ECB EZB EKT BCE EKP

THE FISCAL COSTS OF FINANCIAL INSTABILITY REVISITED

BY FELIX ESCHENBACH AND LUDGER SCHUKNECHT

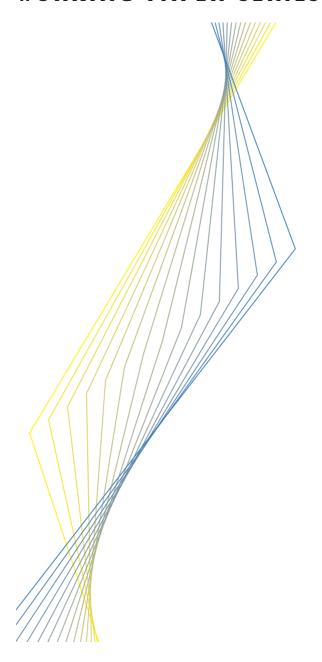**November 2002**

WORKING PAPER NO. 191

THE FISCAL COSTS OF FINANCIAL INSTABILITY REVISITED

BY FELIX ESCHENBACH AND LUDGER SCHUKNECHT*

November 2002

Contents

Abstract:

This paper conducts a comprehensive analysis of the fiscal costs of financial instability (defined as major asset price changes and including, as extreme cases, financial crises). The study identifies three channels to fiscal accounts: 1) revenue effects on capital gains, asset turnover and consumption tax, 2) bailout costs as asset price declines undermine balance sheets of companies/banks, and 3) second-round effects from asset prices changes via the real economy and via debt service costs.

A panel analysis and case studies show that episodes of financial instability increase the variability of fiscal balances. Moreover, fiscal costs are often very large and much larger than assumed in the literature so far with public debt rising by up to 50% of GDP during such episodes. These fiscal effects can also serve as a, so far under-emphasised, rationale for the deficit and debt targets in the EU's Maastricht Treaty and Stability and Growth Pact.

JEL codes: H3, H6, E6

Keywords: Fiscal policies, deficits, asset prices, financial stability, financial crisis

The Fiscal Costs of Financial Instability Revisited – A Non-Technical Summary

The sensitivity of fiscal balances to economic and non-economic shocks has received renewed attention since the introduction of deficit and debt limits in the EU with the Maastricht Treaty and the Stability and Growth Pact. By contrast, few studies have so far systematically analysed the relationship between asset prices, private financial balance sheets and financial instability on the one hand and fiscal balances on the other. Schuknecht and Eschenbach (2002) discuss and examine econometrically the revenue effects of asset price changes in industrialised countries. Caprio and Klingebiel (in their seminal 1996 paper) and Honohan and Klingebiel (2000) report the direct fiscal costs of bank bailouts in the context of financial crisis. This shortage of studies is surprising given that episodes of financial instability and crisis have coincided with some of the most serious deteriorations in fiscal balances in recent decades.

This paper attempts to provide a more comprehensive analysis of the fiscal costs of asset price changes and financial instability. It argues that major financial instability (defined as periods of large asset price swings) or even financial crisis (periods with financial instability and government support for the financial system) can also bring about significant fiscal instability.

To determine the fiscal effects of financial instability, the paper first analyses the transmission channels from asset price changes (via private financial balance sheets) to fiscal variables. We distinguish three main channels. First, asset price changes affect fiscal revenue via capital gains taxes and wealth-based taxes, via capital transaction taxes and via wealth effects on consumption and hence indirect taxes. These effects can result in much more volatility in fiscal balances than output fluctuations alone even without major financial instability. Second, asset price changes can undermine private sector financial balance sheets to such an extent that companies and/or financial institutions seek and receive government support. Thirdly, there are second round effects, whereby deteriorating/improving private financial balance sheets adversely/positively affect output via falling investment, employment and consumption which, in turn, affect public finances. Moreover, changes in fiscal balances affect the level of debt and, possibly, refinancing conditions, and thereby interest expenditure on public debt.

In a next step, the paper conducts a panel analysis on 20 OECD countries for the 1982-2001 period. Although the results do not provide estimates of fiscal costs in percent of GDP (a measure

that is much liked by the policy-oriented literature) they provide a first illustration of the relevance of the transmission channels and the sensitivity of fiscal accounts to financial instability.

Subsequently, the paper examines empirically the fiscal costs of major financial instability by conducting case studies of the boom-bust cycles in Sweden and the United Kingdom in the late 1980s to early 1990s. We identify those changes in revenue variables that cannot be explained by cyclical variations in output and discretionary fiscal policy measures alone. We argue that these unexplained residuals (which are strongly correlated with the boom-bust cycles) exacerbated the variability of fiscal accounts. The revenue effects together with the bailout costs of financial and non-financial institutions, the fiscal effects of the output loss during the "bust", and the increase in the interest burden are also argued to approximate the fiscal costs of financial instability and crisis in these two cases. Fiscal costs are estimated at around 15% of GDP in the UK and Sweden.

We also look at public debt developments as an alternative measure of the fiscal costs of financial instability in a number of financial instability episodes in industrialised countries. Public debt has been increasing by 10 to 50 percent of GDP during such episodes. We decompose this "gross" increase into denominator effects (due to lower growth) and numerator effects (on annual fiscal balances due to the three transmissions channels identified above). Even when adjusting such figures for denominator effects of lower growth, fiscal costs range from almost 10 to 32% of GDP. For both Sweden and the United Kingdom, the figures calculated in this manner are broadly consistent with those of the case studies. Both approaches show that the fiscal costs of bank bailouts alone are only a fraction of the full fiscal costs of instability.

In short, important asset price changes and financial instability can have major effects on fiscal accounts, raising the variability of fiscal accounts and the public debt ratio. These two features of many instability episodes provide further justification for the EU Stability and Growth Pact's deficit target of "close to balance or in surplus". The latter provides some safety margin for fiscal balance deteriorations (even if sometimes not enough to prevent large deficits). It also implies a continuous decline in public debt which, together with the Maastricht Treaty's debt ceiling of 60% of GDP, generates a safety margin against the potential threat to sustainability from large debt increases.

I.   Introduction

The sensitivity of fiscal balances to economic and non-economic shocks has received renewed attention since the introduction of a fiscal institutional framework including deficit and debt limits in the EU with the Maastricht Treaty and the Stability and Growth Pact. There is by now a considerable literature that examines the effects of economic fluctuations on fiscal variables and the budget balance (e.g., van den Noord, 2000; Bouthevillain et al, 2001). The design of the "close to balance or in surplus" clause is closely linked to the need for allowing cyclical fluctuations in budget balances due to automatic stabilisers and to contain overall deficit and debt. In addition, political economy variables such as elections, institutions, terms of trade shocks and special events (such as natural disasters or German unification) have helped explain fiscal balances and their changes (literature on political business cycles, fiscal institutions).

By contrast, few studies have so far systematically analysed the relationship between asset prices, private financial balance sheets and financial instability on the one hand and fiscal balances on the other. Schuknecht and Eschenbach (2002) discuss and examine econometrically the revenue effects of asset price changes in industrialised countries. Caprio and Klingebiel (in their seminal 1996 paper) and Honohan and Klingebiel (2000) report the direct fiscal costs of bank bailouts in the context of financial crisis. This shortage of studies is surprising given that episodes of financial instability and crisis have coincided with some of the most serious deteriorations in fiscal balances in recent decades.

This paper attempts to provide a more comprehensive analysis of the fiscal costs of asset price changes and financial instability, and in how far such episodes affect the variability of fiscal accounts. It argues that major financial instability (defined as periods of large asset price swings) or even financial crisis (periods with financial instability and government support for the financial system) can also bring about significant fiscal instability.

To determine the fiscal effects of financial instability, the paper first analyses the transmission channels from asset price changes (via private financial balance sheets) to fiscal variables. We distinguish three main channels. First, asset price changes affect fiscal revenue via capital gains taxes and wealth-based taxes, via capital transaction taxes and via wealth effects on

consumption and hence indirect taxes. These effects are analysed in detail in Eschenbach and Schuknecht (2002) who find significant such effects in many OECD countries. They can result in much more volatility in fiscal balances than output fluctuations alone even without major financial instability. Second, asset price changes can undermine private sector financial balance sheets to such an extent that companies and/or financial institutions seek and receive government support (Caprio and Klingebiel, 1996 & Honohan and Klingebiel, 2000). Thirdly, there are second round effects, whereby deteriorating/improving private financial balance sheets adversely/positively affect output via falling investment, employment and consumption which, in turn, affect public finances. Moreover, changes in fiscal balances affect the level of debt and, possibly, refinancing conditions, and thereby interest expenditure on public debt.

In a next step, the paper conducts a panel analysis on 20 OECD countries for the 1982-2001 period. We test for the three transmission channels of asset price and financial instability effects on fiscal balances and public debt. Although these results do not provide estimates of fiscal costs in percent of GDP (a measure that is much liked by the policy-oriented literature) they provide a first illustration of the relevance of the transmission channels and the sensitivity of fiscal accounts to financial instability.

Subsequently, the paper examines empirically the fiscal costs of major financial instability by conducting case studies of the boom-bust cycles in Sweden and the United Kingdom in the late 1980s to early 1990s. We identify those changes in revenue variables that cannot be explained by cyclical variations in output and discretionary fiscal policy measures alone. We argue that these unexplained residuals (which are strongly correlated with the boom-bust cycles) exacerbated the variability of fiscal accounts. The revenue effects together with the bailout costs of financial and non-financial institutions, the fiscal effects of the output loss during the "bust", and the increase in the interest burden are also argued to approximate the fiscal costs of financial instability and crisis in these two cases. Fiscal costs, according to this approach are around 15% of GDP in the UK and Sweden.

We also look at public debt developments as an alternative measure of the fiscal costs of financial instability in a number of financial instability episodes in industrialised countries. Public debt has been increasing by 10 to 50 percent of GDP during such episodes. We decompose this

"gross" increase into denominator effects (due to lower growth) and numerator effects (on annual fiscal balances due to the three transmissions channels identified above). The latter could be called the growth-adjusted debt increase that is due to financial instability.

In short, the study sheds light on fiscal effects of financial instability from a number of angles: the next section discusses the transmission channels. Section 3 presents a panel analysis of the relevance of these channels. Section 4 provides two case studies on Sweden and the United Kingdom. Section 5 analyses the fiscal costs of episodes of financial instability in terms of the related deterioration in the public debt position. Section 5 concludes by also discussing the role of deficits and debt limits as present in the EU's fiscal institutional framework.

II.   Asset Prices, Financial Instability and the Transmission to Fiscal Variables

In this section we discuss the transmission channels from changes in asset prices via private sector financial balance sheets to public finances.[1] We want to focus in particular on episodes of financial instability and crisis. The former are defined as periods of major asset price volatility where typically a period of asset price growth (boom) is followed by a major downturn (bust). The latter are defined as episodes where liquidity/solvency problems in the banking systems induce governments to provide public support (bailouts).

We will discuss three channels by which asset price changes and financial instability can affect fiscal variables; i) revenue channels whereby in particular capital gains and wealth-effect related consumption taxes are affected by instability; ii) bailout costs when governments decide to cover instability-related balance sheet losses; and iii) second round effects when asset price and financial balance sheet changes affect fiscal variables via second round effects on investment, consumption and employment.

Formally, these three channels can be represented as follows:

$$\Delta FB_p = (t_w)\Delta w + t_c(c_w(1 - t_w)\Delta w) + t_t\sigma w \quad + bailout(\Delta w) \quad + t\Delta Y(\Delta w) \quad + r\Delta b,$$

[channel 1   ]   [channel 2]   [channel 3   ]

---

[1] Of course it is not only asset price changes that affect private sector financial balances. Other factors include interest rates, exchange rates, etc. Nevertheless asset prices have the most direct effect and they are often also correlated with other variables. For example, higher interest rates typically result in lower asset prices and in higher debt service costs.

where FBp is the fiscal balance and the first three elements on the right of the equation reflect the revenue channel where t_w is the tax on changes in wealth/balance sheets Δw (following asset price changes and financial instability), $t_c c_w$ is the indirect tax revenue from wealth effect induced consumption, and t_t is the turnover tax on capital transactions. Bailout (Δw) stands for the takeover of balance sheet losses and $t\Delta Y(\Delta w)$ represents the tax revenue from second round effects. The increase in interest expenditure on growing public debt is reflected by the simplified term $r\Delta b$ (that does not reflect changes in financing conditions).

Note, however, that episodes of instability and crisis are only the extreme cases along a continuum of increasing instability. Or in other words, small instability with limited changes in asset prices and private financial balance sheets can also have effects on public finances. As asset price fluctuations grow, instability rises and the implications for private financial balance sheets become more important. Fiscal effects of such events also start becoming more important and more distinguishable from other influences on public finances. Hence, the fiscal effects of financial instability are best to be discussed along a spectrum of growing instability (see Fig. 1).
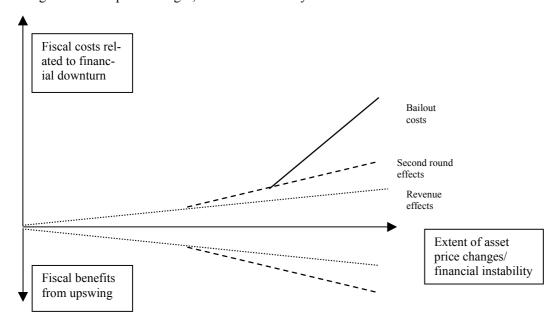
Figure 1: Asset price changes, financial instability and fiscal costs

a.   **The revenue channels**

Eschenbach and Schuknecht (2002) describe in detail the channels by which asset price changes can affect fiscal variables. First, asset price changes are likely to affect **capital gain/loss-**

related taxes. These are typically recorded as part of **direct taxes on households and corporations**.[2] Personal income taxes may be affected in four ways: if the capital gains from private asset sales are taxed, if asset price effects on profits and dividends feed into personal income taxes, if (taxable) rental income changes with asset prices, and if interest payments (e.g. on mortgages) are tax deductible. Revenue from corporate income taxes is also likely to be affected by asset price changes if related gains affect the taxable base. And given growing internationalisation of asset holdings, fiscal variables are not only affected by domestic asset price fluctuations and financial instability. A company holding assets abroad may have to pay tax on capital gains or may be able to write off losses against tax obligations at home.

Secondly, changes in private financial balances affect consumption and thereby **indirect taxes** via **wealth effects**. Household and firms feel richer when the value of their assets rises, even if they do not realize the profits, and confidence is likely to be affected positively. Moreover, credit-worthiness of households and firms improves as the value of collateral rises. These effects stimulate consumption and (less importantly for immediate tax effects) investment.[3]

Thirdly, governments often draw revenue from transactions in assets, in the form of **turnover taxes**. These taxes are important especially regarding real estate transactions and can reach a noticeable share of total revenue. To our knowledge, there is no industrial country that does not tax real estate transactions while many countries have abolished stock turnover taxes in recent years.

As these channels are based on the tax system they are likely to arise already for small asset price changes. Effects become more important as asset price changes and financial instability increase. However, as countries' tax systems differ, such effects have also been found to differ considerably across countries, depending on tax bases and rates. Moreover, the more capital/assets are taxed, the more dispersed ownership of assets and the more frequently tax bases are adjusted to changing market values of the assets, the higher the likely fiscal effects of asset price changes. Finally, revenue effects from financial instability are likely to be more or less symmetric, i.e., rising asset prices and improving financial balances will improve fiscal balances and vice versa.

---

2 In principle, wealth taxes could also be relevant, but they have become unimportant in most industrialised countries.
[3] Recent literature has given more attention to wealth effects across assets and countries. See , for example, Case, Quigley and Shiller, 2001; Lettau and Ludvigson, 2001; or Ludwig and Slok, 2002.

Eschenbach and Schuknecht (2002) find that a 10 percent change in stock and real estate prices affects the fiscal balance by on average 0.4% of GDP in most industrialised OECD countries with values ranging from 0.1 and 0.8 % of GDP depending on the country.

b.   Bailout costs

Asset price changes can by themselves or in conjunction with other adverse developments (such as higher interest rates, higher taxes) undermine the soundness of private financial balance sheets to the extent that agents (companies, households) have negative equity and become illiquid/insolvent. If agents cannot (or become unwilling to) service their loans, this could generate non-performing loans in financial institutions, thereby, undermining the net-worth of banks as well. If asset price declines take on major proportions and are coupled with corporate and/or financial sector difficulties, this degree of financial instability can give rise to additional significant fiscal costs to the government. These arise from helping out insolvent companies and banks. If an asset price fall results in difficulties for the corporate sector, the government may be burdened by called-up guarantees on loans. If the industry is important for political reasons (say as an important regional employer), the government may be inclined/pressured to provide subsidies or other types of emergency assistance. Most importantly perhaps, the government may have implicit or explicit contingent liabilities in the financial system. Individual banks "too big to fail" or systemic risks to the whole financial system can make it impossible for a government to avoid a "bail-out". Such costs can be very significant in quantitative terms and have reached double-digit shares of GDP in many emerging market and developing countries in the past (Caprio and Klingebiel, 1996).[4]

However, such bailouts typically affect public finances through other channels than revenues. They can take the form of budgetary subsidies which are paid directly to companies to stay afloat. Alternatively, governments can give out guarantees which can be called-up later (thereby possibly postponing the visible costs). Financial transactions instead of budgetary measures are often employed to recapitalise banks and companies. One possibility for governments is to purchase newly issued capital (equity injections). This activity would be recorded as a financial transaction

---

[4] Conceptually, bailouts of balance-sheet losses are equivalent to taxes on capital gains. The difference is mainly the ad hoc nature of the extent and timing of a bailout (as compared to an "orderly" deduction of balance sheet losses in income tax statements of corporations).

that raises public debt but not the deficit. Alternatively, governments can purchase bad loans via a holding company. After completion of its task the holding company can be liquidated (or recapitalised) with the government footing the bill. If the holding company is liquidated, governments may book its losses as a debt takeover which raises public debt but never affects the deficit. Only when the recapitalisation is regularised in the budget (e.g. under subsidies) will it raise the deficit.

The Asian crisis of the late 1990s but also financial crisis in some industrial countries have painfully exposed the importance of asset price boom and bust cycles in contributing to financial sector difficulties and subsequent large and costly public bail-outs.

It is worth noting that fiscal policies and the rules governing bailouts affect the likelihood that such costs arise (Gropp and Vesala, 2000). Many observers claim that--in the absence of clear rules--implicit government guarantees in the financial sector exacerbated the boom-bust cycle and financial sector problems in the Asian crisis. The latter had given rise to excessive risk taking by banks, households and firms. As households and firms had easier access to credits, asset prices rose more than they would have in the absence of "easy money". Similarly, the prospect of a "bail-out" for "politically important" companies (e.g., housing and building companies) can also lead to moral hazard which, in turn, can affect asset prices.[5]

c.   Second-round effects

There are also likely to be second round effects on fiscal variables, particularly when significant financial instability feeds back into the macroeconomy. For example, when house prices rise and agents feel richer they consume and invest more (first round effects on revenue as discussed above). This will raise output which feeds back into employment and further consumption. This in turn will boost direct and income tax receipt while lowering unemployment related outlays (second round effects). A major asset price downturn is likely to have the opposite effect. Agents feel poorer (i.e. they have a lower net worth and hence less collateral), adjust their consumption and investment activity downward, with adverse effects on public finances.

---

[5] Fiscal policies also affect asset prices via the tax and subsidy system (for a short discussion, see Eschenbach and Schuknecht, 2002).

Adverse second round effects on economic activity can also arise via the credit channel. Asset price volatility makes it more difficult for lenders to screen out good from bad borrowers as the net worth of a company (an indicator of creditworthiness) is highly volatile and may even become negative. Moreover, a stock market decline, for example, could leave borrowers with little (net worth) to lose and therefore become reckless at the lenders expense. These adverse selection and moral hazard problems would lead to a contraction in lending and economic activity (Mishkin and White, 2002).

These second round effects can have an even more pronounced effect on the public debt ratio as higher deficits raise public debt (numerator effect) and lower output reduces the GDP against which debt is assessed (denominator effect). As a result of a higher debt ratio, the public interest burden is likely to rise as well. This effect is magnified if in a situation of instability, a large share of existing debt needs to be refinanced and if the refinancing conditions deteriorate.[6]

Here, the fiscal impact of bailouts on first and second-round effects is worth discussing briefly. On the one hand, the costs of bailouts are likely to be significant. On the other hand, bailouts can help repair companies' or banks' balance-sheets. Thereby, they help re-establish a company's ability to pay taxes more quickly than in a scenario when losses have to feed fully through corporate and bank balance sheets. Moreover, second round effects are likely to be smaller. Especially if the financial sector is bailed out so that balance sheets are repaired more quickly, output-enhancing lending is likely to resume earlier. In this regard, figure 1 is not quite precise as higher bail-out costs may offset partly first and second round effects on revenue. This trade-off, however, is unlikely to apply when a bailout undermines the sustainability of public finances and private agents start adjusting their consumption and investment decisions accordingly.

Finally, it is worth noting that along the spectrum of instability, the relevance of the different transmission channels differs. Some revenue effects are relatively immediate and automatically linked to asset price and financial balance changes.[7] Second round effects and bail-out costs only "kick in" once (probably country and case dependent) threshold values of instability are exceeded.

---

[6] Financing conditions for Swedish public debt, for example, deteriorated significantly during this country's financial turmoil of the early 1990s.
[7] But the effect of such limited instability may be hardly measurable and distinguishable from cyclical effects, discretionary measures and other "noise" that affects fiscal variables.

III. A panel analysis of the effects of asset prices and financial instability on fiscal accounts

A panel analysis for 20 OECD countries for the 1982-2001 period can illustrate the importance of asset price changes, financial instability and bailout costs for public deficits and debt. We will hence estimate the following linear models with fixed country effects:

a) $\Delta \text{deficit} = \alpha X + \beta Y + \varepsilon$

b) $\Delta \text{debt} = \alpha X + \beta Z + \varepsilon$

The variables Δdeficit and Δdebt stand for the change in general government deficit and total debt, scaled by GDP. X is a vector of n-1 country dummies and a constant needed for a fixed effects model. Y is vector of variables that is assumed to determine general government deficit changes. It includes real output growth, changes in interest expenditure (in percent of GDP), asset price changes (stock and property price variables, deflated), and bailout dummies. Z is a slightly modified version of X and includes deficit instead of changes in interest expenditure and a different property price variable. The data are annual (for further details see the Data Appendix).

The change in the deficit and debt to GDP ratios are argued to be significantly correlated with real growth. This reflects the effect of cyclical fluctuations of the economy and (unfortunately inseparably) also the above-described second round effects on the deficit and (via the deficit) on public debt. Second, variables reflecting the change in real estate and stock prices estimate the direct effects from asset price changes and financial instability on revenue. We apply two types of variables, (i) the rate of change in the (CPI-adjusted) asset price variable and (ii) a dummy when the asset price change is very large (i.e. over 10%/25% in real terms in one year for real estate/stock prices).

We also introduced a number of dummy variables reflecting years where governments bailed out banks in the sample countries. Finally, the change of deficit estimation includes a public interest expenditure variable, reflecting changing debt-service costs. The estimation of debt developments includes the deficit as independent variable, as this determines the numerator of the debt ratio development.

The results confirm our hypotheses on the links between asset price changes, financial instability and fiscal accounts. Table 1 gives an overview of our regression results, with coefficients, t-values in brackets, and significance levels marked by asterisks. Columns 1 through 3 suggest that coefficients of the growth variable are significant in explaining the change in the deficit ratio. The magnitude of the coefficient is broadly in line with budget elasticity estimates elsewhere in the literature. Changes in the interest burden are also found to significantly affect the change in the deficit. Adding variables reflecting stock price changes and major real estate price declines significantly improves the overall model fit. The fact that only major declines in property prices (rather than the regular property price variable) are significantly correlated with changes in the deficit ratio may be due to the fact that capital loss deduction and wealth effects on consumption only become relevant above a certain threshold level of real estate price changes. In column 3, adding the Swedish bailout episodes proves relevant, also positively affecting different measures of model fit.[8]

Columns 4 through 6 display parameter estimates for the model with the change in debt as the dependent variable. Growth and deficit are confirmed to be driving factors of debt changes. There seems to be some additional impact from asset price changes beyond what's incorporated in the deficit. Most bailout dummies also perform well, consistent with the hypotheses that bailouts may be regularised only with a lag (or not at all) in the budget, but immediately affect the debt to GDP ratio.

Columns 7 and 8 replicate the models estimated in columns 3 and 6, using two-stage least square as estimation technique. This takes account of the fact that growth may be jointly determined with fiscal positions as it may be affected by automatic stabilisers and discretionary fiscal policy measures. We use a number of instruments including the lags of growth and find that the coefficients of OLS regressions are confirmed while the significance level of coefficients declines marginally.

In sum we find support for the above formulated hypotheses, even though the results should be seen mainly as illustrative evidence of the relevance of our claims and as an introduction to the following case studies.

---

[8] This is consistent with the treatment of bailout costs as discussed in the next section.

Table 1: A Panel Analysis of Asset Price and Financial Instability Effects on Fiscal Accounts

Model type	Linear OLS fixed effects			Linear OLS fixed effects			Linear two-stage (TSLS) fixed effects	
Dependent variable	Change in deficit			Change in debt			Change in deficit	Change in debt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent Variables							Instruments: 1st & 2nd lag of output growth + all other indep. vars	
Real output growth	0.36 (8.25)**	0.31 (6.7)***	0.29 (6.5)***	-0.79 (-9.1)***	-0.76 (-7.6)***	-0.69 (-7.4)***	0.26 (3.5)***	-0.75 (-3.6)***
Change in interest bill	0.40 (3.69)**	0.35 (2.9)***	0.34 (2.9)***				0.35 (3.0)***	
Deficit				-0.82 (-16.3)***	-0.76 (-12)***	-0.72 (-12)***		-0.71 (-11)***
Change in stock prices		0.96 (2.9)***	0.84 (-2.6)***		-1.52 (-2.13)**	-0.98 (-1.5)	0.87 (2.6)***	-0.89 (-1.26)
Change in property prices					-0.04 (-1.33)1/	-0.04 (-1.6)*1/		-0.04 (-1.41)1/
Strong decline Prop. prices		-2.04 (-4.7)***	-1.50 (-3.3)***				-1.59 (-3.2)***	
Finland 92			-1.76 (-1.17)			12.74 (4.4)***	-1.88 (-1.2)	12.51 (4.3)***
Japan 99			-1.16 (-0.81)			3.99 (1.44)	-1.20 (-0.8)	3.95 (1.42)
Norway 86			-2.48 (-1.17)			10.95 (4.0)***	-5.22 (-3.7)***	10.94 (4.0)***
Sweden 92			-4.51 (-3.0)***			11.24 (4.0)***	-4.55 (-3.0)***	11.08 (3.9)***
Sweden 93			-5.22 (-3.7)***				-2.56 (-1.68)*	
R^2 adj.	0.17	0.27	0.32	0.60	0.60	0.66	0.32	0.66
No. of obs.	374	301	301	379	292	292	300	292

1/one period lagged, *, **, *** = significance at 90, 95, 99 % level

IV.   Two case studies: Sweden and the United Kingdom

The fiscal effects of asset price changes and related financial instability can be studied in a number of ways. Eschenbach and Schuknecht (2002) focus on the first round effects on fiscal revenue as described above when conducting an econometric analysis for 17 OECD countries. Episodes with very significant financial instability, however, are perhaps better studied as case studies to cover all channels and the unique features of each episode. We chose Sweden and the United Kingdom to analyse the interaction between financial instability and public finances via asset price effects on private financial balances and fiscal variables. We find that fiscal balances first improved and later deteriorated much more than what can be explained by cyclical influences and discretionary policies alone. Note that this was the case in both Sweden and the United Kingdom,

even though only in Sweden financial instability resulted in a full fledged financial crisis with a government bailout of the banking system.

In the following sub-sections, we will first provide evidence on the boom-bust cycle in the late 1980s-early 1990s in these two countries. Subsequently, we estimate the first-round fiscal implications of the asset price boom and subsequent bust on the Swedish and British public accounts. We look at various revenue categories and calculate the residual between actual revenue developments and what can be explained with the help of cyclical developments and discretionary policy measures. In the case of Sweden, the budgetary costs of bank support (bailout costs) were taken into consideration as well while in the UK such costs did not arise (despite the significant financial instability and private financial balance problems as outlined below). Finally, we will approximate second round fiscal costs via the fiscal effects of the bust related output loss and put these together with the fiscal effects via the other two channels. We find significant fiscal costs in both cases in the order of 13-14% of GDP, as compared, for example, to bailout costs in Sweden of about 4% of GDP.

a. A "Boom Bust Cycle" in Sweden and the United Kingdom

Both Sweden and the United Kingdom experienced strong growth in the second half of the 1980s accompanied by significant increases in house and stock prices. This period was followed by years of low and even negative growth accompanied by a sharp reversal of stock and real estate prices in the early 1990s (Charts 1-3, see end of document). The cumulative output loss as compared to trend growth during the "bust" in Sweden amounted to over 10% of GDP and to almost 7% of GDP in the United Kingdom.

Table 2: Sweden, Real After Tax Interest Rate in Selected Years

	1980	1989	1991
1. Nominal interest rate	14.0	14.0	14.0
2. Tax effect	8.7	6.6	4.2
3. Interest rate after tax (1.-2.)	5.3	7.4	9.8
4. Inflation rate for coming year	12.3	10.2	2.6
5. Real rate of after tax interest (3.-4.)	-7.0	-2.8	7.2

Source: Agell, Englund, Soedersten (1998)

For Sweden, a relatively detailed account of the factors underlying financial instability and the reversal in asset prices is available. As shown in Table 2, real interest rates increased significantly between 1989 and 1991. This increase was particularly pronounced for house purchases on credit for which the real after tax interest rate increased by about 10 percentage points between 1989 and 1991 (Agell, Englund, Soedersten, 1998). Throughout much of the 1980s, low real interest rates and generous tax deductibility of interest payments caused the after tax interest rate to be negative for house purchases. Lax lending practices resulting from increased banking competition and from inappropriate prudential regulation and supervision appears to have contributed to the bubble in the housing sector. Between 1989 and 1991, however, Sweden first raised interest rates to defend its fixed exchange rate regime, and subsequently (after the exchange rate was floated) kept interest rates high to reduce inflation. At the height of the boom, the government tightened the tax deduction regime and, thereby, also raised the real after tax interest rate. A reduction in specific housing subsidies exacerbated this effect.[9] Figure 2 contains a simplified illustration of the transmission channels from fiscal and monetary policies to asset (and in particular real estate) prices which caused the Swedish "bubble" to burst. The strong asset price adjustment put significant pressure on corporate and financial sector balance sheets. A financial crisis emerged, and the government had to provide significant support to troubled banks (see Jonung, 1994 and Jonung, Soderstrom and Stymne, 1996 and Jonung and Stymne, 1997 for a more detailed discussion).

Figure 2: Sweden, Factors Contributing to Bursting of Asset Price Bubble

_____

[9] The relative importance of monetary, fiscal and other policies in the propagation of the Swedish boom-bust cycle is difficult to judge, though monetary and financial deregulation related policies seem to have been most relevant. For detailed quantitative information about the 1990/91 tax reform see Kristofferson (1995).

In the case of the United Kingdom, the sequence of "boom" and "bust" in real variables and asset prices is similar to the Swedish case as the earlier charts illustrate. Striking similarities can also be noted with respect to economic policy. After the mid-1980s, monetary policies became more accomodative (as monetary policies became exchange rate oriented) and resulted in significant money growth. Following German unification in 1990, however, interest rates increased strongly.

As for fiscal policy, the objective of the tax measures was initially twofold: The overall tax burden was to be shifted towards indirect taxes in order to reduce distortions in the economy. On top of that the government was aiming for a balanced budget, to be achieved mainly through expenditure cuts. This restrictive stance was relaxed towards the end of the 1980s. To make up for tax losses in the downturn of the early 1990s, some tax cuts were reversed. Mortgage interest relief was limited to the basic rate of income tax in 1991 while previously, the government had strongly subsidized private house ownership. Like in Sweden this policy shift exacerbated the price decline in the real estate market.

However, while lose monetary and later also fiscal policies seem to have contributed to the boom and subsequent tightening to the bust, instability did not result in a financial crisis. Nevertheless, private financial balances were severely strained and for a number of years many households, for example, were reported to have negative equity (house value was less than the mortgage) which in turn depressed consumption and investments.

b. Fiscal effects via the revenue channels

As discussed above, asset prices and financial instability are likely to affect capital-gains taxes, turnover related taxes and indirect taxes. In the following we will calculate the revenue that we would have expected on the basis of "normal" cyclical elasticities and the effect of discretionary policy changes for the 1985-93 period (up to 1997 in the case of the UK). We then compare the findings with actual revenue. We argue that the unexplained residual is likely to be (at least partly)

due to asset price changes and financial instability as the residuals are strongly correlated with the asset price cycle.[10]

Calculations over time and revenue categories are based on the following formula:

Boom: **Bust:**

$$\sum_{i=85}^{90} Tres_{ij} = \sum (Tact_{ij} - Tpred_{ij}) \qquad \sum_{i=91}^{93/7} Tres_{ij} = \sum (Tact_{ij} - Tpred_{ij})$$

where:

$$Tpred_{ij} = Tpred_{i-1,j} * [1 + (\frac{base_{ij} - base_{i-1,j}}{base_{i-1,j}} * e_j)] + Tdis_{ij}$$

Tres = residual revenue
Tact = actual revenue
Tpred = predicted revenue (base year where Tpred=Tact is 1984)
Tdis = effect of discretionary measures
Base = tax base
e = elasticity of tax revenue with respect to base
i = period
j = tax category

The effects of asset prices on revenue will be presented in two ways. We will first calculate the cumulative positive/negative effect on revenue from asset price changes for each revenue category and as a total over all four categories for both countries. We will then present the fiscal balance path as it actually occurred and as we conjecture it would have occurred, had asset price effects been absent (in the case of Sweden including bail-out costs from the financial crisis).

Direct household taxes. Starting with Sweden, the asset price boom of the late 1980s resulted in significant accrued and realised capital gains. This, in turn, boosted direct household

---

[10] "Elasticities for different fiscal categories are based on international organisation estimates and are assumed to have been constant over the observation period. These and data sources for the case studies are reported in Annex Table 1. Details on the fiscal effects of Swedish discretionary measures can be found in Swedish Ministry of Finance (1989 and 1995 (2)) and Kristofferson (1995). For the period after 1993, such data was not available so that the Swedish case study does not consider later years. In the United Kingdom, data on discretionary measures was taken from the annual budget documents. For data underlying the subsequent analysis and for an account of Sweden's tax reforms, see Annex Tables 1 and 2. Note, however, that residuals may also capture other factors: elasticities are not necessarily stable over time. Income tax elasticities in particular might have been higher during the boom due to strong tax progressivity and lower in the downturn. While this might reduce the overshooting and undershooting of household taxes it cannot explain the same pattern in other tax categories.

taxes as realised capital gains increased the tax base and were taxed at the marginal tax rate.[11] Table 3 reports that by 1989, five percent of factor income was due to realised capital gains. Although accrued capital gains became negative from 1991, the carry over effect from buying more "cheaply" in the past still resulted in some capital gains revenue in 1992. We hence expect that capital gains related revenue peaked in 1989/90 and then fell.

Unfortunately, Sweden does not report detailed data on capital gains related revenue. Therefore, we applied the above-mentioned methodology and calculated the residual between the expected and actual direct tax revenue. The expected revenue was calculated from the change in the base (compensation of employees), the cyclical elasticity and discretionary policy changes. We find that annual revenue overshooting (i.e. revenue above what could have been expected from cyclical and discretionary factors alone) reached up to 1.1 percent of GDP in 1988 (Table 4a, see end of document). Rising interest rates thereafter probably increased household tax deductions and depressed revenue—despite continued positive capital gains.

Table 3: Sweden, Composition of Aggregate Factor Income and Share of Accrued Capital Gains (in % of Factor Income)

Income categories	1980	1985	1989	1991	1992
Wages	89.6	87.3	85.7	87.1	88.9
Entrepreneurial income	3.4	3.8	3.0	2.2	2.0
Interest and dividends	6.2	7.8	6.3	5.8	6.7
Realized capital gains	**0.8**	**1.0**	**5.1**	**4.9**	**2.2**
Factor income	100.0	100.0	100.0	100.0	100.0
Accrued capital gains	**-13.1**	**2.0**	**22.3**	**-3.9**	**-23.2**

Source: Agell, Englund, Soedersten (1998)

Cumulative revenue overshooting in this category amounted to 3.3 percent of GDP for the 1985-90 period. In the subsequent downturn, revenue undershot the projected level but only slightly. This is probably at least partly due to the fact that realized capital gains stayed positive at until 1992.

---

[11] Before the 1990/91 tax reform personal income taxation was global, i.e. labour and capital income (also realised capital gains) were taxed jointly at the same rate of the progressive tax schedule. In this system negative capital income, i.e. interest payments, was deductible from labour income and thus reduced the marginal tax rate. This mechanism worked like a subsidy and stimulated household borrowing. In 1990/91 there was a major change, implying that negative capital income tax (i.e. the individual reported a capital deficit) was deducted from the overall tax liability and not from labour income. Positive capital income was to be taxed at a uniform rate of 30 per cent. This means a change from global to dual taxation of labour and capital income.
Note also that the Swedish experience shows the possible adverse revenue effects of ill-conceived tax increases. Instead of raising revenue, the tax reforms lowered revenue at least temporarily via exacerbating the asset price fall in the bust. However, it is not clear and probably unlikely that enough of the asset price fall was due to fiscal changes so that one could talk of a Laffer curve phenomenon.

For the United Kingdom (Table 5a, see end of document), we can observe a similar pattern of over- and undershooting with the latter more pronounced than in the case of Sweden. Revenue exceeded what could have been expected by a cumulative 3 ¼ percent during the boom and undershot it by 2 ½ percent in the subsequent downturn.

Corporate income tax revenue in Sweden results from a flat rate which has been reduced several times between 1980 and 1991 along with broadenings of the tax base. Before 1990 not only realized but also accrued capital gains were taxed. This explains to some extent why corporate income tax revenue for 1985-1990 exceeded the expected value by a very high 3.1 percent of GDP (compared to the base, gross operating surplus). This is indicative of strong effects outside operating surplus, i.e. capital gains, boosting revenue. Overshooting peaked in 1989 at 1.1 percent of GDP (Table 4b). Between 1990 and 1993, the corporate income tax "overshooting" was more than reversed and undershooting peaked at 0.5 percent of GDP in 1992. Note again the imbalance between over- and undershooting. Corporate income tax revenue probably would have undershot expected revenue much more strongly if it had not been for two factors: if the tax system had not changed away from an accrual based system and if the full balance sheet losses in the private sector, especially banks, had fed through to profits and taxes rather than being absorbed by government. We will return to this latter point below.

Again the pattern is very similar in the UK (Table 5b). First revenue overshot, though at a cumulative 1.9 percent of GDP somewhat less than in Sweden. The subsequent undershooting, however, was very large at a cumulative 4.8% and a peak of 1.3 percent in 1993. The main explanation of the difference in the downturn phase is probably that the full balance sheet losses in the UK had to be absorbed by the private sector rather than by government.[12].

Turning to **asset turnover taxes** in Sweden, we can observe a strong increase in revenue up to 1989/90 and a subsequent steep fall until 1993. Table 4c provides more details on the development of the two categories. Assuming average (="neutral") revenue of about 0.3 percent of GDP for 1975-93 for financial and capital transactions, the cumulative excess revenue increase for 1985-90 was 0.5 percent. Revenue for this category continued to stay marginally above average until 1993.

---

[12] For both the boom and the bust periods, the OECD already observed that corporate tax revenue development cannot be fully explained by profits and discretionary policy measures, though no reference to the arguments presented here is made (see OECD Economic Surveys 1986/87 and 1992/93).

Turnover taxes were also above average until 1991 and it was abolished in the following year (Table 4d).[13]

In the United Kingdom, both tax categories are reported together. The same analysis as for Sweden reveals that such taxes stayed above the long term trend even during the downturn, if only marginally. This is probably due to the lagged effect of asset price increases on turnover taxes but it could also be due to tax changes which has led us to underestimate the relevant "average" tax base.[14]

When looking at **indirect tax revenue developments** in Sweden, we observe an increase in private consumption above disposable income until 1989 and lower consumption for subsequent years.[15] Table 4e translates these figures into approximations of revenue deviations due to wealth effects. Between 1985 and 1990, cumulative revenue exceeded the projected level by 2.8 percent of GDP. In 1989, excess revenue peaked at 0.9 percent of GDP. By 1990, rising interest rates had started depressing consumption quite strongly and indirect tax revenue fell below trend in the following year. During the "bust" years 1991-93, cumulative undershooting of revenue was 1.6 percent, and the trough was reached in 1993.

In the United Kingdom (Table 5d), private consumption increased disproportionately during the late 1980s boom and consequently revenue as well. The related indirect tax revenue overshooting peaked at ¾ percent of GDP in 1988 and added up to 2 ½ percent over the whole boom period. The reversal during the downturn was almost symmetrical and resulted in cumulative revenue undershooting of 2 ½ percent. The (pro-cyclical) VAT increase during the downturn may have contributed to the undershooting of consumption and, thereby, indirect tax revenue.

When adding up the unexplained residuals to what is presumably the total annual and cumulative impact of asset price changes and financial instability on revenue, both countries show remarkable figures. The asset price boom in Sweden seems to have led to significant revenue overshooting. According to our methodology, the cumulative effect was 8.2 percent of GDP over the 6-year boom period 1985-1990 with the peak differing across revenue categories and the strongest effect in 1988

---

[13] Turnover taxes were only introduced in 1984 with revenue reaching 0.14 % of GDP in 1985. This was also assumed to be the "neutral" revenue for calculating residuals.

[14] During the boom, however, revenue from turnover taxes rose sharply because of a rapidly expanding securities turnover and rising securities and house prices (see OECD Economic Survey 1986/87).

[15] To calculate the residual between expected and actual revenue, we adjusted expected revenue by the difference between indirect tax revenue and private consumption as the impact of discretionary measures and possible shifts in the consumption pattern. The residual between the two lines, therefore, strictly reflects

at 2.5 percent of GDP. In the subsequent bust, asset price change-related factors depressed revenue by 3.0 percent of GDP more than could have been expected from cyclical and discretionary measures alone (Table 4f). The peak in revenue undershooting was in 1992/93 at 1 ½ percent in each year.

This finding changes the picture of Sweden's fiscal position during the late 1980s and early 1990s quite significantly: subtracting asset price effects, fiscal balances in 1987-90 would have been significantly worse than what can be explained by cyclical and discretionary factors. Similarly, asset price effects are argued to explain part of the strong deterioration of fiscal balances in 1992 and 1993. Between peak and trough, a fiscal balance deterioration of about 4 percent of GDP cannot be explained by cyclical effects or discretionary measures, and our conjecture is that much if not all of this was due to financial instability/asset price related effects on revenue. Chart 4 at the end of the document (the difference between the bold and the dotted line) presents the actual and "asset price adjusted" fiscal balance for Sweden and illustrates the significant differences over the period.

There is a clear asymmetry between over- and undershooting. The main explanation, as mentioned, could be that the government covered a substantial amount of balance sheet losses, thereby partly offsetting losses that would otherwise have fed through corporate profits, incomes and consumption (and thereby leading to more revenue undershooting). Although our series end in 1993 and a detailed numerical analysis for the following years was not possible, we know that revenue and fiscal balances subsequently recovered (as did asset prices and the real economy).

As could be induced from the discussion by category, revenue effects over all categories and over time were also substantial in the UK. Overshooting peaked at 2.4 percent of GDP in 1989 and undershooting at 2.3 percent in 1993 (Table 5e). This more symmetrical development may reflect the absence of a bailout in the UK (hence it took longer to repair private financial balances and to let losses feed through the fiscal accounts) and the fact that asset prices, in particular real estate prices, remained subdued much longer in the UK than in Sweden.

As to the hypothetical fiscal balance in the absence of financial instability, Chart 4 presents a similar picture for the UK as for Sweden. Fiscal balances would have been much worse in the late 1980s and much better in the early 1990s if it had not been for the "boom-bust cycle" and its revenue effects as argued above. The line reflecting the asset price and instability adjusted deficit is much

---

differences in the developments between private consumption and disposable income, which could be

less volatile than the unadjusted line. The difference between "adjusted" deficits at the peak and in the trough is only about 5 percent of GDP—half the total deterioration in the "unadjusted" fiscal balance of 9 percent of GDP over the same period.

In summary, the revenue (channel 1) effects of asset price changes and resulting financial instability in Sweden and the United Kingdom appear to have been very significant. In Sweden, the extra revenue during the upswing is estimated at about 8 percent of GDP while the revenue undershooting excluding bank support in the downturn amounted to roughly 3 percent of GDP. In the case of the United Kingdom, over- and undershooting are estimated at nearly balanced at 9 percent of GDP. The volatility of fiscal balances appears to have been much exacerbated through these effects.

c. Bailout-costs: fiscal effects of Sweden's financial crisis

This section is limited to the analysis of Sweden's bailout costs, as the UK government did not undertake any significant takeovers of balance sheet losses. The strong asset price declines in the downturn resulted in significant balance sheet losses in Sweden's economy. The government came to the rescue of the financial sector and paid kronor 65.3 billion or about 4 ½ percent of GDP to support the banking system during 1991-93.[16] However, of this total only about 90 percent were charged to the budget. Moreover, since financial support was first recorded as a financial transaction it did mostly not show up in Sweden's deficit before 1992 and 1993 and strong inflation had reduced the GDP value of the bank support by the time it was regularised. Hence, the regularisation of bank support that increased the deficit "only" amounted to 3.4 percent of GDP. If it had not been for the regularisation of bank support, the Swedish deficit would have been 0.7 and 2.7 percent of GDP lower in 1992 and 1993 respectively (Chart 4, thin line). Or in other words, budgetary bank support further increased the downturn (and thereby the variability) of fiscal accounts in the early 1990s. Annex table 3 provides details on the Swedish government's commitments, payments and budgetary recording of financial sector support.[17]

---

interpreted as the wealth effect.

[16] For details of the financial crisis and its resolution see Englund (1999), Ingves/Lind (1996), Drees/Pazarbazioglu (1998), Swedish Ministry of Finance (1995(2)) and the studies by Jonung et al.

[17] Note that most of the public support was paid back by 1997, hence in the end reducing the net fiscal costs of the banking crisis. Net losses amounted to half a percent of GDP in nominal terms and 2 percent of GDP when taking into account forgone interest. This speaks in favour of the hypotheses that public support of the banking sector in Sweden served—at

In addition, Swedish public sector entities supported mortgage institutions which experienced significant loan losses and local housing companies which often needed "bailing out" (Roennberg, 2002; Jonung and Stymne, 1997). Such fiscal costs (which to our knowledge were not regularised in the budget) amounted to kronor 34 billion or over 2% of GDP over the 1990s (Roennberg, 2002). There are indications that 1/3 to 1/2 of this total or about 1% of GDP affected public debt without being regularised in the budget up to 1993. These costs, hence, add to the fiscal costs of instability but did not affect the downturn/variability of the deficit.

d.   Second round effects and putting fiscal costs via the three channels together

In order to make a full assessment of the fiscal effects of the Swedish and UK financial instability episodes, it is also necessary to estimate second round effects via the fiscal costs due to instability related output loss and via higher debt service costs. We can only approximate the former very crudely, following a similar method as applied by Honohan and Klingebiel (2000), Hoggarth, Reis and Saporta (2002) and Eichengreen and Bordo (2002). These two studies look at the cumulative output loss over the "bust" period (measured at 10% and 7% of GDP for Sweden for 1990-93 and the UK for 1990-97 respectively, as mentioned above). This would need to be multiplied with the sensitivity of fiscal balances to output loss, i.e., 0.7 in the case of Sweden and 0.5 in the United Kingdom, yielding 7% of GDP in the case of Sweden and about 3.5% of GDP for the UK.[18]

As to changes in the interest burden, the costs for the period in question were rather limited. The post-boom increase in the UK interest burden peaked at 0.8% in 1995 and was a cumulative 2.0% up to 1997. Sweden's interest burden increased by 0.9% of GDP in 1993 as compared to 1990. This is also the cumulative effect over the three year period as the interest burden at first came down.[19]

Table 6 summarises the findings on the costs of fiscal instability via the three channels. In the case of Sweden, costs add up to 16.3% of GDP and in the case of the UK to 14.5% of GDP. This

---

least partly—an insurance function (see Jennergren and Naeslund (1998) for an attempt at assessing net costs of the financial crisis).

[18] Output loss data is calculated from difference between actual growth and trend growth (we use the average growth rate of trend GDP measured for the 10 years preceding the crisis), as provided by OECD; budgetary elasticities are from Van den Noord (2000) and Bouthevillain et.al (2001). Note that this approach assigns all the output loss to second round effects which, although consistent with the literature, is thereby clearly an upperbound estimate of the fiscal costs of such effects.

is much higher, than what is typically quoted in the literature where the UK does not feature at all and where Sweden's fiscal costs are only estimated at roughly 4% of GDP. When we also correct the earlier Chart 4 for the second-round effect via interest payments on growing public debt, an even larger share of the variability of fiscal accounts is related to the instability episodes in the two countries.

Table 6: Fiscal costs of financial instability in Sweden and the United Kingdom (% of GDP)

	Sweden	United Kingdom
Revenue effects	3.0	9.0
Bank bailout costs	4.4	--
Other bailout costs (mortgage institutions etc)	~1.0	--
Second round effects via output	~7.2	~3.5
Second-round effects via public interest expenditure	0.9	2.0
Total	**~16.3**	**~14.5**

Nevertheless, one could argue that the net fiscal effects of financial instability over boom and bust are perhaps not very grave as extra revenue during the boom compensates at least for some of the costs in the bust. Hence there is perhaps nothing to worry about apart from more fiscal volatility. This, however, is probably an error. Second round effects on output are not likely to be fully symmetrical. In fact, both countries report much more significantly negative growth during the downturn than growth overshooting during the upturn. Moreover, the boom itself is likely to lead to mal-investment and hence an inefficient and output-reducing allocation of resources. Finally, fiscal effects are not likely to be symmetrical over a "boom-bust" cycle. Bail-out costs in the bust are without counterpart in the boom. Governments are tempted to treat the extra revenue during the boom as permanent rather than as temporary. As a result they are likely to spend all or part of the money. Witness the much larger fiscal deficits in the downturn than surpluses during the boom as experienced by these two countries. This claim and the finding of significant fiscal costs of financial instability will find further support in the following section when we examine more episodes with significant financial instability.

---

[19] However, after 1993 the interest burden continued to grow strongly to a peak of 3.4% of GDP above the 1990 ratio. This constitutes the price of a higher debt ratio and, thereby, a delayed fiscal costs of financial instability.

V.   The Fiscal Costs of Financial instability across Industrialised Countries

In the previous section we looked at two case studies to estimate the fiscal costs of asset price changes and financial instability, seperating the fiscal effects via three transmission channels. In this section, we will apply a different approach and assess the fiscal costs of episodes of important financial instability by looking at public debt developments. The results confirm the earlier findings of the case studies.

Public debt developments are important to analyse when assessing the full short term and in particular the long term fiscal costs of financial instability. We noted earlier that the full costs of financial instability and especially those related to bailouts are often not reflected in fiscal balance figures.   Instead, recapitalisations and other bailout costs often only feature under financial transaction (below the line) so that such costs affect the debt but not the deficit.   Moreover, the public debt level is a most relevant indicator for the long term sustainability of public finances.

We, therefore, look at debt developments in six industrialised countries which experienced significant asset price cycles with financial instability or even financial crisis in the early 1990s. These episodes are characterised by a remarkably similar pattern for fiscal balances, growth and asset price developments, which have already been reported for the two case studies, i.e. Sweden and the UK above. Before the fiscal deterioration, there is a period of relatively strong growth, improving and often very favourable fiscal balances and strong asset price increases. This is followed by a strong downturn where growth, fiscal balances and asset prices adjust strongly (Annex table 4 provides more details). Even though public deficits come down eventually in all these episodes (except Japan), public debt is significantly higher after the boom-bust cycle than before.

Table 7 illustrates output loss and debt developments in these financial instability episodes. Note that debt increased significantly and rapidly in all countries. In Finland and Japan, public debt increased by over 40 percent of GDP. In the other four countries, public debt increased by 12.6 to 28.6% of GDP. These figures by themselves are a useful measure of the deterioration of public accounts in periods of financial instability and the revealed magnitude is sometimes staggering and much higher than what can be explained economic and deficit developments alone. However, they exaggerate the fiscal costs as slowing or even negative growth gives rise to a debt-ratio-increasing

denominator effect. The second part of the table tries a crude correction of this denominator effect. Column (5) presents the total debt ratio at the end of the instability period if GDP had been higher by the percentage of output loss. With higher GDP, the debt ratio and its increase would have been lower.   This yields the increase in adjusted debt (col. 6).   These figures are more moderate, suggesting fiscal costs of 10-30 percent of GDP. Nevertheless, they confirm that financial instability has hence been a relatively rare but very important determinant of the deterioration of public accounts in industrialised countries over the past 20 years.

Table 7: Debt Indicators in Periods of Financial Instability (% of GDP)

Countries	Periods (1)	Cumulative output loss (2)	Cumulative Increase in debt (3)	Total debt (end of period) (5)	Debt (adjust. for output loss) (6) = (5)/(1+(2))	Cumulative increase in adjusted debt (7)
Sweden	90-93	10.3	31.0	73.7	66.8	24.1
Finland	90-93	22.2	41.7	56.0	45.8	31.5
Japan	91-99	22.8	50.7	115.3	93.9	29.3
France	92-95	5.2	14.6	59.3	56.4	11.7
UK	90-97	6.9	16.1	58.1	54.3	12.2
Switzerland	90-93	5.1	11.4	46.0	43.8	9.2

Source: compiled from OECD, 2001 and Swiss Ministry of Finance

We can now also pull together the findings from this section and compare them to the results of the case studies and the estimates of financial crisis costs of earlier literature (Table 8). The first two columns repeat the findings from Table 7 on the six instability episodes as measured via debt developments. Column 3 recalls that the case studies produced double-digit fiscal costs for the UK and Sweden. For both countries, there are some though not major differences between the two approaches. Note also the much larger fiscal costs resulting from the two approaches (columns 2 and 3) as compared to the bailout costs alone (4). The latter are typically only a fraction of the full fiscal costs of instability.

Japan and the nordic countries may also be good examples of how important it is to enter a crisis with relatively low debt levels (Finland and Sweden did, Japan did not) and how important a

determined crisis resolution is (again Finland and Sweden did while Japan did not) (see also Honohan and Klingebiel, 2000).

Table 8: Fiscal costs of financial instability: summary findings (% of GDP)

Countries	Periods	Cumulative increase in debt (1)	Cumulative increase in adjusted debt (2)	Findings of case studies (3)	Bank bailout costs Only (3)
Sweden	90-93	31.0	24.1	16.7	4.0-4.4
Finland	90-93	41.7	31.5	…	8.0
Japan	91-99	50.7	29.3	…	5.1 1/
France	92-95	14.6	11.7	…	0.7
UK	90-97	16.1	12.2	14.5	…
Switzerland	90-93	11.4	9.2	…	…

Source: OECD, Table 6, Honahon & Klingebiel, 2000, IMF, own computations.
1/ 1998-2000 only.

VI.   Conclusion

In this paper we have attempted to provide a comprehensive analysis of the fiscal effects of asset price changes and financial instability and what their fiscal costs in terms of GDP are. We have first identified the channels by which asset price changes and financial instability affect fiscal balances: 1) revenue effects via taxation of capital gains and turnover and indirect tax revenue from wealth effects on consumption; 2) the budgetary/fiscal costs of government bailouts as balance sheet losses undermine bank and corporate solvency; and 3) second round effects from wealth/balance sheet effects on public finances via investment, consumption and employment and via changes in debt-servicing costs.

We argue that this 3-channel approach allows a much more complete assessment of fiscal effects of major asset price and financial instability than previous measures of fiscal costs for bank bailouts alone. In order to examine this claim empirically, we first conduct a panel analysis. This has confirmed the relevance of such variables for explaining fiscal deficits and debt in 20 industrialised countries for the 1982 to 2001 period. Moreover, two case studies of Sweden and the United Kingdom have analysed the boom-bust-cycle of the late 1980s-early 1990s. The two countries experienced a dramatic deterioration in fiscal balances by 9 and almost 16 % of GDP respectively. We find that 40-50% of the fiscal balance deterioration in the two countries was at least partly if not fully due to asset price and financial instability-related effects on revenue and

financial sector bailout costs. Total fiscal costs via the three channels identified above are estimated at 14.5 and 16.3% of GDP for the UK and Sweden respectively.

Another useful (and readily available) indicator of the fiscal costs of financial instability is the change in the public debt ratio. The study looked at six episodes of financial instability/financial crisis in industrialised countries and found that debt ratios increased significantly by 11 to 50 % of GDP during period of financial instability. Even when adjusting such figures for denominator effect of lower growth, fiscal costs measured in such a way range from almost 10 to 32% of GDP. For both Sweden and the United Kingdom, there are some but not major differences between these figures and those calculated in the case studies. When applying the two approaches proposed here, it turns out that fiscal costs of bank bailouts alone are only a fraction of the full fiscal costs of instability.

In short, important asset price changes and financial instability can have major effects on fiscal accounts, raising the variability of fiscal accounts and the public debt ratio. Especially when there is a full-fledged "crisis" and when the debt stock at the outset is high, the rapid and major deterioration of the fiscal deficit and the strong increase in public debt can undermine the stability and sustainability of public finances. These two features of many instability episodes provide further justification for the EU Stability and Growth Pact's deficit target of "close to balance or in surplus". The latter provides some safety margin for fiscal balance deteriorations (even if sometimes not enough to prevent large deficits). It also implies a continuous decline in public debt which, together with the Maastricht Treaty's debt ceiling of 60% of GDP, generates a safety margin against the potential threat to sustainability from large debt increases.

Bibliography:

Agell, Jonas, Englund, Peter, and Soedersten, Jan, Incentives and Redistribution in the Welfare State, 1998

Agell, Jonas, Englund, Peter, and Soedersten, Jan, The Swedish Tax Reform: An Introduction, Swedish Economic Policy Review 2, 1995 , pp. 219-228

Agell, Jonas, Englund, Peter, and Soedersten, Jan, Tax Reform of the Century- The Swedish Experiment, National Tax Journal 49 (4),1996, pp.643-664

Aronsson, Thomas, and Palme, Marten, A Decade of Tax and Benefit Reforms in Sweden: Effects on Labor Supply, Welfare and Inequality, Economica 65, 1998, 39-67

Blomquist, Soren, Eklof, Matias, and Newey, Whitney, Tax Reform Evaluation Using Nonparametric Methods: Sweden 1980-1991, NBER Working Paper 6759, 1998

Bouthevillain, C. Cour-Thimann, P., Van Den Dool, G., Harnandez de Coz, P. Langenus, G., Mohr, M, Momigliano, S. and M. Tujula, Cyclically Adjusted Budget balances: An Alternative Approach, forthcoming ECB Working Paper.

Caprio, Jr., Gerald, and Klingebiel, Daniela , Bank Insolvencies: Cross-Country Experience, Working Paper 1620, World Bank, Washington, 1996.

Case, Karl E., Quigley, John M. and Robert J. Shiller Comparing Wealth Effects: The Stock Market Versus the Housing Market, NBER Working Paper 8606, 2001.

Dai, Qiang, Ownership Structure, Income Distribution, and Competitive Equilibrium: A theory of Business Cycles, Human Capital and Asset Returns, New York, Stern School of Buisness Mimeo, 2000.

Drees, Burkhard, and Pazarbasioglu, Ceyla, The Nordic Banking Crises: Pitfalls in Financial Liberalization, IMF Occasional Paper 161, Washington, 1998.

Eichengreen, Barry and Michael Bordo Crises Now and Then: What Lessons From the Last Era of Financial Globalisation? NBER Working Paper 8716, 2002.

Englund, Peter, The Swedish Banking Crisis: Roots and Consequences, Oxford Review of Economic Policy, Vol. 15, No. 3, 1999, pp. 80-97.

Eschenbach, Felix and Ludger Schuknecht, Asset Prices and Fiscal Balances, ECB Working Paper 141, 2002.

European Union, Ameco Database.

Hemming, R. and M. Petrie A Framework for Assessing Fiscal Vulnerability, Washington: IMF Working Paper 00/52,2000.

Hoggarth, Glenn, Racardo Reis and Victoria Saporta Journal of Banking and Finance, 26: 825-55,2002.

Honohan, Patrick and Klingebiel, Daniela Contolling Fiscal Costs of Banking Crises, World Bank Policy RWP No. 2441,2000.

Ingves, Stefan, and Lind, Goeran, The Management of the Bank Crisis – in Retrorespect, Sveriges Riksbank Quarterly Review, 1996,1, pp. 5-18.

Jennergren, Peter, and Naeslund, Bertil, Efter Bankkrisen: Vad blev notan foer Skattebetalarna ?, Ekonomisk Debatt 1998, arg 26, 1, pp. 69-76.

Jonung, Lars, The Rise and Fall of Credit Controls: The Case of Sweden, 1939-89, Stockholm School of Economics Working Paper No. 146, 1995.

Jonung, Lars, Hans Tson Soederstroem, and Joakim Stymne, Depression in the North- Boom and Bust in Sweden and Finland, 1985-93, published in Finnish Economic Papers, (Special Issue; The Finnish Economic Crisis of the 1990s), Vol. 9, No. 1, Spring 1996, pp. 55-71.

Jonung, Lars and Stymne, Lars, The Great Regime Shift : Asset Markets and Economic Activity in Sweden, 1985 - 93 , in: Asset Prices and the Real Economy, Capie, Forrest H.,1997, pp. 19-55.

Kristofferson, Anders, Was the Tax Reform Fully Financed ? Tax Evaluation Report 23, National Institute of Economic Research / Economic Council, Stockholm, 1995.

Lettau, Martin and Sydney Ludvigson, Understanding Trend and cycle in Asset Values: Bulls, Bears, and the Wealth Effect on Consumption. CEPR DP No. 3104, 2001.

Ludwig, Alexander and Torsten Slok, The Impact of Changes in Stock Prices and House Prices on Consumption in OECD Countries, IMF WP 2002/02/01, 2002.

Mishkin, Frederic and Eugene White, U.S. Stock Market Crashes and Their Aftermath: Implications for Monetary Policy, NBER Working Paper 8992, 2002.

OECD, Revenue Statistics 1998.

OECD, Economic Surveys United Kingdom 1986/87, 1988/89, 1990/91, 1992/93, 1995.

Roennberg, Mats, Staten fick Svarte Petter-en Eso Rapport om Bostadsfinansieringen 1985-93, Ministry of Finance Ds 2002:9.

Swedish Ministry of Finance, Ending the Bank Support, Memo: Stockholm, 1995 (1).

Swedish Ministry of Finance, Reformerad Inkomstbeskattning, Del 1 Skattereformens Huvudlinjer, Stockholm, 1989.

Swedish Ministry of Finance, Skattereformen 1990-1991, En Utvaerdering, Stockholm, 1995 (2).

UK Treasury, Financial Statement and Budget Report (Budget Red Book), 1984-97.

Van Den Noord, P. The Size and Role of Automatic Fiscal Stabilizers in the 1990s and Beyond, OECD Economics Department Working Papers No. 230, 2000.

Annex Table 1: Documentation of datasources in microanalysis UK and Sweden

	Sweden	UK
Revenue data	OECD	OECD
Compensation of employees	AMECO	AMECO
Gross operating surplus	AMECO	AMECO
Private consumption	AMECO	AMECO
Disposable income	OECD	OECD
Elasticity direct taxes on households	1.15 (estimate ECB, period 1971-1998)	1.11 (estimate ECB, period 1981-2000)*
Other elasticities	assumed 1, because of flat rates	assumed 1, because of flat rates
Discretionary measures	Swedish Ministry of Finance	UK Treasury (Budget Red Book)

* A shorter period was chosen because of fiscal reforms undertaken in the 1970s & early 1980s.

Annex Table 2: Sweden, General Government Fiscal Policy Measures 1991-93

Discretionary fiscal policy measures[20] of general government 1991-93 (billion SKr)	1991	1992	1993
Revenue Categories			
Tax reform 1991	-11.7	-2.4	-0.8
Other changes in tax legislation	-7.4	-10.7	+5.6
Interest and capital income, net	-0.9	+8.5	-16.9
Expenditure Categories			
Housing subsidies	-6.9	-4.7	-8.8
Health insurance	+3.0		+1.0
Dental care			+0.6
Medication			+0.9
Parental insurance			+0.4
Contributions to organisations			+0.8
Corporate health care			+1.2
Industry subsidies			+1.1
Labour injury insurance			+0.8
Pensions			+3.0
Education etc.			+1.0
Unemployment insurance			+2.0
Refugee support		-6.0	
Public consumption	-12.9	+2.5	+2.5
Public investment	-3.6	-0.4	-1.2
Capital transfers	-3.3	-2.1	+5.4
Sum of discretionary measures (nominal)	-43.7	-15.3	-1.4
Sum of discretionary measures (% of GDP)	-3.0	-1.1	-0.1
Cumulative effect (% of GDP)	-3.0	-4.1	-4.2

Source: Swedish Ministry of Finance
Note: The table is based on calculations by the Ministry of Finance. Negative numbers imply expansionary policies.

---

[20] A minus indicates an increase in expenditure or a decrease in revenue and a plus stands for a decrease in expenditure or an increase in revenue

Annex table 3: Sweden: Gross Bailout Costs 1991-93 (millions of kronor)

	Total commitment	Paid out	Charged to budget
Banks			
Savings bank foundations	6,803	no	No
Guarantees	1,028	1,028	1,028
Interest subsidies			
Nordbanken			
Share subscription	4,191	4,191	4,191
Share purchase	2,055	2,055	2,055
Capital contribution	10,000	10,000	10,000
Securum			
Guarantee	9,850	9,850	9,850
Guarantee	13,150	13,150	13,150
Share purchase	1,000	1,000	no
Guarantee	10,000	no	no
Gota Bank			
Capital contribution	20,000	20,000	20,000
Guarantee shareholders'			
Equity	231	231	231
Retriva			
Capital contribution	3,800	3,800	no
Guarantee	3,500	no	no
Foereningsbanken			
Capital adequacy			
Protection	2,500	No	no
Total bank support	**88,108**	**65,305**	**60,505**
% of GDP		**4.4**	
Non-bank institutions:			
a.) Central Government			
Government owned			
mortgage institutions'		24,000	
loan losses; support to			
local governments to			
reconstruct local housing			
companies			
b.) Local governments		10,000	
Total non-bank support		**~34,000**	
% of GDP		**over 2% 1/**	

Source: Roennberg, 2002; Swedish Ministry of Finance (1995 (1)) , Drees/Pazarbasioglu (1998)
1/ Determination of percentage difficult as exact timing an detailed numbers not fully known.

Annex Table 4: Details of Financial Instability Periods

Countries	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Sweden																
fiscal balance	-2.9	-3.7	-1.2	4.1	3.4	5.2	4.0	-1.1	-7.5	-11.8						
GDP growth	4.0	2.0	2.4	3.0	1.7	2.7	1.6	-1.1	-1.6	-2.4						
real estate price index	100.0	96.7	97.9	106.2	118.9	131.3	133.4	130.3	115.6	98.0						
stock price index	100.0	116.9	169.3	149.6	214.7	251.0	156.9	151.2	146.9	215.6						
Finland																
fiscal balance	4.0	3.8	3.8	1.3	4.0	6.1	5.4	-1.1	-5.5	-7.1						
GDP growth	3.1	3.4	2.4	4.1	4.9	5.5	-0.5	-5.9	-3.2	-0.6						
real estate price index	100.0	99.5	100.6	107.4	137.7	158.2	140.9	116.3	93.7	83.7						
stock price index	100.0	84.0	124.8	187.0	220.5	226.8	154.4	101.3	67.0	125.1						
Japan																
fiscal balance	-2.1	-0.8	-0.9	0.5	1.5	2.5	2.9	2.9	1.5	-1.6	-2.3	-3.6	-4.2	-3.4	-6.0	-7.6
GDP growth	3.9	4.4	2.9	4.2	6.2	4.8	5.1	3.8	1.0	0.3	0.6	1.5	5.1	1.4	-2.8	1.4
real estate price index	100.0	100.5	102.2	109.2	115.2	120.3	133.2	136.5	129.4	122.0	118.1	116.4	114.0	110.5	108.2	105.7
stock price index	100.0	116.5	151.0	213.4	247.0	304.4	255.7	204.2	150.2	155.7	161.3	140.7	170.7	146.2	121.5	133.2
France																
fiscal balance	-2.8	-3.0	-2.8	-1.9	-1.7	-1.3	-1.6	-2.2	-4.2	-6.0	-5.6	-5.6				
GDP growth	1.3	1.9	2.0	2.5	4.2	4.3	2.6	1.1	1.4	-1.0	1.8	1.8				
real estate price index	100.0	100.3	105.4	112.1	119.8	125.8	130.5	130.7	125.2	121.5	119.2	113.9				
stock price index	100.0	122.3	198.3	223.6	189.2	259.8	268.6	233.3	230.5	257.8	275.8	260.3				
UK																
fiscal balance	-4.0	-2.9	-2.6	-1.9	0.6	0.9	-1.5	-2.8	-6.5	-8.0						
GDP growth	2.3	3.8	4.2	4.4	5.2	2.1	0.6	-1.5	0.1	2.3						
real estate price index	100.0	103.3	112.8	126.4	153.5	172.5	158.2	144.5	132.5	125.9						
stock price index	100.0	116.3	138.3	173.9	150.5	168.8	154.1	155.3	153.0	176.0						
Switzerland																
fiscal balance	-0.4	-0.2	0.7	0.5	1.0	0.8	0.4	-2.1	-3.4	-3.6						
GDP growth	1.8	3.4	1.6	0.7	3.1	4.3	3.7	-0.8	-0.1	-0.5						
real estate price index	100.0	101.5	106.7	112.6	126.3	137.5	131.2	122.0	112.2	103.2						
stock price index	100.0	123.8	157.8	149.7	124.2	147.1	132.0	125.9	129.2	159.4						

Source: compiled from OECD, BIS, Datastream and own calculations
real estate price index and stock price index are CPI adjusted, base year is 1984 (=100)
white column= turning point, light column= boom, dark column= bust

Data Appendix: Sources of Data used in Panel Analysis

Variable	Source
Change in Deficit (% of GDP)	OECD, Swiss Ministry of Finance
Change in Debt (% of GDP)	OECD, Swiss Ministry of Finance
Real output growth (annual %)	OECD
Change in interest (% of GDP)	OECD
Change in stock prices, defl.	Datastream, BIS (Sweden), IFC (Portugal, Greece)
Change in property prices, defl.	BIS

Table 4: Micro-analysis of tax developments Sweden

a. Direct taxes on households

	1985	1986	1987	1988	1989	1990	1991	1992	1993
Actual revenue (1)	19.23	19.91	20.53	21.26	21.68	21.3	17.89	17.78	17.51
Discretionary policies (current year) (2)	0	0	0	0	0	-1	-2.4	0.08	0.3
Discretionary policies (cumulative) (3)	0	0	0	0	0	-1	-3.4	-3.32	-3.02
Actual revenue excluding discretionary policies (1)-(3)=(4)	19.23	19.91	20.53	21.26	21.68	22.30	21.29	21.10	20.53
Predicted revenue based on changes in tax base* (5)	19.31	19.62	19.88	20.19	20.94	21.71	21.61	21.37	20.22
annual over-/undershooting (6)=(4)-(5)	-0.08	0.29	0.65	1.07	0.74	0.59	-0.32	-0.27	0.31
sum of over-/undershooting 85-90 (7)	-0.08	0.21	0.86	1.93	2.67	3.26			
sum of over-/undershooting 91-93 (8)							-0.32	-0.59	-0.28

* An elasticity of tax revenue with respect to the base of 1.15 is assumed

b. Corporate income taxes

	1985	1986	1987	1988	1989	1990	1991	1992	1993
Actual revenue (1)	1.75	2.5	2.3	2.87	2.1	1.74	1.87	1.46	2.16
Discretionary policies (current year) (2)	0	0	0	0	0	0	0	0.28	0.33
Discretionary policies (cumulative) (3)	0	0	0	0	0	0	0	0.28	0.61
Actual revenue excluding discretionary policies (1)-(3)=(4)	1.75	2.50	2.30	2.87	2.10	1.74	1.87	1.18	1.55
Predicted revenue based on changes in tax base* (5)	1.78	1.74	1.69	1.71	1.66	1.53	1.57	1.72	1.81
annual over-/undershooting (6)=(4)-(5)	-0.03	0.76	0.61	1.16	0.44	0.21	0.30	-0.54	-0.26
sum of over-/undershooting 85-90 (7)	-0.03	0.73	1.34	2.50	2.94	3.15			
sum of over-/undershooting 91-93 (8)							0.30	-0.24	-0.50

* An elasticity of tax revenue with respect to the base of 1 is assumed

c. Taxes on financial and capital transactions

	1985	1986	1987	1988	1989	1990	1991	1992	1993
Actual revenue (1)	0.25	0.28	0.32	0.37	0.46	0.51	0.47	0.37	0.31
Discretionary policies (current year) (2)	0	0	0	0	0	0	0	0	0
Discretionary policies (cumulative) (3)	0	0	0	0	0	0	0	0	0
Actual revenue excluding discretionary policies (1)-(3)=(4)	0.25	0.28	0.32	0.37	0.46	0.51	0.47	0.37	0.31
Predicted revenue based on changes in tax base* (5)	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
annual over-/undershooting (6)=(4)-(5)	-0.03	0.00	0.04	0.09	0.18	0.23	0.19	0.09	0.03
sum of over-/undershooting 85-90 (7)	-0.03	-0.03	0.01	0.10	0.28	0.51			
sum of over-/undershooting 91-93 (8)							0.19	0.28	0.31

* Due to the lack of a tax base the average of the preceeding 20 years is considered as predicted revenue

d. Capital turnover tax

	1985	1986	1987	1988	1989	1990	1991	1992	1993 **
Actual revenue (1)	0.14	0.28	0.37	0.36	0.47	0.45	0.27	0.02	0
Discretionary policies (current year) (2)	0	0	0	0	0	0	0	0	N.A.
Discretionary policies (cumulative) (3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N.A.
Actual revenue excluding discretionary policies (1)-(3)=(4)	0.14	0.28	0.37	0.36	0.47	0.45	0.27	0.02	0.00
Predicted revenue based on changes in tax base* (5)	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.00
annual over-/undershooting (6)=(4)-(5)	0.00	0.14	0.23	0.22	0.33	0.31	0.13	-0.12	0.00
sum of over-/undershooting 85-90 (7)	0.00	0.14	0.37	0.59	0.92	1.23			
sum of over-/undershooting 91-93 (8)									-0.01

* Due to the lack of a tax base the revenue yielded in the first year after introduction of the tax (1985) is considered as predicted revenue
** In this year the tax was abolished, we therefore consider actual and predicted revenue both as zero.

e. Indirect taxes

	1985	1986	1987	1988	1989	1990	1991	1992	1993
Actual revenue (1)	13.31	13.13	13.57	13.39	13.41	13.88	14.17	13.22	13.22
Discretionary policies (current year) (2)	0.68	-0.24	0.16	-0.15	0.30	0.57	-0.35	-1.11	0.13
Discretionary policies (cumulative) (3)	0.68	0.43	0.60	0.45	0.75	1.32	0.97	-0.15	-0.01
Actual revenue excluding discretionary policies (1)-(3)=(4)	12.63	12.70	12.97	12.94	12.66	12.56	13.20	13.37	13.23
Predicted revenue based on changes in tax base (5)	12.65	12.58	12.33	12.07	11.81	12.23	13.28	14.10	14.04
annual over-/undershooting (6)=(4)-(5)	-0.02	0.12	0.64	0.87	0.85	0.33	-0.08	-0.73	-0.81
sum of over-/undershooting 85-90 (7)	-0.02	0.10	0.74	1.61	2.46	2.79			
sum of over-/undershooting 91-93 (8)							-0.08	-0.81	-1.62

f. All categories: over and undershooting of revenue

	1985	1986	1987	1988	1989	1990	1991	1992	1993
annual over-/undershooting (6)=(4)-(5)	-0.14	1.19	1.53	2.54	1.69	1.34	0.22	-1.65	-1.54
sum of over-/undershooting 85-90 (7)	-0.14	1.05	2.58	5.12	6.81	8.15			
sum of over-/undershooting 91-97 (8)							0.22	-1.43	-2.97

* An elasticity of tax revenue with respect to the base of 1 is assumed
Wealth effects are approximated assuming an elasticity of private consumption with respect to disposable income of 1 as normal,
deviations from this are treated as resulting from asset price changes

Table 5: Micro-analysis of tax developments UK: over and undershooting of revenue
(all values in % of GDP)

a. Direct taxes on households

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Actual revenue (1)	10.27	10.26	9.94	9.93	9.91	10.47	10.18	9.91	9.36	9.56	9.82	9.31	9.09
Discretionary policies (current year) (2)	-0.38	-0.47	-0.19	-0.40	-0.69	0.01	0.07	0.12	-0.21	0.06	0.08	-0.04	-0.42
Discretionary policies (cumulative) (3)	-0.38	-0.82	-0.94	-1.25	-1.83	-1.70	-1.56	-1.38	-1.52	-1.37	-1.22	-1.20	-1.55
Actual revenue excluding discretionary policies (1)-(3)=(4)	10.65	11.08	10.89	11.18	11.73	12.17	11.74	11.30	10.88	10.93	11.04	10.51	10.64
Predicted revenue based on changes in tax base* (5)	10.44	10.54	10.48	10.64	10.94	11.40	11.63	11.67	11.41	11.23	11.16	11.17	11.31
annual over-/undershooting (6)=(4)-(5)	0.21	0.54	0.40	0.54	0.80	0.77	0.11	-0.38	-0.53	-0.29	-0.12	-0.66	-0.67
sum of over-/undershooting 85-90 (7)	0.21	0.74	1.15	1.69	2.49	3.26							
sum of over-/undershooting 91-97 (8)							0.11	-0.27	-0.80	-1.10	-1.22	-1.88	-2.55

* An elasticity of tax revenue with respect to the base of 1.11 is assumed

b. Corporate income taxes

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Actual revenue (1)	4.60	3.80	3.72	3.86	4.35	4.04	3.27	2.67	2.46	2.73	3.32	3.77	3.95
Discretionary policies (current year) (2)	-0.44	-0.04	-0.03	-0.06	-0.07	0.00	0.00	-0.06	0.00	0.01	0.00	-0.01	0.00
Discretionary policies (cumulative) (3)	-0.44	-0.45	-0.43	-0.45	-0.49	-0.46	-0.44	-0.48	-0.46	-0.43	-0.40	-0.39	-0.37
Actual revenue excluding discretionary policies (1)-(3)=(4)	5.04	4.25	4.16	4.32	4.84	4.50	3.70	3.16	2.92	3.16	3.72	4.16	4.31
Predicted revenue based on changes in tax base* (5)	4.30	4.16	4.25	4.23	4.18	4.13	3.99	4.04	4.23	4.36	4.40	4.50	4.44
annual over-/undershooting (6)=(4)-(5)	0.74	0.09	-0.09	0.09	0.66	0.37	-0.29	-0.88	-1.31	-1.20	-0.69	-0.34	-0.13
sum of over-/undershooting 85-90 (7)	0.74	0.83	0.74	0.83	1.48	1.85							
sum of over-/undershooting 91-97 (8)							-0.29	-1.17	-2.48	-3.68	-4.36	-4.71	-4.84

* An elasticity of tax revenue with respect to the base of 1 is assumed

c. Taxes on financial and capital transactions

All values in % of GDP	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Actual revenue (1)	0.33	0.44	0.56	0.50	0.41	0.32	0.31	0.21	0.26	0.27	0.27	0.30	0.40
Discretionary policies (current year) (2)	-0.13	0.00	0.00	0.00	-0.02	0.00	0.00	0.03	0.00	-0.03	0.00	0.00	0.00
Discretionary policies (cumulative) (3)	-0.13	-0.12	-0.11	-0.10	-0.11	-0.11	-0.10	-0.07	-0.07	-0.10	-0.09	-0.09	-0.08
Actual revenue excluding discretionary policies (1)-(3)=(4)	0.45	0.57	0.67	0.60	0.52	0.43	0.41	0.27	0.33	0.37	0.36	0.38	0.48
Predicted revenue based on changes in tax base* (5)	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
annual over-/undershooting (6)=(4)-(5)	0.19	0.31	0.41	0.34	0.26	0.17	0.15	0.01	0.07	0.11	0.10	0.12	0.22
sum of over-/undershooting 85-90 (7)	0.19	0.50	0.91	1.25	1.51	1.68							
sum of over-/undershooting 91-97 (8)							0.15	0.17	0.23	0.34	0.45	0.57	0.79

* Due to the lack of a tax base the average of the preceeding 20 years is considered as predicted revenue

d. Indirect taxes

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Actual revenue (1)	11.80	11.65	11.30	11.54	11.26	11.58	11.50	11.99	11.95	12.23	12.59	12.68	12.45
Discretionary policies (current year) (2)	0.20	-0.49	-0.33	0.06	-0.30	0.13	-0.27	0.36	-0.18	0.38	0.43	-0.09	-0.25
Discretionary policies (cumulative) (3)	0.20	-0.29	-0.62	-0.56	-0.86	-0.73	-1.00	-0.65	-0.83	-0.45	-0.02	-0.11	-0.36
Actual revenue excluding discretionary policies (1)-(3)=(4)	11.60	11.94	11.92	12.10	12.12	12.31	12.50	12.64	12.78	12.68	12.61	12.79	12.81
Predicted revenue based on changes in tax base* (5)	11.55	11.64	11.43	11.35	11.49	12.02	12.61	13.16	13.32	13.01	13.05	13.06	13.06
annual over-/undershooting (6)=(4)-(5)	0.05	0.31	0.49	0.75	0.63	0.29	-0.11	-0.52	-0.54	-0.33	-0.44	-0.26	-0.25
sum of over-/undershooting 85-90 (7)	0.05	0.36	0.85	1.60	2.23	2.52							
sum of over-/undershooting 91-97 (8)							-0.11	-0.62	-1.16	-1.49	-1.93	-2.19	-2.45

* An elasticity of tax revenue with respect to the base of 1 is assumed
Wealth effects are approximated assuming an elasticity of private consumption with respect to disposable income of 1 as normal, deviations from this are treated as resulting from asset price changes

e. All categories: over and undershooting of revenue

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
annual over-/undershooting (6)=(4)-(5)	1.19	1.24	1.22	1.72	2.35	1.60	-0.13	-1.76	-2.31	-1.71	-1.14	-1.14	-0.83
sum of over-/undershooting 85-90 (7)	1.19	2.43	3.65	5.36	7.71	9.31							
sum of over-/undershooting 91-97 (8)							-0.13	-1.89	-4.20	-5.92	-7.06	-8.20	-9.04

Sources: Financial Statement and Budget Reports (UK Treasury), OECD Revenue Statistics 1998
Base year for simulations: 1984

Chart 1: United Kingdom, Real GDP Growth 1981-99

Source: World Bank WDI

Chart 1: Sweden, Real GDP Growth 1981-99

Source: World Bank WDI

Chart 2: United Kingdom, Real Estate Market Returns 1985-97 in % (deflated)

Source: BIS

Chart 2: Sweden, Real Estate Market Returns 1985-93 in % (deflated)

Source: Affaersvaerlden

Chart 3: United Kingdom, Stock Market Returns 1985-97 in % (deflated)

Source: BIS

Chart 3: Sweden , Stock Market Returns 1985-93 in % (deflated)

Source: Affaersvaerlden

Chart 4: Sweden, Actual Fiscal Balance vs. Balance adjusted for Asset Price Effects and Bank Support 1984-93 (% of GDP)

actual fiscal balance (% of GDP)
fiscal balance ad. for asset price effects (% of GDP)
fiscal balance ad. for asset price effects and bank support (% of GDP)

Source: OECD and own calculations

Chart 4: UK, Actual Fiscal Balance vs. Balance Adjusted for Asset Price Effects 1984-97 (% of GDP)

actual fiscal balance (% of GDP)
fiscal balance adjusted for asset price effects (% of GDP)
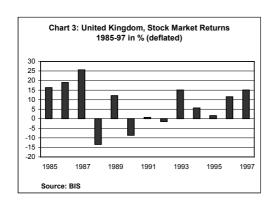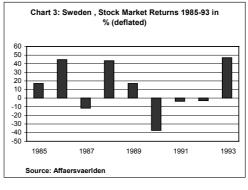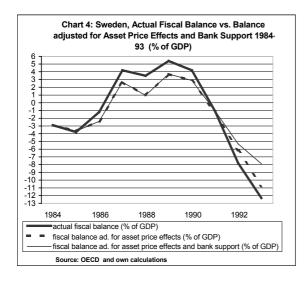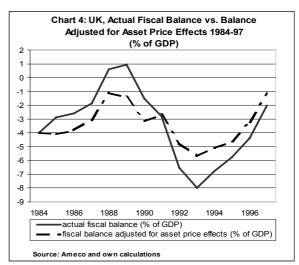
Source: Ameco and own calculations

European Central Bank working paper series

For a complete list of Working Papers published by the ECB, please visit the ECB's website (http://www.ecb.int).

113 "Financial frictions and the monetary transmission mechanism: theory, evidence and policy implications" by C. Bean, J. Larsen and K. Nikolov, January 2002.

114 "Monetary transmission in the euro area: where do we stand?" by I. Angeloni, A. Kashyap, B. Mojon, D. Terlizzese, January 2002.

115 "Monetary policy rules, macroeconomic stability and inflation: a view from the trenches" by A. Orphanides, December 2001.

116 "Rent indices for housing in West Germany 1985 to 1998" by J. Hoffmann and C. Kurz., January 2002.

117 "Hedonic house prices without characteristics: the case of new multiunit housing" by O. Bover and P. Velilla, January 2002.

118 "Durable goods, price indexes and quality change: an application to automobile prices in Italy, 1988-1998" by G. M. Tomat, January 2002.

119 "Monetary policy and the stock market in the euro area" by N. Cassola and C. Morana, January 2002.

120 "Learning stability in economics with heterogenous agents" by S. Honkapohja and K. Mitra, January 2002.

121 "Natural rate doubts" by A. Beyer and R. E. A. Farmer, February 2002.

122 "New technologies and productivity growth in the euro area" by F. Vijselaar and R. Albers, February 2002.

123 "Analysing and combining multiple credit assessments of financial institutions" by E. Tabakis and A. Vinci, February 2002.

124 "Monetary policy, expectations and commitment" by G. W. Evans and S. Honkapohja, February 2002.

125 "Duration, volume and volatility impact of trades" by S. Manganelli, February 2002.

126 "Optimal contracts in a dynamic costly state verification model" by C. Monnet and E. Quintin, February 2002.

127 "Performance of monetary policy with internal central bank forecasting" by S. Honkapohja and K. Mitra, February 2002.

128 "Openness, imperfect exchange rate pass-through and monetary policy" by F. Smets and R. Wouters, February 2002.

129 "Non-standard central bank loss functions, skewed risks, and certainty equivalence" by
A. al-Nowaihi and L. Stracca, March 2002.

130 "Harmonized indexes of consumer prices: their conceptual foundations" by E. Diewert,
March 2002.

131 "Measurement bias in the HICP: what do we know, and what do we need to know?" by
M. A. Wynne and D. Rodríguez-Palenzuela, March 2002.

132 "Inflation dynamics and dual inflation in accession countries: a "new Keynesian"
perspective" by O. Arratibel, D. Rodríguez-Palenzuela and C. Thimann, March 2002.

133 "Can confidence indicators be useful to predict short term real GDP growth?" by
A. Mourougane and M. Roma, March 2002.

134 "The cost of private transportation in the Netherlands, 1992-1999" by B. Bode and
J. Van Dalen, March 2002.

135 "The optimal mix of taxes on money, consumption and income" by F. De Fiore and
P. Teles, April 2002.

136 "Retail bank interest rate pass-through: the new evidence at the euro area level" by
G. de Bondt, April 2002.

137 "Equilibrium bidding in the eurosystem's open market operations" by U. Bindseil, April
2002.

138 "New" views on the optimum currency area theory: what is EMU telling us?" by
F. P. Mongelli, April 2002.

139 "On currency crises and contagion" by M. Fratzscher, April 2002.

140 "Price setting and the steady-state effects of inflation" by M. Casares, May 2002.

141 "Asset prices and fiscal balances" by F. Eschenbach and L. Schuknecht, May 2002.

142 "Modelling the daily banknotes in circulation in the context of the liquidity management of
the European Central Bank", by A. Cabrero, G. Camba-Mendez, A. Hirsch and F. Nieto,
May 2002.

143 "A non-parametric method for valuing new goods", by I. Crawford, May 2002.

144 "A failure in the measurement of inflation: results from a hedonic and matched experiment
using scanner data", by M. Silver and S. Heravi, May 2002.

145 "Towards a new early warning system of financial crises", by M. Fratzscher and M. Bussiere,
May 2002.

146 "Competition and stability – what's special about banking?", by E. Carletti and P. Hartmann,
May 2002.

147 "Time-to-build approach in a sticky price, stricky wage optimizing monetary model, by M. Casares, May 2002.

148 "The functional form of yield curves" by V. Brousseau, May 2002.

149 "The Spanish block of the ESCB-multi-country model" by A. Estrada and A. Willman, May 2002.

150 "Equity and bond market signals as leading indicators of bank fragility" by R. Gropp, J. Vesala and G. Vulpes, June 2002.

151 "G-7 inflation forecasts" by F. Canova, June 2002.

152 "Short-term monitoring of fiscal policy discipline" by G. Camba-Mendez and A. Lamo, June 2002.

153 "Euro area production function and potential output: a supply side system approach" by A. Willman, June 2002.

154 "The euro bloc, the dollar bloc and the yen bloc: how much monetary policy independence can exchange rate flexibility buy in an interdependent world?" by M. Fratzscher, June 2002.

155 "Youth unemployment in the OECD: demographic shifts, labour market institutions, and macroeconomic shocks" by J. F. Jimeno and D. Rodriguez-Palenzuela, June 2002.

156 "Identifying endogenous fiscal policy rules for macroeconomic models" by J. J. Perez, and P. Hiebert, July 2002.

157 "Bidding and performance in repo auctions: evidence from ECB open market operations" by K. G. Nyborg, U. Bindseil and I. A. Strebulaev, July 2002.

158 "Quantifying Embodied Technological Change" by P. Sakellaris and D. J. Wilson, July 2002.

159 "Optimal public money" by C. Monnet, July 2002.

160 "Model uncertainty and the equilibrium value of the real effective euro exchange rate" by C. Detken, A. Dieppe, J. Henry, C. Marin and F. Smets, July 2002.

161 "The optimal allocation of risks under prospect theory" by L. Stracca, July 2002.

162 "Public debt asymmetries: the effect on taxes and spending in the European Union" by S. Krogstrup, August 2002.

163 "The rationality of consumers' inflation expectations: survey-based evidence for the euro area" by M. Forsells and G. Kenny, August 2002.

164 "Euro area corporate debt securities market: first empirical evidence" by G. de Bondt, August 2002.

165 "The industry effects of monetary policy in the euro area" by G. Peersman and F. Smets, August 2002.

166 "Monetary and fiscal policy interactions in a micro-founded model of a monetary union" by R. M.W.J. Beetsma and H. Jensen, August 2002.

167 "Identifying the effects of monetary policy shocks on exchange rates using high frequency data" by J. Faust, J.H. Rogers, E. Swanson and J.H. Wright, August 2002.

168 "Estimating the effects of fiscal policy in OECD countries" by R. Perotti, August 2002.

169 "Modeling model uncertainty" by A. Onatski and N. Williams, August 2002.

170 "What measure of inflation should a central bank target?" by G. Mankiw and R. Reis, August 2002.

171 "An estimated stochastic dynamic general equilibrium model of the euro area" by F. Smets and R. Wouters, August 2002.

172 "Constructing quality-adjusted price indices: a comparison of hedonic and discrete choice models" by N. Jonker, September 2002.

173 "Openness and equilibrium determinacy under interest rate rules" by F. de Fiore and Z. Liu, September 2002.

174 "International monetary policy coordination and financial market integration" by A. Sutherland, September 2002.

175 "Monetary policy and the financial accelerator in a monetary union" by S. Gilchrist, J.O. Hairault and H. Kempf, September 2002.

176 "Macroeconomics of international price discrimination" by G. Corsetti and L. Dedola, September 2002.

177 "A theory of the currency denomination of international trade" by P. Bacchetta and E. van Wincoop, September 2002.

178 "Inflation persistence and optimal monetary policy in the euro area" by P. Benigno and J.D. López-Salido, September 2002.

179 "Optimal monetary policy with durable and non-durable goods" by C.J. Erceg and A.T. Levin, September 2002.

180 "Regional inflation in a currency union: fiscal policy vs. fundamentals" by M. Duarte and A.L. Wolman, September 2002.

181 "Inflation dynamics and international linkages: a model of the United States, the euro area and Japan" by G. Coenen and V. Wieland, September 2002.

182 "The information content of real-time output gap estimates, an application to the euro area" by G. Rünstler, September 2002.

183 "Monetary policy in a world with different financial systems" by E. Faia, October 2002.

184 "Efficient pricing of large value interbank payment systems" by C. Holthausen and J.-C. Rochet, October 2002.

185 "European integration: what lessons for other regions? The case of Latin America" by E. Dorrucci, S. Firpo, M. Fratzscher and F. P. Mongelli, October 2002.

186 "Using money market rates to assess the alternatives of fixed vs. variable rate tenders: the lesson from 1989-1998 data for Germany" by M. Manna, October 2002.

187 "A fiscal theory of sovereign risk" by M. Uribe, October 2002.

188 "Should central banks really be flexible?" by H. P. Grüner, October 2002.

189 "Debt reduction and automatic stabilisation" by P. Hiebert, J. J. Pérez and M. Rostagno, October 2002.

190 "Monetary policy and the zero bound to interest rates: a review" by T. Yates, October 2002.

191 "The fiscal costs of financial instability revisited" by F. Eschenbach and L. Schuknecht, November 2002