The NIER´s Conceptual Framework for Fiscal Policy

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Preface

This report describes how the National Institute of Economic Research (NIER) reaches its fiscal policy assessments, in regard to the trade-off between the goal of stabilization and targets for public finances, for example.

Also provided in the report is a theoretical and empirical review of the literature on fiscal policy. This report may be revised subsequently in light of new theoretical, empirical and practical knowledge. New versions will be published on the NIER's home page.

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The report was written by Göran Hjelm.

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1 Introduction

The National Institute of Economic Research (NIER) comments regularly on the stance of fiscal policy in its quarterly publication *The Swedish Economy*. Beginning with the issue of January, 2008, forecasts of future fiscal policy are made for the purpose of improving forecasts for both the real economy and the general government sector. For the years in the forecast period where no central government budget has been adopted or (proposed), the fiscal policy forecast normally consists of the NIER's opinion on an appropriate fiscal policy stance in view of the Government's fiscal and stabilization policy objectives.[1] To ensure that the NIER's assessments are consistent, transparent and pedagogically presented, this Special Study explains the basis for the NIER's assessments.

While stabilization is the sole purpose of monetary policy, a fiscal policy may be followed for several different reasons. One way to classify these is the following: (i) income redistribution policy, (ii) efficiency, (iii) stabilization of resource utilization and (iv) budget policy targets (such as the surplus target and the expenditure ceiling). When the NIER forms an opinion on an appropriate stance for fiscal policy, the focus is on the trade-off between (iii) stabilization and (iv) general government net lending in relation to the surplus target. The trade-off, however, is not always without problems, as objectives often conflict. The two-by-two diagram presented below shows the four basic combinations that may arise.

[1] For a year for which a central government budget has been proposed (or adopted), its content determines the fiscal policy forecast. For this year, however, the NIER can recommend that fiscal policy be realigned in a certain direction in cases where the central government budget deviates substantially from what the NIER considers to be an appropriate fiscal policy. Despite a possible recommendation, the central government budget proposed (or adopted) will normally be the NIER's forecast. As noted in the main text, the fiscal policy forecast normally consists of the NIER's assessment of an appropriopriate fiscal policy stance for the years for which no central government budget has been proposed (or adopted). The latter presupposes that the Government will subsequently reach the same assessment of an appropriate fiscal policy stance as the NIER for these years. See the special analysis "The NIER's Fiscal Policy Forecasts" (only in Swedish) in *The Swedish Economy*, January 2008, for a detailed description of this in practical application.

		Net lending	
		High	Low
Resource utilization	High	*Conflicting objectives*	Raise taxes/cut expenditure
	Low	Cut taxes / raise expenditures*	*Conflicting objectives*

*If the expenditure ceiling so permits.

In two of the combinations, resource utilization and net lending give the same fiscal policy "signal;" this simplifies the fiscal policy assessment, although that simple signal does not in itself provide any guidance on the magnitude of the desired change in fiscal policy. Cases where objectives conflict are far more difficult, for example when measures that would improve resource utilization would unfavourably impact net lending in relation to the surplus target. It is important to emphasize, however, that with the surplus target formulated as an average over an economic cycle, there are fewer potential conflicts between objectives than if the surplus target applied to a single year.[2]

The present Special Study results in an explicit fiscal-policy reaction function that on average reflects the NIER's preferred fiscal policy stance in various fiscal and cyclical

[2] The surplus target is designed to improve, on average, the chances that fiscal policy action will be taken at the "right" time. Assume that resource utilization in period t (the current year, for example) is regarded as balanced, whereas in period $t + 1$ it is expected to be strained. If average net lending with an unchanged fiscal policy is estimated to fall short of the surplus target in both of these periods, there is reason to wait until $t+1$ before taking action to strengthen the budget. The explanation is that both objectives (full resource utilization and the surplus target) call for a contractionary policy in period $t+1$; thus, the two objectives do not conflict for this period.

situations.[3] It should be emphasized, though, that this reaction function is only an aid in the NIER's assessment of the appropriate stance for fiscal policy. Each economic situation is unique, calling for situation-specific considerations that cannot be captured in a model. On the other hand, the fiscal policy reaction function is intended to play a central role as a "steering oar" in the determination of an appropriate fiscal policy stance – not least in order to ensure that assessments will be consistent over time. The reaction function also promotes transparency and serves a pedagogical purpose, partly because reasons should normally be provided for any deviations from the fiscal policy proposal generated by the reaction function.

1.1 Presentation and Suggestions to Readers

Chapter 5 presents the fiscal policy reaction function, which is the NIER's instrument for determining the appropriate trade-off between the surplus target and full resource utilization in different fiscal and cyclical situations. The trade-off (i. e. the NIER's preferences) is based on the fiscal policy analysis presented in Chapter 2–4.

More specifically, the first step in this Special Study is to define a number of important fiscal policy concepts in Chapter 2 that are subsequently used throughout the study and in the NIER's other publications. Chapter 3 discusses the role that fiscal policy can play in an economy with a flexible exchange rate and an inflation target. Here, in addition, comments are provided on the relationship between monetary and fiscal policies and its effect on the NIER's fiscal policy assessments. Chapter 4 analyzes the advantages and disadvantages of fiscal policy[4] in a discussion on fiscal policy rules and transparency. Also provided is a brief overview of the

[3] This approach has been inspired by Svensson's (2007) suggestion of extracting and formalizing the monetary policy preferences of decision-makers on monetary policy (in Sweden, the *Executive Board* of the Riksbank, the country's central bank), in other words, primarily on the trade-off between the inflation target and balanced resource utilization in various cyclical situtions.

[4] As shown in Section 2.2, the concept of "fiscal policy" refers to changes in general government net lending that remain after adjustment for the effects of automatic stabilizers. In the literature, this is customarily termed active/discretionary/structural fiscal policy. As discussed in Section 2.4, the concept of "fiscal policy" is subdivided into an "active" and a "passive" component, with the difference consisting in the degree to which political decisions can be linked to the fiscal policy stance observed.

thinking on fiscal policy in other countries and in international organizations. Finally, the chapter presents a theoretical and empirical review of the effects of fiscal policy on the economy (a so-called multiplier analysis). The findings from Chapter 2-4 are then used in Chapter 5, where the reaction function takes specific form. The Special Study concludes with a number of appendices in Chapter 6.

Finally, some suggestions for further reading: The target group for this Special Study consists of economists and news reporters on economic affairs who follow the NIER's fiscal policy assessments. Although reading the entire Special Study is recommended, the more initiated might omit Chapters 3–4. However, all should read Chapter 2, on definitions, partly because fiscal policy concepts are sometimes used incorrectly in economic debates, and partly because the NIER's definitions of certain central concepts differ from those customarily found in the literature.

1.2 Delimitations

In this conceptual framework for fiscal policy, the approach is pragmatic throughout. The tools of analysis used are designed to function in the NIER's situation, which is characterized, among other things, by imperfect information and limited time between data processing, analysis and publication.

From a welfare standpoint, no "optimal" fiscal policy is developed in the Special Study (see, for example, Benigno and Woodford, 2005, for such an approach when it comes to monetary and fiscal policy). As is discussed in Section 4.1.4, the literature on optimal monetary and fiscal policy, compared to other fiscal-policy theory, is relatively new, and it is still an open question what policy-relevant conclusions it will ultimately reach. Instead, a so-called revealed preference approach is followed; it gives senior personnel at the NIER an opportunity to indicate their preferences about the trade-off between full resource utilization and achievement of the surplus target in fictitious and real-life experiments. In these experiments, the relationship between monetary and fiscal policy has been taken into account in several ways. One is that the calibration of the fiscal policy multiplier was adjusted in view of monetary policy responses to fiscal policy. Also, the effects of fiscal policy on resource utilization were calculated in the development of the reaction function, obliging participants to

consider (implicitly) the effects of fiscal policy on inflationary pressure. With this approach, a fiscal policy reaction function was developed (see Chapter 5).[5]

[5] It should be noted that the deviation, if any, from the so-called expenditure ceiling is not considered in the present study. The analysis of an appropriate fiscal policy stance considers resource utilization, the level of general government net lending in relation to the surplus target and the level of cyclically adjusted net lending (see Chapter 5).

2 Definitions

To put it simply, monetary policy is conducted for the purpose of stabilization, the targets for Sweden being 2-percent inflation and stable resource utilization. As fiscal policy has several objectives, it is important to establish what type of fiscal policy is involved in the present Special Study. One possible classification of the different aims of fiscal policy measures is the following:

1. *Income redistribution policy*
   - governed by value judgments.
2. *Efforts to improve efficiency*
   - increase the long-term production capacity of the economy, for example, through infrastructure, education and the design of the tax and benefit systems.
3. *Stabilization policy*
   - achieve a high and stable level of resource utilization.
4. *State of public finances*
   - meet the surplus target (can be viewed as a policy of income redistribution between generations).[6]
   - not to exceed the expenditure ceiling..

Items 1 and 2 require specification of *which* tax rates and types of expenditure should be changed; this is outside the scope of the NIER's assignment.[7] When the NIER

[6] Since the surplus target is expressed as an average over an economic cycle, it may be viewed as an intermediate target designed to promote the desired development of the debt ratio; see also Section 2.1.1 below.

[7] As for Item 2, the NIER continually assesses whether fiscal policy measures affect efficiency. For the years when no central government budget has been proposed or adopted, i. e. the years when the NIER's opinion on an appropriate stance for fiscal policy constitutes the forecast (see Footnote 1), the NIER also divides the proposed change in general government net lending into expenditure and revenue; see the special analysis "The NIER's Fiscal Policy Forecasts" (only in Swedish) in *The Swedish Economy*, January 2008.

expresses an opinion on the stance of fiscal policy in this and other publications, reference is made to Items 3 and 4, i. e., considerations of stabilization policy, as well as the stance of fiscal policy in relation to established targets for general government finances (such as the surplus target and expenditure ceilings).[8]

It should be noted even at this early juncture that the NIER regards both resource utilization and the surplus as symmetrical. This means that it is equally important, in principle, to use stabilization policy to moderate the tendency of GDP, whether above or below trend. Also, fiscal policy should, in principle, be adjusted so that net lending on average neither exceeds nor falls short of the surplus target over an economic cycle. The primary reason for the NIER's symmetrical approach is that the Government's objectives of full resource utilization and surpluses in general government finances are expressed symmetrically. Thus, in the present study the NIER makes no assessment as to whether the objectives *in themselves* are optimally designed.

2.1 Actual and Cyclically Adjusted Net Lending

Actual net lending (FS_t) is normally separated into a cyclically dependent component (so-called automatic stabilizers, AS_t; see Section 3.2 for a more detailed discussion) and a component that is not dependent on the cyclical phase of the economy (so-called cyclically adjusted net lending, KS_t), i. e:

$$FS_t = KS_t + AS_t. \tag{1}$$

Often FS_t is expressed in relation to (nominal) GDP (Y_t), and KS_t in relation to (nominal) potential GDP (Y_t^*).Equation (1) can then be expressed as:

$$\frac{FS_t}{Y_t} = \frac{KS_t}{Y_t^*}\left(\frac{Y_t^*}{Y_t}\right) + \frac{AS_t}{Y_t}. \tag{2}$$

The change in actual net lending, $\Delta\left(FS_t / Y_t\right)$, can be further divided into what is termed in the literature as discretionary, structural or active fiscal policy,

[8] The NIER does not normally express any opinion on an appropriate level for expenditure ceilings. In the forecast of future fiscal policy, however, the established expenditure ceiling constitutes a restriction in the classification of changes in cyclically adjusted net lending as expenditure or revenue.

$\left(\left(KS_t / Y_t^*\right)\left(Y_t^* / Y_t\right) - KS_{t-1} / Y_{t-1}^*\left(Y_{t-1}^* / Y_{t-1}\right)\right)$[9], and the change in the contribution of automatic stabilizers, $\Delta\left(AS_t / Y_t\right)$, i. e:

$$\left(\frac{FS_t}{Y_t}\right) - \left(\frac{FS_{t-1}}{Y_{t-1}}\right) = \left(\frac{KS_t}{Y_t^*}\right)\left(\frac{Y_t^*}{Y_t}\right) - \left(\frac{KS_{t-1}}{Y_{t-1}^*}\right)\left(\frac{Y_{t-1}^*}{Y_{t-1}}\right) + \left(\frac{AS_t}{Y_t}\right) - \left(\frac{AS_{t-1}}{Y_{t-1}}\right)$$

$$\Leftrightarrow \tag{3}$$

$$\Delta\left(\frac{FS_t}{Y_t}\right) = \left(\frac{KS_t}{Y_t^*}\right)\left(\frac{Y_t^*}{Y_t}\right) - \left(\frac{KS_{t-1}}{Y_{t-1}^*}\right)\left(\frac{Y_{t-1}^*}{Y_{t-1}}\right) + \Delta\left(\frac{AS_t}{Y_t}\right).$$

As discussed in the next section, the change in cyclically adjusted net lending in proportion to potential GDP is an important indicator for determining whether fiscal policy has an expansionary or a contractionary effect on the economy. To facilitate this analysis, the NIER's definition of KS_t / Y_t^* is shown below in Equation (4):[10]

$$\frac{KS_t}{Y_t^*} = \sum_{i=1}^{N}\left(\frac{T_{t,i}}{B_{t,i}}\right)\left(\frac{B_{t,i}}{Y_t}\right)^* - \left(\frac{G_t^U}{Y_t^*}\right)\left(\frac{U_t^*}{U_t}\right) - \left(\frac{\overline{G_t} + r_t D_t}{Y_t^*}\right). \tag{4}$$

$T_{t,i} / B_{t,i}$ is the implicit tax rate for the tax i; $\left(B_{t,i} / Y_t\right)^*$ is the equilibrium value of the tax base $B_{t,i}$ in proportion to nominal GDP[11]; G_t^U is unemployment compensation; U_t, U_t^* is unemployment and equilibrium unemployment, respectively; $\overline{G_t}$ is general government expenditure (in addition to unemployment compensation) , and $r_t D_t$ is the cost of interest.

2.1.1 The Surplus Target

Since 2000, fiscal policy has been subject to the objective of meeting the so-called surplus target. This means that general government finances are to show a surplus,

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[9] As discussed in Section 2.2, the NIER has chosen to refer to this part of fiscal policy, i. e. the part remaining after adjustment for automatic stabilizers, simply as "fiscal policy".

[10] See Braconier and Forsfält (2004) for a detailed description.

[11] A specific example may provide further clarity: let $T_{t,i}$ stand for payments of income tax, and $B_{t,i}$ for the relevant tax base of "earned income". This means that $\left(T_{t,i} / B_{t,i}\right)$ is the implicit income tax rate and that $\left(B_{t,i} / Y_t\right)$ is earned income as a share of GDP.

currently targeted as an average of 1 percent of GDP, over an economic cycle.[12] The surplus target plays a central role in the NIER's conceptual framework for fiscal policy, since that target and full resource utilization are the two primary objectives of fiscal policy that are evaluated by the NIER. Chapter 5 shows how the balance should be struck, according to the NIER, between the surplus objective and full resource utilization in various fiscal and cyclical situations.

In the spring budget bill of 2007, the Government specified how it intended to interpret the surplus target in planning fiscal policy. The Government would use three indicators: (i) a centred moving average over seven years, taking into account the three preceding years and the three following years, together with the current year; (ii) cyclically adjusted net lending (see Equation (4)) in particular years; (iii) historical average general government net lending since the target was introduced in 2000. In the NIER's opinion, indicators (i) and (ii) are most relevant,[13] and they are therefore included explicitly in the fiscal policy reaction function developed in Chapter 5.

2.2 Fiscal Policy

The NIER has chosen to use the concept of "fiscal policy" for changes in general government net lending that are not dependent on changes in the contribution of so-called automatic stabilizers. The latter refer to changes in tax revenue and expenditure that depend on the level of economic activity (see Section 3.2 for a more detailed description). The concept of fiscal policy thus applies to factors that result in changes in cyclically adjusted net lending in proportion to potential GDP, i. e.

[12] The surplus target was 2 percent of GDP in the period 2000–2006. According to a decision by Eurostat, the EU office of statistics, the premium pension system (PPM) as from 2007 is reported in the household sector instead of the general government sector as before. As the net lending of the PPM is equivalent to about 1 percent of GDP, the surplus target was changed to 1 percent.

[13] As from 2000, average net lending will reflect to a diminishing extent average net lending during the current economic cycle, and to an increasing degree deviations from the surplus target in previous economic cycles. Such historical deviations from established targets are captured in the situation-specific considerations (see Section 5.3) that are not included in the NIER's reaction function.

$\Delta\left(KS_t / Y_t^*\right) \neq 0$.[14] As discussed in Section 2.4 below, these factors may be "active" or "passive" in nature; the former may involve changing a tax rate, whereas the latter would consist in not increasing general government expenditure at the same rate as the growth in potential GDP. It is important to analyze both types of factors, as the NIER assesses the stance of fiscal policy (i. e. whether a particular fiscal policy is expansionary or contractionary) in relation to resource utilization (not GDP growth); see Section 2.3.

However, separating general government net lending into automatic stabilizers (i. e. the part dependent on the development of economic activity) and a "remainder" (i. e. the part dependent on factors other than economic activity, such as political decisions) is no simple task. In practice, various methods are used to eliminate the effects of automatic stabilizers on general government net lending.[15] Organizations like the EU, the IMF and the OECD agree on defining what the NIER terms "fiscal policy" as the change in so-called primary cyclically adjusted net lending as a share of potential GDP.[16] Cyclically adjusted net lending is the general government net lending that would have resulted with the economy in cyclical balance, i. e., with full resource utilization. However, the NIER includes interest revenue and costs in cyclically adjusted net lending; see Equation(4). The main reason for doing so is that effects of interest are included in evaluating the surplus target and that a change in net interest must therefore be considered when other fiscal policy decisions are taken for the purpose of meeting the target.

[14] Various concepts are used in the international literature. Three of the most common ones are "discretionary/structural/active fiscal policy".

[15] See Blinder and Solow (1974) for an early but rigorous review of different ways to identify fiscal policy. The article also discusses the trade-off between the simplicity of measures used and their relevance.

[16] The most commonly used term in English is "primary cyclically adjusted budget balance", CAB, where "primary" refers to the exclusion of interest revenue/costs, whereas in the NIER's measure, interest revenue and costs are included (see Equation (4) in Section 2.1).

2.3 Expansionary and Contractionary Fiscal Policy

The NIER has chosen to define whether a particular fiscal policy is expansionary or contractionary according to its effect on resource utilization (not GDP growth)[17], i. e:

Definition: Fiscal policy is expansionary (contractionary) when it leads to an increase (decrease) in resource utilization.

Previously, the NIER defined expansionary and contractionary fiscal policies according to their effect on GDP growth, as many international organizations and textbooks still do. It turns out, though, that the overall choice of terminology for describing fiscal and monetary policy is more intuitive with the NIER's definition in cases where fiscal policy also affects potential GDP. The following example is illustrative:[18]

Assume that a fiscal policy measure, or set of measures, is expected to increase potential GDP more than actual GDP in the short run (and thus to reduce resource utilization and inflationary pressure). Assume further that the textbook definition would be used and thus that this fiscal policy measure would be considered "expansionary" on account of the higher GDP growth. The NIER would then state in its published opinion that an expansionary fiscal policy should be matched with an expansionary monetary policy; the reason for the latter would be that resource utilization *de facto* was expected to decrease because of the fiscal policy in this imaginary case, despite higher GDP growth. If the NIER's definition is applied instead, the reasoning is that the contractionary fiscal policy (because potential GDP increases more than actual GDP in the short run) should be accompanied by a more expansionary monetary policy. Consequently, the NIER has found it preferable from a pedagogical standpoint to focus on resource utilization when assessing the expansionary/contractionary effect of fiscal policy actions on the economy. An alternative justification for the use of resource utilization as a yardstick for measuring the expansionary degree of fiscal policy is that stabilization policy, and thus the

[17] Thus, the effects of so-called automatic stabilizers on resource utilization (see Section 3.2) are not considered in determining whether fiscal policy is expansionary or contractionary.

[18] See the special analysis "Effects of the New Government's Economic Policy" in *The Swedish Economy*, December 2006, for a reality-based analysis of the effects of fiscal policy on actual and potential GDP.

development of the inflation rate, is in focus in the NIER's analysis. There is a stronger link between resource utilization and the inflation rate – both theoretically and empirically – than between GDP growth and the inflation rate. With the definition provided above, an expansionary fiscal policy, all else being equal, is associated with higher resource utilization and a higher inflation rate.

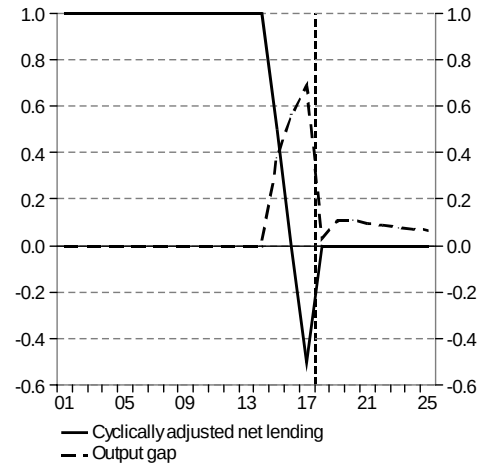
The NIER regards the change in cyclically adjusted net lending in proportion to potential GDP, $\Delta\left(KS_t / Y_t^*\right)$, as an significant indicator of the effect of fiscal policy on resource utilization in a particular year. In the normal case, an improvement in this net lending, $\Delta\left(KS_t / Y_t^*\right) > 0$ (due for example, to lower general government expenditure and/or higher tax rates), means that resource utilization decreases; see Section 2.5 and Appendix 6.1. The reason is the assumption of a Keynesian multiplier in the short run. Conversely, resource utilization normally increases when $\Delta\left(KS_t / Y_t^*\right) < 0$.

The fact that a fiscal policy measure can increase (decrease) GDP growth, i. e. what textbooks term an expansionary (contractionary) policy, is referred to by the NIER in several different ways, such as "fiscal policy reinforces (curbs) growth in demand" or "fiscal policy provides a positive (negative) contribution to GDP growth." Finally, it should be noted that in cases where fiscal policy is not considered to affect potential GDP, the NIER's definition coincides with the one customarily used in the literature.

2.3.1 The Time Dimension Makes a Difference

The NIER's terminology for the expansionary or contractionary effect of fiscal policy on the economy refers primarily to how the change in cyclically adjusted net lending in proportion to potential GDP is expected to affect resource utilization *in the current year*. The choice of period depends on the kind of analysis to be performed concerning the effects of fiscal policy. In Diagram 1 a fictitious example is used to illustrate this point.

Diagram 1 Assessment of the degree to which fiscal policy is expansionary/contractionary: Fictitious example
Percent of GDP and potential GDP, respectively



Source: NIER.

Diagram 1 refers to an economy where cyclically adjusted net lending has been constant at 1 percent between periods 1 and 14 (see solid line). The output gap has been zero during the period, owing partly to the stabilizing function of monetary policy (see Section 2.6 for a discussion on the link between fiscal and monetary policy). In period 15–17, measures are taken that cause net lending to deteriorate by –0.5 percentage point per year (gradually higher general government expenditure, for example), whereas measures to improve net lending by 0.5 percentage point are implemented in period 18. The degree to which fiscal policy is expansionary or contractionary during periods 15–18 can be described in at least three different ways:

1. In the aggregate, fiscal policy has had an *expansionary* effect on the economy during periods 15-18, as resource utilization (see dashed line) was higher on average than it would have been with no changes in cyclically adjusted net lending.

2. In the aggregate, fiscal policy in periods 15–18 has had a *neutral* effect, in principle, on resource utilization in period 18, as resource utilization with fiscal policy included is basically the same as resource utilization with fiscal policy excluded. The reason is partly that the effects of the fiscal policy applied in periods 15–17 have "subsided" because of a diminishing multiplier (due to monetary policy, among other factors; see Section 2.6), and partly that the expansionary fiscal policy in periods 15–17 is countered by the contractionary policy in period 18.

3. Fiscal policy in period 18 (i. e. the improvement in cyclically adjusted net lending that year) has a *contractionary* effect on resource utilization in period 18, since resource utilization in this period would have been higher if the

effect of the increase in cyclically adjusted net lending this period had been excluded.

The NIER's use of the concepts of expansionary and contractionary fiscal policies (see Section 2.3 above) refers generally to item 3 above; i. e, the focus is on how fiscal policy in a particular year is expected to affect resource utilization in the current year and in the coming forecast period. The reason for this is that the "old" fiscal policy (i. e. the one conducted in periods 15–17 in Diagram 1) has already been incorporated into the assessment of resource utilization and net lending in coming periods (period 18 and subsequent periods in Diagram 1).[19] When the NIER determines an appropriate fiscal policy for a forecast period, consideration is given to the effects of the fiscal policy conducted until the year before the start of the forecast period and having effects during the forecast period. Of course the NIER may also analyze the aggregate effect of fiscal policy on resource utilization during a particular historical period when there is a need for such an analysis (i. e. in alternative 1 above).

The choice of language, however, is not clear-cut. The contractionary policy, according to item 3 above, could also be expressed by stating that fiscal policy shifts in a less expansionary direction (or nearly neutral direction), as the aggregate effect of fiscal policy in periods 14-17 is slightly expansionary or neutral in period 17. The language used may be especially important to consider at turning points in resource utilization and fiscal policy; see also the discussion in Section 2.7, where procyclical and countercyclical policies are defined.

2.4 "Active" and "Passive" Fiscal Policy

The fact that the NIER uses resource utilization as a yardstick makes it is necessary to consider both "active" and "passive" fiscal policies in order to tell whether fiscal policy is expansionary or contractionary. As noted above, the NIER determines whether a particular fiscal policy is expansionary in a given year according to the

[19] Quite possibly, the "old" fiscal policy decisions were designed to affect the change in cyclically adjusted net lending during the forecast period. In this fictitious example, however, it is assumed that fiscal policy decisions affect only the change in cyclically adjusted net lending in the current year. Of course, the *level* of cyclically adjusted net lending is dependent on changes prior to the forecast period.

change in cyclically adjusted net lending in proportion to potential GDP. Use of Equation (3) yields the following expression:[20]

$$\Delta\left(\frac{KS_t}{Y_t^*}\right) \approx \left[\Delta\left(\frac{FS_t}{Y_t}\right) - \Delta\left(\frac{AS_t}{Y_t}\right)\right]\left(\frac{Y_t}{Y_t^*}\right). \tag{5}$$

"Active" fiscal policy decisions, like changes in tax rates and expenditure ($T_{t,i}/B_{t,i}$ and $\overline{G_t}$, respectively, in Equation (4)) of course affect KS_t/Y_t^*. But the absence of fiscal policy decisions, or a "passive" policy, also influences KS_t/Y_t^*. An analysis of Equation (4) shows, for example, that the following factors impact KS_t/Y_t^* even though no active fiscal policy decisions have been taken:[21]

- *Changes in potential GDP, Y_t^*, and equilibrium unemployment, U_t^**: If $\overline{G_t}$ is held constant (i. e. a "passive" decision), an improvement in Y_t^* from one year to the next means that KS_t/Y_t^* increases.
- *Changes in tax bases, $B_{t,i}/Y_t$*: Structural changes may mean that one tax base (such as household consumption) increases to the detriment of another tax base (such as total earnings). Since implicit tax rates ($T_{t,i}/B_{t,i}$) differ, KS_t/Y_t^* will change, given no change in $T_{t,i}/B_{t,i}$ (i. e. a "passive" decision).
- *Change in the real rate of interest, r_t*: This affects the net cost of general government debt and thereby KS_t/Y_t^*.

A feature common to these "passive" changes in KS_t/Y_t^* is that unlike "active" changes in tax rates and expenditure, they do not necessarily affect actual GDP in the short run. But since the NIER has chosen to define an expansionary/contractionary fiscal policy in terms of resource utilization, it is

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[20] The approximation applies if $\left(Y_{t-1}^*/Y_{t-1}\right)/\left(Y_t^*/Y_t\right) \approx 1$.

[21] It should be noted, however, that the "passive" changes below may be the direct or indirect results of political decisions. For example, changed replacement levels in the unemployment insurance system can affect equilibrium unemployment and potential output in the longer run. The differences between "active" and "passive" policy is thus not always crystal-clear. What the NIER means by "active" is that decisions by politicians quite probably have a direct effect on resource utilization, as would be the case, for example, with a change in the tax rate or or in general government expenditure. However, the NIER considers the distinction between "active" and "passive" to be important, not least for pedagogical reasons when fiscal policy is under discussion.

important to analyze both "active" and "passive" fiscal policies and their effects on actual and potential GDP. An illustrative example follows:

Assume that potential GDP is revised upward after a new estimate of potential productivity. Assume further, for the sake of simplicity, that all GDP components except general government consumption increase directly and to the same degree. In this example, a "passive" decision not to increase general government consumption has two effects. First, there is an increase in KS_t / Y_t^*.[22] Second, there is a decrease in resource utilization, as actual GDP increases less than potential GDP. The "passive" policy (i. e. not increasing $\overline{G_t}$ when Y_t^* increases) means that resource utilization decreases, which according to the discussion in Section 2.3, means that fiscal policy is contractionary. Thus, in this example, the following applies:

$$\Delta\left(\ln y_t^*\right) > 0 \begin{cases} \nearrow \; \Delta\left(KS_t / Y_t^*\right) > 0 \\ \searrow \; \Delta\left(\ln y_t - \ln y_t^*\right) < 0 \end{cases}$$

where y_t^*, y_t are real potential and actual GDP,[23] respectively. The following section discusses the conditions under which $\Delta\left(KS_t / Y_t^*\right)$ can be used to indicate whether fiscal policy (both "active" and "passive") is expansionary or contractionary in regard to resource utilization, i. e. what link there is between $\Delta\left(KS_t / Y_t^*\right)$ and $\Delta\left(\ln y_t - \ln y_t^*\right)$.

2.5 Fiscal Policy and Resource Utilization: Some Rules of Thumb

A question frequently raised in *The Swedish Economy* and in general public debate is whether fiscal policy has an expansionary or contractionary effect on the economy. As discussed in Section 2.3 (including Section 2.3.1) above, the NIER usually focuses on how changes in fiscal policy ("active" and/or "passive") affect current and forecast

[22] In other words, according to Equation (4), the derivative with respect to potential GDP is positive, $\partial\left(KS_t / Y_t^*\right) / \partial Y_t^* > 0$.

[23] Upper-case letters are used for nominal quantities, lower-case letters for real quantities.

resource utilization. In connection with the autumn budget bill, there is consequently considerable interest in analyzing whether the new policy proposed (that is, the changes in fiscal policy) will have an expansionary or a contractionary effect on the economy.

Different fiscal policy measures of course have different effects on the economy and on resource utilization.[24] Therefore, to answer the question whether the fiscal policy measures in a budget bill affect resource utilization positively or negatively generally requires detailed analysis of the expected effect of the various changes. There is nevertheless a need for a fiscal policy indicator that can summarize whether fiscal policy is expansionary or contractionary.

For this purpose the NIER uses the change in cyclically adjusted net lending in proportion to potential GDP, $\Delta\left(KS_t / Y_t^*\right)$. Two steps are required in the analysis:

(i) the relationship between fiscal policy ("active" and "passive;" see Section 2.4) and $\Delta\left(KS_t / Y_t^*\right)$ and

(ii) the relationship between $\Delta\left(KS_t / Y_t^*\right)$ and $\Delta\left(\ln y_t - \ln y_t^*\right)$.

As shown in Appendix 6.1, higher taxes and/or lower expenditure mean that $\Delta\left(KS_t / Y_t^*\right) > 0$. If, for example, a tax rate is raised by 1 percentage point and its tax base constitutes 30 percent of potential GDP, then $\Delta\left(KS_t / Y_t^*\right) * 100 = 0.3$. If general government consumption or interest expenditure is reduced by 1 percent of potential GDP, then $\Delta\left(KS_t / Y_t^*\right) * 100 = 1.0$.[25] In the normal case, the NIER assumes a positive multiplier in the short run; in other words, stimulating demand affects output positively for a few years (see Section 4.5.4 for a detailed discussion). If a multiplier of 0.75 percent is assumed, the tax increase above means that GDP (and the GDP gap) decreases by 0.75*0.3=0.225 percent in the first year. With the decrease in expenditure by one percentage point, GDP (and the GDP gap) are reduced by 0.75*1.0=0.75 percentage point.

[24] Another way to express this is that fiscal policy instruments have different multipliers; see Section 4.5 for a discussion of theoretical and empirical findings.

[25] In these examples, it is assumed that potential GDP is not affected by the fiscal policy measures. As discussed in Appendix 6.1, interrelationships become somewhat more complicated if fiscal policy measures also affect potential GDP.

In the normal case, the following thus applies:

$$\begin{aligned} \Delta\left(KS_t / Y_t^*\right) > 0 \quad &\Rightarrow \quad \Delta\left(\ln y_t - \ln y_t^*\right) < 0 \\ \Delta\left(KS_t / Y_t^*\right) < 0 \quad &\Rightarrow \quad \Delta\left(\ln y_t - \ln y_t^*\right) > 0, \end{aligned} \tag{6}$$

In other words, if cyclically adjusted net lending as a share of potential GDP improves, the effect on resource utilization will be negative; i. e. the fiscal policy measure will have a contractionary effect on the economy. The converse applies if cyclically adjusted net lending deteriorates in proportion to potential GDP.

In an actual forecasting environment, it is of course necessary to analyze the reason for $\Delta\left(KS_t / Y_t^*\right)$ in order to determine the effect on resource utilization. This is so since $\Delta\left(KS_t / Y_t^*\right)$ usually depends both on a package of "active" measures and on factors that are more "passive" in nature. As discussed in Section 2.4, $\Delta\left(KS_t / Y_t^*\right) \neq 0$ may depend, for example, on changes in the relative size of tax bases and in the real rate of interest. Since neither of these changes is likely to affect resource utilization, the relationship in (6) will not always apply.

2.6 Economic Effects of the Repo Rate Level, of the Level of General Government Net Lending, and of the Change in These Two Factors

Monetary and fiscal policy are the primary instruments of stabilization policy and can be used to increase or decrease economic activity. A change in stabilization policy through these two instruments can have the same qualitative effect on the economy in the short run, although the channels followed differ. Both a reduction in the policy interest rate (i. e. monetary policy) and an increase in general government expenditure (i. e. fiscal policy) will generally increase resource utilization.

However, there is an important difference between how the *level* of the policy interest rate and the *level* of general government net lending, respectively, can affect resource utilization in the economy in the medium to long term. With monetary policy, not only changes, but also the level of the policy interest rate (or actually the level of the real rate of interest), are of pivotal significance. Since a central bank has a monopoly on printing money, it can control the supply and thus the price of money, i. e. the real rate of interest. If the central bank reduces the policy interest rate in a contractionary economy so that the real rate of interest is below what is considered its equilibrium position, the real cost of borrowing to agents in the economy

decreases. As long as the level of the real rate of interest is below what is considered its equilibrium position, monetary policy can have effects in real terms, i. e. a positive influence on actual GDP growth.[26] Since monetary policy is not assumed to have any effects on potential GDP, a lower real rate of interest means that resource utilization in the economy, all else being equal, will increase.

With fiscal policy, the analysis is different. The level of actual or cyclically adjusted net lending does not necessarily affect resource utilization, especially not if a particular level of net lending lasts for an extended period. Two factors interact to bring about this result. First, agents in the economy are assumed to consider the net lending of the general government sector in their own decisions on saving and net lending, and increasingly so the longer the time elapsed after a change to a new level of general government net lending. A decrease (increase) in general government net lending is thus countered partly by an increase (decrease) in the net lending and saving of the private sector. This means that the new level of general government net lending will have a gradually diminishing effect on resource utilization. In the literature, the degree of so-called Ricardian equivalence is frequently discussed. Perfect Ricardian equivalence is an extreme case, one feature of which is that a change in taxes levied does not affect resource utilization even in the short run, as the private sector changes its behaviour to the same extent in the opposite direction. In the NIER's opinion, Ricardian equivalence is not a reasonable assumption for the short and medium term. However, there may be elements of such behaviour that limit the macroeconomic effects of the level of net lending chosen by the general government sector. This brings us to the second factor.

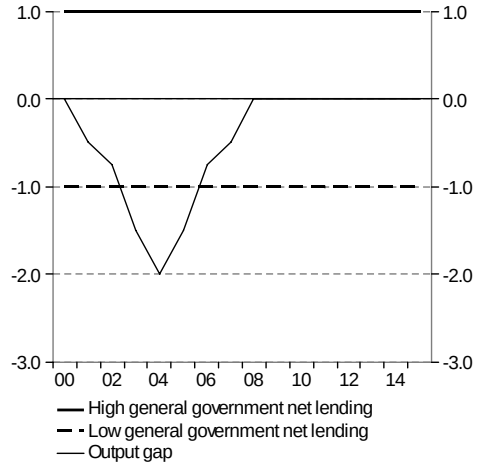
The second reason why the level of general government net lending probably has no significant effect on resource utilization in the medium term is the role of the central bank (the *Riksbank* in Sweden) in the economy. Even if a change in fiscal policy leading to a new level of net lending could be assumed to affect household consumption in the medium term because of imperfect Ricardian equivalence, the Riksbank is required to seek balanced resource utilization. A specific example will clarify this argument. If net lending exceeds the current surplus target for a time and this in itself (which is thus not certain) has a contractionary effect on demand

[26] Fiscal policy is assumed not to react to the monetary policy followed; see Section 3.1 for a discussion.

(because of lower household consumption, for example), the Riksbank will adjust interest rates so that balanced resource utilization is achieved after a period of adjustment. The higher general government net lending will have no effect on resource utilization in the medium or long term (and thus, according to the NIER's definition in Section 2.3, will not be contractionary). To put it another way, the NIER's assessment is that the short-term fiscal policy multiplier is positive, whereas the multiplier in the longer run is zero. The latter is also a frequent result when macroeconomic simulation models are used; see Bergvall et al. (2007) and Harrison et al. (2005).

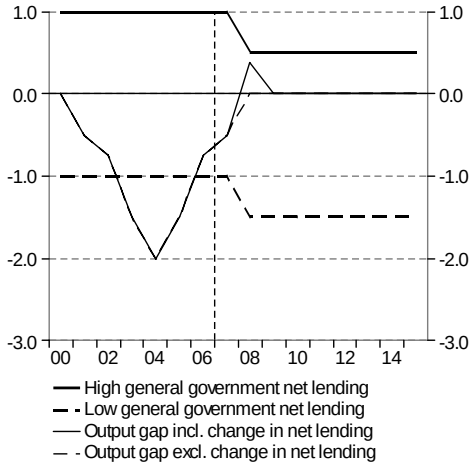
The discussion above can be exemplified by the surplus objective, i. e. that the net lending of the general government sector should average a set percentage, currently 1 percent, of GDP over an economic cycle. This objective was introduced in 2000. The Government has proposed that the target rate apply for the current term of office, but has also indicated that it would be desirable to maintain that rate through 2015. Given the above view on the effects of fiscal policy, the average level of resource utilization in 2000–2015 would probably not be appreciably different than if, for example, the Government's target were –1 percent of GDP over an economic cycle instead of +1 percent, see Diagram 2 below.

Diagram 2 Level of net lending does not necessarily affect resource utilization: Fictitious example
Percent of GDP and potential GDP, respectively



Source: NIER.

Diagram 3 Change in net lending affects resource utilization: Fictitious example
Percent of GDP and potential GDP, respectively



Source: NIER.

But, for example, if in 2008 the Government with no warning announced that net lending was to decrease by 0.5 percentage point, resource utilization would be affected in the short run. This would come about via the two factors discussed above,

i. e. partly because agents in the economy would gradually (but not necessarily completely) adapt to the new level of general government net lending, and partly because the Riksbank would act to bring the economy back to full resource utilization. Realistically, however, the effect of this change in net lending in 2008, within reasonable limits, would not be dependent on the original level of net lending. In other words, resource utilization would improve equally in the two cases, as general government consumption would permanently increase by 0.5 percent of GDP; see the diagram above.[27]

The direct explanation for the result above is the assumption that the long-run fiscal policy multiplier in regard to resource utilization is zero; this assumption, as mentioned above, is warranted by another assumption, namely that the Riksbank in the long run can stabilize resource utilization (in this case) after a fiscal policy disturbance.[28] Although reasonable in fairly normal economic situations, this assumption is not always valid. If for example nothing had been done to reverse the highly negative tendency of net lending in Sweden at the outset of the 1990's, there could have been a relatively long-lasting negative effect on resource utilization. In this case, the uncertainty of agents in the economy about the sustainabililty of public finances could have affected household consumption and private-sector investment negatively, and on account of the uncertainty, it would have been difficult to influence agents through monetary policy.

As noted in Section 2.3.1, the effects of previous fiscal policy on general government net lending and resource utilization are incorporated into the forecasts made. For this reason, the NIER's analysis usually focuses on how the Government's fiscal policy in budget bills during the forecast period affects these variables and on the NIER's view

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[27] There is reason to believe, however, that certain non-linearities are present, especially since the initial level of net lending is highly negative (see Section 4.5.2 for a discussion). Under "normal" circumstances, though, it is a reasonable approximation that the initial level of net lending is without consequence for the effects of fiscal policy measures on resource utilization. For a more thorough discussion on the macroeconomic effects of fiscal policy (so-called multiplier analysis), see Section 4.5

[28] Fiscal policy may of course have long-term effects on the economy,whereas monetary policy only affects the short-run development of the economy. Examples of fiscal policy measures with possible long-term effects are investments in infrastructure, education and the design of the systems of taxes and benefits. However, fiscal policy in general has no long-term effects on *resource utilization* (i. e. the difference between actual and potential output).

of the appropriate path for fiscal policy given the fiscal objectives for resource utilization in the economy.

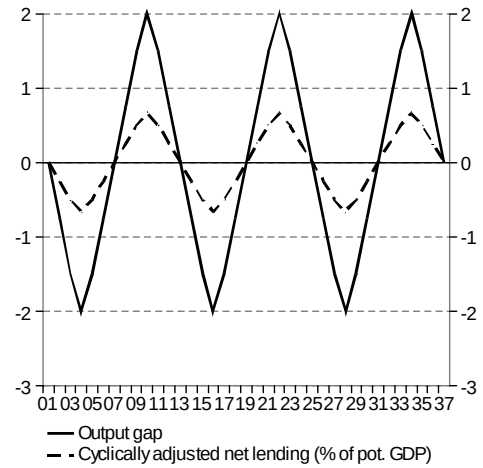
2.7 Pro- and Countercyclical Fiscal Policy

In the debate on the economy, a so-called countercyclical fiscal policy is often advocated. This term refers to the question whether the change in cyclically adjusted net lending as a share of GDP should have the same sign as the change in resource utilization, i. e:

$$\frac{KS_t}{Y_t^*} = f\left(\underset{+}{\ln y_t - \ln y_t^*}\right). \tag{7}$$

A countercyclical policy means that $\Delta\left(KS_t / Y_t^*\right) < 0$ in an economic downturn and that $\Delta\left(KS_t / Y_t^*\right) > 0$ in an economic upturn; see Diagram 4 below for a stylized example.

Diagram 4 Countercyclical fiscal policy
Fictitious example
Percent of potential GDP



Source: NIER.

Assume that all changes in KS_t / Y_t^* are dependent solely on changes in labour market programmes, that the number participating in programmes when there is full resource utilization (i. e. when the output gap is zero) is 100 000, and that net lending is then zero. When the output gap deteriorates between periods 0 and 4, the number enrolled in programmes gradually increases as a result of political decisions; this means that KS_t / Y_t^* progressively worsens. In period 4 the number of programme participants is highest, say 150 000. When the economy enters an upswing in period 5, the number

of programme participants gradually decreases, and when the output gap is widest in period 10, the number is at its lowest, say 50 000.[29]

It is worth noting from this simple example that the definition of a countercyclical fiscal policy in Equation (7) means that policy *is changed* in a more contractionary direction, i. e. that $\Delta\left(KS_t / Y_t^*\right) > 0$, when the economic upturn begins in period 5 even though the economy is still contractionary. However, because of fiscal policy *as a whole* during the contractionary phase in periods 1–7, the GDP gap will be less negative than would otherwise have been the case (see also the discussion in Section 2.3.1).

Although a countercyclical fiscal policy, as defined above, is reasonable as an average over a longer period, it need not be the best policy in each specific situation. Assume, for example, that average net lending for period 4 in Diagram 4 was 3 percent of GDP (equivalent, for example, to a programme enrolment capacity of 10 000), i. e. clearly above zero, which is assumed to be the target in the example. Since the output gap in the same period is negative, an expansionary policy is called for in regard to both objectives (i. e. full resource utilization and the surplus target/number of programme participants), not a contractionary policy as in Diagram 4 above. In this situation, there is no reason for a contractionary policy in period 4. Instead, resource utilization can be restored to balance more quickly with the aid of an expansionary fiscal policy (here, increasing programme enrolment capacity) – the latter means, at the same time, that net lending will move toward the surplus target. The NIER's trade-off between stable resource utilization and the surplus target in different fiscal and cyclical situations is illustrated concretely in Chapter 5.

2.8 Permanent and Temporary Fiscal Policy

As described in the introduction to Chapter 2, the NIER discusses and assesses fiscal policy on the assumption that it has two purposes: one of these is stabilization, the other is to achieve set targets for general government finances. In regard to stabilization, fiscal policy measures – given that the targets for general government

[29] A procyclical policy, by contrast, would mean that KS_t / Y_t^* improves (worsens) in an economic downturn (upturn). By analogy to the example in the text, the number participating in labour-market-related programmes would decrease during periods 0 to 4 etc.

finances have been met – should be temporary in nature, i. e. to strengthen the economy when it is contractionary and to curb it when it is expansionary. As for the surplus target, the opposite applies; permanent changes in net lending are required if it is above or below the target at the outset.

The NIER's analysis is based on the central government budget proposed or adopted for the year for which there is one (see footnote 1). This means, for example, that all enacted changes in taxes and expenditure are to be considered permanent unless specifically designated as temporary (i. e. that they are to be reversed at a given point in time). Depending on the cyclical and fiscal situation, on the other hand, an appropriate future fiscal policy (which is not found in a proposed or adopted central government budget). according to the NIER's assessment may be both permanent and temporary. Section 4.5 discusses the macroeconomic effects of fiscal policy; where the effects are shown to vary depending on whether agents in the economy consider the change in fiscal policy permanent or temporary.

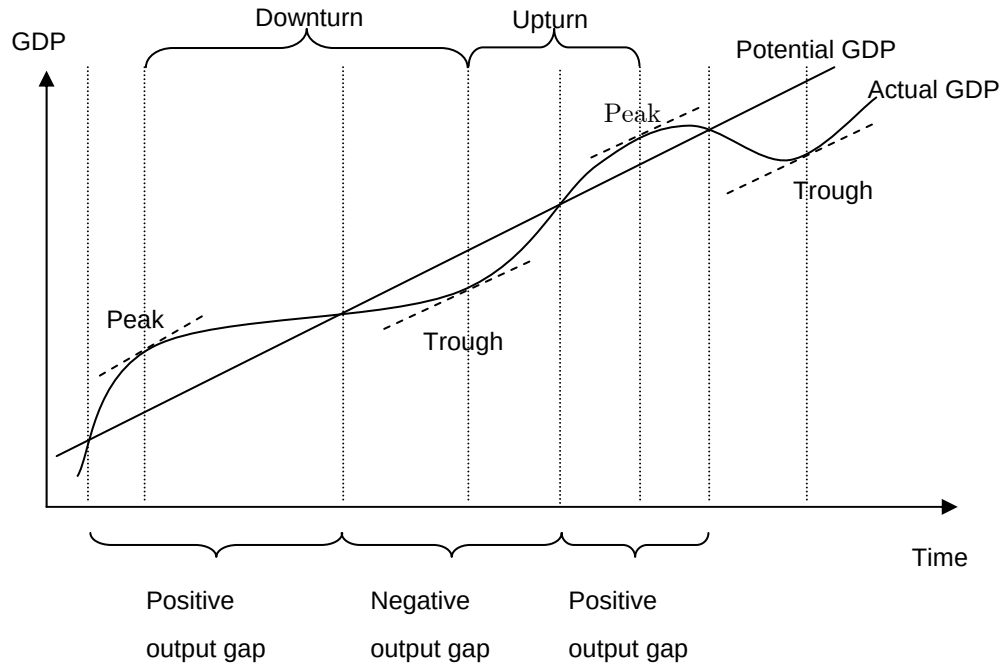
2.9 Business Cycle

The term "business cycle" and its various phases are often referred to in debates, as in this Special Study as well. To aid in following the discussion, the relevant concepts are defined in this section. Moreover, there is a brief discussion of the prevailing view of *why* economic cycles arise. This is of central importance for understanding both the possible uses and the limitations of stabilization policy.

2.9.1 Concepts

Diagram 5 below shows the different phases of an economic cycle.

Diagram 5: Phases of the Business Cycle



A positive (negative) output gap means that actual GDP exceeds (is less than) potential GDP. An economic upturn means that resource utilization in the economy is rising; this is equivalent to saying that actual growth exceeds potential growth. The opposite applies in an economic downturn.

However, the definition of "business cycle" is not so obvious. Normally the terms "peak-to-peak" or "trough-to-trough" are used in stylized textbook examples, where cycles are symmetrical. But in reality, an economic cycle is often asymmetric; thus, "peak-to-peak" may mean that the accumulated output gap during this period deviates from zero. For example, the economy may have been "more" expansionary than contractionary, during the period.

It may also be worth emphasizing that for stabilization policy, what matters is the *expected* development of the business cycle, since stabilization policy must be designed in reference to this information. As discussed below, expectations seldom prove correct, as fluctuations in the economy depend largely on exogenous disturbances, which are unforeseeable.

2.9.2 Causes

There are two basic explanations for business cycles; they can be summarized in the following concepts (see Burda and Wyplosz, 2001):

- endogenous cycles
- exogenous cycles.

Endogenous cycles are explained by the fact that the economy does not start from equilibrium. The development of the business cycle (i. e. the output gap) after its starting point is determined by the internal dynamics of the system (i. e. is not affected by exogenous forces) and can take one of three basic paths, where the output gap may:

1. vary decreasingly until it disappears, i. e. reaches zero and stays there
2. vary around zero with constant force, i. e. never reaches zero, and its fluctuations around zero maintain the same magnitude
3. vary around zero with ever-increasing force, i. e. until exploding out of the pattern.

Since the three variations above are inconsistent with empirical economics, the conception of cycles as endogenous is generally discarded in favour of *exogenous cycles*. The latter are explained by the continuous exposure of the economy to exogenous disturbances (or shocks) that cause economic activity (and thus the GDP gap) to vary over time. Examples of such shocks are:

- "animal spirits" (a term used by Keynes for optimism/pessimism)
- innovations
    - new products
    - new work methods
- wars, natural disasters
- behavioural changes (for example, in the propensity to save or to participate in the labour force).

Monetary and fiscal policy cannot prevent these disturbances, as they are exogenous. This means that stabilization policy cannot be expected to eliminate economic cycles, for the shocks that cause them cannot be foreseen by governments or central banks.

Instead, the task of stabilization policy is to alleviate the cyclical fluctuations that result from these exogenous disturbances.

3 Basic Assumptions for a Fiscal Policy with a Flexible Exchange Rate

This chapter discusses several basic assumptions for fiscal policy that concern Sweden's current monetary policy regime with a flexible exchange rate and an inflation target. Certain advantages and disadvantages of fiscal policy are present *regardless* of monetary regime; these are analyzed in Chapter 4.

One central assumption is that monetary policy offers greater potential than fiscal policy for stabilizing resource utilization with a flexible exchange rate than with a fixed exchange rate. In a standard IS/LM model, fiscal policy generally has less impact on resource utilization with a flexible exchange rate since fiscal policy expansion (contraction) pushes interest rates up (down) and appreciates (depreciates) the currency. Consumption, investment and net exports are then affected negatively (positively), thereby counteracting the effect of the fiscal policy measure on resource utilization (see, for example, Krugman and Obstfeld, 2000). For this reason, the task of stabilization policy under the current monetary policy regime in Sweden is entrusted chiefly to monetary policy.

In highly simplified models without price rigidity, demand is affected solely by monetary policy when the exchange rate is flexible. Fiscal policy measures are neutralized, even in the short run, by higher interest rates and an appreciated exchange rate. Under more realistic assumptions, as in the macromodels of the Bank of England and the NIER (see Harrison et al., 2005, and Bergvall et al., 2007), with rigidity of prices and wages in the short run, there is a temporary fiscal policy effect on demand, but less so than with a fixed exchange rate.[30] One conclusion, therefore, is that fiscal policy should be used less for stabilization purposes in Sweden than in countries like those belonging to the euro zone; see the STEMU Study, SOU (2002:16).

[30] See Andersen and Holden (2002) and Frenkel and Razin (1996), among others, for theoretical contributions, as well as Hemming et al. (2002) for an empirical overview of the macroeconomic effects of fiscal policy.

As underscored in Chapter 2, fiscal policy has other purposes than just those of stabilization policy. As far as the NIER is concerned, aside from the aim of stabilization, the focus is on the surplus target. Consequently, there are situations where general government finances require fiscal policy even when stabilization does not. How the deviation of general government net lending from the surplus target affects the NIER's fiscal policy assessments is described in detail in Chapter 5, where the conceptual framework is given concrete form.

3.1 Monetary Policy Response to Fiscal Policy

Fiscal policy, of course, is not conducted in a vacuum, and in assessing its macroeconomic effects, consideration should be given to the monetary policy response. Theoretically, stabilization policy may be viewed as a "game" with two "players," the Riksbank and the Swedish Parliament. Different assumptions may be made about "the rules of the game". One of these is that the players act simultaneously, resulting in what is known in the literature as the Nash solution; see Lambertini (2006). Partly because major fiscal policy decisions in the form of budget bills are reached rather infrequently, whereas monetary policy decisions are taken fairly often, fiscal policy is more likely to be a so-called Stackelberg leader; see Lambertini and Rovelli (2003). This means that fiscal policy "makes the first move," and monetary policy responds, implying that politicians consider the monetary policy response when deciding on fiscal policy measures. By contrast, the Riksbank does not consider possible fiscal policy responses in its decisions. In the present Special Study, that relationship between fiscal policy and monetary policy is assumed to exist.

As a practical matter, this means that when the NIER's assesses the effect of fiscal policy on the economy (the so-called multiplier), it considers the reaction of monetary policy to fiscal policy. Increased general government expenditure and/or lower taxes generally call for a somewhat more contractionary monetary policy than without an expansionary fiscal policy. The converse is true with reduced expenditure and/or higher taxes. The effect on the economy will thus be somewhat more limited than if monetary policy did not react to fiscal policy. The NIER's assessment of the effect of fiscal policy on the economy is treated in Section 4.5. It should be noted, moreover, that in the fictitious and actual examples presented to senior NIER personnel for their views in revealed-preference exercises (see Chapter 5), the effects of the proposed fiscal policy on resource utilization were calculated; thus, inflationary pressure was implicitly taken into account.

3.2 Automatic Stabilizers

Although this Special Study focuses on the government budget after adjustment for the effects of so-called automatic stabilizers, it is important to keep in mind that much of the cyclical effect of general government finances on the economy is due to automatic stabilizers. An increase in demand leads to higher tax revenue and lower expenditure on items like unemployment benefits, curbing the increase in demand. Similarly, a decrease in demand results in lower tax revenue and higher expenditure on unemployment benefits and the like, slowing the decrease in demand. These effects arise when there is no change in provisions for expenditure and taxation, thus explaining the term "automatic stabilizers".

Automatic stabilizers thus tend to stabilize demand. Sweden's general government net lending appears to be among the most cyclically sensitive in the entire OECD (see van der Noord, 2000 for an empirical analysis).[31] Variation in such variables as GDP and consumption is reduced, enhancing individual welfare since a regular flow of consumption is generally preferred over an erratic one (see, for example, Andersen, 2005). However, since individuals probably dislike variations in general government consumption as well, this variable is not appropriate for use as an automatic stabilizer. In principle, it would be good to have automatic countercyclical variations[32] in general government investment. For example, the general government sector could invest more in infrastructure in a contractionary economy than in an expansionary one, an advantage being that the marginal cost is lower in the former situation. However, because the decision process is protracted, there is a substantial risk that the "automatic" change will come at the wrong time for the economy.

In the discussion above, one argument cited in favour of automatic stabilizers was that individuals prefer a regular flow of consumption to an uneven one. This means that economic cycles should be minimized even when they are believed to be symmetrical so that there is no effect on the magnitude of accumulated output. Another advantage of automatic stabilizers and stabilization policy is that the presence of so-called non-linearities in the economy may mean that economic cycles

[31] Automatic stabilizers, however, cannot distinguish between temporary and permanent changes in the economy, a shortcoming that can lead to problems; more on this subject at the end of the section.

[32] See the definition of countercyclical policy in Section 2.7.

are *asymmetric* and result in lower accumulated output. With this asymmetry, the output gap (i. e. actual output in relation to potential output) is more negative in a contractionary economy than positive in an expansionary economy. Such a situation arises if prices and wages are more flexible upward than downward.[33]

Automatic stabilizers are faster acting not only compared to the rest of fiscal policy, but also compared to monetary policy decisions. Furthermore, automatic stabilizers are automatically symmetrical; in other words, general government net lending improves in principle just as much when resource utilization increases as when it decreases. It is important to remember, though, that precisely because automatic stabilizers are "automatic," there is a danger that economic disturbances, which after a number of years prove to be (unexpectedly) permanent, may lead to imbalance in government budgets. If for example a drop in employment is considered temporary, the cost of unemployment compensation is assumed to increase in the short run but not in the long run. If the decrease subsequently turns out to be permanent, the income-replacement rate will have to be lowered if the cost of unemployment benefits is to remain the same as it was initially.

Fluctuations in resource utilization that result from variations in demand are thus dampened by automatic stabilizers. By contrast, automatic stabilizers may accentuate fluctuations in resource utilization due to variations in supply. For example, they may retard a long-run increase in demand after an upward shift in labour supply or productivity (see Blanchard, 2000). In addition, automatic stabilizers *in themselves* may have repercussions on supply, for example, via the elasticity of the aggregate supply curve, negatively affecting its stabilizing influence on resource utilization (see Buti et al., 2003). According to Andersen (2005), however, the effects on supply are minor in the short run, when the impact on demand predominates. In the NIER's opinion, higher automatic stabilizers make resource utilization in the aggregate is more stable. The conclusion, therefore, is that from a stabilization standpoint, strong automatic stabilizers are desirable.[34] As noted

[33] See, for example, Bergvall and Dillén (2005) and Eliasson (2001) for an analysis.

[34] As discussed in greater detail in the STEMU study on stabilization (SOU, 2002:16), automatic stabilizers could be strengthened by a general increase in taxes and expenditure, as well as by more progressive income taxation. In the NIER's opinion, however, such changes should be guided primarily by the views of Parliament on effectiveness and income redistribution, rather than considerations of economic stabilization.

above, automatic stabilizers enhance welfare in the economy by smoothing cyclical fluctuations. Other elements of fiscal policy adopted for reasons of stabilization have this same purpose.

It is important to emphasize, though, that strong automatic stabilizers entail substantial fluctuations in general government net lending because of the variability of resource utilization. Even though there is no problem in theory (on the contrary, there is the positive effect of moderating cyclical fluctuations), it is difficult as a practical matter to know whether a change in net lending is cyclically caused or more permanent in nature. The reason is the difficulty (particularly in real time) of determining the level of resource utilization and, accordingly, the magnitude of cyclically adjusted net lending (see Section 4.1.5 for some examples). Strong automatic stabilizers thus make it an exacting task to measure resource utilization as accurately as possible.

4 Fiscal Policy – Difficulties and Opportunities

As explained in Chapter 1, the conceptual framework presented here is intended to describe a consistent and transparent trade-off between the surplus target and full resource utilization in different fiscal and cyclical situations. The analysis in this chapter serves as a foundation for development of the fiscal policy reaction function in Chapter 5. More specifically, the present chapter consists of the following four parts:

- arguments for and against using fiscal policy as a tool of stabilization policy (Section 4.1-4.2).
- arguments for a fiscal policy that is transparent and based on rules (Section 4.3).
- presentation of views in other countries and organizations on when fiscal policy should be used (Section 4.4).
- theory and empirical findings on the macroeconomic effects of fiscal policy, so-called multiplier analysis (Section 4.5).

4.1 Arguments *against* Fiscal Policy

Numerous well-known arguments against fiscal policy are found in all introductory textbooks on macroeconomics; see, for example, Burda and Wyplosz (2001). These arguments are mentioned below together with some disadvantages less thoroughly discussed in economic debates.[35]

4.1.1 Decisions Delayed by Time-Consuming Process of Decision-Making

Normally the processes of reaching and implementing decisions are more time-consuming for fiscal policy than for monetary policy. After a stabilization problem has been identified, it is necessary to negotiate a political majority before a decision can be taken. Once a decision is made, it must be implemented. With changes in

[35] The disadvantages of fiscal policy due to Sweden's flexible exchange rate and inflation target were discussed in Chapter 3 and are not treated here.

taxation, it is sometimes necessary for technical reasons to wait until the following fiscal year, delaying the measure further. Changes in government expenditure are usually administered by some authority, such as the Labour Market Board or the National Road Administration. But expanding labour market training and/or the system of roads requires planning and projecting, which may take considerable time. As a consequence, a measure designed to stabilize resource utilization may in fact *de*stabilize it because of the time lag in its adoption and implementation.[36]

4.1.2 Asymmetry in Political Decision-Making

A desire for re-election is a natural feature of the political system. Economic theory and empirical findings show that this factor entails a substantial risk of systematic budget deficits and thus of increasing indebtedness. From the 1970's until the mid-1990's, these effects were prevalent in a majority of OECD countries, including Sweden. It was therefore necessary from time to time to restore order in public finances, and there was a need for a set of fiscal policy rules in Sweden, the EU and elsewhere that would prevent recurrence of the historical pattern.

In this connection, reference is also made to so-called political cycles. Voters are assumed to be shortsighted in their thinking and to reward (i. e. vote for) politicians who promise unfinanced tax cuts or increases in expenditure during election campaigns. Asymmetry in political decision-making, leading to deficits, may also be due to strong lobbies that succeed in obtaining more expenditure or lower taxes for their own interests without a corresponding reduction of expenditure or increase in taxes for other groups.

Thus, owing to the nature of the political system, fiscal policy feature systematic deficits in general government finances. For this reason, it is arguable that the political system should not conduct fiscal policy for stabilization purposes. But as discussed in Section 4.3, there are methods for reducing problems of asymmetry.

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[36] However, once fiscal policy measures have been taken, they rapidly affect demand in the economy. With monetary policy, the opposite is true; decisions are quickly reached, but it takes longer for them to impact demand (see Section 4.2.2 for further discussion).

4.1.3 Time-Consistency Problems

Since incomes and employment are important to voters, it is reasonable to assume that political parties will try to bring about favourable macroeconomic development. For good reason, however, individuals are often assumed to be relatively shortsighted, and short-term improvement in incomes and employment may suffice to win voter confidence (compare political cycles above). In the short run, politicians can stimulate incomes and employment by surprising agents in the economy with an expansionary fiscal policy. This policy can increase output and employment in the short run, largely because of a weak tendency in real earnings. The explanation for this weakness is that nominal earnings are usually bound more strongly by contracts than are the prices charged by firms. If agents in the economy (primarily employees) knew about the expansionary policy in advance, they would bargain for higher wages to protect their real earnings. The expansionary fiscal policy would then have much less impact (if any at all). But political decision-makers may gain by *first* promising not to pursue an expansionary fiscal policy and *then* adopting one anyway. Why is this so? If agents in the economy (primarily employees) believe the promises of politicians and negotiate a nominal wage based on assurances of no expansionary fiscal policy, and *then*, once the labour contract is signed, politicians go ahead and carry out such a policy, there will be positive short-term effects on incomes and employment,[37] a phenomenon called "time-inconsistent behaviour".

This "game" between the agents in the economy and political decision-makers has no winner. It risks causing systematic deficits in general government finances since politicians, according to the assumptions above, gain from surprising economic agents with an expansionary fiscal policy that results in a budget deficit.[38]

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[37] Barro and Gordon (1983a,b) are standard references for analysis of time-consistency problems in monetary policy..

[38] "Asymmetry" and " time-consistency problems" may thus lead to systematic budget deficits and in turn in to higher general government indebtedness. The question whether this is a problem *in itself* is not extensively discussed in this Special Study. Here it is only noted that heavy indebtedness has several potential drawbacks, including higher interest rates, higher inflation, a risk of unplanned redistribution of general government consumption between generations and, ultimately, a risk that the central government will have to suspend payments (see Calmfors, 2005).

4.1.4 Models for Optimal Monetary and Fiscal Policy

There is relatively recent literature on the interaction between monetary and fiscal policy in dynamic general equilibrium models. The purpose is to calculate, for different economic scenarios,[39] which combinations of monetary and fiscal policy maximize welfare for individuals in the model and can thus be considered "optimal". At the forefront of this research, new models are rapidly being developed, incorporating step-by-step a growing number of imperfections (such as price rigidity and sluggish capital formation) and thus providing an increasingly accurate representation of reality.

The vigorous pace of advancement in this literature makes it difficult to determine what conclusions it will ultimately reach for fiscal policy. At present, the conclusion often seems to be that, assuming monetary policy is "well managed" from a stabilization standpoint, there is basically no need of a fiscal policy for purposes of stabilization (see, for example, Annicchiarico et al., 2004, Kirsanova et al., 2006, Muscatelli et al., 2004, and Schmitt-Grohé and Uribe, 2006). In these models, it is most appropriate to use fiscal policy to ensure that the debt ratio remains stable, whereas using it to achieve full resource utilization is not desirable. The results, of course, are dependent on the model, and Benigno and Woodford (2003), for instance, show that fiscal policy can also have welfare-enhancing effects.

One interesting ingredient in the literature on optimal monetary and fiscal policy is how so-called strategic decision-making involving both types of policy might work. Strategic decision-making is present when one party (such as a fiscal policy maker) takes into account the other party's (the monetary policy maker's) expected response to a fiscal policy decision. Lambertini (2006), for example, shows that the macroeconomic outcome is very similar to the preferences of monetary policy makers even in cases where the fiscal policy decision is taken first. To express it differently, the monetary policy response, even though it comes last in "the game," is a limitation for fiscal policy makers, who "draw first". As discussed in Section 3.1, it is more likely that monetary policy will respond to fiscal policy, rather than the other way around.

[39] These "scenarios" are constructed by analyzing the effects of various economic disturbances, such as supply and demand shocks, on GDP and consumption, for example.

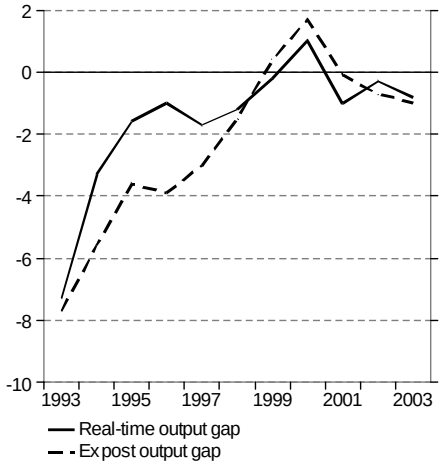
4.1.5 Uncertainty about Resource Utilization and Net Lending in Real Time

When the NIER and other forecasting institutions are to form an opinion on current and future economic policy, only so-called real-time information is available. This information will be revised subsequently, partly because of revisions by Statistics Sweden and partly because of revisions in the NIER's assessments, primarily concerning potential GDP.

The question is "how wrong" real-time information is. Since the conceptual framework for fiscal policy presented here leads to a trade-off between full resource utilization and achievement of the surplus target, it is of special interest to study how these variables differ when it comes to real-time information and information *ex post*.

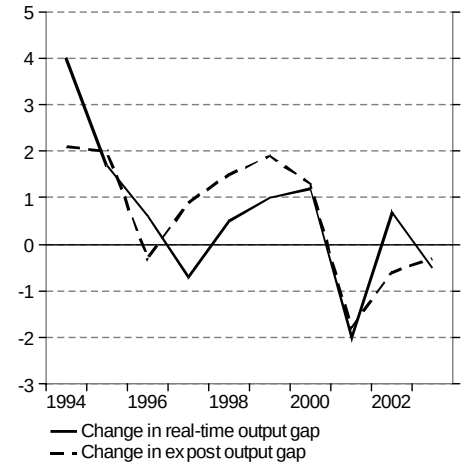
Forni and Momigliano (2004) have studied how much resource utilization (in the form of the so-called GDP gap) differs between real time and *ex post*. They have used old issues of *Economic Outlook* for the period 1993–2003 in order to determine the GDP gap in real time for each year. These real-time estimates are added here for the years 2004–2005.[40] The results for Sweden in regard to resource utilization and the changes in it are shown in Diagrams 6–7 below.

Diagram 6 GDP gap in real time and ex post
Percent of potential GDP



Source: OECD Economic Outlook and NIER.

Diagram 7 Change in GDP gap in real time and ex post
Percent of potential GDP



Source: OECD Economic Outlook and NIER.

[40] *Ex post* data for resource utilization are taken from Economic Outlook no. 79, 2006. Unfortunately, the time series is too short to permit statistical analysis. Consequently, the analysis is descriptive in nature.

In Diagram 6, it is apparent that the estimates in real time and *ex post* have opposite signs only for 1999 and 2001. Based on this simple descriptive analysis, it thus appears relatively safe to rely on the sign of resource utilization in real time. However, in the period 1993–1998 it was probably not particularly difficult to determine this sign. On average, the absolute deviation between real time and *ex post* is just over 1 percentage point.

What about the sign of the change in resource utilization? Diagram 7 above shows this variable in real time and *ex post*. Here the differences prove to be more numerous. In 1996, 1997, 2002 and 2005 the two estimates have different signs for the change in resource utilization.

What, then, about the difference between general government net lending in real time and *ex post*?[41] The surplus target of 1 percent for average net lending over an economic cycle was introduced in 2000.[42] But as discussed in Section 2.1.1, the Government, according to the 2007 spring budget bill, intends to use a moving average over seven years (three years back, the current year and three years ahead). It is of interest, therefore, to study average net lending in real time and *ex post* during the period 2004–2006.

Diagram 8 below shows the development of average general government net lending in real time and *ex post*. Real time for 2004 is the forecast made in March of that year. Real time for 2005 (2006) is the forecast made for the average for 2004–2005 (2004–2006) in March 2005 (2006). *Ex post* is based on the outcome data available in March 2007. The diagram shows relatively substantial revisions. It may be noted, for example, that the real-time estimate in 2006 of the average for 2004–2006 differs appreciably (0.7 percentage point) from the *ex post* calculation made in the following year, i. e. 2007.

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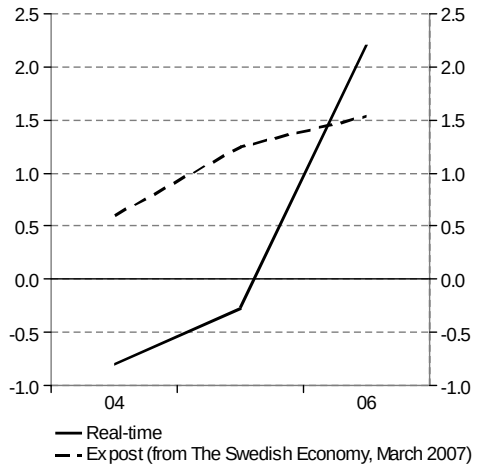
[41] Hallett et al. (2007) find that cyclically adjusted net lending in real time is not satisfactory as an indicator, for it is revised rather substantially *ex post*. Here, however, the focus is on average general government net lending since the surplus target is defined in terms of that variable; see Section 2.1.1.

[42] When the net lending target was introduced, it was 2 percent of GDP. But, as discussed in Section 2.1.1, the target was changed to 1 percent in 2007 for statistical reasons.

Diagram 8 Average general government net lending in real time and *ex post*
Percent of GDP (Excluding PPM)



Source: NIER.

The conclusion from Diagrams 6-8 is that it is important for fiscal policy not to react to minor deviations from full resource utilization or from the surplus targets. The reason is that real-time information may be revised considerably after the fact. What qualifies as "minor deviations" is discussed in Section 5.3.2.

4.2 Arguments *for* Fiscal Policy

Because of the many plausible and generally accepted arguments against fiscal policy, numerous economists have concluded that fiscal policy for stabilization purposes should be used with caution; see, for example, the STEMU study (SOU, 2002:16). Nevertheless, there are several relevant arguments for fiscal policy, which are presented below. In view of the surplus target, moreover, fiscal policy is *necessary* when there is a deviation from the target. This means, in turn, that stabilization policy analysis is important for ensuring that measures to reach the surplus target are taken at the "right" juncture in the economic cycle.

4.2.1 Impotence of Monetary Policy

The recent experience of Japan, in particular, but also of the United States to some extent, with an extremely low policy interest rate (even zero in Japan) and low inflation (even deflation in Japan) has led economists to recommend fiscal policy in response to a situation of low demand, a low policy interest rate and low inflation (see Feldstein, 2002). Monetary policy has a natural limit, i. e. zero, beyond which it cannot be used to increase demand in the economy. In such situations, an expansionary fiscal policy will probably have a positive effect on the economy.

4.2.2 Rapid Impact on Demand

As discussed above, the decision-making process generally takes much longer for fiscal policy than for monetary policy. But once the decision has been operationalized, fiscal policy affects demand more rapidly than does a change in the policy interest rate. The full impact of that rate change will not occur until one or two years later, whereas demand will be affected immediately, in principle, as more nurses are hired, new roads are built or child allowances are raised.

If stabilization policy is viewed as consisting of four steps – (i) identification of problems, (ii) decision, (iii) implementation of the decision and (iv) effect on demand – monetary policy is faster in steps (ii) and (iii), whereas fiscal policy is faster in step (iv) once a decision has been implemented. It is uncertain which type of policy is faster from (i) to (iv).

4.2.3 Many Tools

Unlike monetary policy, fiscal policy has many tools at its disposal. It is customary to divide government expenditure into consumption, investment or transfer payments, and government revenue into income taxes, business taxes, indirect taxes and social security contributions. Within these categories of expenditure and revenue, there are of course a variety of different instruments, offering a number of ways for fiscal policy to stabilize the economy according to its state at the time.

Allgulin et al. (2003) list a number of desirable criteria for stabilization policy instruments, among them those mentioned below. The instrument should:

- impact a large portion of the economy
- allow decisions to be made quickly, to be implemented on an ongoing basis during the current year and to take effect within a short time after the decision to use it
- have few or preferably no effects on income redistribution or allocation.
- have a relatively substantial effect on demand (i. e. a large so-called multiplier).

Based on these criteria, Allgulin et al. (2003) argue that changes in VAT and in social security contributions are preferable as tools. While the NIER does not normally express an opinion on the choice of fiscal policy tool, it is of course essential that the Government and Parliament carefully consider the design of fiscal policy.

Moreover, it should be noted that the many fiscal policy tools may not only be considered separately, but also *combined* in response to specific cyclical situations. Feldstein (2002), for example, describes several different fiscal policy recipes for the Japanese economy which, owing to their composition, would not burden the country's already overstrained budget.[43]

4.2.4 Fiscal Policy Objectives Require a Fiscal Policy

Fiscal policy is dependent not only on the cyclical situation, but also on the fiscal policy objectives of the Government, or more specifically, the *expenditure ceiling* and the *surplus target* for general government net lending of 1 percent on average over an economic cycle. In pursuing these fiscal policy objectives, however, it is important to take the economic cycle into account, i. e. to determine *when* it would be appropriate to take action to meet these objectives (see also Chapter 5).

4.3 Fiscal Policy Should Be Transparent and Based on Rules[44]

The review of advantages and disadvantages above shows that fiscal policy is associated with substantial problems and risks. One conclusion reached by Calmfors (2005), among others, is that *if* fiscal policy is recommended, it should be accompanied by (i) well-defined fiscal policy targets and rules, (ii) transparency and (iii) an incentive structure that makes it costly to deviate from established rules. As will be apparent from the discussion below, the NIER's conceptual framework is designed to provide precisely these three ingredients.

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[43] One example was that Japan should temporarily raise the tax rebate on investment by 30 percent and then reduce this rebate by 5 percentage points per year until it was eliminated. This measure would be paid for by a temporary increase in business taxes. In the short run, the combination of fiscal policy measures, according to Feldstein (2002), would substantially improve the incentive for firms to invest and thus help Japan to escape from its predicament of slack demand and deflation. At the same time, the combination of measures was neutral from a budgetary standpoint.

[44] The discussion in this section follows the reasoning in Calmfors (2005).

4.3.1 Targets and Rule-Based Fiscal Policy

Given the problems of asymmetry and time-consistency discussed above, it is essential that political decision-making be guided by pre-established *targets*. Examples of such targets in Sweden are the expenditure ceiling and the surplus target. In the EU, there are the targets of the Stability and Growth Pact – a maximum budget deficit of 3 percent and a ceiling on central government debt of 60 percent of GDP. These targets can be supplemented by a set of *rules* prescribing how fiscal policy is to be conducted in various cyclical situations. For example, such rules may specify the level of resource utilization at which fiscal policy should back up monetary policy in guiding the economy toward full resource utilization. Rules can also specify in advance which fiscal policy instruments should be used, speeding up the decision-making process and thus increasing the likelihood that the fiscal policy measure taken will influence the economy in the intended cyclical phase.

4.3.2 Transparency

One way to improve the chances that politicians will actually try to achieve targets and follow established rules is of course to make sure that these are well defined and that their observance is verifiable; in other words, targets and rules should be quite clear, i. e. have a high degree of *transparency*. The political cost of not meeting declared targets is perceived to be higher if voters can easily verify after the fact whether they have been achieved.

4.3.3 Incentive Structure that Encourages Target Achievement

Even if transparency increases the incentives for politicians to achieve pre-established targets, the system of sanctions is not always sufficient for that purpose. Therefore, the Stability and Growth Pact, though to a lesser extent than before, provides a system of sanctions including monetary penalties for countries that fail to meet their fiscal policy targets. The system of sanctions need not be monetary. Calmfors (2005) outlines the basic features of an independent fiscal policy council that the Government would have to consider. For instance, the Government might have to explain publicly why it is not following the fiscal policy considered appropriate by the council. The formation of the Swedish Fiscal Policy Council in the autumn of 2007 can thus be viewed as a step toward transparency and an improved incentive structure for fiscal policy.

As mentioned above, the NIER's conceptual framework for fiscal policy is designed to include the three ingredients of a successful fiscal policy. The fiscal policy *targets*

(expenditure ceiling and surplus target)[45] have already been set by the Government and Parliament. The conceptual framework, which is presented in concrete form in Chapter 5, develops a fiscal policy *rule* (a so-called fiscal policy reaction function) that determines in advance how fiscal policy should be conducted in different cyclical and fiscal situations. The established targets and the rule can thus be said to provide for greater transparency. With a higher degree of transparency and clarity in communication by the NIER, the Government and Parliament would be likely to give the institute's analyses greater consideration. The conceptual framework would thus help to *improve the incentive structure* for achieving fiscal policy targets.

4.4 Ideas of Other Countries and Organizations about Fiscal Policy

The advantages and disadvantages of fiscal policy outlined above apply generally to all countries. This means that the NIER is not alone in attempting to define the role of fiscal policy. It may therefore be of interest to examine the thinking in other countries and international organizations on these issues. Three such examples follow below. One feature of fiscal policy shared by these countries is that they have (i) established targets for indebtedness and/or surpluses, and (ii) resource utilization.

In the United Kingdom, *HM Treasury* (2005) publishes an annual *End of year fiscal report* that discusses of fiscal policy outcomes and forecasts in relation to established fiscal policy targets and policy rules. The fiscal policy targets are the following:

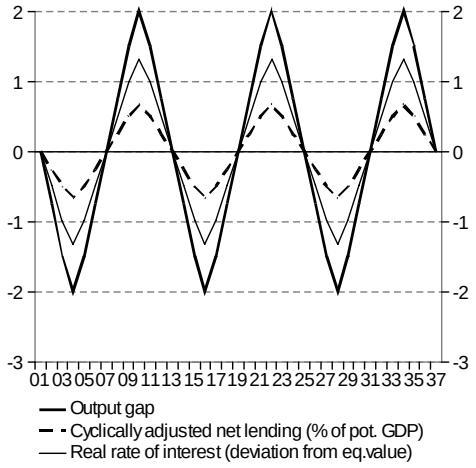
- The general government sector may borrow to finance investment, whereas its other expenditure must be financed over an economic cycle.
- Net general government debt in proportion to GDP should be stable over an economic cycle and maintain a prudent level (currently under 40 percent).

Furthermore, fiscal policy should feature transparency and openness. This means, for instance, that fiscal policy targets are to be declared and followed up. In addition, it should be explained how the targets are to be achieved with the aid of the fiscal policy rules that govern the actions taken.

[45] The balanced budget requirement is another overall budget policy target, but from a fiscal policy standpoint it is considered subordinate to the surplus target (i. e. viewed as a means of achieving the surplus target).

It is the view of HM Treasury on fiscal policy that automatic stabilizers, together with monetary policy, should be the primary means of smoothing the level of output over an economic cycle. Fiscal policy may be used, but only in support of monetary policy. As defined by HM Treasury, this restriction means that the change in cyclically adjusted net lending is to have the same sign as the change in the real rate of interest. That point is illustrated in Diagram 9 by a fictitious example, where resource utilization and cyclically adjusted net lending from Diagram 4 in Section 2.7 are shown together with the deviation of the real rate of interest from equilibrium.

Diagram 9 Countercyclical fiscal and monetary policy: Fictitious example
Percent of potential GDP and percentage points, respectively



Source: NIER.

The two targets above, and the principle that fiscal policy is to support monetary policy, are hardly controversial in themselves.[46] But reality is more complex than the fictitious example shown above, as objectives often conflict, for example when the debt target calls for a contractionary fiscal policy whereas resource utilization calls for an expansionary fiscal policy. HM Treasury does not discuss which trade-offs will be made when objectives conflict. For the sake of transparency and consistency, considerable importance is attached to this issue when the conceptual framework takes concrete form in Chapter 5.

[46] The point when fiscal and monetary policy are to "turn" depends on the speed at which these policies act on the economy. Probably monetary policy (i. e. the interest rate) should "turn" before fiscal policy, as monetary policy has a longer so-called effect lag.

The *OECD* (2003) advocates a fiscal policy similar to that of HM Treasury in Diagram 9 above. This policy is defined as countercyclical and means that an expansionary fiscal policy (for example, a larger number enrolled in labour-market-related programmes) should be followed in economic downturns, when actual growth is less than potential growth, i. e. as Sweden on average conducted fiscal policy in 1980–2004 (see Galí and Perotti, 2003, and Hjelm, 2006). The OECD study finds that many countries follow a procyclical fiscal policy because of their debt situation. Countries with initially high debt are forced to tighten fiscal policy in an economic downturn even when the cyclical state of the economy calls for the opposite policy.

The *EU Commission* (2004) also focuses on the dual role of fiscal policy: to ensure observance of the debt and surplus targets prescribed by the Stability and Growth Pact, and to reinforce (restrain) economic activity in a contractionary (expansionary) economy. The EU Commission emphasizes that a country should make a special effort to meet the debt and surplus targets in "good" times, which are defined as situations where output exceeds its potential level. The EU Commission also discusses the uncertainty regarding measures of resource utilization and argues that *changes* in resource utilization should be considered even when the level of resource utilization is close to zero. A situation of relatively rapid positive change in resource utilization, when the level of resource utilization is slightly negative, should also be considered "good times" that call for a fiscal policy designed to achieve the debt and surplus targets.

The conclusion in this section is that net lending and resource utilization are in focus in discussions on fiscal policy. When measures intended to achieve a net lending target are to be taken, the EU Commission also considers changes in resource utilization. Unlike the OECD and the EU Commission, HM Treasury in the UK is relatively explicit about the trade-off between these two targets and holds that fiscal policy should support monetary policy. However, neither HM Treasury, the OECD nor the EU is explicit about cases of conflict between the net lending target and full resource utilization. Nor do they clearly indicate how rapidly the targets are to be reached, one reason being that they take no position on the magnitude of fiscal policy measures in various fiscal and cyclical situations.

4.5 Macroeconomic Effects of Fiscal Policy: Multiplier Analysis

To achieve the target of full resource utilization, it is of course crucial to determine the precise effects of fiscal policy on resource utilization, i. e. the size of the so-called

multiplier. The purpose is to determine "how much" fiscal policy is needed in a given cyclical situation.

The discussion in this section is divided into three parts. In the first, there is a brief discussion of economic theory and the diverse results in that area concerning the effects of fiscal policy. In the second part, there is an overview of empirical studies that estimate the effects of fiscal policy on GDP. Effects of various instruments are discussed, as is the dependence of such effects on the cyclical situation. The third and final part presents how economists who use macromodels at organizations like the EU, the IMF and the OECD calibrate the macroeconomic effects of fiscal policy.

4.5.1 Theory

The theoretical answer regarding the size of the multiplier differs depending on which theoretical model is used. The results vary between large positive multipliers in Keynesian models, via multipliers between zero and one in models with Ricardian equivalence,[47] to negative multipliers in the literature on "expansionary fiscal contractions".

As shown in Chapter 3, a simple IS/LM model, for example, with a flexible exchange rate implies that fiscal policy has no macroeconomic effects in real terms. However, in more sophisticated models that incorporate both nominal and real sluggishness, fiscal policy also has short-run effects in real terms in an economy with a flexible exchange rate; see, for example, Harrison et al. (2005) for a thorough description of such a model. The mainstream thinking in current theoretical literature appears to be that fiscal policy can affect the economy in the short run even when the economy has a flexible exchange rate, and the NIER shares this view. In the theoretical literature, the following is also worth noting:

- Fiscal policy measures considered temporary by agents in the economy have greater macroeconomic effects than permanent measures in neoclassical models (see, for example, Andersen, 2005). The reason is that agents in the economy

[47] Temporary tax changes have no effect on GDP in models with Ricardian equivalence, whereas temporary changes in general government consumption generally have a multiplier of one. The reason for the latter is that the decrease in household consumption required to pay for the increase in general government consumption is distributed by consumers over their entire lifetime.

alter their net-lending/saving behaviour more when changes are believed to be permanent, thus counteracting the effect of fiscal policy measures on resource utilization.[48]

- In theoretical models with Keynesian sluggishness, the multiplier is larger for general government consumption and general government investment than for transfer payments and income taxes. The reason is that the former have a direct impact on demand and thus on GDP, whereas the effects of the latter two are transmitted via disposable income, which is not fully consumed in the short run.

In addition, fiscal policy measures generally have greater effects on output and employment (i. e. have a larger multiplier) when the output gap is negative compared to the case when the output gap is positive.[49] The reason is that when the output gap is negative there are spare resources available, which also means that inflationary pressure (and thus the NIER's repo rate) need not be appreciably affected. However, the literature on so-called "expansionary fiscal contractions" contradicts this view (see, for example, Bertola and Drazen, 1993. Perotti, 1999, and Sutherland, 1997). According to that theory, when countries find themselves in a fiscal crisis like the one experienced by Sweden in the early 1990's, reducing general government expenditure or raising taxes can have a *positive* effect on GDP.[50] Although there is some empirical support for this statement, especially in the case of certain countries (see, for example, Giavazzi and Pagano, 1990, and Ardagna, 2004), other empirical results suggest that the phenomenon is not a general one (see, for example, Hjelm, 2002a,b, 2007, and Lambertini and Tavares, forthcoming).

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[48] Permanently lower general government consumption is offset by permanently higher household consumption since agents in the economy expect permanently lower taxes. A permanently lower tax results in permanently higher household consumption but has no effect on GDP if general government consumption is permanently reduced at the same time.

[49] This statement, however, is difficult to disprove empirically since most estimates are made on the assumption that the economy is in equilibrium when the fiscal policy measure is taken.

[50] The theoretical explanation for this finding is that if general government expenditure is lowered or taxes are raised when central government finances are in a crisis, there may be a positive effect on expectations for the future development of the economy provided an even more severe fiscal crisis can be avoided later on. These improved expectations can result in higher consumption and investment.

The NIER's conclusion based on economic theory is that fiscal policy has short-term Keynesian effects on the economy, i. e. higher expenditure and/or lower tax rates affect GDP growth positively within the NIER's forecasting horizon. In the longer term, however, the effect is generally estimated at zero, although there are exceptions where measures affect the long-run behaviour of economic agents. The magnitude of the short-term effect is assessed below with the aid of information from empirical studies and calibration decisions in macroeconomic models used throughout the world.

4.5.2 Empirical Findings

According to the theoretical discussion, there are arguments that the effects of fiscal policy depend on which fiscal policy instrument is used. In the empirical literature, however, the focus is usually on effects of the two most aggregate measures: general government expenditure and revenue. The findings of such studies are first shown below. Then reference is made to certain results where general government consumption and general government investment are treated separately.

A central element in the empirical literature on estimating macroeconomic effects of fiscal policy is the use of methods designed to identify *unforeseen* changes ("disturbances" and "shocks" are alternative designations) in fiscal policy variables. Consequently, different types of structural time-series models are often used; see Hemming et al. (2002) for an overview. Table 1 below shows a number of such estimates. Most are based on data for the United States; unfortunately, no study is available for Sweden.[51]

[51] An exception is a short appendix with preliminary findings in Clayes (2007), who concludes that the multiplier is negative in Sweden. These preliminary results are interesting but require more research and a more thorough analysis of Swedish data.

Table 1: Empirical Estimates of Fiscal Policy Multipliers

Study	**Country**	**Period**[1]	**Expenditure multiplier**[2]		**Tax multiplier**[3]	
			1 year	2 years	1 year	2 years
Blanchard & Perotti (2002)	US	1960-97	0.5	0.5	0.7	0.7
Burnside et al. (2003)	US	1947-95	1.0	1.0	--	--
Edelberg et al. (1999)	US	1948-93	1.5	1.0	--	--
Gali et al. (2004)	US	1954-98	0.7	1.3	--	--
Mountford & Uhlig (2005)	US	1955-00	0.3	0.4	0.5	2.1
Perotti (2004)[4]	US	1960-01	--	--	0.1	0.2
–"–	Australia	1960-01	--	--	-0.4	-1.3
–"–	Canada	1961-01	--	--	0.2	0.4
–"–	UK	1963-01	--	--	-0.1	-0.2
–"–	Germany	1960-89	--	--	-0.1	-0.1
Perotti (2007)[4]	US	1954-05	1.5	1.8	--	--
–"–	Australia	1959-06	1.3	1.1	--	--
–"–	Canada	1961-06	0.2	0.4	--	--
–"–	UK	1963-06	0.3	–0.3	--	--
Mean value, US			**0.9**	**1.0**	**0.4**	**1.0**
Mean value, other countries			**0.6**	**0.4**	**–0.1**	**–0.4**

[1] Quarterly data are used in all studies. Note that not all figures are exact, as some are taken directly from a diagram. [2]A multiplier of 1.0, for example, means that GDP rises by the same amount (not percentage) as general government expenditure. [3] A multiplier of 1.0, for example, means that GDP rises by the same amount (not percentage) as the *decrease* in tax revenue. [4] The tax multipliers are taken from Perotti (2004). The expenditure multipliers are taken from the latest estimates in Perotti (2007), whose study, however, does not include tax multipliers.

Among other things, the following may be noted from Table 1:

- Since rather many studies are based on US data, it appears fairly certain that the expenditure multiplier in the short run (one to two years) is positive and relatively close to 1.0 in the US.[52]
- For all countries, fiscal policy multipliers decrease over time (not shown in the table; see Hemming et al., 2002). The table shows the average for the respective period. If periods are divided into two parts (for example, 1960–1979 and 1980–2000), the results show that the multiplier is greater for the first half of the period than for the second half.
- For other countries excluding the United States (Australia, Canada, Germany and the United Kingdom) only one study is shown here (Perotti, 2004).[53]

[52] See the note to Table 1 for a definition of "multiplier".

Since the same method is used there, the results are highly model-dependent and therefore more difficult to interpret than the findings for the US. Clearly, however, there appears to be a difference between these countries and the US; in the former, the multipliers are generally lower.

- The tax multiplier is lower in the US in the short run, whereas the mean value two years ahead coincides with the expenditure multiplier. The tax multiplier in the countries other than the US is negative, on average, for both one and two years ahead.

The relative diversity of empirical findings is probably one reason for the lack of consensus among scholars in this matter. The following quotation from a prominent researcher illustrates this situation:

"While most economists would agree that an exogenous 10 percent increase in money supply will lead to some increase in prices after a while, perfectly reasonable economists can and do disagree even on the basic qualitative effects of fiscal policy" (Perotti, 2007, p. 1).

The articles in the literature often focus on the effects of general government consumption. A limited number of studies are available in which structural time-series models are used to separate the effects of general government consumption and general government investment. In these models, however, it generally appears that general government investment has greater macroeconomic effects; see, for example, Heppke-Falk et al. (2006), Kamps (2005), Pereira and Sagalés (2006).

As mentioned above, no studies based on Swedish data are available, thus challenging scholarly and practically involved economists to develop such a study in the future.[54] Since the empirical findings vary substantially from country to country, it is difficult, based on them alone, to provide a well-founded estimate of the size of the multiplier in Sweden. Moreover, there is the general difficulty in all empirical models of isolating fiscal policy disturbances and their effects on the economy. For this reason, the study

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[53] Other studies are available as well; see, for example, Bruneau and Bandt (1999), Marcellino (2003) and Rebei (2004). The problem, however, is that it is not possible to determine the multiplier effects from these articles, but only the signs of the responses.

[54] One exception is Becker and Paalzow (1996), but this study is not especially informative on the questions discussed here. See also footnote 51.

below also examines how practically involved economists have calibrated fiscal policy effects in some of the best-known and most commonly used macroeconomic models throughout the world.

4.5.3 Calibration Decisions in Macromodels

Yet another piece of the puzzle is thus the question how organizations like the IMF, the EU and the OECD calibrate their macroeconomic simulation models. It is assumed that these organizations have competent economists, who have probably drawn relevant conclusions from existing literature. Their calibration decisions are therefore (at least) as important a source of information as the (deficient) empirical evidence noted above.

Table 2 below shows a compilation of short-term expenditure multipliers for different countries where the common feature is that the results come from macroeconomic simulation models.

Table 2: Short-Term (approx. 1 year) Multipliers for General Government Expenditure in Macroeconomic Simulation Models

Study & Model	US	Japan	Germany	France	UK	Italy
Bryant et al. (1988). Average several mods.	1.4	1.6	1.6	--	--	--
Bryant et al. (1993). Average several mods.	0.9	1.0	0.9	--	--	--
McKibbin (1997). Average several mods.	0.3	--	--	--	--	--
Richardson (1988). OECD Interlink	1.3	1.2	1.0	--	--	--
Dalsgaard et al. (2001). OECD Interlink	1.1	1.7	1.1	0.8	--	1.2
IMF (1996). Multimod	1.1	--	--	--	--	--
IMF (1998). Multimod	--	0.8	--	--	--	--
Roeger/Veld (2002). Quest	--	--	0.8	0.9	0.8	0.8
Hunt/Laxton (2002). Multimod	--	--	1.3	1.3	--	1.3
Barrel et al. (2002). Nigem	--	--	1.0	0.8	0.6	0.7
Mean value	**1.0**	**1.3**	**1.1**	**1.0**	**0.7**	**1.0**
Mean value, total	**1.0**					

The table is a summary of Tables 1 and 2 in Hemming et al. (2002). The mean values for the respective studies are shown. In the majority of the studies, general government expenditure corresponds to general government consumption.

Among other things, the following may be noted from Hemming et al. (2002) and Table 2:

- All expenditure multipliers are positive, and the mean value is approximately 1.0 for all countries studied.
- There are far fewer simulation studies for the tax multiplier. In general, however, the multipliers for tax changes are less in the short run. In Dalsgaard

et al. (2001, OECD Interlink model), the average short-term tax multiplier is 0.5 for Japan, Germany and the US.

- Differences in monetary regimes (such as a fixed or flexible exchange rate) have relatively little effect on short-term multipliers (not shown in the table; see Hemming et al., 2002).[55]
- Long-term multipliers are often clearly less than short-term ones (not shown in the table; see Hemming et al., 2002).

According to the analysis above, the large macroeconomic simulation models are obviously calibrated to highlight short-term Keynesian mechanisms. This calibration is consistent with the empirical results for the US but hardly so for other countries. Moreover, fiscal policy multipliers decrease rather sharply if the 1950's and 1960's are omitted. One could therefore say that the economists responsible for the above-mentioned models overestimate the size of the fiscal policy multiplier in light of empirical studies. Their assessment need not be erroneous, however, as the empirical estimates are generated by models that are more or less reality-based. Clearly, however, the prevailing opinion among economists associated with large macroeconomic simulation models, based on their aggregate economic expertise, calibrates the fiscal policy expenditure multiplier at about 1.0 in the short run (roughly one year). The tax multiplier is calibrated at 0.5, on average, for the short run.

4.5.4 The NIER's View on the Fiscal Policy Multiplier

Given the current state of research, it is not possible with any substantial certainty to reach a firm opinion on the effect of fiscal policy on the economy – especially not for Sweden, as in principle there are no relevant studies. However, since the NIER makes economic assessments, it is necessary to declare openly how fiscal policy is believed to affect the Swedish economy. From the literature, the NIER has drawn the following conclusions:

[55] See Chapter 3 for a discussion on macroeconomic effects of fiscal policy under different monetary regimes.

- When the economy is in cyclical balance (i. e. when the output gap is zero), the fiscal policy multiplier for the current year is generally assumed to be 0.75 when the monetary policy response is taken into account (see Section 3.1); this applies with the average mix of fiscal policy measures. As with the model calibrations in Section 4.5.3, the average short-term expenditure and tax multipliers are generally estimated at 1.0 and 0.5, respectively.

- The multiplier, m_t, for a fiscal policy measure in year t is generally expected to decrease according to the following pattern:

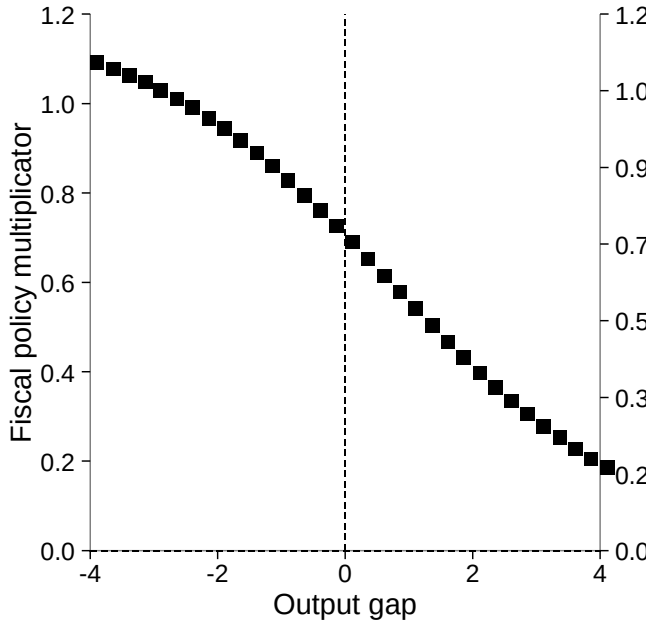
$$m_{t+s} = \frac{m_t}{s+1}, \tag{8}$$

  where s is the number of years after the fiscal policy measure has been implemented. As a result, the long-term multiplier (i. e. as $s \to \infty$) is zero. It should be noted that there is no direct empirical support for the dynamic multiplier represented by Equation (8), but, as is apparent from the discussion above, there is no strong empirically supported alternative, either.

- In an expansionary economy, the multiplier is estimated to be lower, and in a contractionary economy, to be higher. There is no direct empirical support here, either, largely because the empirical estimates are generated by models where the economy is in equilibrium. Exactly how much the multiplier is adjusted is specific to each situation and must be assessed from case to case. One possible approximation is obtained by using a logistic function to represent the multiplier; see Diagram 10 below.[56]

[56] The logistic function is defined according to: $m = a + c/\left(1 + t * \exp(-b * (gap - r))^{1/t}\right)$, where m stands for the multiplier and gap for resource utilization (the output gap). The relationship in Diagram 10 is obtained with the following parameters: $a = 0; b = -0.5; c = 1.2; t = 1.0; r = 0.6$.

Diagram 10 Example of a fiscal policy multiplier as a function of the GDP gap



Source: NIER.

Diagram 10 implies that when the output gap decreases, the multiplier increases, though at a diminishing rate. It should be noted that the logistic multiplier function in Diagram 10 is not presently used in the NIER's analysis, nor is it in the fictitious and actual examples shown in Sections 5.2.3 and 5.4. In the latter, the multiplier used is 0.75 for the current year; it then decreases according to Equation (8) above.

As is apparent from the preceding presentation, the size of the multiplier is very uncertain and probably depends both on the state of the economy and on the fiscal policy tools that are used. Consequently, the NIER in practice assesses the magnitude of the multiplier from case to case. It is the NIER's ambition that this assessment be as explicit and evident as possible.

5 The Fiscal Policy Reaction Function: a Trade-off between the Surplus Target and Resource Utilization

This chapter presents the NIER's model for assessing how fiscal policy should be used in various fiscal and cyclical situations. The assessment is illustrated in a number of fictitious and actual examples. As discussed in Chapter 2, fiscal policy has several different purposes, but the NIER's assessment of an appropriate stance for fiscal policy focuses solely on how fiscal policy measures affect

- achievement of the surplus target, and
- resource utilization.

As discussed in the introduction to Chapter 2, the NIER views both these targets as symmetrical, primarily because the Government has expressed the targets symmetrically. This means that in principle fiscal policy should react with equal force when net lending is above the surplus target as when it is below it. Similarly, fiscal policy in principle should respond just as strongly when the output gap is positive as when it is negative.[57]

Since the surplus target is defined as an average over an economic cycle, it may be interpreted as an implicit target for indebtedness. The NIER accepts the target as given and does not discuss whether it is well designed. There is no theoretical guidance concerning either an optimal level of indebtedness from a welfare standpoint or how rapidly a targeted level of indebtedness (or targeted surplus) should be achieved (Wyplosz, 2005). Moreover, the theoretical and empirical results in Section 4.5 demonstrate that there is considerable uncertainty about the effects of fiscal policy on GDP (i. e. the magnitude and the "sign" of the so-called multiplier).

To put it differently, there is no positive model or method for arriving at the best trade-off between the two targets based on some criterion of "optimality". Consequently, the NIER's trade-off between the surplus target and resource

[57] A positive output gap is then regarded as a condition to be "corrected". This approach is the standard one in the literature on optimal stabilization policy; see, for example, Benigno and Woodford (2005). However, there are new alternative models in the Keynesian tradition that question this view; see Appendix 6.2.

utilization is necessarily *subjective*. But representing NIER's assessment (or preferences) through a so-called fiscal-policy reaction function increases the probability that assessments will be consistent over time. The explicit trade-off between the two targets also enhances transparency and is a pedagogical advantage.

The approach has been inspired by Svensson (2007), who discusses how the preferences of central banks in the trade-off between resource utilization and the inflation target can be identified, formalized and applied practically in decision-making. In Section 5.2.2 additional comments on Svensson (2007) are provided, for instance concerning why the NIER currently uses a reaction function instead of a loss function.

It should be emphasized that the reaction function is only an aid in the NIER's analysis of fiscal policy and that reality is more complex than any possible representation in a model. For this reason, the NIER's assessments often deviate from the results of the reaction function. But by presenting the latter together with the final assessment, the reasons for the differences can be communicated to the reader.

This chapter consists of four parts. Section 5.1 provides a brief review of the fundamental conflicts between two objectives: the surplus target and full resource utilization. Section 5.2 describes the fiscal policy reaction function, including the method by which it has been developed. Section 5.3 discusses circumstances where not following the results of the reaction function is generally warranted. Here it should be noted that no "maximum or minimum amounts" have been set for the reaction function. This means that the reaction function can generate both very large and very small amounts. To counter such a situation (including so-called "fine tuning" when small amounts are involved), the result of the reaction function is reviewed after the fact for reasonableness, as the purpose of the reaction function is not to encourage fine tuning of resource utilization. At the same time, a more active fiscal policy is probably needed with a surplus target in effect than if resource utilization alone is considered in fiscal policy decisions. Finally, Section 5.4 applies the reaction function to Sweden's current fiscal and cyclical situation.

5.1 Fundamental Conflicts of Objectives: a Two-by-Two Table

The two objectives (the surplus target and full resource utilization) sometimes conflict, but not always. If each objective is considered *separately*, the following applies:

- Low net lending – *Action*: increase taxes/reduce expenditure.
- High net lending – *Action*: reduce taxes/increase expenditure.
- Low resource utilization – *Action*: reduce taxes/increase expenditure.
- High resource utilization – *Action*: increase taxes/reduce expenditure.

The problem is that neither the surplus target nor resource utilization can be changed in isolation from the other objective. As shown in Section 4.5, fiscal policy (via the multiplier) affects resource utilization. A change in resource utilization in turn affects net lending through the automatic stabilizers (see Section 3.2). The conflicts of objectives can be shown in the two-by-two diagram, which was presented in Chapter 1.

		Net lending	
		High	Low
Resource utilization	High	*Conflicting objectives*	Raise taxes/cut expenditure
	Low	Cut taxes / raise expenditure	*Conflicting objectives*

It is worth noting that with the surplus target defined as an average over an economic cycle, there are fewer potential conflicts of objectives. The reason is that achieving the surplus target can be timed to minimize the "damage" to resource utilization. In two of the four combinations, objectives conflict, requiring a trade-off. It should be noted, though, that even in the two cases where there is no conflict of objectives, a trade-off is required on the *speed* at which the different targets should be achieved. The fiscal policy reaction function derived below is intended to show the NIER's opinion on the consideration that should be given to the two objectives in different cyclical and fiscal situations.

5.2 Fiscal Policy Reaction Function: Method and Results

The fiscal policy reaction function derived in this section is designed to represent how the NIER on average will make the trade-off between objectives in all four cases above, and how rapidly the respective targets are to be achieved depending on the initial fiscal and cyclical situation. To determine fiscal policy preferences, a number of senior personnel at the NIER were presented with four fictitious combinations of fiscal and cyclical situations. The reaction function derived (by iteration) from these choices has then been applied in a number of actual economic situations. The four fictitious examples correspond to the four fields in the two-by-two diagram shown in the previous section.[58]

5.2.1 Choice of Variables in the Reaction Function

In the literature on monetary policy, use is often made (in both empirical and theoretical models) of a reaction function where the policy interest rate is normally a function of the rate in previous periods (so-called smoothing), resource utilization and inflation (a so-called Taylor rule).

As far as the NIER is concerned, resource utilization and general government net lending in relation to the net lending target are of course two central variables in a fiscal policy reaction function. As discussed in Section 2.7, countercyclical fiscal policy involves the following relationship between cyclically adjusted net lending (KS_t) and resource utilization ($\ln y_t - \ln y_t^*$):

$$\left(\frac{KS_t}{Y_t^*}\right) = \alpha\left(\ln y_t - \ln y_t^*\right), \tag{9}$$

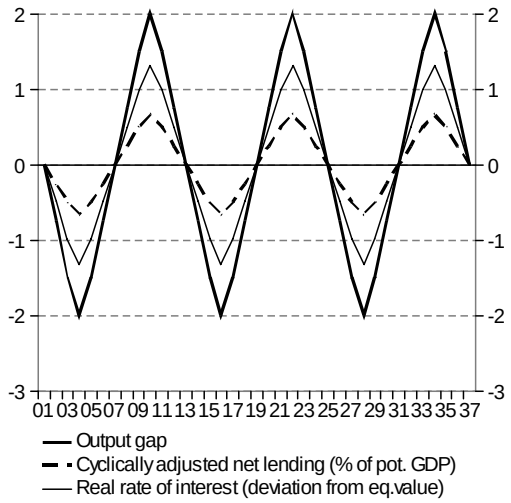
[58] This approach may be compared to a *revealed prefererence* approach. In the microeconomic literature, it is used, for example, to describe the individual's choice of goods at given prices and with a given income. In deriving the fiscal policy reaction function, the NIER's choice of fiscal policy has been made for a given initial level of net lending and resource utilization in a number of fictitious examples. As the experiments where fictitious, one could label the method as a *stated* preference approach, but we use the term "revealed" in the report.

where $\alpha > 0$.[59] This means that cyclically adjusted net lending should be higher (i. e. have a contractionary effect) in an expansionary economy than in a contractionary economy. Taking the first difference of Equation (9) yields:

$$\Delta\left(\frac{KS_t}{Y_t^*}\right) = \alpha\left[\left(\ln y_t - \ln y_t^*\right) - \left(\ln y_{t-1} - \ln y_{t-1}^*\right)\right]. \tag{10}$$

Equations (9)–(10) thus generate a positive covariation between resource utilization and cyclically adjusted net lending; see Diagram 9 from Section 4.4 below, where the basic development of the real rate of interest over an economic cycle is shown.[60]

Diagram 9 Countercyclical fiscal and monetary policy: Fictitious example
Percent of potential GDP and percentage points, respectively



Source: NIER.

[59] Resource utilization, $\left(\ln y_t - \ln y_t^*\right)$, is expressed, as shown in the reaction function below, excluding the proposed fiscal policy (see Appendix 6.4 for a detailed description). Note that upper-case (lower-case) letters denote nominal (real) variables.

[60] The exact design of monetary and fiscal policy over an economic cycle depends on the effect lag for each policy. In Diagram 9, it is assumed for the sake of simplicity that monetary and fiscal policy "turn" at the same point in time. In reality, monetary policy probably turns somewhat earlier than fiscal policy, since the effect lag of monetary policy is generally longer.

Equation (10) means that the change in KS_t / Y_t^* and the change in the output gap switch sign at the same time, as in period 4 in Diagram 9 above. All else being equal, an improvement in resource utilization (i. e. an increase in the output gap) means that higher (i. e. less expansionary) cyclically adjusted net lending is needed (for example, via fewer participants in labour market programmes; see Sections 2.7 och 4.4 for further discussion).

To reflect the NIER's preferences as shown in revealed-preference exercises (see Section 5.2.3 below), it also proved necessary to include the *level* of the output gap in the reaction function, i. e:

$$\Delta\left(\frac{KS_t}{Y_t^*}\right) = \delta\left(\ln y_t - \ln y_t^*\right) + \alpha\left[\left(\ln y_t - \ln y_t^*\right) - \left(\ln y_{t-1} - \ln y_{t-1}^*\right)\right], \qquad (11)$$

where $\delta > 0$. This means, among other things, that KS_t / Y_t^* "changes sign" at a somewhat later turning point than with a reaction function of the type shown in Equation (10).[61] This difference may be interpreted by the NIER with some caution at turning points, as identifying these in real time is often surrounded by considerable uncertainty.

In addition to the variables in Equation (11), the surplus target should of course be included as well. But letting the reaction function depend on the surplus target is not without problems, as the Government uses three indicators to determine whether the target has been met (see Section 2.1.1):

(i) a moving seven-year average,

(ii) cyclically adjusted net lending, level, and

(iii) average net lendng since 2000.

The NIER treats (i) and (ii) as equally important, whereas indicator (iii) does not influence the Institute's assessment of an appropriate fiscal policy.[62] Thus, Equation

[61] According to Equation (10), as noted, the change in KS_t / Y_t^* should be positive between periods 4 and 5, and would thus have a certain contractionary effect on the economy in Diagram 9. Since the level of the output gap is included in Equation (11), the change in KS_t / Y_t^* is less positive between periods 4 and 5, or even zero/negative depending on the parameters.

[62] See footnote 13.

(11) is expanded to include an error-correction term that takes into account whether (i) and (ii) in the aggregate deviate from the surplus target.[63]

The NIER's reaction function is thus expressed as follows:[64]

$$\Delta\left(\frac{KS_t}{Y_t^*}\right)=\delta\left(\ln y_t-\ln y_t^*\right)+\alpha\left[\left(\ln y_t-\ln y_t^*\right)-\left(\ln y_{t-1}-\ln y_{t-1}^*\right)\right] \\ -\beta\left[\chi\left(\frac{\overline{FS_{t-1}}}{Y_{t-1}}\right)+(1-\chi)\left(\frac{KS_{t-1}}{Y_{t-1}^*}\right)-\left(\frac{\overline{FS}}{Y}\right)^{\text{Target}}\right], \tag{12}$$

where $\beta>0, 0<\chi<1$. $\left(\overline{FS/Y}\right)$ refers to average net lending, as the surplus target is expressed as an average over an economic cycle.

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[63] The error-correction term differs from the term on the left side of the equation. The reason is that the surplus target is defined in terms of general government net lending, whereas the decision variable is cyclically adjusted net lending. The effects on automatic stabilizers are included in the calculation; see Appendix 6.4.

[64] Readers of previous versions of the present Special Study may note that the reaction function has been changed in two respects compared to previous drafts. First, $\left(KS_{t-1}/Y_{t-1}^*\right)$ has been incorporated in the error-correction term. The reason for this is that after more thorough discussion at the NIER on the Government's three indicators for the surplus target (see Section 2.1.1), an explicit balance has been struck between the seven-year moving average, $\left(\overline{FS_{t-1}/Y_{t-1}^*}\right)$, and the level of cyclically adjusted net lending, $\left(KS_{t-1}/Y_{t-1}^*\right)$. Second, the previous smoothing term (i. e. lagged change in cyclically adjusted net lending, $\Delta\left(KS_{t-1}/Y_{t-1}^*\right)$) has been removed. If the NIER's assessment of an appropriate fiscal policy were communicated for a series of years (for example, 2008–2010), a smoothing term would probably be included in order to "smooth out" fiscal policy. In practice this is not presently the case. For the years for which the NIER normally publishes its most important assessment (for example, for 2009 in the spring of 2008), $\Delta\left(KS_{t-1}/Y_{t-1}^*\right)$ (i.e.. 2008) has already been determined by the Government's policy in the central governmet budget for that year (see the special analysis in "The NIER's Fiscal Policy Forecasts" in *The Swedish Economy*, January 2008, for a more thorough description). The smoothing term thus loses its relevance, as the NIER in its assessment does not explicitly wish to be influenced by the policy actually followed in the previous year. Because of these two changes, the other parameters of the reaction function have been modified somewhat from previous versions, the purpose being (as in previous versions) to achieve the NIER's chosen fiscal policy in the fictitious and real-life experiments (see Section 5.2.3 below for a description). Thus, the preferences and the fiscal policy deemed appropriate by the NIER are basically the same as in earlier versions. There have been minor changes after an additional review of the examples in connection with the publication of the Special Study.

Since Equation (12) is a reaction function, its left side (i. e. the decision variable) should preferably be under the full control of the decision-maker (i. e. the Government and Parliament). As discussed in Section 2.4, the left side can be affected by factors which (at least in the short run) are not dependent on political decisions (i. e. a so-called "passive" fiscal policy). An alternative variable on the left side would then be the change in the cyclically adjusted net lending of the *central government*, which is under greater government and parliamentary control. However, in the NIER's assessments of an appropriate stance for fiscal policy, an imbalance in general government net lending that in the NIER's opinion warrants action by the Government and Parliament should be corrected specifically via the central government budget. In other words, the NIER assumes that the Government and Parliament bear the overall responsibility for the stance of fiscal policy in Sweden.

5.2.2 Reaction Function or Loss Function?

Svensson (2007) argues that central banks should explicitly show how they arrive at the trade-off between resource utilization and the deviation of inflation from its target value. Svensson (2007) exemplifies how the preferences of members of a "monetary policy committee" (in Sweden, the Executive Board of the Riksbank [*direktionen*]) can be extracted from their expressed choice of paths for interest rates (and thus paths for output and inflation) in different cyclical situations. In Section 5.2.3 the parameters for the fiscal policy reaction function are derived in Equation (12) based on the NIER's choices between resource utilization and the surplus target in various (fictitious and actual) cyclical and fiscal situations.

Whereas Svensson (2007) employs an intertemporal loss function, a reaction function is used in the present study. The principal reason for this choice is that in the NIER's opinion it is currently more pedagogical to use the reaction function. The approach of parametrizing an intertemporal loss function, where consideration should be given to the three variables in Equation 12, is also unclear. That does not rule out the possibility that the NIER may switch to an explicit loss function in the future, especially if research can indicate a practical way to solve the problems of parametrization and application.

One difference between a loss function and a reaction function is that the former is forward-looking. The quantity of information in the reaction function as shown in Equation (12) includes only historical data and real-time data. But it is important to point out that as described in detail in Appendix 6.4, the resource utilization and the net lending (excluding fiscal policy) used in period t and thereafter constitute the

NIER's *forecasts*. For example, if the economy is expansionary in period t and a contractionary economy is forecast for $t+i$, the reaction function, all else being equal, will mean a more expansionary fiscal policy in $t+i$ than in t. The NIER's preferences were identified with this quantity of forward-looking information, resulting in the parametrization in Section 5.2.3 below. As discussed in Section 5.3, the NIER can also conduct a comprehensive assessment of the results of the reaction function over several years, making it possible to take period $t+i$ into account in the final decision on a suitable policy in period t etc. Finally, it should be emphasized that the reaction function has been developed chiefly for practical use within the forecasting horizon of 1–2 years (in addition to the current year) that is relevant for the NIER).

5.2.3 Choice of Parameters in the Reaction Function

The reaction function is intended for use in numerous combinations of fiscal and cyclical situations. It is therefore crucial to apply the same parametrization throughout to ensure consistency over time. The process of "guiding the progression" of such a parametrization based on the NIER's model consisted essentially of three steps:

1. Senior NIER personnel were asked to decide freely what fiscal policy they preferred in four fictitious situations based on the two-by-two diagram in 5.1. At their disposal was a small fiscal policy model (see Appendix 6.4) that calculated the dynamic effects of the proposed policy on resource utilization and net lending.

2. Based on step 1, an initial proposal was developed for parametrization of the reaction function (i. e. Equation (12) for the four fictitious situations). The results of this first iteration, which are shown in Appendix 6.3, provided a basis for a discussion on desirable changes in view of the NIER's preferences.

3. The reaction function was parametrized again in order to accommodate these suggestions for change, and new results were shown.

The process of iteration between steps 2 and 3 was concluded when the development in all four fictitious situations was accepted for the same parametrization. This parametrization was then used on two real-life situations in order to illustrate its

effects; see examples in Section 5.4. The final parametrization of the reaction function was as follows:[65,66]

$$\Delta\left(\frac{KS_t}{Y_t^*}\right) = 0.3\left(\ln y_t - \ln y_t^*\right) + 0.2\left[\left(\ln y_t - \ln y_t^*\right) - \left(\ln y_{t-1} - \ln y_{t-1}^*\right)\right] \\ -0.4\left[0.5\left(\frac{\overline{FS_{t-1}}}{Y_{t-1}}\right) + (1-0.5)\left(\frac{KS_{t-1}}{Y_{t-1}^*}\right) - \left(\frac{\overline{FS}}{Y}\right)^{\text{Target}}\right]. \tag{13}$$

The following four fictitious situations were used in parametrizing the reaction function; they reflect the four fields in the two-by-two diagram in Section 5.1:

Example 1: Positive output gap and low net lending

Example 2: Negative output gap and high net lending

Example 3: Negative economy and low net lending

Example 4: Positive output gap and high net lending.

A fiscal policy multiplier model, including the reaction function in Equation (13), is used to develop the fiscal policy for 2007–2010 that the NIER considers most appropriate.[67] Average general government net lending is calculated from 2004 on.[68]

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[65] The parametrization of the reaction function has been changed somewhat from previous versions. The reason was not that the NIER's preferences had changed, but that two changes in variables were made after the previous draft; see footnote 64 for an explanation. The slightly modified parametrization results in basically the same fiscal policy assessments as the previous parametrization (see Diagrams 11–14 in the text).

[66] It should be noted that this is not some unique representation of the NIER's preferences. Another combination of parameter values or another arrangement of variables/parameters could probably be found. The chosen reaction function, however, is considered to provide a satisfactory approximation of the NIER's preferences in regard to the current level of general government indebtedness, for example. It should be noted that this parametrization may be changed later in light of new knowledge and new assessments at the NIER.

[67] See Appendix 6.4 for a detailed description. The "model" is very simple and provides only that the fiscal policy of the reaction function has diminishing effects on resource utilization (see Equation (8)) and effects on general government net lending (including automatic stabilizers).

The results are shown in Diagrams 11–14. These diagrams also include fictitious paths for the development of resource utilization and average net lending *in the absence of* the fiscal policy generated by the reaction function. The output gap is assumed to diminish by ¼ per year, as a result, for example, of the design of monetary policy and/or the equilibrium-seeking mechanisms of the economy itself. General government net lending is assumed to be constant in 2004–2006. General government net lending in 2007–2010, absent the fiscal policy generated by the reaction function, consists of the development of the automatic stabilizers and unchanged cyclically adjusted net lending. The net lending due to automatic stabilizers has been set at $0.55*(\ln y_t - \ln y_t^*)$. The elasticity of 0.55 is a reasonable average value, but in practice the amount of elasticity is dependent on the cause (or disturbance) that explains the change in GDP. The unchanged cyclically adjusted net lending in 2007–2010 is set at the net lending of 2006 less the net lending resulting from the automatic stabilizers.

The fictitious paths are used to compare how fiscal policy generated by the reaction function would affect the development of these variables. The fictitious fiscal policy is assumed in the example to affect resource utilization only through actual GDP, not potential GDP.

Example 1: Positive output gap and Low Net Lending

In this fictitious example, there is no conflict between the surplus target and the objective of full resource utilization. Net lending is initially low, averaging 0.5 percent in 2004–2006; see the thin solid line in Diagram 11a and the broad solid line in Diagram 11b. Moreover, cyclically adjusted net lending is negative (see the dashed line in Diagram 11b). Resource utilization is initially high, 3 percentage points above equilibrium; see the broad solid line in Diagram 11a. Both targets thus call for a contractionary fiscal policy. In the absence of fiscal policy, the output gap decreases by ¼ each year (see the broad solid line in Diagram 11a), and average net lending weakens further, as the automatic stabilizers contribute less and less as the output gap decreases.

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[68] This means that the fictitious examples cover the same period for the surplus target as one of the indicators presented by the Government in the spring budget bill of 2007 (Prop. 2006/07:100, Appendix 1), i. e. the period 2004–2010 (see Section 2.1.1).

Diagram 11a Fiscal policy according to the reaction function. Fictitious example 1: Expansionary economy, low net lending
Percent of GDP and potential GDP, respectively

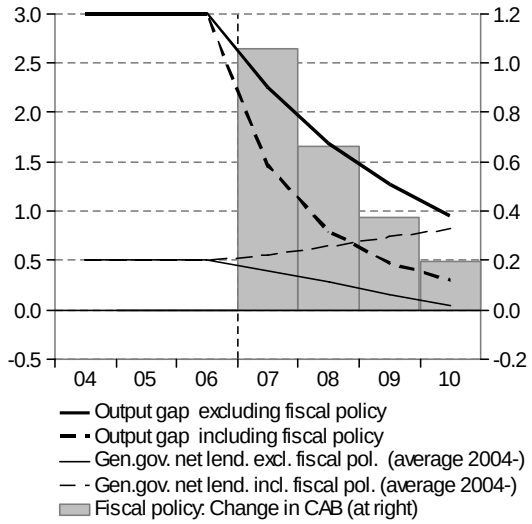
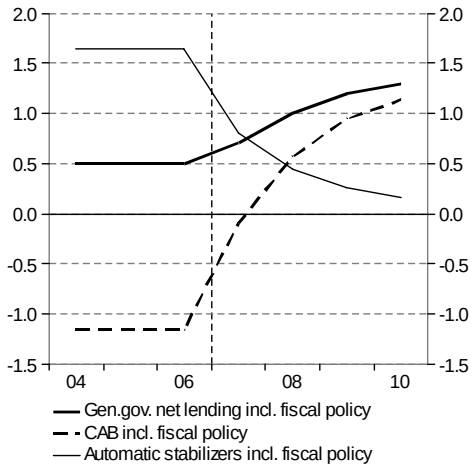


Diagram 11b Net lending. Fictitious example 1: Expansionary economy, low net lending
Percent of GDP and potential GDP, respectively



Source: NIER.

The fiscal policy reaction function results in gradual strengthening of cyclically adjusted net lending; see the grey bars in Diagram 11a and the dashed line in Diagram 11b. Thus, average general government net lending strengthens until 2010 (see the thin dashed line in Diagram 11a). The improvement is curbed to some extent, however, for as cyclically adjusted net lending increases, the output gap approaches zero more quickly (see the broad dashed line in Diagram 11a), thus weakening the contribution of automatic stabilizers compared to an unchanged policy. The fiscal policy of the reaction function means, though, that both resource utilization and average general government net lending are brought closer to their targets than if policy is unchanged.[69,70]

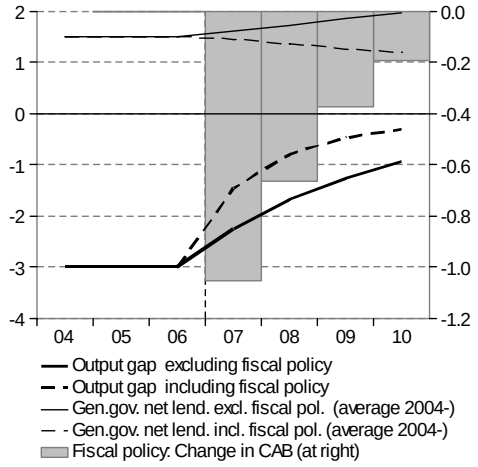
[69] A relevant question is why fiscal policy is not used directly to achieve full resource utilization and the net lending target. But even if this is theoretically possible, it is not realistic in practice. One reason is that the effects of fiscal policy are uncertain; another is that rapidly meeting the targets would involve abrupt shifts in fiscal policy, particularly when they conflict. The NIER prefers instead to achieve the two objectives at an average rate considered reasonable in practice.

[70] It may be noted that in the example 2010 is not a year of equilibrium in general government net lending. One reason is that average net lending is slightly below 1 percent (see Diagram 11a); another is that the level of cyclically adjusted net lending exceeds 1 percent that year (see Diagram 11b). Consequently, a minor adjustment in net lending will probably be needed after the fictitious period. The focus, however, is on the forecasting horizon most relevant for the NIER, usually 1-2 years (in addition to the current year).

Example 2: Negative output gap and High Net Lending

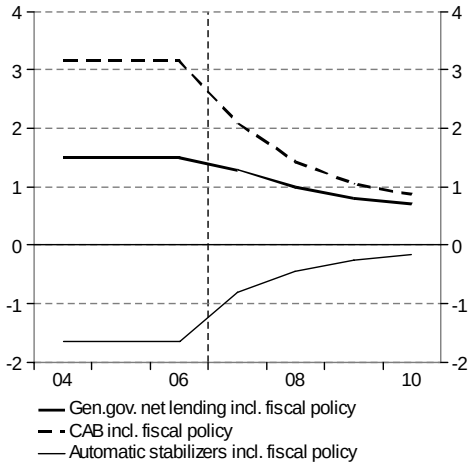
This cyclical situation, which is the converse of the one above, yields the same result but with the opposite sign, as the reaction function is linear and symmetrical.[71] Resource utilization is low, and net lending is high; both factors thus call for an expansionary policy. As shown in Diagrams 12a-b, fiscal policy follows exactly the same principle as in Diagrams 11a-b, but with the opposite sign.

Diagram 12a Fiscal policy according to the reaction function. Fictitious example 2: Contractionary economy, high net lending
Percent of GDP and potential GDP, respectively



Source: NIER.

Diagram 12b Net lending. Fictitious example 2: Contractionary economy, high net lending
Percent of GDP and potential GDP, respectively



Source: NIER.

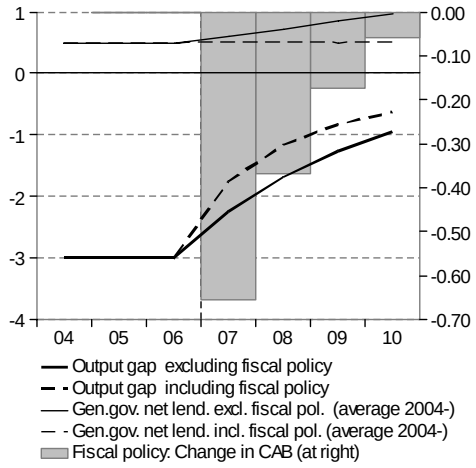
Example 3: Negative output gap and Low Net Lending

In Diagrams 11a-b and 12a-b, the stance of fiscal policy was relatively uncomplicated since there was no conflict in those two examples between the objectives of full resource utilization and meeting the surplus target. In reality, however, such conflicts are likely to arise. In Diagrams 13a-b, the economy is initially contractionary while average net lending is initially low, averaging only 0.5 percent in 2004–2006, i. e. the same net lending as in Example 1 above. By contrast, cyclically adjusted net lending is high, over 2 percent; see the dashed line in Diagram 13b. If no fiscal policy measures are taken, resource utilization will gradually rise (solid black line in

[71] Although Example 2 is only the converse of Example 1, it has been important to use it in the parametrization of the reaction function. As a consequence, NIER personnel participating in this process have had to think (though without being obliged to act) symmetically, a precondition for achieving the targets, on average, over a longer period.

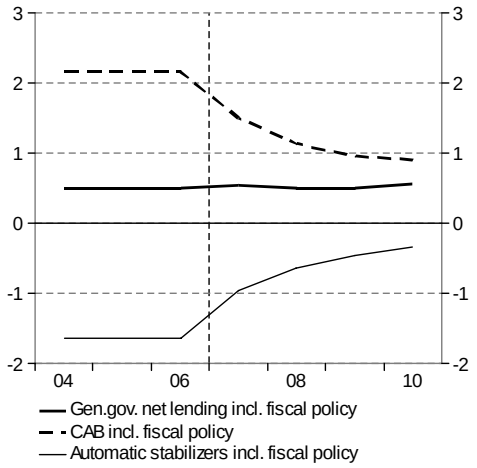
Diagram 13a), leading to improvement in average general government net lending (thin solid line) via automatic stabilizers.

Diagram 13a Fiscal policy according to the reaction function. Fictitious example 3: Contractionary economy, low net lending
Percent of GDP and potential GDP, respectively



Source: NIER.

Diagram 13b Net lending. Fictitious example 3: Contractionary economy, low net lending
Percent of GDP and potential GDP, respectively



Source: NIER

In this cyclical situation with relatively strong negative output gap, the question naturally arises whether fiscal policy should be used actively to speed the return of the economy to full resource utilization even if doing so would mean that average net lending deviated further from the target of 1 percent. A way out of this stabilization-policy dilemma would of course be available if an expansionary economy had been forecast some time after the present contractionary economy. Then an expansionary fiscal policy during the period of negative output gap, causing average net lending to deteriorate, would have shifted stance to a contractionary policy in the expansionary period. Thus, average net lending over the full economic cycle would not have to be affected, and the GDP gap with fiscal policy included would have averaged close to zero.

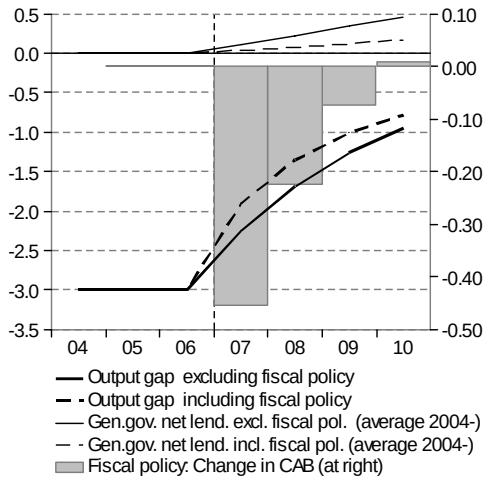
One problem with this strategy is that economic analysists generally do not forecast that "the current contractionary period will be followed by a an expansionary period of equal magnitude;" i. e. the *forecast* cyclical pattern does not resemble the one in Diagram 4, Section 4.4. The explanation is the assumption that economic cycles are caused by disturbances (see the discussion in Section 2.9.2), which generally means that the output gap is forecast to gradually approach zero. Some "overshooting," i. e. a contractionary economy becomes expansionary, may be forecast, but because of the diminishing effect of disturbances on the economy, the magnitude of the expansionary period will be less by definition than that of the preceding contractionary period. The

NIER has chosen not to "wait" for the next economic cycle and in the meanwhile let general government net lending, for example, gradually move farther away from its target. Instead, there is an explicit trade-off between objectives, based on the economic forecast that the NIER consideras most reasonable.

The NIER's trade-off in the reaction function means that a certain degree of expansionary fiscal policy is required in this situation, as the bars in 2007–2010 add up to more than one percent of potential GDP (see the right axis). This means that resource utilization will improve somewhat at the cost of not meeting the net lending target by 2010. But if that policy is followed, cyclically adjusted net lending will approach 1 percent in 2010. With the reaction function designed as it is, it can generate very small changes in fiscal policy, as in the example above. If this case had been real and the NIER had chosen to follow the fiscal policy of the reaction function, probably no fiscal policy recommendation would have been made for 2009–2010; see Section 5.3 for reasons not to follow the fiscal policy of the reaction function to the letter.

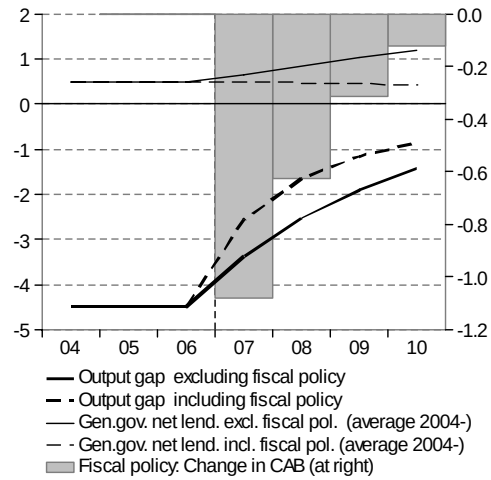
In order to demonstrate the sensitivity of net lending and resource utilization, Diagrams 13c-d below show the fiscal policy that the reaction function would generate in Example 3 above if (c) net lending were initially even lower, 0 percent on average, and if (d) resource utilization were initially 1.5 percent lower. In Diagram 13c the now lower level of initial net lending compared to Diagram 13a above means that the expansionary policy in Diagram 13a is curtailed by roughly half. This gradually improves average net lending, whereas the improvement in the output gap is more limited.

Diagram 13c Fiscal policy according to the reaction function. Fictitious example 3c: Contractionary economy, low net lending
Percent of GDP and potential GDP, respectively



Source: NIER.

Diagram 13d Fiscal policy according to the reaction function. Fictitious example 3d: Contractionary economy, low net lending
Percent of GDP and potential GDP, respectively



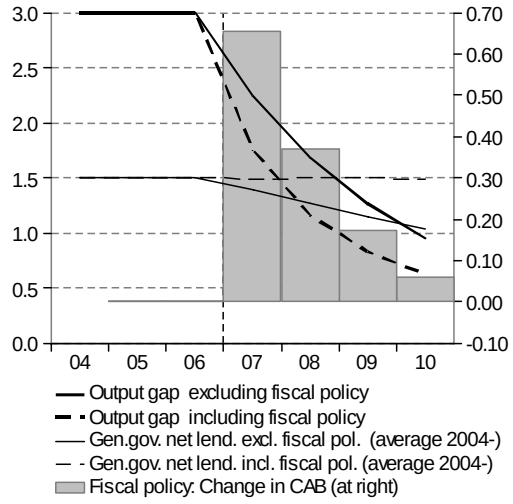
Source: NIER.

In Diagram 13d resource utilization is initially lower than in Diagram 13a; fiscal policy is thus even more expansionary. But as a consequence, net lending will move still further away from the surplus target by 2010 (see the thin dashed line).

Example 4: Positive output gap and High Net Lending

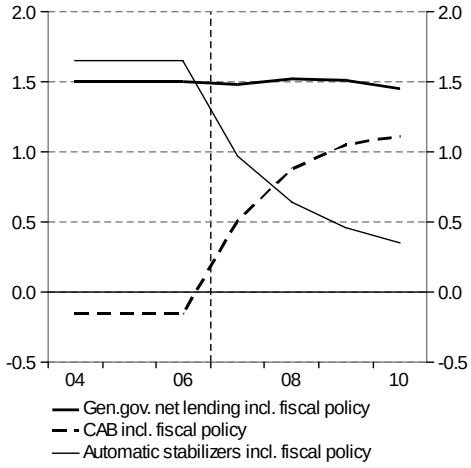
This cyclical situation is the converse of the one shown in Diagrams 13a-b above. Although resource utilization is decreasing, the economy is overheated in the forecast; see Diagrams 14a-b. At 1.5 percent, net lending initially exceeds the surplus target, but it gradually moves back toward 1 percent as decreasing resource utilization reduces the contribution of automatic stabilizers. Cyclically adjusted net lending is initially negative; see Diagram 14b.

Diagram 14a Fiscal policy according to the reaction function. Fictitious example 4: Expansionary economy, high net lending
Percent of GDP and potential GDP, respectively



Source: NIER.

Diagram 14b Fiscal policy according to the reaction function. Fictitious example 4: Expansionary economy, high net lending
Percent of GDP and potential GDP, respectively



Source: NIER
.

Since the reaction function guarantees symmetry, fiscal policy from the reaction function will be the mirror image of that in Example 3, Diagrams 13a-b; i. e. fiscal policy should be somewhat contractionary with the economy in this state, according to the reaction function and, hence, NIER's preferences.

5.3 Reasons not to Follow the Fiscal Policy of the Reaction Function

In the introduction to this chapter, it was emphasized that the fiscal policy reaction function is only an aid in the NIER's assessment of an appropriate stance for fiscal policy. In reality, there are always factors and considerations that are specific to the economic situation at hand and cannot be considered in a simple linear model. The

very existence of situation-specific considerations makes it difficult to anticipate what these may be. It is possible, however, to provide in advance examples of the considerations that will very probably enter into the NIER's fiscal policy assessment, in addition to the reaction function. Some of these examples are presented below.

But first and foremost, it is important to emphasize that the NIER's current trade-off between the surplus target and full resource utilization implicitly takes into account Sweden's currently favourable debt situation, with central government debt around 30 percent of GDP and negative net indebtedness. Since the surplus target is expressed in terms of general government net lending, central government debt is not explicitly included in the reaction function. Probably the importance of meeting the surplus target, i. e. parameter β in Equation (12), will increase (decrease) the higher (lower) central government debt is at the outset.

5.3.1 "Abnormal" Cyclical Situations

The four cyclical examples used in Section 5.2.3 above were all relatively "normal" in character. "Normal" means that resource utilization and net lending were not too distant from their target values.[72] It is therefore uncertain whether the reaction function reflects the NIER's preferences when the target variables are far removed from their policy values.

However, parametrization of the target function from abnormal cyclical situations as well is not considered very appropriate as a strategy. One advantage of the present reaction function is that it is linear and thus relatively easy to understand. But reality is probably nonlinear; moreover, its nonlinearity is likely to become more pronounced the farther the economy deviates from normal levels. A reaction function that also covers abnormal situations would necessarily be nonlinear and thus relatively difficult to understand. Moreover, abnormal situations are hard to capture even in nonlinear models. The NIER has therefore concluded that it is more useful to apply a linear reaction function that represents the institute's preferences in a

[72] To define a "normal" situation precisely in advance is of course difficult since normality depends on factors like the combination of resource utilization, net lending and general government indebtedness.

satisfactory manner in normal situations and then make situation-specific assessments when abnormal situations arise.

5.3.2 Slight Deviations from Targets

With the present design of the reaction function, even minimal deviations from full resource utilization and/or the surplus target result in a fiscal policy recommendation, limited though it may be. This is reasonable on several grounds. As shown in Section 4.1.5, the uncertainty surrounding resource utilization is relatively great in real time, as revisions are made after the fact, both in actual GDP by Statistics Sweden and in potential GDP by the NIER. Taken alone, therefore, small deviations from full resource utilization should not be sufficient justification for a fiscal policy measure. There is also uncertainty about distances from the surplus target (see Section 4.1.5). Consequently, a minor deviation, by itself, should not elicit a fiscal policy recommendation. For the approximate limits of a "minor" deviation, it is the NIER's opinion that:

- an output gap between –1.0 and 1.0 is not sufficient reason *by itself* to recommend a fiscal policy;
- average general government net lending between 0.75 and 1.25 percent is not sufficient reason *by itself* to recommend a fiscal policy, and
- cyclically adjusted net lending between 0.75 and 1.25 percent is not sufficient reason *by itself* to recommend a fiscal policy.

By contrast, if the output gap is between –1.0 and 0 (1.0 and 0) and *at the same time* net lending is above (below) the surplus target, a fiscal policy recommendation may be called for, as there is no conflict between the two target variables.

It should also be noted that with the adoption of the surplus target, it is reasonable to use fiscal policy more often than if only resource utilization were in focus. Because of the surplus target, it is preferable, all else being equal, to guide net lending toward the target rather than in the wrong direction. Consequently, given the surplus target, the NIER will recommend the use of fiscal policy more often than if only resource utilization were taken into account (i. e. in a situation where no surplus target existed).

5.3.3 Avoid Fiscal Policy of Minimal or Great Magnitude

With the reaction function specified as it is, there is no lower or upper limit to the magnitude of the fiscal policy that may be deemed appropriate by the NIER. In practice, however, it would be neither reasonable nor desirable to express fiscal policy in excessively small amounts. If for example the reaction function implies that net lending should be strengthened by 0.3 percent for a two-year period, it would probably be more reasonable and effective to strengthen net lending by 0.6 percent for one year and then switch to a neutral policy. At the other end of the scale, it may be argued that when a fiscal policy recommendation of great magnitude is generated by the reaction function, it is better to apportion that recommendation over several years.

5.4 Application of the Reaction Function in Actual Economic Situations

To show specifically how the conceptual framework is intended to function in practice, and to demonstrate its quantitative implications, the fiscal policy stance generated by the reaction function is presented below for the economic situation on two actual occasions: in June 2003 and in March 2008. It should be noted that the so-called labour market gap is currently the NIER's principal measure of resource utilization and is used in the real-life examples below, unlike the output gap in the fictitious examples above.[73]

June 2003: Net lending in 2000–2003 averaged 2.4 percent, exceeding the surplus target of 2 percent in effect at that time (see the thin solid line in Diagram 15a below).[74] Cyclically adjusted net lending, on the other hand, was only about 1 percent

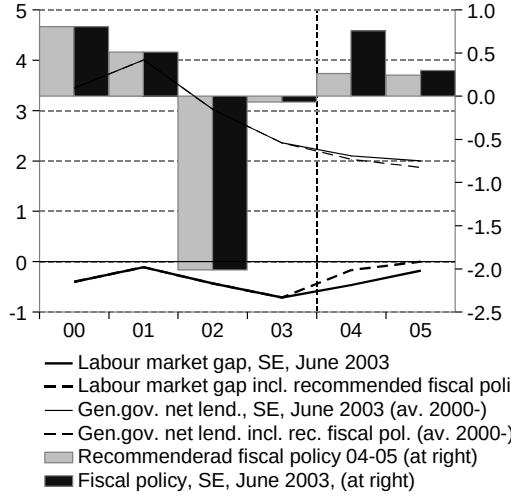
[73] The labour market gap is the percentage difference between actual and potential hours worked. At the NIER, an effort is currently under way to devise and apply a method for calculating a output gap. This gap is intended for subsequent use in the reaction function instead of the labour market gap, which is the measure currently used.

[74] The data used here are those available in real time for the forecast in June 2003. Note that the former surplus target of 2 percent was in effect in 2003, when the net lending of the PPM system was included; see Section 2.1.1. In Diagrams 15a-b, therefore, the target is 2 percent instead of 1 percent as in Diagrams 11–14.

in 2003, i. e. below 2 percent (see the dashed line in Diagram 15b). The labour market gap was negative in 2003 (–0.7) and was expected to remain so during the forecast years of 2004–2005. This expectation, however, was based in part on the fiscal policy forecast for 2004–2005, which was contractionary (see the black bars in Diagram 15a, scale at right). Without this contractionary policy, the labour market gap would have been slightly positive in 2004–2005 (not shown in the diagrams), given the multiplier approach described in Section 4.5.4.

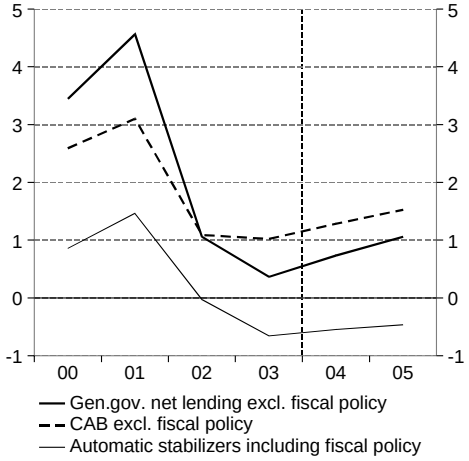
When the reaction function from Equation (13) is applied to the period 2004–2005, the results are as shown in Diagrams 15a-b.

Diagram 15a Fiscal policy according to the reaction function, 2004–2005. Actual example: *The Swedish Economy* (SE), June 2003
Percent of GDP and potential GDP, respectively



Source: NIER.

Diagram 15b Fiscal policy according to the reaction function, 2004–2005. Actual example: *The Swedish Economy* (SE), June 2003
Percent of GDP and potential GDP, respectively



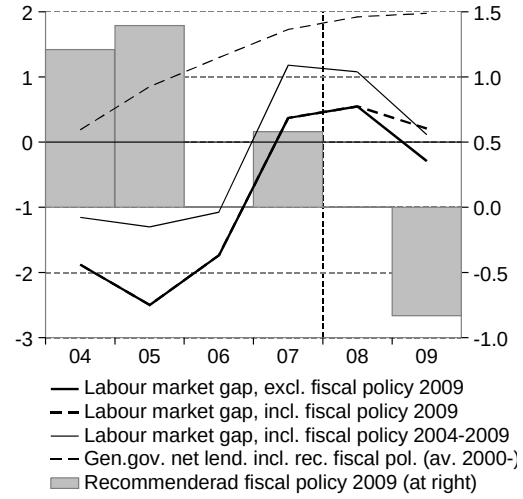
Source: NIER
.

The reaction function implies a slightly contractionary fiscal policy (see the grey bars in Diagram 15a [scale at right]) that causes cyclically adjusted net lending to approach 2 percent (see the dashed line in Diagram 15b). This also means that the labour market gap recovers faster (see the broad dashed line in Diagram 15a) than with the forecast policy (see the broad solid line in Diagram 15a).

March 2008: Just prior to the forecast in *The Swedish Economy*, March 2008, average net lending in 2004-2007 was roughly 1.8 percent of GDP, i. e. clearly above the surplus target, and it was also expected to increase during the forecast period (see the thin dashed line in Diagram 16). Cyclically adjusted net lending was about 3 percent, and the labour market gap was expected to be positive in 2008–2009.

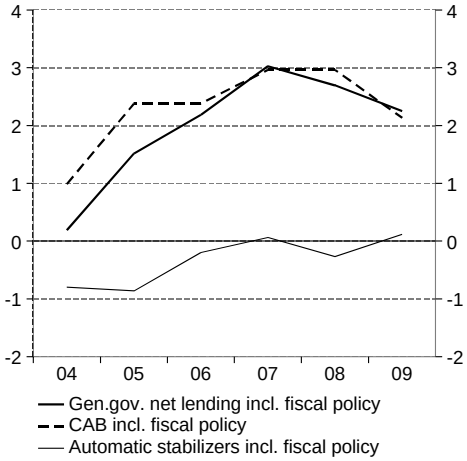
First, it may be noted that fiscal policy in 2004–2007 (i. e. during the period considered when the moving average for 2004–2010 is applied in the above-mentioned forecast) was clearly contractionary. This is apparent from comparing the broad and thin solid lines in Diagram 16a, where the latter line shows the development of the labour market gap excluding fiscal policy.[75] Without the contractionary policy, the labour market gap would have been more positive (or less negative) during the period.

Diagram 16a Fiscal policy according to the reaction function, 2008–2009. Actual example: *The Swedish Economy* (SE), March 2008
Percent of GDP and potential GDP, respectively



Source: NIER.

Diagram 16b Fiscal policy according to the reaction function, 2008–2009. Actual example: *The Swedish Economy* (SE), March 2003
Percent of GDP and potential GDP, respectively



Source: NIER
.

If the reaction function in Equation (13) is applied to 2008–2009, it generates a fiscal policy that is neutral in 2008 and expansionary in 2009: approximately 0.8 percent of potential GDP (see grey bars, scale at right). The cyclically adjusted budget balance (CAB) then start to move towards the 1 percent target (see diagram 16b, dashed line). Fiscal policy in 2009 will have an expansionary effect on the labour market gap in 2009 compared to a situation where no policy is applied that year; the gap including fiscal policy is slightly positive compared to a negative gap in the case without fiscal policy. As is shown by the thin solid line, however, aggregate fiscal policy for 2004–2009 still has some contractionary effect on the labour market gap in

[75] This is calculated with the same multiplier model as in the fictitious experiments in Section 5.2.3. See also Appendix, Section 6.4.

2009. Thus, the fiscal policy action taken in 2009 can be said to give fiscal policy a less contractionary stance and to "switch sign" when the change in resource utilization also "switches sign".[76] To put it another way, overall fiscal policy is contractionary in 2004–2009 since the changes in cyclically adjusted net lending have had a contractionary impact on resource utilization. The deterioration in cyclically adjusted net lending in 2009 have an expansionary effect on the economy; as a result, resource utilization will be higher in 2009 than it otherwise would have been, and overall fiscal policy in 2004-2009 will be less contractionary.

[76] See Section 2.3 for a discussion of fiscal policy terminology and Section 2.7 for a discussion of fiscal policy over an economic cycle.

6 Appendices

6.1 Fiscal Policy and Resource Allocation: Examples and Rules of Thumb

Section 2.3 presented the following rule of thumb shown below for using $\Delta\left(KS_t / Y_t^*\right)$ to indicate whether fiscal policy in period t is expansionary or contractionary (see section 2.3.1 for a discussion concerning the importance of the time dimension when labelling fiscal policy as expansionary or contractionary):

$$\begin{aligned} \Delta\left(KS_t / Y_t^*\right) > 0 \quad &\Rightarrow \quad \Delta\left(\ln y_t - \ln y_t^*\right) < 0 \\ \Delta\left(KS_t / Y_t^*\right) < 0 \quad &\Rightarrow \quad \Delta\left(\ln y_t - \ln y_t^*\right) > 0. \end{aligned} \tag{14}$$

With the aid of two examples, there is then a more detailed discussion of the conditions under which this rule of thumb is valid. The analysis is divided into two steps:

Step 1: How does fiscal policy affect the fiscal policy measure KS_t / Y_t^*?

Step 2: How does $\Delta\left(KS_t / Y_t^*\right)$ affect resource utilization, $\left(\ln y_t - \ln y_t^*\right)$?

6.1.1 Example. 1: Fiscal Policy That Affects Actual *but not* Potential GDP

Step 1: Effect on cyclically adjusted net lending as a share of potential GDP

Cyclically adjusted net lending is defined in Equation (4). By letting $G_t = G_t^U\left(U_t^* / U_t\right) + \overline{G_t} + r_t D_t$, Equation (4) can be simplified as follows:[77]

$$\frac{KS_t}{Y_t^*} = \sum_{i=1}^{N}\left(\frac{T_{t,i}}{B_{t,i}}\right)\left(\frac{B_{t,i}}{Y_t}\right)^* - \left(\frac{G_t}{Y_t^*}\right). \tag{15}$$

[77] $T_{t,i} / B_{t,i}$ is the implicit tax rate for tax i, $\left(B_{t,i} / Y_t\right)^*$ is the equilibrium value of tax base $B_{t,i}$ in proportion to GDP, G_t^U is unemployment compensation, U_t, U_t^* are unemployment and equilibrium unemployment, respectively, $\overline{G_t}$ is general government expenditure (in addition to unemployment compensation) and $r_t D_t$ is cost of interest.

Assume a permanent increase in tax i (i. e. the implicit tax rate $T_{t,i}/B_{t,i}$ rises) that affects neither potential GDP, equilibrium unemployment nor the composition of GDP (i. e. Y_t^*, U_t^* and $\left(B_{t,i}/Y_t\right)^*$ are constant). If Equation (15) is differentiated by the implicit tax rate $T_{t,i}/B_{t,i}$, it can be seen how KS_t/Y_t^* is affected by a tax increase of one percentage point:

$$\frac{\partial\left(KS_t/Y_t^*\right)}{\partial\left(T_{t,i}/B_{t,i}\right)}=\left(\frac{B_{t,i}}{Y_t}\right)^* \tag{16}$$
$$>0.$$

If tax base i is 30 percent of GDP, KS_t/Y_t^* improves by 0.3 percentage point as a result of the tax increase. If the multiplier of 0.75 is used, a tax increase of 0.3 percentage point of GDP will mean that GDP decreases by 0.3*0.75=0.225 percent in the same year (see Section 4.5.4). Since potential GDP is unchanged, the output gap is affected to the same degree.

If expenditure is increased instead, there will be a negative effect on KS_t/Y_t^*:

$$\frac{\partial\left(KS_t/Y_t^*\right)}{\partial G_t}=-\frac{Y_t^*}{\left(Y_t^*\right)^2}=-\frac{1}{Y_t^*} \tag{17}$$
$$<0.$$

If $Y_t^*=3000$ billion and G increases by 30 billion, Equation (17) means that KS_t/Y_t^* increases by 0.01, or one percentage point. If the multiplier is assumed to be 0.75, GDP increases by 0.75*30=22.5 billion, or 0.75*1.0=0.75 percentage point. The following conclusion can then be drawn:

<u>*Conclusion 1*</u>*: A tax increase/expenditure cutback (tax cut/expenditure increase) that does not affect potential GDP improves (worsens) cyclically adjusted net lending in proportion to potential GDP.*

<u>Step 2: Effect on the output gap</u>

Step two is now to analyze how $\Delta\left(KS_t/Y_t^*\right)$ from step 1 affects the output gap. In this example, since potential GDP is not affected, a tax increase or a cutback in expenditure will *reduce* resource utilization, $\Delta\left(\ln y_t-\ln y_t^*\right)<0$, i. e. have a contractionary effect on the economy. The reason is the assumption that tax

increases and expenditure cutbacks negatively affect actual GDP (through the conventional Keynesian channel[78]). The aggregate effect will be that the output gap, i. e. the percentage difference between actual and potential GDP, $\ln y_t - \ln y_t^*$, decreases. The converse applies, of course, in the case of a tax cut or an increase in expenditure. Overall, the following conclusion may be drawn:

Conclusion 2: In cases where fiscal policy does not affect potential GDP, the rule of thumb in Equation (14) *applies, given the assumption of a short-term Keynesian multiplier.*

As shown in the example below, the analysis becomes more complicated when fiscal policy measures are allowed to affect potential GDP.

6.1.2 Ex.2: Fiscal Policy That Affects Actual *and* Potential GDP

Step 1: Effect on cyclically adjusted net lending in proportion to potential GDP

Assume now that the tax increase in Example 1, Equation (16) reduces potential GDP, by decreasing labour supply, for example. If we ignore possible effects on equilibrium unemployment and the composition of GDP, the tax increase has the following effect on KS_t / Y_t^*, shown through differentiating Equation (15) by the implicit tax rate $T_{t,i} / B_{t,i}$:

$$\frac{\partial\left(KS_t / Y_t^*\right)}{\partial\left(T_{t,i} / B_{t,i}\right)} = \left(\frac{B_{t,i}}{Y_t}\right)^* - \left(\frac{-G_t \dfrac{\partial Y_t^*}{\partial\left(T_{t,i} / B_{t,i}\right)}}{\left(Y_t^*\right)^2}\right) \qquad (18)$$

$$> 0.$$

[78] See Section 4.5 for a presentation of the theory and empirical results for the fiscal policy multiplier.

This effect is less than the one in Example 1, Equation (16), since $\left(\partial Y_t^* / \partial\left(T_{t,i} / B_{t,i}\right)\right) < 0$. But on reasonable assumptions, it is still positive.[79] The following conclusion thus applies:

Conclusion 3: A tax increase (tax cut) with negative (positive) effects on potential GDP means that the improvement (deterioration) in KS_t / Y_t^* will be less than in the case where potential GDP does not change.

An increase in expenditure (through increased general government investment, for example) that is judged to have a positive effect on potential GDP means that KS_t / Y_t^* is affected as follows:

$$\frac{\partial\left(KS_t / Y_t^*\right)}{\partial G_t} = -\left[\frac{\frac{\partial G_t}{\partial G_t} Y_t^* - G_t \frac{\partial Y_t^*}{\partial G_t}}{\left(Y_t^*\right)^2}\right] \qquad (19)$$

$$< 0.$$

The assumption that higher general government investment will increase potential GDP, $\left(\partial Y_t^* / \partial G_t\right) > 0$, means that the negative effect on KS_t / Y_t^* will be less than here in Equation (19) compared to Equation (17) in Example 1. Under reasonable assumptions, however, the effect will still be negative.[80] The following conclusion can thus be drawn:

Conclusion 4: An increase (decrease) in expenditure with positive (negative) effects on potential GDP means that the deterioration (improvement) in KS_t / Y_t^* will be less than in the case where there is no change in potential GDP.

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[79] Theoretically the derivative in Equation (18) could be negative. In that case the tax base must be fairly small and the negative effect on potential GDP comparatively large. An example might be an increase in the net wealth tax or in the tax on high incomes. Since relatively few people are affected, the tax revenue involved would be rather limited, but the tax increase in itself might mean that financial and human capital move to other countries, possibly with a substantial negative impact on potential GDP. In a normal case, however, the NIER estimates that the derivative in Equation (18) will be positive.

[80] Since $G_t < Y_t^*$ it is necessary that $\left(\partial Y_t^* / \partial G_t\right) > Y_t^* / G_t$ if the derivative in Equation (19) is to be positive – an unlikely outcome. If it were determined instead that the increase in G_t reduced Y_t^*, the change in KS_t / Y_t^* would of course be even more negative.

For the effects of fiscal policy on KS_t / Y_t^*, the summarizing conclusion below can thus be drawn from Examples 1 and 2:

Conclusion 5: Under reasonable assumptions, tax increases/expenditure cutbacks (tax cuts/increases in expenditure) cause cyclically adjusted net lending to improve (deteriorate) in proportion to potential GDP.

Step 2: Effect on the output gap

The question now is whether it suffices to consider $\Delta\left(KS_t / Y_t^*\right)$ in order to determine how $\left(\ln y_t - \ln y_t^*\right)$ is affected by fiscal policy when fiscal policy measures also affect potential GDP. When potential GDP is affected, the situation is more complicated, as there will be a supply channel in addition to the demand channel from Example 1. For example, the tax increase discussed above may reduce labour supply, with a resultant decrease in potential GDP. The demand channel, however, is the same as in Example 1; i. e. resource utilization decreases (through lower growth in demand) as a result of the tax increase. The two channels thus lead resource utilization in different directions, and it is not possible to determine which channel is generally strongest. The NIER's assessment, however, is that the demand channel normally predominates over the supply channel in the short run.[81] But the analysis may vary depending partly on the state of the economy and partly on the fiscal policy instruments used.[82] The following summary conclusion can be drawn concerning the link between KS_t / Y_t^* and $\left(\ln y_t - \ln y_t^*\right)$:

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[81] In the special analysis "Effects of the New Government's Economic Policy" in *The Swedish Economy,*, December 2006, the assessment was that fiscal policy (cuts in income taxes, lower replacement levels in unemployment benefits, etc.) reduced resource utilization in that potential GDP would be affected more positively than actual GDP in the short run, 2007–2010. Thus, in this case the supply channel was considered to predominate over the demand channel.

[82] The increase in expenditure in Example 2, which was expected to increase Y_t^*, means that $\Delta\left(KS_t / Y_t^*\right) < 0$ in Equation (19). For the rule of thumb in Equation (14) to remain applicable, it is necessary that $\Delta\left(\ln y - \ln y^*\right) > 0$, i.e. actual GDP must be affected more positively than potential GDP in the short run as a result of the increase in expenditure. However, the economy may be in a state (see the more detailed discussion in Section 4.5) where the Keynesian demand channel is small or even negative. The supply channel would then predominate; this means that potential GDP would generaly be affected more than actual GDP in the short run, i. e. $\Delta\left(\ln y - \ln y^*\right) < 0$. The rule of thumb in Equation (14) does not apply in this case, which like similar situations is regarded by the NIER as a relatively rare exception to the rule of thumb.

Conclusion 6: In the normal case, the change in KS_t / Y_t^* *may be used as an indicator in determining whether fiscal policy in period t has an expansionary or contractionary effect on the economy. If* $\Delta\left(KS_t / Y_t^*\right) > 0$*, a contractionary policy is followed in period t, i. e.* $\Delta\left(\ln y_t - \ln y_t^*\right) < 0$*. If* $\Delta\left(KS_t / Y_t^*\right) < 0$*, an expansionary policy is followed in period t, i. e.* $\Delta\left(\ln y_t - \ln y_t^*\right) > 0$*.*

6.2 Cyclical Variations and Welfare

As can be seen from the reaction function in Chapter 5, a positive output gap, all else being equal, means that fiscal policy will bring the economy back to equilibrium. In other words, a positive output gap is considered "bad" and requires "correction". In theoretical models for optimal monetary and fiscal policies (see, for example, Benigno and Woodford, 2005), the standard result is that welfare is optimized if monetary policy minimizes variation in the output gap, among other factors. This means that a positive output gap are just as "harmful" to welfare as a negative output gap, one reason being the effect on inflation, where variation also has negative effects on welfare. Moreover, since the output gap averages zero in these models, a positive output gap now means that a negative output gap will arise in the future. That variation is negative for individual welfare. This applies whether the economy is with or without distortions (such as restrictions on competition on goods and labour markets).

If consideration is not given to the effects on inflation and the possibly higher probability of a contractionary period in the future, an expansionary period will normally mean a higher level of welfare in an economy where imperfect competition prevails on goods and labour markets. Galí et al. (2007) illustrate this point in a model where they derive a so-called efficiency gap, which is the difference between the welfare that would result in an economy where perfect competition prevailed and welfare in an economy with limitations on competition. In the former, the marginal ratio of substitution between consumption and leisure (MRS) would equal the marginal product (MPL), and Pareto-optimal equilibrium P would arise in Diagram

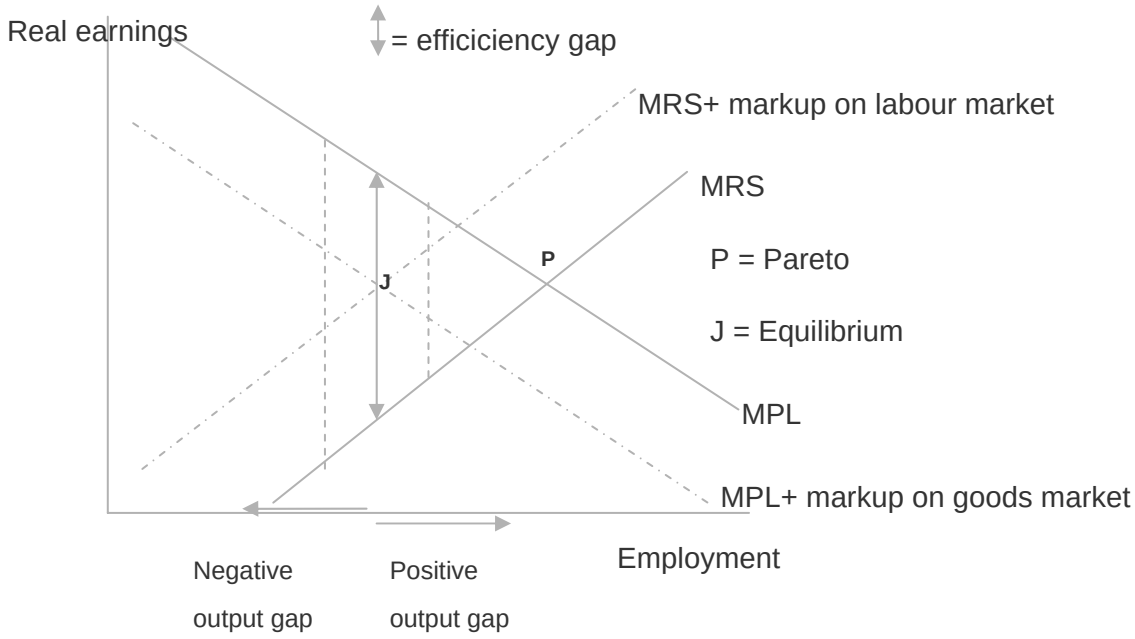
17 below.[83] But because of imperfect competition on goods and labour markets, equilibrium is achieved only at point J, thus causing a loss of efficiency/welfare in the economy (shown by the distance between MRS and MPL). An expansionary period means that the economy moves toward P, increasing welfare as the difference between MRS and MPL decreases. It may also be noted that cyclical fluctuations have asymmetric effects on welfare; the difference between MPL and MRS increases more in a contractionary economy than it decreases in an expansionary economy.

Benigno and Woodford (2005) show, however, that even in this situation of imperfect competition, it is optimal to minimize variation in the output gap, thus maximizing welfare. But this applies on the condition that equilibrium output varies over time and is determined by the shocks that currently drive the development of the economy.

In summary, the literature on optimal monetary and fiscal policy is relatively recent (see Section 4.1.4), and the NIER intends to follow its future development closely.

[83] The equality MRS=MPL means that an individual at the margin (for example, by working for an additional hour) produces goods whose value generates increased consumption potential exactly equivalent to the perceived cost to the individual of the leisure loss required to produce the increased output.

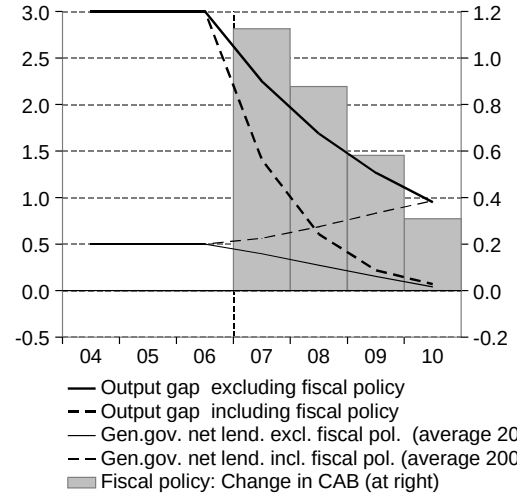
Diagram 17: Efficiency Gap as a Measure of Welfare



6.3 Fiscal Policy Reaction Function. First Iteration

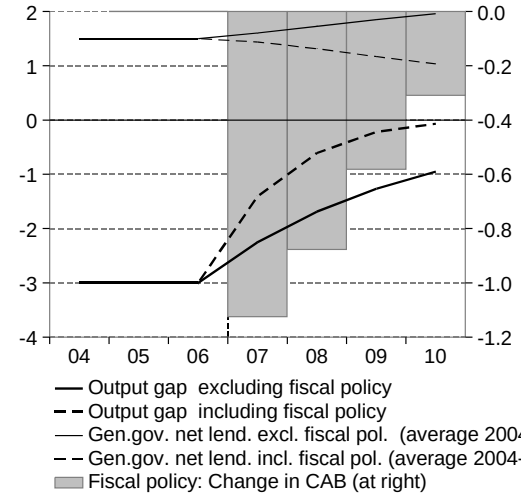
To exemplify how the parametrization of the reaction function was developed at the NIER, the fiscal policy generated by the reaction function is shown; the parametrization used is from the first iteration. Diagrams 18–21 below should be compared with the final result in Diagrams 11–14 in the main text.

Diagram 18 Fiscal policy according to the reaction function: Initial parametrization
Fictitious example 1: Expansionary economy, low net lending
Percent of GDP and potential GDP, respectively



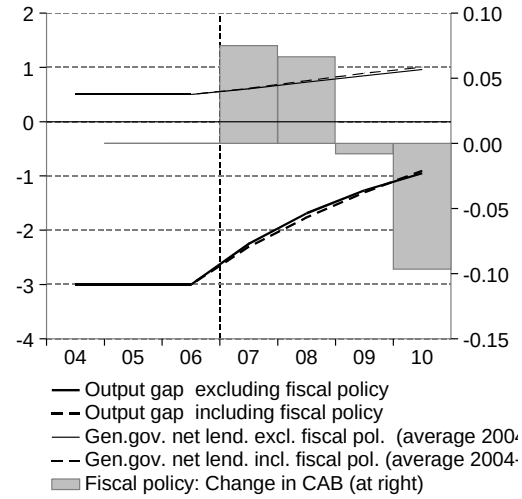
Source: NIER.

Diagram 19 Fiscal policy according to the reaction function: Initial parametrization
Fictitious example 2: Contractionary economy, high net lending
Percent of GDP and potential GDP, respectively



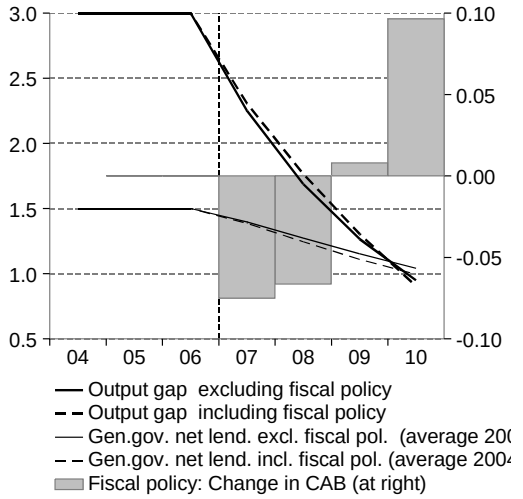
Source: NIER.

Diagram 20 Fiscal policy according to the reaction function: Initial parametrization
Fictitious example 3: Contractionary economy, low net lending
Percent of GDP and potential GDP, respectively



Source: NIER.

Diagram 21 Fiscal policy according to the reaction function: Initial parametrization
Fictitious example 4: Expansionary economy, high net lending
Percent of GDP and potential GDP, respectively



Source: NIER.

The general difference between the first and final parametrizations is that greater importance is attached to meeting the surplus target in the first proposal; i. e. parameter β in Equation (12) was higher. This means, for example, that the fiscal policy contraction (expansion) is more powerful in Diagram 18 (Diagram 19) above than in Diagram 11 (Diagram 12). In the two cases where objectives conflict, the reaction function means, in principle, that, policy will be neutral in Diagram 20 (Diagram 21) compared to a slightly expansionary or contractionary policy, respectively, in the final parametrization; see Diagrams 13 and 14.

6.4 Fiscal Policy Model: Effects on Net Lending and the Output Gap

This section shows the calculations underlying the fiscal policy, and its effects on resource utilization, generated by the reaction function in Diagrams 11–14 in Chapter 5. The calculations are performed in a small fiscal policy model, the principal elements of which are the following:

- a fiscal policy reaction function based on the NIER's preferences, designed to reflect how the NIER on average reaches the trade-off between the surplus target and resource utilization in various fiscal and cyclical situations (see Chapter 5)
- a Keynesian multiplier model where the short-term multiplier is positive but decreasing and the long-term multiplier is zero. The size of the multiplier is

determined for an implicit monetary policy response to the fiscal policy action; see Section 4.5 for a discussion on the size of the multiplier depending on time horizon, fiscal policy instrument and cyclical situation.

Moreover, the calculations track the effects of changes in the output gap (which result from the fiscal policy generated by the reaction function) on the automatic stabilizers. As noted above, the reaction function describes the development of cyclically adjusted net lending, thus making it possible to calculate the effects on general government net lending.

The fiscal policy generated by the reaction function is calculated in two steps:

Step 1: Calculation of forecast paths for resource utilization and net lending excluding forecast fiscal policy. Here the on-going forecasts published in *The Swedish Economy* are used. If these forecast paths include forecast fiscal policy (i. e. $\Delta\left(KS_t / Y_t^*\right) \neq 0$), the multiplier model is also used to calculate how the output gap and net lending develop in the forecast if this policy is *disregarded*. These forecast paths are referred to below as "base paths".

Step 2: The base paths are then fed into the fiscal policy reaction function in order to calculate an appropriate fiscal policy. With the aid of the multiplier model, the dynamic effects on the output gap and general government net lending are then determined.

The procedure in steps 1 and 2 is described in greater detail below.

6.4.1 The Output Gap and Net Lending with Fiscal Policy Excluded

Output Gap with Fiscal Policy Excluded

Fiscal policy (measured as the change in cyclically adjusted net lending in proportion to potential GDP; see Section 2.2) is disregarded by "removing" it from the existing forecast in a "reverse" multiplier analysis. Although this procedure is relatively straightforward, the following example is used to make it clearer. Assume that 2007 is the first year of the forecast and that the fiscal policy forecast is contractionary and 0.5 percent of GDP, i. e. $\Delta\left(KS_t / Y_t^*\right) = 0{,}5$. If the multiplier is estimated at 0.75, the output gap *excluding* the fiscal policy forecast for 2007 will be

0.5*0.75=0.375 percentage point higher than the forecast.[84] More generally, the following formula is used to calculate the forecast GDP gap excluding fiscal policy, $\left(\ln Y - \ln Y^*\right)^{ExFP}$:

$$\left(\ln y - \ln y^*\right)_t^{ExFP} = \left(\ln y - \ln y^*\right)_t^{For} + \sum_{i=0}^{t-s-1}\left(\frac{m}{i+1}\right) * \Delta\left(\frac{KS}{Y^*}\right)_{t-i}^{For}, \tag{20}$$

where $\left(\ln y - \ln y^*\right)_t^{ExFP}$ is the output gap excluding the fiscal policy forecast, $\left(\ln y - \ln y^*\right)_t^{For}$ is the output gap forecast in *The Swedish Economy*, t is the forecast year, s is the final outcome year, m is the multiplier and $\Delta\left(KS/Y^*\right)_{t-i}^{For}$ is the fiscal policy forecast.[85] If, for example, $t = 2008, s = 2006, m = 0,75$ and:

$$\begin{aligned} \left(\ln y - \ln y^*\right)_{2008}^{For} &= 1,0 \\ \Delta\left(KS/Y^*\right)_{2007}^{For} &= -1,0 \\ \Delta\left(KS/Y^*\right)_{2008}^{For} &= -0,5 \end{aligned} \tag{21}$$

Equation (20) then applies as follows:

$$\begin{aligned} \left(\ln y - \ln y^*\right)_{2008}^{ExFP} &= 1,0 + 0,75*(-0,5) + \left(\frac{0,75}{2}\right)*(-1,0) \\ &= 0,25. \end{aligned} \tag{22}$$

Thus, in this example, the output gap for 2008 excluding fiscal policy is less than the output gap including fiscal policy, which was forecast to be expansionary in both 2007 and 2008.

[84] In the interest of simplicity, it is assumed that fiscal policy does not affect potential GDP.

[85] Of course, net lending and the output gap during the forecast period are also affected by the fiscal policy followed before the current year. These decisions, however, have already been taken and cannot be reversed. Their impact during the forecast period remains in that they are implicitly included in the base paths for net lending and resource utilization. Thus, they are also included implicitly in the forecast paths, which consist of base paths plus effects of the fiscal policy generated by the reaction function.

Net Lending with Fiscal Policy Excluded

In the examples in Chapter 5, a seven-year moving average is used; the latter can presently be calculated as an average from and including the year 2004 (see Section 2.1.1), i. e:

$$\overline{\left(\frac{FS}{Y}\right)}_t = \frac{1}{(s-2004+1)} \sum_{i=2004}^{s} \left(\frac{FS}{Y}\right)_i, \tag{23}$$

where s is the final outcome year, 2006, for example if the current year is 2007. With the aid of this method, which was developed by Braconier and Holden (1999, see also Braconier and Forsfält, 2004), FS_t is separated into cyclically adjusted net lending, KS_t, and the contribution of automatic stabilizers, AS_t. The calculation of net lending excluding fiscal policy is performed with the help of its two elements, KS_t and AS_t. An unchanged policy is defined as a policy where KS_t / Y_t^* is unchanged (see Section 2.2), i. e:

$$\left(KS / Y^*\right)_s = \left(KS / Y^*\right)_{s+1}^{ExFP} = \ldots = \left(KS / Y^*\right)_k^{ExFP},$$

with s being the final outcome year and k the final forecast year. The automatic stabilizers are affected by the difference in the appropriate and forecast level of GDP from Equation (20) as follows:

$$\left(\frac{AS}{Y}\right)_t^{ExFP} = \left(\frac{AS}{Y}\right)_t^{For} + \alpha\left(\ln y_t^{ExFP} - \ln y_t^{For}\right), \tag{24}$$

where it is commonly found for Sweden that $\alpha = 0{,}55$. General government net lending can then be defined as follows:[86]

$$\left(\frac{FS}{Y}\right)_t^{ExFP} \cong \left(\frac{KS}{Y^*}\right)_t^{ExFP} + \left(\frac{AS}{Y}\right)_t^{ExFP}. \tag{25}$$

Using the time series for $\left(FS / Y\right)_t^{ExFP}$ in Equation (25), average general government net lending excluding fiscal policy can then be calculated for the forecast period. Equation (23) is used with the change that $s = 2007$, and the average is calculated for one more year, etc.

[86] See Equation (3) for an exact definition.

6.4.2 Appropriate Fiscal Policy According to the Reaction Function

Based on the average net lending between 2004 and the final outcome year in Equation (23), and on the output gap excluding fiscal policy in Equation (20), the fiscal policy reaction function can now be used to calculate an appropriate fiscal policy and its effects on the output gap and net lending. In practice, there is a certain difference between the calculations for the first year of the forecast and the remaining forecast years; for this reason they are described separately.

Calculations for the First Year of the Forecast

For the first year of the forecast (2007, for example) the reaction function is the following:

$$\Delta\left(\frac{KS}{Y^*}\right)_{2007}^{\text{RecFP}} = 0.3*\left(\ln y-\ln y\right)_{2007}^{\text{ExFP}} + 0.2*\left[\left(\ln y-\ln y\right)_{2007}^{\text{ExFP}} - \left(\ln y-\ln y\right)_{2006}^{\text{ExFP}}\right] \\ -0.4*\left[0.5*\overline{\left(\frac{FS}{Y^*}\right)}_{2006}^{\text{For}} + (1-0.5)*\left(\frac{KS}{Y^*}\right)_{2006} - \overline{\left(\frac{FS}{Y^*}\right)}^{\text{Target}}\right], \tag{26}$$

where $\Delta\left(KS/Y\right)^{\text{RecFP}}$ denotes recommended fiscal policy ("RecFP"). A new output gap including the recommended fiscal policy can then be calculated, with the left side of Equation (26) transposed to the right side as below:

$$\left(\ln y-\ln y^*\right)_{2007}^{RecFP} = \left(\ln y-\ln y^*\right)_{2007}^{ExFP} - m*\Delta\left(\frac{KS}{Y^*}\right)_{2007}^{RecFP}, \tag{27}$$

where m is the multiplier. The automatic stabilizers from Equation (24) are then adjusted as follows:

$$\left(\frac{AS}{Y}\right)_{2007}^{RecFP} = \left(\frac{AS}{Y}\right)_{2007}^{ExFP} + \alpha*\left(\ln y_t^{RecFP} - \ln y_t^{ExFP}\right). \tag{28}$$

Thereafter, general government net lending can be calculated using the left side of Equations (26) and (28).

Calculations for the Remaining Forecast Years

For the remaining forecast years, the principle is similar to the one shown above in Equations (26)–(28). The difference is that the fiscal policy for 2007 generated by the reaction function must now be taken into account, as the output gap for 2008 is to be used in Equation (26). More specifically, the output gap excluding the fiscal policy forecast for 2008 is adjusted in Equation (20) with the aid of the fiscal policy for 2007

generated by the reaction function; the adjustment is made via the multiplier $(m/2)$. This adjusted output gap provides the basis for the fiscal policy generated by the reaction function for 2008. For 2009, the output gap in Equation (26) must be adjusted for the fiscal policy generated by the reaction function for 2007 and 2008 etc.

When 2008 is analyzed, the lagged average general government net lending in Equation (26) must be the net lending that incorporates the fiscal policy of the reaction function for 2007. This "loop" of calculations concludes with the final year of the forecast. Then diagrams can be prepared for comparing three pairs of paths for average general government net lending and the output gap:[87]

1. forecast paths including forecast fiscal policy.
2. forecast paths excluding forecast fiscal policy.
3. paths including fiscal policy generated by the reaction function.

[87] Of course it is also possible to calculate cyclically adjusted net lending and the automatic stabilizers (level and average).

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