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Does the structural budget balance guide fiscal policy pro-cyclically? Evidence from the Finnish Great Depression of the 1990s

Abstract:
In this article, I examine the European Commission's output gap method of calculating the structural budgetary position, and assess its bottom-up alternatives in the EU's fiscal framework. The perspective adopted is that of recent Finnish economic developments between the years 1984-2014; a time period that includes the Finnish Great Depression of the 1990s. I then analyze the fiscal requirements that the country would have faced in different time periods based on the EU's fiscal rules. The results reinforce the impression of the limited capacity of the output gap method to predict cyclical changes in real time. Therefore, its use for steering fiscal policy in the EU's fiscal framework could lead to a procyclical fiscal policy (stimulus in upturns and austerity in downturns). Based on the results, it also appears that the calculation model concerning structural unemployment currently used by the Commission is hypersensitive to changes in economic trends due to methodological reasons. I also review the alternative assessment methods used within the EU rules framework: the expenditure rule in the preventive arm of the Stability and Growth Pact (SGP) and the bottom-up assessment method in the corrective arm. It appears that using them to steer the fiscal policy could make the policy more countercyclical.

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1. Introduction

The structural budget balance (SB) measures the budgetary position of public finances, when the effects of economic cycles and one-off expense and income items are eliminated. It has received a central role in the EU's fiscal policy legislation framework. In the corrective arm of the Stability and Growth Pact, SB will help steer the removal of excessive deficit. In the preventive arm of the Stability and Growth Pact, it specifies the government's general medium-term budgetary objective. In principle, the use of SB clarifies the execution of fiscal policy and its control. Public finances should react to shocks of a cyclical nature with automatic stability measures, and in principle, such measures should be allowed to work in spite of the short-term costs inflicted on public finances. However, if the SB worsens, the related change in fiscal policy can be interpreted as independent of economic cycles, and should be corrected at least in cases where the sustainability of the public economy is in danger. Without steering produced by fiscal policy indicators such as SB, uncertainty about the nature of shocks can easily lead to contradictory policy recommendations, which could, in the worst case, paralyse fiscal policy.

In this article I assess the challenges in the European Commission's method of calculating SB based on an output gap. The perspective adopted is that of recent Finnish economic developments between the years 1984-2014. The time period provides rapid swings in Finland's business cycles, from fiscal overheating in the late 1980s through deep crisis in the early 1990s to recovery and growth since the mid-1990s, and finally the Great Recession in the late 2000s. The well-documented time period makes it possible to examine in great detail both the functioning of SB, as well as the alternative indicators that might serve as inputs for tuning fiscal policy.

Assessments of the functionality of the indicators are needed as, despite their conceptual clarity, it is challenging to measure an output gap-based structural balance in practice. The method requires assessments on several quantities that are difficult to measure (see for example Mourre et al. 2013; Havik et al. 2014). First, the output gap must be defined, i.e. the difference between actual economic activity and potential economic activity must be estimated. The structural budgetary balance is calculated next, taking account of the historical sensitivity of tax revenue and public expenditure to fluctuations in the output gap. The resulting assessments of the effects of fiscal cycles on the budgetary position of public finances in different countries have been criticised as inadequate during the recent financial and debt crisis. If this is the case, fiscal policy reliant on such indicators is in danger of becoming procyclical[1].

[1] For example, Lane (2012) and others estimate that prior to the Eurozone crisis, financial policy was excessively based on output gap estimates, without taking into account the risks associated with external imbalances, credit expansion, debt overhang in various sectors and housing price trends. On the other hand, after the crisis broke out, concerns were expressed that the output gap-based assessment of the correction needed for SB had not produced the correct picture of adjustments made in the public finances (European Commission, 2013B).

With regard to the output gap method, I have calculated historical estimates for two key components of the output gap in particular: structural unemployment and the potential level of total factor productivity in 1984–2014. I have examined the statistical plausibility of the Commission's current estimates by comparing them to observations in earlier literature. In addition, I have evaluated the method at various points in time and also in real time – that is without information on the future development of economy that would be available later.

I then analyze the fiscal requirements that the country would have faced in different time periods based on the EU's fiscal rules. The results reinforce the impression of the limited capacity of the output gap method to predict cyclical changes in real time. Therefore, its use for steering fiscal policy in the EU's fiscal framework could lead to a procyclical fiscal policy (stimulus in upturns and austerity in downturns). For example, it seems that fiscal policy guided by an output gap-based SB would not have reacted in a contractionary manner during the economic upswing in the 1980s and early 2000s. On the contrary, the indicator would have permitted a fiscal policy that would have been more expansive than the actual fiscal policy, if it had been calculated without the future development of the economy that would be available later. Besides, an output gap-based SB indicator might have ignored the fairly strong contractionary measures in fiscal policy implemented in the crisis in the early 1990s, which could have led to even stronger contractionary policy.

Based on the results, it appears that the calculation model currently used by the Commission may also be hypersensitive to changes in economic trends due to methodological reasons. In particular, estimates about structural unemployment in the recession of the 1990s that have increased to a quite high level indicate that the indicator could overreact to economic cycles. A key explanation for the behaviour is statistically problematic parameter constraints that have been used when applying the method. I recommend that the parametrisation of the method used for calculating structural unemployment be changed to better correspond to a plausible model based on the literature and observations outside the model.

As methodological alternatives to the output gap method, I will review other fiscal policy evaluation methods used in the EU's legislation framework: the expenditure benchmark that prevents the Stability and Growth Pact, and a bottom up assessment method. It is important to review alternative methods, since they measure the budgetary position using fairly different criteria. Therefore, they offer an opportunity to assess the reliability of various methods and the importance of underlying assumptions. Unlike the SB, both the expenditure rule and the bottom up assessment evaluate potential production in the medium term. Cyclical expenditure items are subtracted from public expenditure more directly than in assessments based on an output gap or standard cyclic elasticity, and the revenue trend is measured based on the observed decisions on a revenue basis and assessments of their effects.

In practice, alternative indicators already form part of the EU's control of fiscal policy. An understanding of the practicality of the various methods is also necessary due to the fact that the EU rules on fiscal policy leave much room for selecting the indicator used to guide fiscal policy

(although the output gap method still plays a fairly central role within the rules). In the preventive arm of the Stability and Growth Pact, the actualisation of the medium-term budgetary objective is assessed not only by output gap-based SB, but also by the expenditure rule. According to the expenditure rule, public expenditure may only grow at the same rate as the potential medium-term GDP used as the reference. In the procedure for excess deficit, the effectiveness of corrective measures is assessed not only via the SB, but also in terms of the number of discretionary measures in question. In practice, such an assessment is based on a method that resembles the expenditure rule very closely. Using this method, cyclical items are eliminated from the expenditure trend, which is then compared to the medium-term growth of potential production, taking account of changes in the revenue basis (bottom up assessment).

For the analysis of alternative methods, I have collected a new historical time series on the effects of the changes on the revenue basis of the entire public economy (the state, local administration and social funds). On the basis of the data, I review the operation of the alternative methods over the last three decades.

The results produced by the application of the expenditure rule and bottom up assessment methods are encouraging. Fiscal policy based on them could have been more countercyclical compared to the policy steered using the output gap-based SB. Fiscal policy based on the expenditure rule would have been contractionary, especially during the lead up to the 1990s crisis, which could have helped to alleviate the crisis and increase the margin for recovery measures while it was taking place. On the other hand, based on a discretionary bottom up assessment, the contractionary fiscal policy practised from 1992 onwards would have been sufficient, and unlike the output gap-based SB, the method would not have generated additional contractionary pressures. It is also noteworthy that in spite of their different assumptions, the methods provide a fairly uniform view of the magnitude of discretionary measures.

In Section 2 of this article, I present the methods used, and in Section 3, I present the key results. I discuss the findings in Section 4, and the conclusions of the article are presented in Section 5.

2. Methodology

In this section, I briefly present the output gap-based structural balance and its discretionary alternatives within the EU's fiscal policy legislation framework.

2.1. Structural balance with the Commission's output gap method

In the European Commission's calculation method the structural balance (SB) is calculated on the basis of estimates about the historical sensitivity of tax revenue and public expenditure to fluctuations in the output gap. This is assessed as the difference between the actual fiscal position and the cyclic effects as relative to the GDP:

$$SB_t = \frac{R_t - G_t}{Y_t} - \epsilon * OG_t - OO_t,$$

where R_t is public sector revenue, G_t is public sector expenditure and Y_t is the nominal GDP at year t. The cyclic correction is the product of the output gap (OG_t) and the elasticity between the output gap and budgetary balance ϵ. In the method used by the Commission, the output gap is determined in proportion to the production potential of the entire national economy, and semi-elasticity ϵ is assumed to be a constant. In addition, the budgetary balance is adjusted in proportion to GDP by using the effect of certain one-off revenue and expenditure items (OO_t). Mourre et al. (2013) reviews the semi-elasticity ϵ calculation method in more detail.

Currently, most international institutions (OECD, IMF, European Commission) calculate potential output using the production function method, which enables the efficient utilisation of the available research information on production technology and the behaviour of various factors of production during the assessment of the cyclic phase of the economy. The idea is to aggregate a comprehensive view of the production capacity of the economy (potential production function), based on an economic theory and observations of the state of the various components. Although the evaluation of the various elements of the production function still requires statistical methods, the output gap method offers a benefit – since it is based on an economic theory, there is an opportunity to consider how reasonable the different output gap estimates are.

In the method applied by the European Commission (see Havik et al. 2014), the production function is assumed to follow the Cobb-Douglas form and it can be presented as

$$Y_t = (U_{Lt} L_t E_{Lt})^{\alpha} (U_{Kt} K_t E_{Kt})^{1-\alpha} = TFP_t {K_t}^{\alpha} {L_t}^{1-\alpha},$$

where Y_t is total production, L_t total labour input, K_t physical capital stock. The use of each production factor is controlled by their utilisation rate (U_{Lt}, U_{Kt}) and the efficiency of use (E_{Lt}, E_{Kt}). The parameter α measures the share of labour input of all inputs. Labour input is measured as the total number of work hours, and capital is measured as the amount of capital services, divided into buildings and equipment. The Cobb-Douglas production function allows total factor productivity to be examined separately as the weighted product of efficiency and the utilisation rate.

$$TFP_t = (U_{Lt} E_{Lt})^{\alpha} (U_{Kt} E_{Kt})^{1-\alpha},$$

The output gap can be divided into different components. When the potential magnitude of the components of the production function is known, the percentual deviation from potential can be approximately estimated as the difference between the logarithms of the components

$$OG_t = LN(Y_t) - LN(Y_t^{pot}) = LN(TFP_t) - LN(TFP_t^{pot}) + (1-\alpha)(LN(L_t) - LN(L_t^{pot})).$$

It is worth noting that, in the output gap calculation, the capital stock is not adjusted separately in line with the phase of the economic cycle. Moreover, the quantity of the potential workforce is divided further into several components. This corresponds to the potential workforce adjusted based on the level of structural unemployment, $NAWRU_t$. The potential workforce is the product of the size of the population of working age people POP_t^W, the average level of participation $PART_t^{pot}$ and working hours per employee H_t^{pot}.

$$L_t^{pot} = POP_t^W PART_t^{pot}(1 - NAWRU_t)H_t^{pot}.$$

The cyclical adjustment of participation and working hours is based on a statistical HP filter. Thus, the assessment of trends does not include a separate economic theory. The population of working age is measured based on the actual number of people of working age.

Here, the focus is particularly on the assessment methods of structural unemployment and total factor productivity.[2] With regard to distinguishing the cyclical and structural component of unemployment, the Commission uses a general labour market framework whose features are ultimately estimated based on the data and correspond to the predictions of various labour market theories (see Havik et al. 2014). Outside the long-term equilibrium, the short-term state of the labour market can be assessed using the Phillips curve. This curve describes the inverse relationship between inflation and cyclical unemployment. Key factors affecting the curve include assumptions about the creation of expectations. The total factor productivity term is also broken down into a cyclical and structural component, but unlike for unemployment, no precisely described theoretical model can be invoked to justify the breakdown. Instead, it is assumed that the cyclical term depends on the underutilisation of economic resources, which is measured using the capacity utilisation rate series and by making various assumptions about the duration of the effects of various shocks.[3]

2.2. Criticism about the SB and discretionary alternatives

Measuring the output gap-based structural balance has been studied quite extensively in literature, and an increasing number of reservations have been raised concerning its use. The estimation of the output gap is highly sensitive to changes in estimates over time, both due to genuine uncertainty and to the difficulty of selecting the right model (e.g. Orphanides and van Norden, 2002; Rünstler, 2002; Planas and Rossi, 2004; Golinelli, 2008; Marcellino and Musso, 2010; Bouis et al., 2012). Applying the Commission's method in the present crisis confirms the rule. For example, Virkola (2014) reviews the revisions made to the European Commission's

[2] The components play a central role in the output gap method and offer the greatest opportunities for a review from an economics point of view.

[3] Conclusions about unobservable structural changes in these components are made using the maximum likelihood method, a Bayesian method of calculation, and the Kalman filter. A more detailed description of the method is presented by Kuusi (2015), Planas and Rossi (2004), Planas and Rossi (2014) and Havik et al. (2014).

output gap methods, and reports that the changes to output gap estimates in 2000–2013 amounted to 1.5 percentage points on average during the crisis.

Challenges associated with the calculation of the output gap-based SB are not limited to the difficulty of measuring the output gap, but also relate to the difficulty of modelling the reactions of the public economy to cyclic shocks. Firstly, a cycle-independent budget should not contain individual expenditure and revenue items that have no clear connection to the long-term balance. Although it is easy to eliminate one-off items from the budget in principle, problems occur when trying to define which items are temporary or large enough (European Commission 2006). Secondly, the budget balance of the public finances can depend on fluctuations in asset and commodity prices that correlate only weakly with economic cycles (see for example Eschenbach and Schuknecht 2002, Price and Dang 2011). In addition, economic crises and their aftermaths are associated with structural and legal reforms that do not treat every sector and public finance revenue base equally. Taking them into account requires an alternative approach to SB calculation, since calculations based on an aggregated output gap assume that economic upswings and downswings are symmetrical and thus neutral towards sources of tax revenue (Kremer et al. 2006; Morris 2007; Wolswijk 2007; Barrios and Fargnoli 2010).

I evaluate alternative indicators that have recently been presented as solutions to the problems presented above within the EU's fiscal policy legislation framework. These comprise the expenditure rule within the preventive arm of the SGP, which is defined in the Commission's vade mecum guidelines (2013A). The purpose of the expenditure rule is to ensure that the countries remain committed to the MTO or a path of adjustments leading to it. On the other hand, the excessive deficit procedure in the SGP's preventive arm assesses the outcomes of actions that seek to correct the budgetary position by means of a bottom up assessment, for example, which very closely resembles the expenditure rule in the preventive arm in methodological terms. The latter indicator is discussed by the European Commission (2013B) and Carnot and de Castro (2015), among others.

The starting point in both alternative indicators is the direct analysis of detected policy changes instead of indirect assessments based on the output gap method. In principle, it is easy to monitor changes in economic policy on the revenue side: economic policy is essentially neutral if no new decisions are made. The combined effects of new decisions can be interpreted as a change in fiscal policy.

On the other hand, there is no corresponding distinct neutral reference point on the expenditure side, but the growth in expenditure must somehow be quantified in reference to other development in the aggregate economy. Changes in fiscal policy are measured based on the growth rate of aggregated expenditures, with various cyclical items being eliminated in proportion

to the potential medium-term growth in GDP[4]. A fiscal policy can be interpreted as neutral if it will not change the expenditure proportion of GDP according to the adjusted expenditure in the medium term. On the other hand, if the adjusted expenditure growth rate exceeds the potential growth of GDP in the medium term, the fiscal policy must be interpreted to have changed, particularly if the difference will not be compensated with discretionary measures on the revenue side.

In the following, I will examine alternative indicators in more detail. In the case of the expenditure rule, revenue base changes and various cyclical items are subtracted from public expenditure

$$E_t = G_t - INT_t - EU_t - (I_t - I_t^{KA}) - UC_t$$

where in year t, G_t is total public economy expenditure, INT_t interest expenses, EU_t the country's share of EU structural fund projects, I_t public investment expenditure, I_t^{KA} average public investment expenditure in the current and three previous years, and UC_t cycle-related changes in unemployment expenditure. Unemployment expenditure due to economic cycles is assessed based on an estimate of the magnitude of cyclical unemployment (derived from the magnitude of structural unemployment) and average unemployment expenses per unemployed person.

The change in adjusted aggregated expenditures is calculated further, taking account of the discretionary change in revenue N_t^R (and certain expenses funded by earmarked revenue) in such a way that the proportional change in expenses is

$$\frac{\Delta E_t}{E_{t-1}} = \frac{E_t - N_t^R - E_{t-1}}{E_{t-1}}$$

The growth rate of expenses is deflated using the price change in GDP. Using the method of calculating the expense rule, inflation is measured as the average of the Commission's previous year's spring and autumn inflation forecasts for the current year. Let us express the real change as $\frac{\Delta e_t}{e_{t-1}}$.

[4] However, it must be noted that the Commission's method of measuring potential production is also applied when making these longer-term assessments. This could still present a problem, especially since the output gap method includes an assumption on the closing of the output gap, which could also generate biased forecasts in the medium term (Timmermann 2006). An alternative method of measuring potential production could, for example, lie in the long-term growth forecasting method used by the US Congressional Budget Office (CBO) (Schackleton 2013; Hetemäki 2015). In the case of Finland, on the other hand, shocks have often occurred at the sector level. Thus, it may be sensible to consider an alternative whereby the development of production is estimated from the sector level upwards, using growth accounting or sector-level growth models (Pohjola 2011; Kuusi 2013; Fernald 2014).

The estimate of growth potential is based on the potential change in the level of production by the aggregate economy in the medium term. When the growth rate of expenditure equals the potential growth rate of production, the economy does not include a tendency to increase or decrease public demand in proportion to GDP in the medium term. Based on the Commission's suggestion, the potential growth rate is defined as the average based on observations of the growth rate of potential GDP during the last five years and forecasts of the growth rate for four years into the future:

$$\frac{\Delta_t^{pot} e_t}{e_{t-1}} = \left(\left(\frac{Y^*_{t+4}}{Y^*_{t-5}}\right) - 1\right)^{\frac{1}{10}},$$

where Y_t^* is potential (real) production at a particular point of time t.

When the adjusted expenditure aggregate has been calculated, its real growth $\frac{\Delta e_t}{e_{t-1}}$ can be compared to the growth potential of the aggregate economy $\frac{\Delta_t^{pot} e_t}{e_{t-1}}$.. A useful result is that the growth of expenditure aggregate must undershoot the reference growth rate by $x * \frac{1}{E_t/Y_t}$, to have the corresponding proportion of expenditure to GDP fall by x per cent, where E_t/Y_t is the nominal GDP proportion of the expenditure variable used.

In a bottom up estimate, the definition of the adjusted expenditure aggregate is slightly different to the expenditure benchmark. The expenditure aggregate is defined by first subtracting the non-discretionary unemployment expenditure (G_t) interest expenses of public bodies (U_t^{nd}) and one-off expenditure items (I_t) from the total expenditure of public bodies (OO_t):

$$E_t^{BU} = G_t - U_t^{nd} - I_t - OO_t.$$

The change rate of expenditure is estimated as above

$$\frac{\Delta E_t^{BU}}{E_{t-1}^{BU}} = \frac{E_t^{BU} - N_t^R - E_{t-1}^{BU}}{E_{t-1}^{BU}}.$$

The *discretionary fiscal effort* (DFE DFE_t) resulting from the nominal difference between the expenditure variable and reference growth indicates their impact on the change in the proportion of expenses in GDP between years t and t-1. I define DFE in the same way as the European Commission (2013B) and Carnot and de Castro (2015), as the difference between growth rates divided by the GDP ratio of the expense indicator, as follows:

$$DFE_t = -\frac{\frac{\Delta E_t^{BU}}{E_t^{BU}} - \frac{\Delta_t^{pot} E}{E_{t-1}}}{\frac{Y_t}{E_t^{BU}}} = -\frac{E_t^{BU} - N_t^R - E_{t-1}^{BU}}{Y_t} + \frac{\frac{\Delta_t^{pot} E}{E_{t-1}} E_{t-1}^{BU}}{Y_t}$$

$$= \frac{N_t^R}{Y_t} - \frac{E_t^{BU} - E_{t-1}^{BU} - \frac{\Delta_t^{pot} E}{E_{t-1}} E_{t-1}^{BU}}{Y_t} = DFE_t^R + DFE_t^E,$$

where the reference growth of potential production is now defined as nominal $\frac{\Delta_t^{pot} E}{E_{t-1}} = \left(1 + \frac{\Delta_t^{pot} e_t}{e_{t-1}}\right) * \frac{P_t}{P_{t-1}} - 1.$. In the last breakdown, the indicator is further divided into the impact of revenue base changes (DFE_t^R) and the change in expenditure related to potential (DFE_t^E).

Subject to reservations due to the differences in the methods, both the DFE indicator and SB can measure the same cycle-independent change in the budgetary position. If the DFE indicator is positive by 1 percentage point, the growth rate of expenditure (with an adjusted expense aggregate and taking the revenue side into account), is estimated to be so slow that the budgetary position is strengthened on a discretionary basis by 1 percentage point.

The theoretical connection between the output gap-based SB and the DFE indicator defined by aggregated expenditures used in a bottom up assessment has been reviewed by the European Commission (2013B, box III.2.1) and Carnot and de Castro (2015, Appendix 1). In principle, the indicators are equivalent: During long-term growth equilibrium, where the elasticity of revenue and expenditure items are close to the averages estimated using the fixed elasticity method and economic growth remains stable, very similar results should be yielded by the different methods. However, differences may appear in the case of a large shock. Based on the breakdowns of the two indicators, it becomes apparent that the differences on the revenue side are explained by changes in expenditure elasticity in cycles (such as windfall revenue), deviations in income class proportions from their fixed shares according to the fixed elasticity method, and changes generated by potential output in the long-term ratio of revenue and GDP. Of the above, changes in cyclical elasticities associated with windfall revenue are by far the most significant explanatory factor according to Carnot and de Castro (2015). On the expenditure side, the differences are mainly explained by unemployment expenditure that cannot be directly attributed to cycles, differences in methods of measuring potential output, or interest expenses.

3. Results

I will now present the key observations. With regard to the output gap method, data and algorithms used are mainly from the European Commission's II/2014 forecast round. I will present the data for discretionary methods in subsection 2.3.[5]

3.1. Evaluations of structural unemployment and total factor productivity

In the following, I will first examine the method for calculating structural unemployment. The short-term state of the labour market can be assessed with the help of the New Keynesian Phillips curve, which describes the inverse proportion of (wage) inflation and unemployment. In principle, the connection to structural unemployment is clear. If inflation reacts clearly to an increase in cyclical unemployment, the detected connection can be reversed, and the increase in cyclical unemployment can be specified efficiently with the help of inflation. Thereafter, structural unemployment can be achieved by removing the cyclical part from detected unemployment. In practice, price stickiness in major economic crises due to anchored inflation expectations or pressures not to lower wages have turned out to be problematic with regard to the assessment of cyclical unemployment (IFAC 2013; Wren-Lewis 2013; Krugman 2013). If they are not sufficiently taken into account in the models – or if the models do not identify them correctly – the result may be oversized assessments regarding the development of structural unemployment. Based on changes in inflation, an increase in unemployment can be considered structural, although it would in fact be cyclically dependent. The output gap will be underestimated, as the increase in structural unemployment does not increase the output gap.

Explaining unemployment with the inflation indicator[6] used by the Commission would also have been problematic in Finland's case. There was no clear unambiguous connection between the variables, in particular during the crisis of the early 1990s (see the left panel in Figure 1). During the years of highest unemployment, strong inflation would have been required in order for such a connection to have been observed. This could not, however, be discerned on the basis of the data. The highest unemployment estimates were specifically for these years, based on the Commission's method (see the right panel in Figure 1). In addition, special attention should be paid to the parameter constraints used by the Commission that constrain the cyclically dependent change in unemployment forecasted by the model, insofar as the New Keynesian Phillips curve does not directly explain it. Using the restrictions could lead us to underestimate the amount of cyclical unemployment. I recommend that the parametrisation of the method used for calculating structural unemployment be changed to better correspond to a plausible model based on the literature and observations outside the model. When the restriction is removed, structural

[5] The policy report by Kuusi (2015) contains more details of the data and the estimation algorithms.
[6] The inflation variable is a change in unit labour cost that is equal to wage inflation less the labour productivity growth rate and the change in consumer prices.

unemployment increases more moderately during the crisis of the early 1990s (see the right panel in Figure 1).[7]

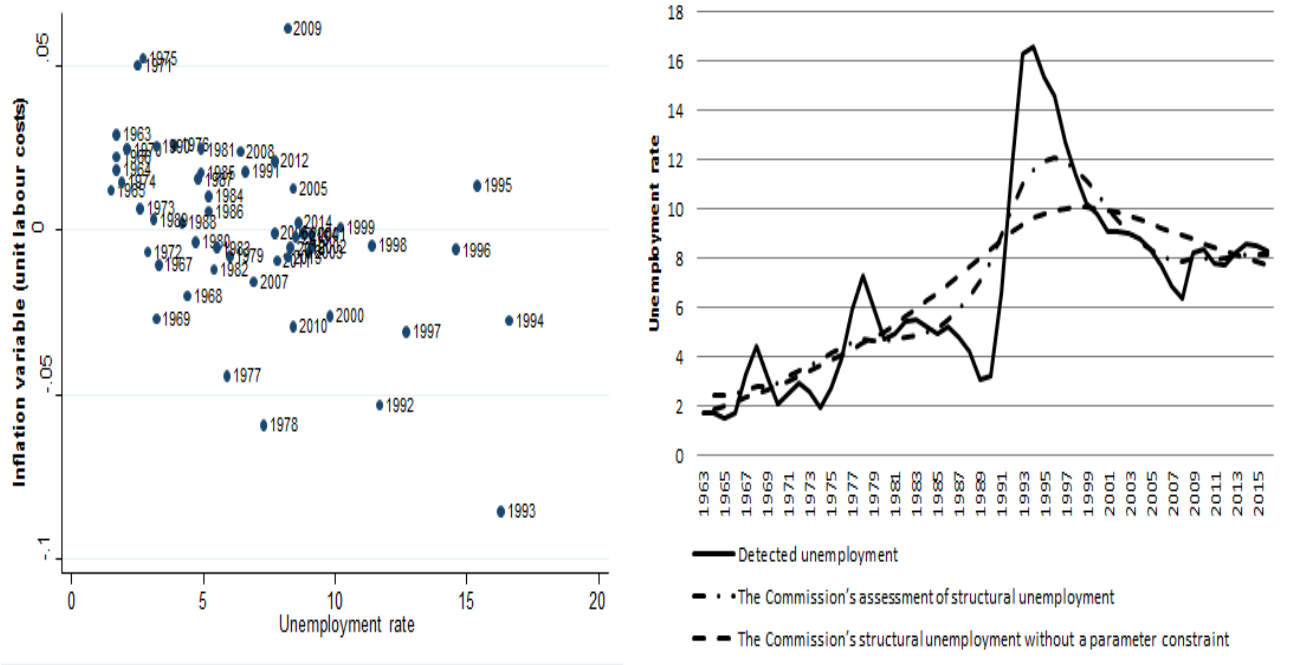

Figure 1

I have also examined the European Commission's assessments of structural total factor productivity. Figure 2 shows the natural algorithm of structural total productivity and an assessment of potential total factor productivity with the Commission's calculation method for 1980–2016. The dominant feature in the figure is the strong slowing of the total factor productivity growth rate after 2007. During the present crisis, the development of total factor productivity has been the main factor affecting potential output. For example, compared to the recession in the 1990s, the halt in total factor productivity growth has lasted significantly longer. Total productivity reached 1989 levels only a couple of years after the start of the crisis, whereas during the current crisis, total factor productivity was far from the 2007 level in 2014.

Reasons for the weak development of Finland's total factor productivity during the economic crisis have been searched for, particularly in the industry-level shocks that have hit the economy. It has been argued that the fall in total factor productivity is due to problems in the Nokia-driven ICT cluster and in the paper and mechanical engineering industries. On the basis of productivity growth from sector to sector, and when Finland is compared to Sweden and the United States, it appears that the rather gloomy assessments about the development of total factor productivity

[7] The development of Finland´s structural unemployment during the crisis of the 1990s has been assessed by Fregert and Pehkonen (2009), who summarise the results of the previous literature. Their conclusion is consistent with the presented unconstrained model: the increase in structural unemployment would have been approximately 4 to 6 per cent during the crisis, and would have begun to decrease very slowly during the recovery phase.

that have been calculated using the Commission's method are fair. When the development of the total factor productivity is examined in various periods of time in Finland, Sweden and the United States, for example, it becomes evident that the growth rate of total factor productivity have been on average very similar in the said countries in 1995–2014. Following the crisis, the strong growth effect of ICT prior to the economic crisis is stabilising in the Nordic countries to the same level with the United States.

Figure 2

3.2. Evaluations of the structural balance

When the gap estimates for different components have been calculated, they can be aggregated as an output gap in the economy. Measuring the structural budget balance used by the Commission is fairly straightforward. The estimated output gap is multiplied by cyclical elasticity (ϵ) and income is subtracted from the headline balance. I use the estimate of 0.57 provided by the Ministry of Finance in the spring of 2015 as the cyclical elasticity.

Figure 3 shows alternative structural balance estimates as well as a series of non-adjusted balance retrieved from the AMECO database. I have first calculated an ex post evaluation of a cyclical correction (an ex post evaluation of cyclically-adjusted structural balance) using the method

recommended in the report Kuusi (2015), that is, I based structural unemployment on an assessment in which the above-mentioned parameter constraint has not been used.[8] In addition, I evaluated the operation of the indicator in (quasi) real time, without information on future development of the variables that are used in the estimation. I calculate the estimate after constraining the data being used at different points in time.[9] I adjust the output gap estimate that I recommended, which does not contain parameter constraints, for key turning years in the economic cycle (1989, 1993, 1997, 2001, 2003, 2007 and 2009) by changing the ex post estimate of total productivity and structural unemployment to real-time estimates (real-time cyclically-adjusted balance). I will make the adjustment by removing the difference between the ex post estimate and real-time estimate of both components from the output gap. At the same time, I do not comment on the real-time cyclical adjustment of other output gap components, such as the participation rate. The GDP and nominal deficit estimates are also ex post.

Real time has a considerable effect on the indicator's functioning. When estimates of total factor productivity and structural unemployment are based on data which takes no account of the trend for future years, the structural balance proves to be considerably more procyclical.[10] In real time, the structural balance has deviated materially from the ex post estimate in two of the three expansions in recent decades (1989, 2000, 2007). The structural balance would be overestimated by approximately 1.3 percentage points with respect to three business cycle peaks, on average. In addition, the real-time structural balance underestimated the deficit component due to the economic crisis when the downturn of the early 1990s had already begun. For example, the 1993 ex post estimate of the structural contribution to the total deficit would have been approximately 35 per cent, while the real-time estimate would have been approximately 60 per cent.

The results suggest that the output gap method has limited capacity to predict cyclical changes in real time, and therefore, its use for steering fiscal policy could lead to a procyclical fiscal policy. On the basis of the figure, it seems that fiscal policy guided by an output gap-based SB would not have reacted in a contractionary manner during the economic upswing in the 1980s and early 2000s. On the contrary, the indicator would have permitted a fiscal policy that would have been more expansive than the actual fiscal policy, if it had been calculated without the future development of the economy that would be available later. Besides, an output gap-based SB indicator might have

[8] The suggested change in the calculation method of structural unemployment would have a positive effect of about 1 percentage point on the structural balance during the crisis of the 1990s. During the present crisis, the effect is not quite as great. For example, a change in the calculation method of structural unemployment in 2016 would have a positive effect of approximately 0.02 percentage points on the structural balance.

[9] To be precise, a genuine real-time analysis would require the selection – as data – of the time series actually in use during the year under scrutiny. As regards the unemployment series, the data is not revised ex post. However, later data or methodological changes may have influenced the inflation series. In addition, the Commission uses estimates for the next two years when measuring the structural deficit.

[10] However, when examining the recession at the beginning of the 1990s, it can be observed that ex post estimates are rather procyclical, particularly when a crisis has emerged. The budget balance weakened by nearly 6 percentage points within a few years when the crisis broke out at the beginning of the 1990s.

ignored the fairly strong contractionary measures in fiscal policy implemented in the crisis in the early 1990s, which could have led to even stronger contractionary measures in economic policy. In the next subsection, I will return in more detail to the importance of the observations in terms of fiscal policy.

It should be note that the real-time results presented are not without problems. Firstly, the real-time estimate of the present output gap may underestimate the accuracy of the Commission´s estimate, as the Commission uses forecasts of the trend for future years to support the estimate. If the forecasts are informative regarding cyclical change, they can improve the model´s accuracy. On the other hand, revisions may have taken place in the material used which are not taken into account by ex post cutting of the material. Finally, it should be noted that the assessment of the real-time gap does not take into account the effect of changes in other output gap components (such as participation).

However, earlier literature would seem to indicate that there are no major differences between realised forecasts and quasi real-time assessments such as the one presented here. Kuusi (2014) compared quasi real-time output gaps with the Commission's genuine real-time estimates, and the results achieved with the method did not significantly deviate from each other. The average difference in the output gap estimates was about 1/2 a percentage point in 2006–2012, which corresponds to about a 1/4 percentage point effect on the structural deficit. Virkola (2013) also examined the Commission´s revisions in respect of 2007 and observed that real ex post revisions to the output gap in Finland were on the same scale as the estimates currently shown, i.e. approximately 5 percentage points.

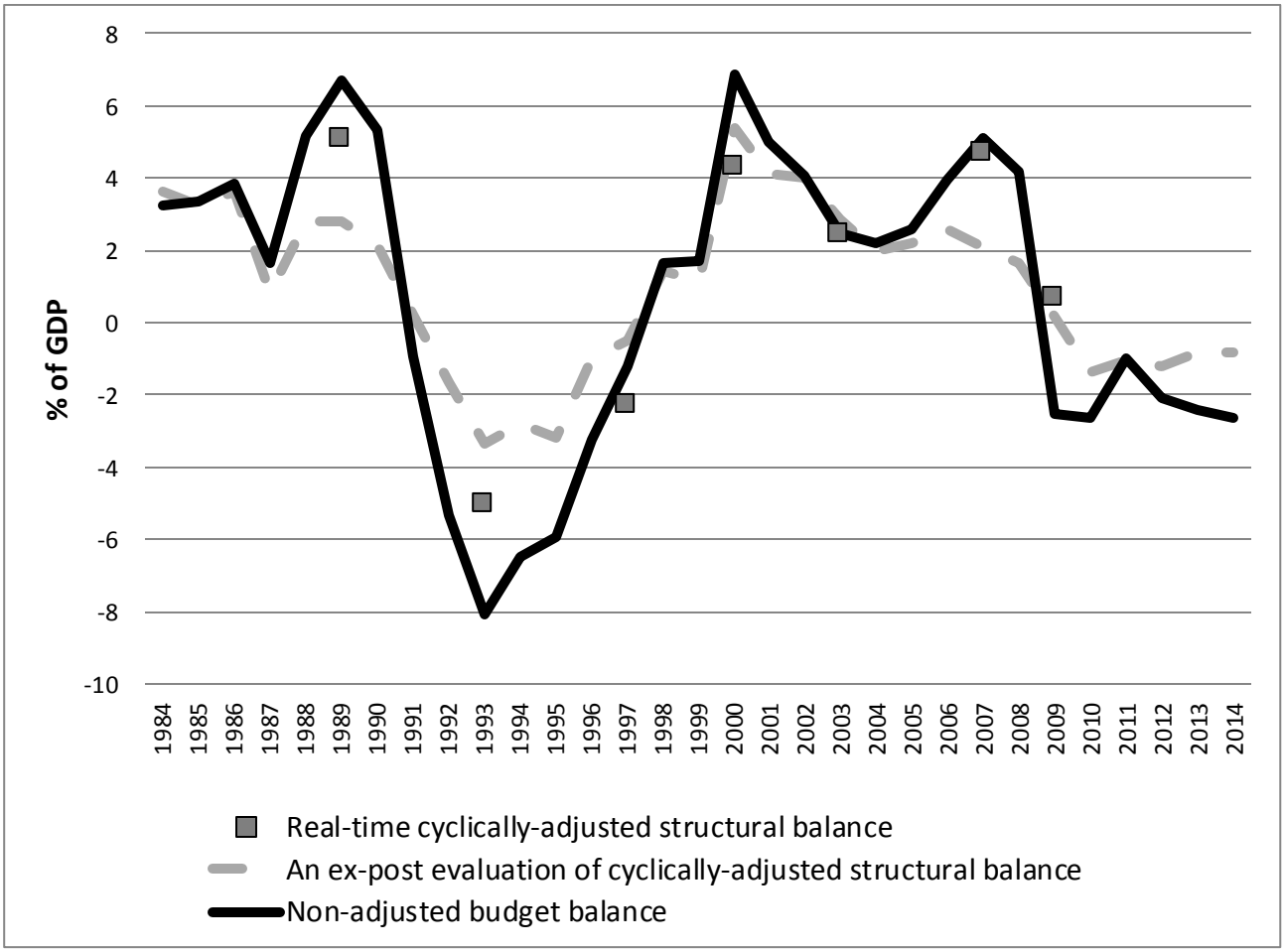

Figure 3

3.3. Discretionary alternatives and the regulatory requirements

Data

For a historical assessment of alternative indicators, we need information on revenue-related policy changes implemented in public finances (including central government, municipalities and social funds). With respect to central government finances, the data I have collected for this report contains information on the estimated effects of changes in tax policy as provided by the Financial Status Reports 1977–2002. After the year 2002, the reports are no longer available in the same form. Therefore, I have evaluated the changes in the tax policy against the government's budget proposals for 2003–2008. With respect to the period 2009–2014, I received the necessary information from the Ministry of Finance. The Ministry's data also includes information on various types of deductions concerning the whole public sector. [11] In addition to state taxation, I will

[11] I retained the inflation adjustments made to the income tax scale as part of the effects of the changes in the revenue base. In the subsequent analysis of discretionary fiscal efforts, this is compensated as the reference growth of expenditure takes inflation into account. I also examined various alternatives for the treatment of inflation, but they did not essentially affect the results.

examine the effects of policy changes made in general government finances. With respect to the period 2009–2014, I will use the evaluations of the Ministry of Finance. As for the preceding years, 1977–2008, I could not find direct estimates of the effects of changes made to the criteria for charges on revenues, so I used the observed changes in charge percentages as the basis for the effect estimates of the decisions.

I will evaluate local government finances' revenue estimates on the basis of changes in the weighted average local income tax rate and the real estate tax rate. I will calculate the euro-denominated effect of the change by multiplying the change in the tax base with the tax basis of the previous year, which in the case of local income tax means private income and in the case of real estate tax the taxable value of real estate. As for social insurance funds, I will evaluate the changes on the basis of the average social insurance contributions (employer's child benefit, accident, health, national pension, unemployment and TEL contributions and employee's unemployment and TEL contributions), expressed as percentages of the payroll. I will multiply the change in these with the previous year's total payroll.

The number of discretionary measures on the revenue side in my calculations corresponds fairly well to previous assessments (for more details, see the policy report by Kuusi 2015). Perotti (2011) assessed discretionary total changes on the revenue side with regard to Finland during the crisis of the 1990s. The calculations that have now been completed reinforce the impression presented in the article that the revenue basis had a major impact on the overall balance of public finances during the crisis. However, the results differ from the earlier evaluations by the IMF (see Perotti, 2011), according to which public finances were not adjusted by increasing revenues but by cutting expenditure. In addition, the Commission's figures for 2010–2014 from the AMECO database (UDMGCR variable) are also parallel with the estimates used in this work.[12]

Results

In Figure 4, I present assessments on the amount of discretionary fiscal efforts based on the bottom up method. I measure the number of discretionary measures with the cumulative framework of the DFE indicator specified above (see equation 4). By applying the said method, an increase of one percentage point in the DFE indicator improves the structural balance by one percentage point. The cumulative change, on the other hand, indicates the change in the budgetary position within a certain time period. I will focus here on assessments according to the bottom up method, as they do not use ex post data on the development of the economy. In that way, the presented method offers a real-time baseline for the SB.[13] For comparison, the figure

[12] In addition to the evaluation of changes in the revenue basis, I have collected other variables needed for the calculation of alternative discretionary measures that are described in more detail in the policy report Kuusi (2015).
[13] Based on the observations in the report, the expenditure aggregates, which were calculated differently and applied in both the expenditure benchmark and the bottom up evaluation, function similarly. The adjustment items for different types of expenditure have a relatively minor effect on the resulting interpretation of fiscal policy developments. On the other hand, the differences between the assessments are almost fully attributable to the used inflation variables. The numbers of discretionary measures in accordance with the expenditure benchmark are available in the policy report.

contains the real-time cyclically-adjusted balance and the non-adjusted balance presented in the previous subsection.

On the basis of Figure 4, a fiscal policy steered by discretionary measures could have become more countercyclical than a policy steered by SB.[14] During the economic upswings in the 1980s and the 2000s, the fiscal policy would have been stimulative when measured using a discretionary assessment. This observation could have enabled the use of a tighter fiscal policy, as well as the control of the overheating of the economy and the creation of a margin for recovery measures during the crisis. Before the outbreak of each of the two major crises, on the basis of the output gap method, the structural balance, as measured in real time by the output gap, was exceptionally strong, which could have enabled the continuation of a stimulative fiscal policy.

On the other hand, the tightening of the fiscal policy after the outbreak of the crisis in the 1990s is clearly visible on the basis of the discretionary indicator. In particular, the significant tightening on the revenue side of social insurance contributions explains the strong increase in the discretionary indicator. After the outbreak of the crisis, the measured fiscal policy was tightened rapidly from 1992 onwards and continued throughout the 1990s. The observation could have enabled the use of a more stimulative fiscal policy. When comparing the results to the development of the output gap-based structural balance as an ex post evaluation (see Figure 3), we can see that, on the basis of the latter, the tightening of the fiscal policy did not begin until after the mid-1990s.

[14] In the light of the results, it appears that a significant part of the differences between the indicators is attributable to assumptions related to potential output estimates and the cyclical adjustment of unemployment expenditure. Furthermore, it appears that during an economic boom, the differences are affected by the cyclical behaviour of income and, to some extent, the lack of interest expenses in the evaluation of discretionary fiscal efforts (see Kuusi 2015). These results are parallel with recent international observations (Carnot and de Castro, 2015).

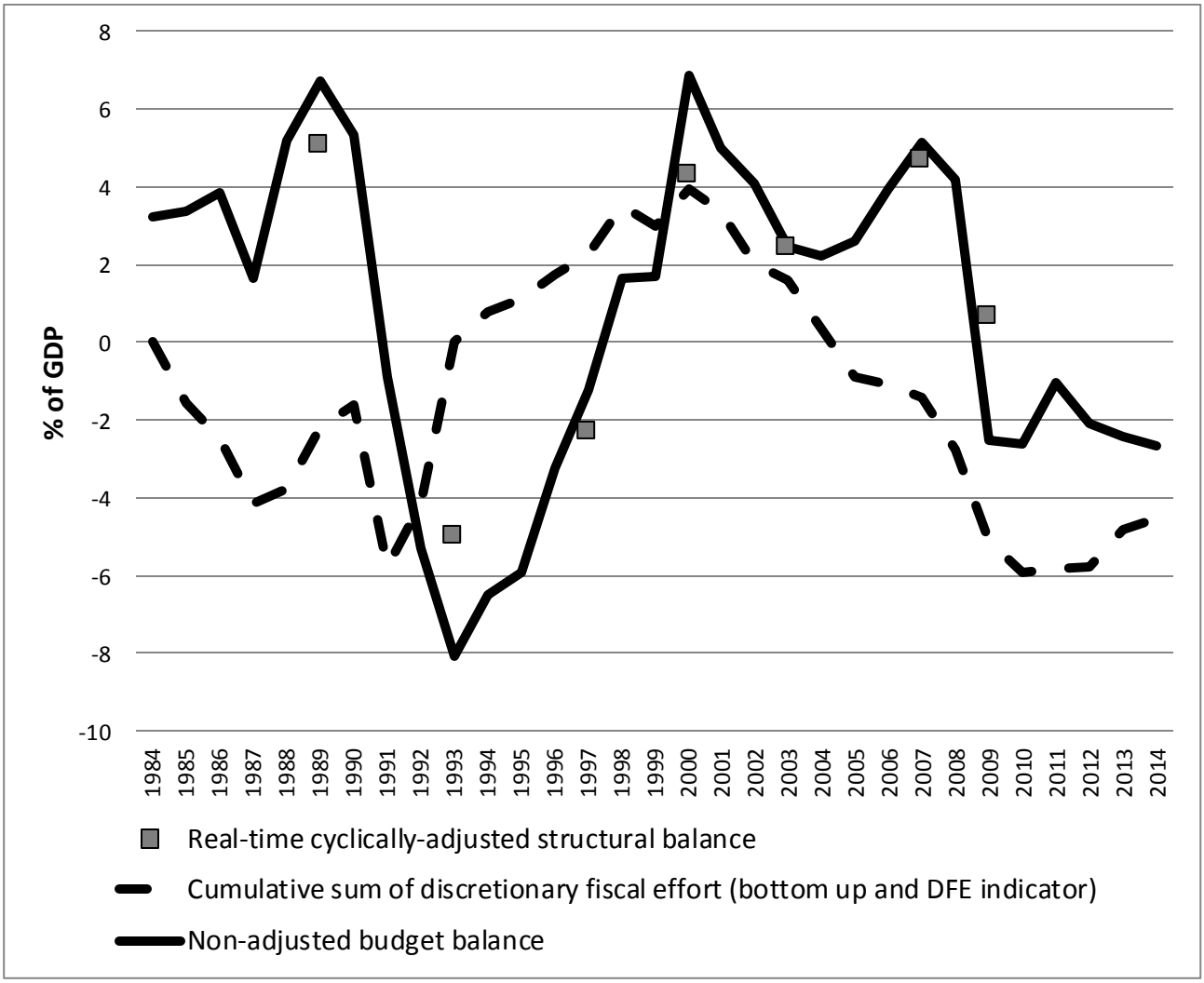

Figure 4

Measured by both indicators, the fiscal policy was stimulative at the initial stage of the present crisis, but from 2011 onwards, the indicators diverge again as the discretionary fiscal effort indicator suggests a 2–3 percentage point tightening of the fiscal policy in 2010–2014, whereas the ex post structural balance indicator shows hardly any signs of improved public finances (compare with Figure 3).

Finally, I collect the observations in the previous analysis, and examine the regulatory requirements that the country would have faced in different time periods. The rules are based on a summary of the criteria applied regarding deviations from the rules of the preventive and corrective arms of the SGP:

- Deviation in the preventive arm:
  - The deviation from the MTO in the previous year was more than 0.25 per cent of the GDP **and**

    - the nominal deficit does not exceed 3 per cent, i.e. the country is not subject to the corrective arm of the SGP[15] **and**
    - on the path towards the MTO, the structural balance improves by less than 0.5 percentage points **and**
    - the deviation from the path (ex post) is significant, i.e. at least 0.5 per cent of GDP **and**
    - the deviation is significant from the viewpoint of both the structural balance and the expenditure benchmark while taking account of the cyclical state in accordance with the guidelines of the European Commission (2015, appendix 2).
- Deviation in the corrective arm:
    - The nominal deficit exceeds 3 per cent **and**
    - the measures are not effective, i.e. the country is unable to adjust its budgetary position by at least 0.5 percentage points (structural balance adjustment path) **and**
    - the deviation from the path (ex post) is significant, i.e. at least 0.5 percentage points per year **and**
    - the deviation is significant in terms of both the structural balance and the bottom-up assessment.

The analysis shows that during economic upturns Finland would have achieved the MTO based on the real-time SB in many years, but at the same time would not have achieved the expenditure growth rate required by the expenditure benchmark, or would have been close to exceeding it. The major strengthening in the structural balance that preceded the crisis of the early 1990s and the current crisis could have allowed an expansion in the public finances. During both periods, the structural balance was rather strong as measured on the basis of both ex post and real time output gap estimates. At the same time, the expenditure benchmark might have imposed stricter limits on fiscal policy during the said years. Based on the expenditure benchmark, Finland's real growth in expenditure would have exceeded the medium-term real potential output growth rate in several years in both the early 1980s and the early 2000s.

Between the years 1993–1996, during which the legislation related to the corrective arm of the SGP could have been applied on the basis of the deficit criterion, Finland would not have reached the 0.5 percentage point adjustment requirement in the crisis years 1993 and 1995. Due to its fiscal policy in those years, Finland would have been unable to sufficiently adjust its structural deficit, and further measures might have been required. However, following a careful consideration based on the bottom-up indicator, it can be seen that a strong adjustment of the general government balance was implemented in those years.

Since the outbreak of the present crisis Finland would have breached the expenditure benchmark, whereas it would have achieved the MTO as measured by the structural balance indicator. Since 2010, fiscal policy has tightened as measured by the expenditure benchmark. However, based on the output gap-based structural balance, it seems that fiscal policy has not tightened and Finland has been fairly close to breaching the MTO. As regards the differences, however, it is worth noting that the medium-term potential output growth rate in line with the expenditure benchmark has

[15] Here, I abstract from the debt rule, as the debt level of the Finnish economy has remained below the 60% per GDP benchmark during the whole time period.

been slower than the reference growth rate applied. If this is taken into account in the expenditure benchmark, the expenditure aggregate development is not far from its reference values.

4. Discussion of the fiscal indicators

All in all, empirical analysis of the rules reinforces the impression of the limited capacity of the output gap method to predict cyclical changes in real time, and on the other hand, about the countercyclical effect of discretionary indicators. It seems that the fiscal policy based on the expenditure rule would have been contractionary during the lead up to the 1990s crisis, which could have helped to alleviate the crisis and increase the margin for recovery measures during the crisis. On the other hand, based on a discretionary bottom up assessment, the contractionary fiscal policy practised from 1992 onwards would have been sufficient, and unlike the output gap-based SB, the method would not have generated additional contractionary pressures. Also, in the present situation an assessment of the trend in Finnish fiscal policy, based on the discretionary expenditure benchmark, deviates somewhat from output gap-based assessments. An output gap-based structural balance would threaten to breach the limits of the EU's fiscal policy rules, but so far, on the basis of the expenditure benchmark, tightening in fiscal policy has been sufficient to compensate for the pressure – resulting from the weakened growth rate in potential output – to limit increases in expenditure.

The historical analysis raises several concerns regarding the use of the current fiscal measures. First, it seems that explaining unemployment on the basis of inflation may be problematic, especially in the case of major economic crises, like the Finnish Great Depression of the 1990s. In particular, the findings are consistent with the recent literature suggesting that the behaviour of inflation does not necessarily correspond to the Neo-Keynesian Phillips curve during major crises, even though it includes a delayed inflation term. For example, Stock and Watson (2010) are of the opinion that, in the US, an increase in unemployment does decrease inflation, but this effect wears off when a higher level of unemployment has lasted for 11 quarters. One of the underlying causes of this could be anchored inflation expectations, whose effects during the euro crisis are a topic of discussion, see for example Krugman (2013). Wage inelasticities (for example, pressure not to reduce nominal wages) can affect the relation between inflation and unemployment in such a way that it does not correspond to the Neo-Keynesian Phillips curve. (Daly and Hobijn, 2013). In Finland's case, there is clear evidence of fairly substantial wage inelasticity in the crisis of the early 1990s (Gorodnichenko et al., 2012).

Second, the meltdown in potential output during the present crisis is an outcome of the country's strong specialisation within export markets and of the weak competitive performance of some industries. While this paper does not find any systematic problems in the measurement of total factor productivity, the sector-specific nature of the crisis should nevertheless be more carefully taken into consideration in open economies like Finland. One way of developing the assessment

of potential total factor productivity is to examine it from the industry or sector level (cf. e.g. Pohjola, 2011; Kuusi, 2013; Fernald, 2014). The TFP methods should be devised allowing the systematic follow-up of potential trends in total factor productivity at industry level and aggregation of the results to give the total factor productivity potential of the economy and the total output gap.

Third, the expenditure benchmark and bottom-up assessment are not immune to measurement problems either. They should also be buttressed by an understanding of the medium-term output potential of the economy. Although the moving average for past trends and forecasts over the business cycle is less sensitive to cyclical changes, short-term positions may also be reflected in longer-term assessments. The Finnish current economic crisis is no exception, as the current conditions are bound to reflect upon the long-term growth expectations. Furthermore, independent economic analysis of the effects of various changes in policy is needed to back up the expenditure benchmark and the bottom-up approach. For example, any appraisals of the magnitude of the multiplier effect of fiscal policy – both during and outside crises – remain fairly contradictory. In terms of finding the neutral policy stance, the inflation variable of the expenditure benchmark and the bottom-up approach should be replaced with longer-term equilibrium inflation, in order to avoid changes in inflation or its forecasts having the effect of enhancing cyclicality. Both indicators allow for strong growth in expenditure during periods of high inflation, while during crises and periods of low inflation the need may arise to make additional cuts in public expenditure.

Finally, based on the functioning of the historical behavior of the SB, it is also problematic that the expenditure benchmark plays no clear role – independent of the structural balance and its calculation methods – in the EU´s fiscal rules. In determining the medium-term growth reference rate of potential output in accordance with the expenditure benchmark, the preventive arm of the SGP still relies on the fulfilment of the MTO. In fiscal policy legislation, if the MTO has been achieved in a certain year, the reference growth rate of expenditure is the long-term GDP growth. On the other hand, if the MTO has not been achieved, expenditure growth measured using indicators must be slower so that the deficit decreases by at least 0.5 percentage points per year.[16] This link is necessary, because the discretionary measures as such do not involve monitoring the objective level of fiscal policy, but only changes in fiscal policy. An alternative solution could involve tying the expenditure benchmark more closely to the debt level and to forecasts of its future trends based on sustainability calculations. Hughes Hallett and Jensen (2012), for example, propose a given limit for the indebtedness level below a GDP ratio of 60%, where exceeding such a limit would trigger preventive measures. Although the debt ratio is also sensitive to cyclical changes, it is not as prone to fluctuation as the (structural) deficit. On the other hand, we already have experience of cyclical adjustments of debt under the present rules.

[16] Furthermore, the measurement of the expenditure rule builds on the output gap-based assessments of cyclical unemployment.

5. Conclusions

The structural balance has played a central role in the EU's new fiscal policy legislation. In this study, I examine estimates of the structural balance from a historical perspective, using the European Commission's analysis method and comparing it to alternative fiscal policy indicators. The perspective adopted is that of recent Finnish economic developments between the years 1984-2014; a time period that includes the Finnish Great Depression of the 1990s.

The results of the study corroborate the view presented in earlier literature, according to which a structural balance is difficult to estimate using the output gap approach. Although the European Commission uses the latest statistical methods to assess the cyclical state of the economy, measuring the output gap in real time proves to be a difficult task in practice. The capacity of the output gap method to filter out cyclical fluctuations and measure cyclical phase effects on the budgetary position is limited, which may result in an under- or overestimate of the budgetary position, independent of the economic cycle. Particularly in the overheating phase of the Finnish economy in the 1980s and also in the deep economic crisis of the early 1990s, fiscal policy steering using the structural balance might have resulted in a more procyclical policy than the observed policy.

The results indicate that discretionary indicators (expenditure benchmark and bottom up assessment) are needed alongside structural balance. On the basis of the analysis, fiscal policy based on the discretionary measures could have been more countercyclical compared to the policy that is guided bythe output gap-based method. Therefore, assessments about the effects of individual policy changes and the development of the long-term economic growth potential must be used in steering fiscal policy, although there are challenges related to measuring them.

On the other hand, established ways of analysing the slackness in the economy with the help of inflation in particular should not be ignored, although methodological challenges have been encountered in applying them in practice. Long-term growth values calculated based on discretionary methods do not offer a reference point for assessing the cyclical position of the national economy, which is as clear as the inflation-neutral equilibrium unemployment used for measuring the output gap, for instance. However, it is necessary to develop the output gap method in this respect in order to improve its reliability.

Despite the development of indicators, a consensus about the fiscal policy stance or its best indicator will probably never be achieved. Various indicators are needed to support decision-making, although their use increases the complexity of fiscal policy rules and discretion related to the interpretations of the rules. However, it is certain that regardless of the problems brought forward, various fiscal policy indicators have a significant role in the steering of the policy now and in the future. In any case, using the cyclical corrections of the fiscal position is a better alternative to not using corrections at all.

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