus higher than outstanding commitments as would be required in the absence of prudence. Again, the tax rate is higher to create a precaution-

ary buffer for adverse shocks and the buffer and tax rate are bigger if shocks are more volatile and the government is more prudent. Finally, we note that the traditional lessons of public finance still hold. A temporary recession and fall in the tax base or a temporary increase in public spending (e.g., due to a war) are thus accommodated by a higher deficit, not by a higher tax rate.

#### *Case: permanent shocks*

With permanent shocks ( $\rho = 1$ ), the national income and the tax base follow a random walk. National income is effectively last year's national income plus a serially uncorrelated shock. The expressions are different than the case of temporary shocks. First, we still have that the tax rate is higher than outstanding government commitments and the expected change in the debt-GDP ratio is still less than the level of temporary public spending. In fact, these effects are now much larger than for temporary shocks. Second, there is an offset term in the expression for the optimal tax rate to correct for tax windfalls in the past. 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 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 find 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  $\rho$ ) implies more precautionary taxation and bigger reductions in government debt.

## 4.2 Prudent budgetary policy with endogenous public spending

Governments 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 again the expected value of an exponential transformation of an intertemporal quadratic welfare loss in order to allow for cautious policy mak-

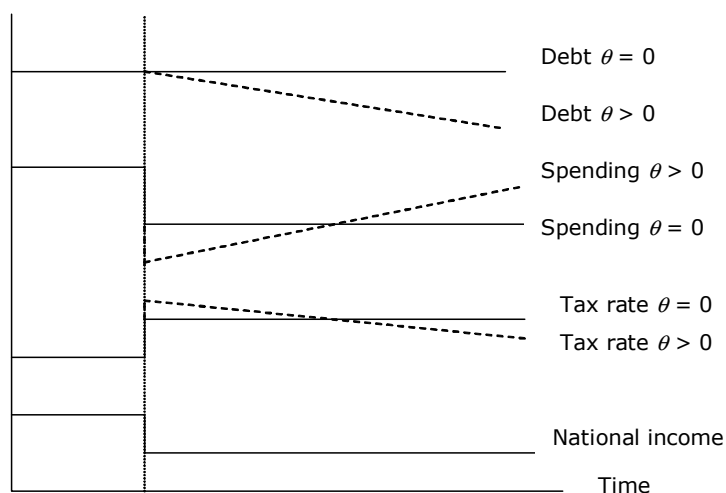
ing. The main difference is that the welfare loss function now includes for each year a quadratic term that penalizes deviations of public spending from its bliss value. The government maximizes its objective function subject to the government budget constraint and the data generation process for the national income. The static and dynamic efficiency conditions are the same as in Section 4.1. In addition, 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. A high tax rate or cost of public funds thus implies a low demand for public goods.

These static and dynamic efficiency conditions yield, together with the present-value government budget constraint, expressions for the optimal tax rate and public sector deficit as shown in van der Ploeg (2007). The intuition behind these expressions is as follows. More right-wing governments with a lower priority to public spending 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 permits 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.

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.

**Figure 1. Prudent Reaction to Permanent Fall in the Tax Base**

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* as shown by Chari et al. (1994) or *incomplete* as demonstrated by 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 as proven by Aiyagari (1995) and Aiyagari and McGrattan (1998). In that case, Shin (2006) shows that only if idiosyncratic risk is more important than aggregate risk and there are no other assets that allow self-insurance, government debt will be positive in the long run.

#### 4.3 Prudent budgetary policy with public investment and 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, bureaucratic 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 (see 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 (i.e., 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 et al., 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 reforms needed to boost long-run growth must be implemented at the same time that budgetary imbalances need to be redressed as highlighted by Rodrik (1996) and Calmfors (2001). Fiscal tightening may also serve as a signal that government are tough and serious about reform (see Deroose and Turrini, 2005). In any case, reforms of tax and benefit systems may not necessarily weaken automatic stabilizers anyway (see 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 of collective agreements, high share of government employment, high national income share of government spending, and high average and marginal tax rates on labour (see EEAG, 2007). Sweden has also been a 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 its 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 (e.g. EEAG 2007). 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 percent 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. 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 economy of precautionary buffers

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 of 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 argue 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).<sup>4</sup> 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

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<sup>4</sup> 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 as demonstrated by 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 (see Hallerberg and Von Hagen, 1999). 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 as shown by Swank (2002).

scarce public revenue before the other spending ministers get a chance to do so. To make the point, van der Ploeg allows for  $N > 1$  spending ministers and, to keep matters simple, only considers two time periods and assumes no inherited debt and a zero rate of interest and discount rate. This does not affect the qualitative nature of the results. The present-value government budget constraint thus simplifies to the condition that the debt at the end of period 1 simply equals the sum of all spending by each of the spending ministers minus tax revenues, all in period 1. This inherited debt *plus* the sum of all spending by each of the spending ministers in period 2 must be financed by taxes in period 2 including the effect of a possibly larger or smaller tax base. It helps to focus on symmetric outcomes and assume that political priorities and bliss values are time-invariant and the same for each public spending category, so each minister minimizes the expected quadratic welfare losses over the two periods.

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 (i.e., the sum of the welfare loss functions for each of the spending ministers) subject to the present-value budget constraint 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.

In the following we attempt to explain where the distortions come from.

#### *Cooperative outcome*

The cooperative outcome in the absence of prudence is easily characterized. 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  $\chi$  leads to higher spending and tax rates.

#### *Non-cooperative outcome with pre-commitment*

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 *intratemporal* distortions in the non-cooperative 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 non-cooperative outcome with pre-commitment becomes the cooperative out-



come and the intratemporal distortions leading to an excessively large public sector are eliminated.

#### *Non-cooperative outcome without pre-commitment*

It is more realistic to assume that there is no pre-commitment in the game that is being played between the various spending ministers. In any case, the game we consider applies to a situation where the finance minister has to accept the budgetary outcome that results from the fight between his spending colleagues. Working backwards each spending minister takes past government debt and spending plans of his colleagues as given. The optimal reaction function for each spending minister is to spend more if there is a small outstanding debt and a positive income shock. If his colleagues spend more, the cost of funds goes up and he spends less. 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 resulting non-cooperative outcome without pre-commitment has the following properties.

There are effectively 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 non-cooperative 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 non-cooperative outcome without pre-commitment 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 non-cooperative outcome without commitment than in the non-cooperative outcome with pre-commitment and *à 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 Case for a strong and pessimistic minister of finance

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 *intra-temporal* 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 *inter-temporal* distortions of the common-pool problem. We are thus searching for a relatively strong priority of avoiding tax distortions, or, alternatively, we are looking for a lower weight  $\chi^* < \chi$  than the weight  $\chi$  given by the spending ministers to reaching the spending target, and a level of prudence  $\theta^*$  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 offset 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 non-cooperative outcome without commitment of Section 5.1 and see whether this can improve social welfare. The cabinet will then deliberately depress forecasts of future national income and the tax base. The finance minister is pessimistic and solves the min-max problem taking the reaction functions of each of his spending colleagues into account. This gives rise to the expressions for the first-period tax rate and level of spending, public debt and the future budgeted income shock discussed in van der Ploeg (2007). The intuition is as follows.

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 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, the intra-temporal and inter-temporal 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 than the critical value

( $\theta > \theta^*$ ), 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.

**Table 1. Strong and prudent finance minister mitigates the common-pool problem**

	Total spending in period 1	Total spending in period 2	Debt at end of period 1	Tax rate in period 1	Tax rate in period 2	$\mathcal{E}_2^B$	Welfare loss for each minister
<b>Cooperative outcome</b>	0.3333	0.3333	0	0.3333	0.3333	0	0.2
<b>Non-cooperative outcome with commitment</b>	0.4286	0.4286	0	0.4286	0.4286	0	0.2204
<b>Non-cooperative outcome without commitment</b>	0.4418	0.4154	0.0462	0.3956	0.4615	0	0.2217
<b>Prudence = 0.1</b>	0.4386	0.4186	0.0350	0.4036	0.4536	-0.0807	0.2212
<b>Prudence = 0.2</b>	0.4352	0.4219	0.0233	0.4119	0.4452	-0.1648	0.2207
<b>Prudence = 0.35</b>	0.4300	0.4272	0.0050	0.4250	0.4321	-0.2975	0.2204
<b>Prudence = 0.4</b>	0.4282	0.4292	-0.0014	0.4296	0.4275	-0.3437	0.2204
<b>Strong finance minister; <math>\chi = 2.5</math></b>							
<b>Prudence = 0.4</b>	0.3522	0.3145	0.0425	0.3097	0.3569	-0.2478	0.2010
<b>Prudence = 0.8</b>	0.3358	0.3308	0.0057	0.3302	0.3365	-0.5283	0.2000

Notes: Parameters:  $\chi = 5$ ,  $N = 2$  and the long-run tax rate and the bliss level of public spending equal 0.3. Key: prudence equals the prudence parameter  $\theta$  times the variance of the shocks to income and the tax bases and times the tax rate.

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 non-cooperative 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 (i.e. zero in our stylized example) debt accumulation. To get rid of these biases, 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 non-cooperative outcome without commitment gives rise to the *intertemporal* 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.,  $(1/2) \cdot (0.4418 + 0.4154) = (1/2) \cdot (0.3956 + 0.4615) = 0.4286$ ). 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 increases it is optimal to spend less today and more tomorrow, to borrow less and bring forward taxation. If the degree of prudence is about 0.35, the debt bias completely disappears and the prudent non-cooperative outcome without commitment has become close to the non-cooperative 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.

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 substantial 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.<sup>5</sup> 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.<sup>6</sup> Short-run political manipulation of election results may thus lead to an excessively prudent budgetary policy. To see this, we increase the weight on second-period welfare losses 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  $\pi$  it is possible to have a welfare improvement, but for large values of  $\pi$  opportunistic political manipulation is excessive and leads to 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 non-cooperative outcome with pre-commitment. In that case, the intertemporal common-pool distortions are exactly offset by opportunistic manipulation of election results.

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<sup>5</sup> The pioneering work of Nordhaus (1975) 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 (see 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 as shown by 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, Ch. 13.3).

<sup>6</sup> 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 as stressed by Jacobs (2007) and 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).

**Table 2. Opportunistic manipulation of election outcomes**

	Total spending in period 1	Total spending in period 2	Debt at end of period 1	Tax rate in period 1	Tax rate in period 2	Welfare loss for each minister
<b>Non-cooperative out- come with commitment</b>	0.4286	0.4286	0	0.4286	0.4286	0.2204
<b>Non-cooperative out- come without commit- ment</b>	0.4418	0.4154	0.0462	0.3956	0.4615	0.2217
<b>Electoral manipulation <math>\pi = 0.1</math></b>	0.4336	0.4235	0.0176	0.4160	0.4412	0.2206
<b>Electoral manipulation <math>\pi = 0.5</math></b>	0.4071	0.4500	-0.0750	0.4821	0.3750	0.2239
<b>Electoral manipulation <math>\pi = 0.1666</math></b>	0.4286	0.4286	0.0000	0.4286	0.4286	0.2204

Note: Parameters:  $\chi = 5$ ,  $N = 2$  and the long-run tax rate and the bliss level of public spending equal 0.3.

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.<sup>7</sup> 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 may be 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

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

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:<sup>8</sup>

“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 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.

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<sup>8</sup> 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.



**Table 3. Guidelines for prudent budgetary policy**

	Traditional approach	Prudent approach
Budget forecasts	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
Taxation	Smooth taxes over time, so that 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
Public consumption	Smooth deviations of public spending from bliss level over time	Precautionary under-spending and expect to gradually raise spending over time
Public investment	Correctly estimate costs and returns on investment	Under-investment due to over-estimation of costs and under-estimation of returns
Structural labour market reforms	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
Government debt	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
Warning about abuse for short-run electoral gains:		
<p>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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