# Sweden: Selected Issues

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**International Monetary Fund
Washington, D.C.**

INTERNATIONAL MONETARY FUND

SWEDEN

**Selected Issues**

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Approved by the European Department

August 16, 2005

## I. THE SWEDISH FISCAL FRAMEWORK: TOWARDS GRADUAL EROSION?[1]

### A. Introduction and Overview

1.      **The gradual introduction of a detailed fiscal framework accompanied the successful consolidation effort over the last decade in Sweden**. The framework includes a surplus target of two percent of GDP for the general government, multi-year expenditure ceilings for central government, and a balanced budget requirement for local governments. Several independent agencies and institutions regularly report and comment upon budgetary assumptions, plans and outcomes, although none is formally entrusted with the task of assessing their consistency with the overall fiscal framework.

2.      **The framework has so far adequately supported the government commitment to sound fiscal policy.** While the framework has clearly played a part in Swedish fiscal consolidation, as elsewhere, the role of political commitment is central. The main drive behind successful consolidations is always political will backed by strong public opinion support. However, a well designed fiscal framework can provide a reference against which progress along the adjustment path can be assessed, so as to keep the process on track and to avoid the loss of momentum which may occur once the crisis which initially motivated the correction is left behind.

3.      **Signs of pressure are emerging.** The definition of the surplus target for general government lends itself to different interpretations. The ensuing ambiguity allowed subsequent downwards revisions of annual budgetary targets, thus pushing the attainment of the two percent surplus beyond the medium-term policy horizon. Margins under the expenditure ceilings for central government have gradually narrowed, while compliance has relied on recourse to various ad hoc measures such as tax expenditures and the postponement of outlays. Central government finances have progressively deteriorated and have been in deficit since 2002. The balanced budget rule for local governments has allowed procyclical fiscal policy in good times, followed later by increased local tax rates and central government transfers. The former offset some of the tax cuts by the central government, while the latter added to pressures on expenditure ceilings.

4.      **The paper discusses whether these pressures are minor disturbances in an otherwise unproblematic setting or symptoms of potentially serious problems.** The paper takes the view that although the framework is generally well-designed and the compliance record is decidedly superior in the EU context, Swedish fiscal rules face the risk of gradual erosion.

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5.      **The paper also examines possible amendments to the current fiscal framework to preserve its contribution to sound policymaking.** While bringing together in a systematic framework the results of previous work (Schimmelpfennig, 2002; Annett, 2003; Danninger, 2004), the paper attempts to provide further insights on crucial elements in the design of the Swedish fiscal framework. Specifically the paper argues that:

- **Resolving the ambiguity concerning the 2 percent surplus target for the general government is a priority**. Based on its current definition, legitimate interpretations of the 2 percent target range from an annual value in cyclically adjusted terms to an average value in nominal terms over a period of unspecified length. This makes it difficult to assess compliance based on actual budgetary outcomes (as it is not clear which nominal balance would be consistent with the framework in any given year) and can compromise the effectiveness of the whole system of fiscal rules. Choosing unambiguously one interpretation is the precondition for the adoption of a transparent and consistent methodology to translate the 2 percent surplus target into annual nominal targets.

- **The interpretation of the surplus target as an annual cyclically adjusted value would provide a better check against procyclical policies in good times than averages over the cycle (or any other period of time).** To guard against procyclicality, restrictions to the use of the margins under the expenditure ceilings could also be introduced. A procyclical bias in good times reduces the margins for countercyclical policy in bad times. In the event, compliance with the target may require a procyclical correction during a downturn. The lack of economic rationale for such a prescription would harm the credibility of the fiscal framework and would likely lead to either pragmatic neglect or explicit repudiation.

- **Formal guidelines could be issued to ensure that central government expenditure ceilings are set at a level consistent with the 2 percent surplus target.** In this respect, the introduction of an explicit intermediate target in terms of central government budget balance could prove a useful device to foster transparency. The somewhat elusive definition of the general government target has so far proved an obstacle to the implementation of such guidelines. The level of ceilings has become somewhat arbitrary. Moreover, in the absence of an anchor in terms of the budget balance, it has been possible to ensure compliance with expenditure ceilings through tax expenditures.

- **Reliance on the expertise of an independent agency for the implementation of the fiscal framework could further enhance transparency and strengthen enforcement.** The framework aims at reconciling soundness and flexibility of fiscal policy. Therefore its consistent implementation ultimately relies on variables such as the output gap and the cyclically adjusted balance. The complexity of the task of assessing and measuring these concepts adversely affects transparency and enforcement. In this respect, once a more precise definition of the surplus target is

agreed upon by policy-makers, consideration could be given to relying on an independent agency for the task of translating the prescriptions of the framework into annual nominal budget targets as well as for the ex post assessment of budgetary outcomes.

- **Encouraging the introduction of multiyear expenditure ceilings and basing the balance budget requirement on potential (as opposed to actual) revenue may help control procyclical biases and encourage fiscal prudence also at the local government level.** It should be noted, however, that budgetary pressures arising in the local government sector may have deeper roots in the definition of mandates and in the incentives provided by the system of grants to local governments.

6.      **The paper is organized as follows.** Section B analyzes the Swedish fiscal performance between the mid-1970s and the early 1990s in order to highlight the rationale for the introduction of the current fiscal framework. Section C describes the framework and provides an assessment of the adequacy of its design with respect to the pursued policy goals. Section D examines the recent fiscal performance and the evidence of rising pressures on the framework. Section E discusses possible amendments to ease those pressures and keep public finances on a solid track.

## B.  Public Finances in Sweden Until The Mid-1990s

7.      **Public debt rose from about 30 percent of GDP to close to 75 percent from the mid-1970s to the early 1990s** (Figure 1). During this period, the debt dynamics was clearly not on a sustainable path. Besides graphical inspection, this can also be seen by way of reference to the government's intertemporal budget constraint. As is well known, solvency requires that the debt to GDP ratio rise at a rate lower than the difference between the nominal interest rate and the nominal growth rate of output.[2] However, in Sweden the debt to GDP ratio grew at an average rate of 5.2 percent over



Figure 1: Debt to GDP ratios in Sweden and the EU: 1970-1994

Source: EU Commission, AMECO

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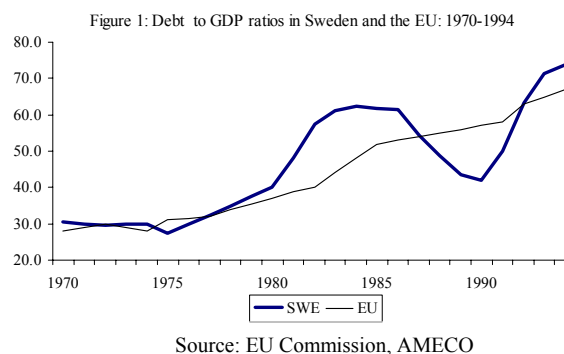
[2] Under this condition, the discounted value of the debt ratio tends to zero
$$\lim_{T\to\infty} [(1+r)/(1+g)]^{-T} d_T = 0$$
which ensures that the discounted value of future primary balances tends to equal the initial level of the debt ratio
$$\lim_{T\to\infty} \Sigma_{t=1,T} \{p_t [(1+r)/(1+g)]^{-t}\} = d_0$$
(see, e.g. Blanchard and others, 1990).

1975–94, far exceeding the difference between interest and growth rates (averaging at 0.7 per cent over the period).[3]

8.      **The Swedish debt followed a similar trend to that of the European Union average, but fluctuated more than in most other EU countries and displayed a clear ratcheting pattern.** This behavior reflects both a stronger sensitivity to cyclical conditions and some degree of asymmetry in the conduct of fiscal policy over the cycle. Fluctuations in debt indicate that fiscal balances moved countercyclically both in downturns and in upturns. However, the increase in the debt ratio during the downturn of the first half of the 1980s was not fully offset in the subsequent upturn. With the onset of a new recession in the 1990s, debt rose to even higher levels.

9.      **A more pronounced reaction of the fiscal balance to negative output gaps than to positive ones is confirmed by regression analysis, suggesting that discretionary fiscal policy may have been procyclical during the upturn.** (Table 1, Figure 2) Estimation of a standard fiscal reaction function[4]—whereby the general government primary balance is a function of its lagged value, the lagged value of the debt ratio and the output gap—yields an estimate of 0.78 for the output (semi)elasticity of the budget over 1970–93 (the year in which the deficit peaked). This is close to available estimates of the size of automatic stabilizers (see, e.g. EC, 2001; IMF, 2004; van den Noord, 2000; and Bouthevillain and others, 2001).[5] However, when coefficients for positive and negative output gaps are estimated separately, it appears that the elasticity to a negative output gap is higher than that suggested by automatic stabilizers, while the elasticity to positive output gap is lower.[6] Based on this evidence, discretionary policy

Table 1.  Asymmetry in Cyclical Sensitivity of the Primary Balance 1/

| | Levels | | First Differences | |
|---|---|---|---|---|
| Constant | -2.42 | -1.90 | -0.42 | -0.40 |
| Lagged primary balance | 0.72 ** | 0.70 ** | ... | ... |
| | (3.52) | (3.43) | | |
| Lagged debt/GRP | 0.04 | 0.04 | | |
| | (0.85) | (1.02) | | |
| Output gap | 0.78 * | | 0.70 ** | |
| | (1.92) | | (2.13) | |
| Positive output gap | | 0.19 | | 0.46 |
| | | (0.30) | | (0.79) |
| Negative output gap | | 1.39 ** | | 0.91 * |
| | | (2.13) | | (1.73) |
| Adjusted R2 | 0.67 | 0.67 | 0.14 | 0.11 |

Source: EU Commission, AMECO. Output gap is estimated by HP filter (λ=30).
1/ Dependent variable: primary balance (percent of GDP). Sample period: 1970-93. OLS, t statistics in brackets. *, **, *** = significant at 10, 5, and 1 percent levels.

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[3] The rate of growth of the debt to GDP ratio exceeded the difference between interest and growth rate also between 1975 and 1990 (when the debt to GDP ratio was at a through).

[4] See, e.g., Bohn (1998), Ballabriga and Martinez-Mongay (2002), and Galí and Perotti (2003).

[5] The semi-elasticity of the Swedish budget may have diminished somewhat over the last decade.

[6] See Balassone and Francese (2004) and Balassone and Kumar (2005) for an application of a similar analytical framework to panels of industrial and emerging market countries.

appears countercyclical in bad times—as it increases the effect of automatic stabilizers—and procyclical in good times (see also Lindh and Ohlson, 2000; IMF, 2001; SOU, 2002:16).

Figure 2: Budgetary Response to 1 Percent Changes in Output Gap
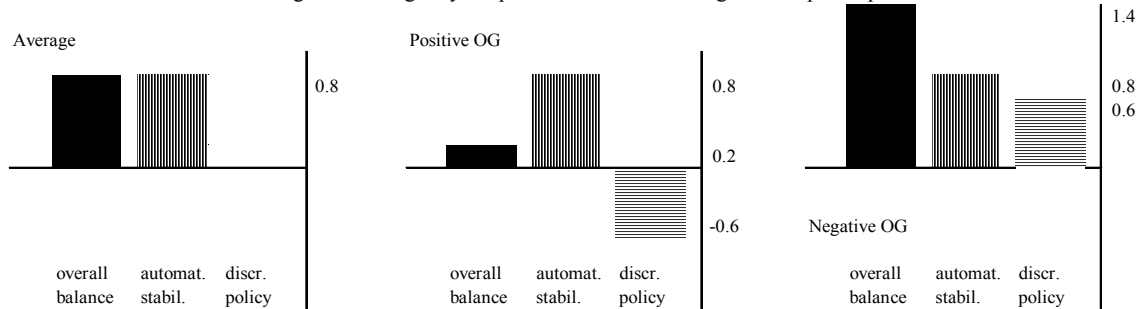


10.     **Rising deficits stemmed from a rapidly increasing expenditure to GDP ratio in the early eighties as well as the early nineties** (Figure 3). Expenditure rose from 57 to 66 percent of GDP between 1977 and 1982; subsequently, although declining, it did not return to its original level and, from a low of 59 percent in 1990, grew further, to reach 70 percent in 1993 in conjunction with the deep economic crisis the country faced in those years. Revenue lagged behind: the ratio to GDP rose from 57 to 59 percent over 1977–82 and, after rising further to reach to an average reach to an average of 62 percent over 1986–90, it fell back to



Figure 3. Expenditure and Revenue: Sweden, 1970-1994
(As a percentage of GDP)

Source: EU Commission, AMECO

59 percent in 1993. Superimposed on these trends, Sweden was also facing the prospect of further sharp increases in spending due to population ageing.
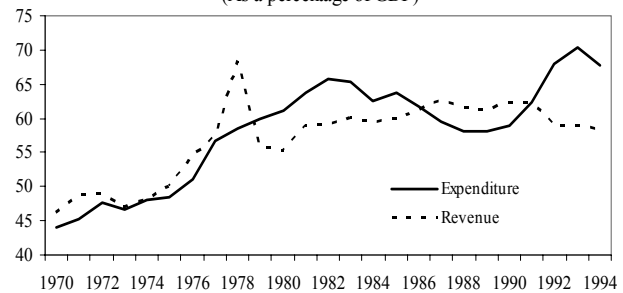
## C.  The Fiscal Framework

11.     **Sweden undertook a successful and impressive fiscal consolidation starting from the mid-1990s.** The general government debt to GDP ratio went down from 74 percent in 1994 to 53 percent in 2000 (Figure 4). Over the same period, the ratio of general government expenditure to GDP was cut by about 15 percentage



Figure 4: Debt to GDP ratios in Sweden and the EU: 1993-2004

points, from about 70 to 55 percent.[7]
Most of the reduction came from the
central government (local government
spending declined from 23.5 to 22.2
percent of GDP). The revenue ratio
remained stable at around 60 percent and
the general government budget balance
turned into a 5 percent of GDP surplus
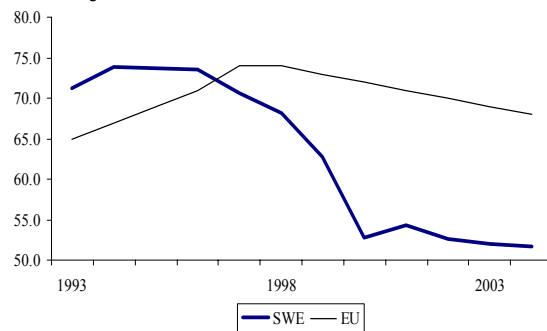in 2000 from a double-digit deficit in
1993 (Figure 5). Over most recent years,
the expenditure ratio hasn't changed
much, while the revenue ratio has been
cut by about 4 percentage points, with

Figure 5. Expenditure and Revenue: Sweden
(As a percentage of GDP)

the budget gradually drifting towards a balanced position. The gross debt ratio has not
declined much further either, but net debt has fallen to zero.
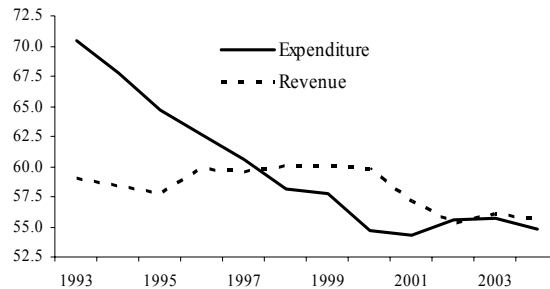
12.      **Sweden also implemented a radical
reform of its pension system.** The reform, put
into effect in 1999, introduced an automatic
balancing mechanism to adjust for
demographic changes, placing the system—a
pay-as-you-go defined contribution one, with
notional individual accounts—on a financially
sustainable basis (see Thakur and others, 2003;
and, for an insider's view of the reform,
Settergren, 2001).

Figure 6. Demand for Local Public Services1/
(Percentage increase)
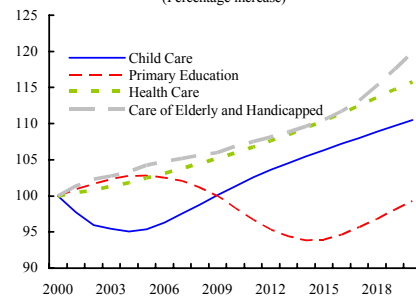
Source: Danniger (2004)
1/ Based on compositional changes in population age structure,
assuming constant utilization rates by age group and gender.
Comparisons are made relative to the level of local public services
provided in 2000 (standardized at 100).

13.      **However, financial pressure from
population ageing is still expected to build
health and long-term care programs.** Expected spending increases in these programs,
forecast at about 3 percentage points of GDP by 2050, are among the highest in Europe
(EPC, 2001). Figure 6—from Danninger (2004)—depicts projected increases in the
demand for the components of these public services provided by local governments.

14.      **The fiscal turnaround was accompanied by the introduction of a detailed
fiscal framework, defining rules for all levels of government and resting on a
transparent accounting system**. Concerns about the sustainability of public finances as
well as the need to correct "stabilization failures" in good times and a desire to allow for
effective countercyclical policy provided the rationale for the gradual implementation of
a rules-based fiscal framework after the crisis of the early 1990s (Heeringa and Lindh,
2001; SOU, 2002:16). In 1997, nominal expenditure ceilings for central government were

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[7] The sustained growth following the crisis of the early 1990s amplifies the reduction of
both debt and expenditures, measured as a share of GDP.

introduced with a view to setting the budget process in a controllable medium-term framework. At the same time, it was decided that general government should aim for a budgetary surplus of 2 percent of GDP, in order to secure a reduction in net debt level and to address the budgetary impact of an ageing population. This provision became operational in 2000, after the pension reform. Beginning from that year, a balanced budget requirement was also applied to local governments.

15.      **While the definition of the general government surplus target as an average over the cycle has remained unchanged since its initial formulation (SOU, 1997), the interpretation of the target has changed over time.** Initially the target was set with reference to the cyclically adjusted balance on a yearly basis (Swedish Ministry of Finance, 1998). Based on this definition, countercyclical movements of the budget balance would have been restricted to those arising from automatic stabilizers. Subsequently, the government specified that annual deviations from the medium term target could be tolerated depending on economic circumstances. Thus, in Swedish Ministry of Finance formulation (2000), the cyclically adjusted target for 2001 was set at 2.5 per cent of GDP, in a context where the economy was approaching a situation of full utilization of resources (Heeringa and Lindh, 2001). More recently, the 2 percent surplus target has been interpreted as referring to the average general government nominal balance as of the year 2000 (Swedish Ministry of Finance, 2004; Fischer, 2005).

16.      **Central government expenditure ceilings are determined annually for a period of three years based on a proposal by the government.** The ceilings cover primary expenditure in the state budget (including transfers to local governments) and old age pension expenditure. Based, *inter alia*, on forecasts of government revenue prepared by the Ministry of Finance (taking into account current tax rules plus any planned change), the ceilings are set with a view to the need to fulfill the medium-term budgetary target for the general government (Heeringa and Lindh, 2001). However, there is no formal guideline to this effect (Fischer, 2005). Recently, ceilings have come to be set as a constant share of potential GDP. Overall expenditures allowed under the ceilings are allocated to 27 spending areas and to a contingency reserve. The latter is not specifically designed to allow room for countercyclical spending; it also provides a buffer against forecasting errors and unspecified reforms (SOU, 2002:16; Schimmelpfennig, 2002). The detailed spending ceilings are voted as a whole by the Parliament, which limits the room for amendments, as opposition parties find it difficult to unite on a comprehensive alternative (Molander, 2000).

17.      **Local governments must plan for revenue higher than current expenditure.** Local governments can borrow to finance investment but revenues must cover the financing cost of the loans. In case the budget outturn is a deficit, compensating surpluses are required over the following years (though under some circumstances this may not be necessary). There is no sanction mechanism in the event of noncompliance.

18.      **The rule-based system is backed by high standards of transparency** (IMF, 2000). Budget documents provide a comprehensive coverage of general government and

they are available on a timely basis on the government website. The economic assumptions used are clearly stated in budget documents. A number of institutions regularly report and comment on budgetary assumptions, plans and outcomes (although none is formally entrusted with the task of assessing their consistency with the overall fiscal framework). The independence of the national statistics office is guaranteed by law.

## D. Emerging Pressures

19.     **The fiscal framework has so far adequately supported the political will to preserve sound fiscal policies.** While the main drive behind successful fiscal consolidations is always political commitment backed by the support of strong public opinion, a well designed fiscal framework can provide a reference against which progress along the adjustment path can be assessed, so as to keep the process on track and to avoid the loss of momentum which may occur once the crisis which initially motivated the correction is left behind.

20.     **The Swedish fiscal framework encompasses rules for all levels of government; it makes reference to several indicators and rests on a transparent accounting system.** Targeting a relatively high surplus for the general government addresses concerns over the sustainability of public finances arising from experience with rapid debt accumulation as well as from pressures related to population ageing. The definition in terms of "over the cycle" intends to reconcile soundness with flexibility and to ensure margins for stabilization policy. Multi-year expenditure ceilings for central government are a means to maintain control of the budgetary process, allowing a reduction of the tax burden, while avoiding excess spending in good times. The balanced budget rule for local governments recognizes that in a decentralized framework, fiscal discipline can only obtain with the contribution of all levels of government. Finally, the open discussion of policy, both at the implementation and at the assessment stage, underpins public support and ownership of the framework and increases the reputation costs of noncompliance.

21.     **However, the brief description in the previous section already suggests a number of problems potentially impairing the effectiveness of the framework:**

- **The 2 percent surplus target for general government is proving to be an elusive concept.** Subsequent shifts in the interpretation of the target are hampering assessment of compliance (Fischer, 2005). The currently prevailing interpretation, which refer to average values over a period of unspecified length, provides little check against a possible tendency to run procyclical policies in good times.

- **The expenditure ceilings for central government lack a formal anchor to a budget balance target** (ESV, 2004). This makes their level somewhat arbitrary and allows the use of tax expenditures to comply with the ceilings, substantially undermining the role of ceilings in ensuring fiscal discipline (IMF, 2000).

- **There is no specific provision for cyclical margins under the expenditure ceilings.** The full contingency margin can therefore be spent procyclically and leave little leeway in case of a downturn (Heeringa and Lindh, 2001; SOU, 2002:16; Schimmelpfennig, 2002; Annett, 2003).

- **The balanced budget requirement for local governments is not adjusted for the cycle.** Coupled with the high cyclical sensitivity of local government revenue—which is strongly dependent on personal income taxes[8]—this may result in procyclical policy in good times[9] and induce restrictive corrections or force a central government bailout in bad times[10] (McGranahan, 1999; Balassone and Franco, 1999; Danninger, 2004; Spilimbergo, 2005).

22.     **Annual targets for the general government budget have been repeatedly revised downwards, pushing the attainment of the two percent surplus beyond the medium-term policy horizon** (Figure 7). The general government recorded surpluses almost uninterruptedly since 1997. However, after 2001 the surplus has remained well below 2 ercent of GDP and no significant increase is planned over 2005–07, in spite of an improving output gap.[11] In recent years, when assessing compliance with the fiscal framework, reference has been made to the average surplus recorded since 2000. This may have blurred the perception of the slippage.[12] However, even when interpreted in in this way, the 2 pecent surplus target is now unlikely to be met before the end of the decade.

Figure 7:  Structural Balance Projections, 2003-05

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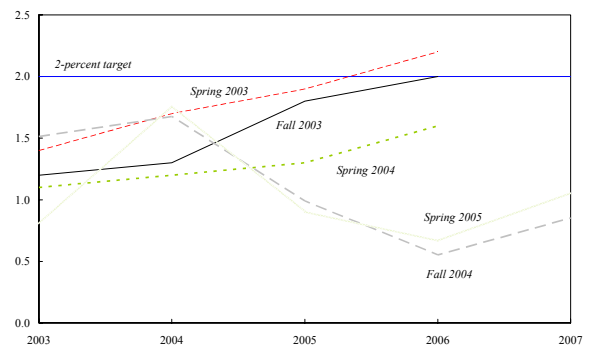
[8] The tax base also includes transfers not directly related to the cycle (e.g., pensions, early retirement benefits etc.). This somewhat reduces its cyclical sensitivity.

[9] Cross country comparison suggests that procyclical spending of revenue gains in good times is the rule, rather than the exception (see, e.g., Balassone and Kumar, 2005, and references therein).

[10] The possibility to compensate for a deficit over subsequent budgets somewhat reduces the problem (SOU, 2002). Moreover, legislation provides for unspecified exceptions to the rule and there are no sanctions for non compliance. However, this makes the rule a weak one. The end-result may be unchecked expenditure increase.

[11] Between 2002 and 2006, while annual values of the cyclically adjusted balance (outturn and projections) remain significantly below the 2 percent surplus target (with the exception of 2004), the average of these values as of 2000 is close to 2 per cent of GDP, thanks to the large surpluses recorded in 2000–01(Figure 9).

[12] While the cyclically adjusted fiscal balance reacted in a timely manner to the widening of the output gap over 2001–03, there are no plans for a symmetric response to the foreseen narrowing of the gap over 2003–06 (Figure 8). This suggests that the current

On the current policies, the average structural surplus is projected to fall to 0.9 percent of GDP during 2005–07 from an average of 1.9 percent of about 3¼ percent of GDP would be required over 2008–10 to attain the target of 2 percent of GDP over the decade to 2010.[13]

Figure 8: Cyclically Adjusted Balance and Output Gap(2001-06)
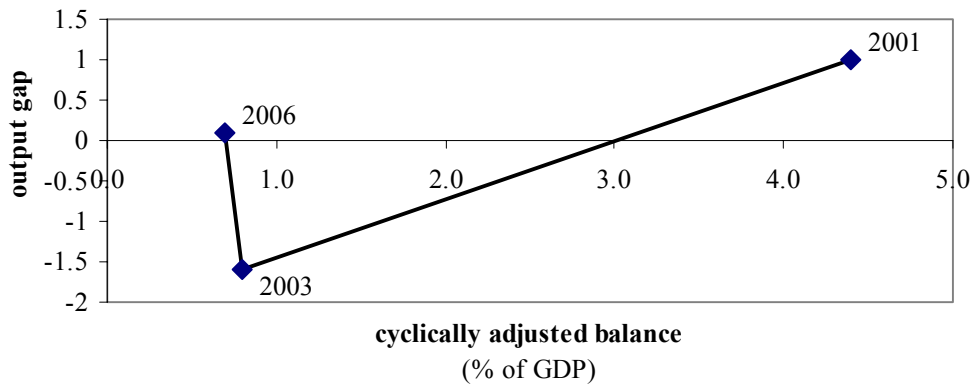


Source:  Ministry of Finance

Figure 9: Cyclically Adjusted Balance: Annual Values and Average as of 2000
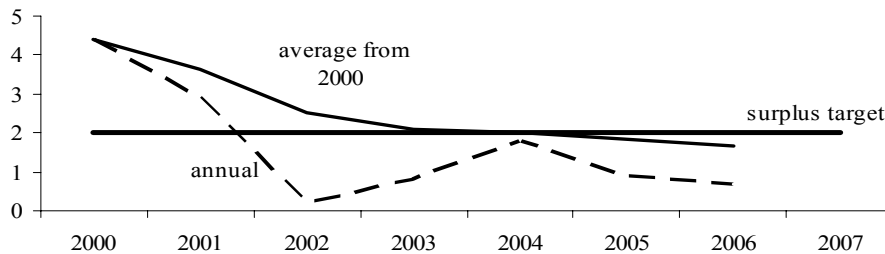


Source: Ministry of Finance

framework is having problems in correcting the procyclical bias underscored in Section II.

[13] The assessment would be similar if compliance with the target were to be gauged in nominal terms.

23.     **Tax expenditure have been rising over recent years and margins under the expenditure ceilings for central government have gradually narrowed.** Tax expenditures rose from less than 2 billion SEK in 2001 to a budgeted value of 16 billions in 2005 (Figuer 10). To avoid pressure on expenditure ceilings, for instance, local authorities have been charged lower value added taxes in return for reduced expenditure transfers (IMF, 2000). In 2003 the employment subsidy to local governments was treated as a decrease in revenue rather than as an expenditure item (Annett, 2003). Subsequent budgets have progressively set narrower expenditure margins even though the output gap has been improving since 2003 (Figure 11). The margins are now too thin to provide any leeway in the event of unexpected shocks (around 0.1 percent of GDP for 2005–06; 0.3 percent, on a provisional basis, for 2007). While compliance with the expenditure ceilings has been formally achieved—also by postponing some outlays—tax expenditure and full use of expenditure margins contributed to a deterioration of central government finances, with the balance moving from a 2.6 percent of GDP surplus in 2000 to a planned 1.6 percent deficit in 2005 (Figure 12).

24.     **Consistent with the balanced budget requirement, local governments used high revenues in the late 1990s and the early 2000s to support an expansion of consumption.** When local government revenue faded, the balanced budget requirement resulted in increases in both local income tax rates (by about 1 percentage point over 2003–04; Figure 13) and central government grants (from 5.0 per cent of GDP in 2000 to 5.4 percent in 2005). The former have offset some of the tax cuts at the central government level, while the latter have added to pressures on central government expenditure ceilings.

25.     **Sweden's fiscal performance over the last decade nevertheless remains impressive in comparison with other advanced economies.** The fiscal framework has certainly contributed to this success. It is only when gauged against its own ambitious targets that the fiscal framework shows signs of stress. Compliance with the rules is not perfect, but it undoubtedly exceeds the standards achieved elsewhere in Europe. However, while the weaknesses of the framework are not an immediate threat, they could become more problematic in the medium-long term.[14]

26.     **A drift away from the spirit of the fiscal framework under the current relatively favorable economic conditions may erode its credibility.** The lack of margins for countercyclical policy in a downturn may put in question the economic rationale of the framework. Failure to maintain a countercyclical stance across the

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[14] Similar concerns are also expressed in Riksbank (2004).

Figure 10:  Tax Expenditures
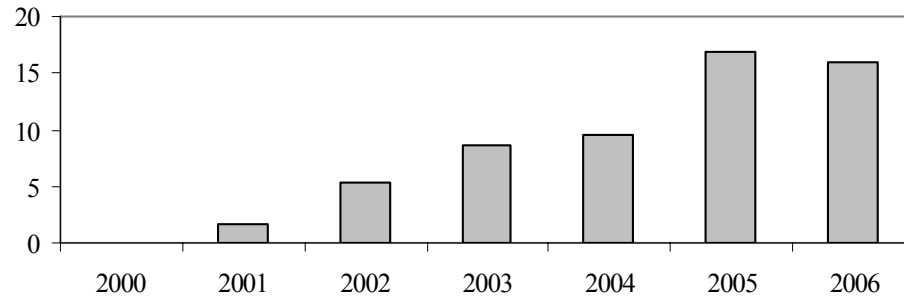(In billions SEK)



Figure 11:  Expenditure Contingency Margins
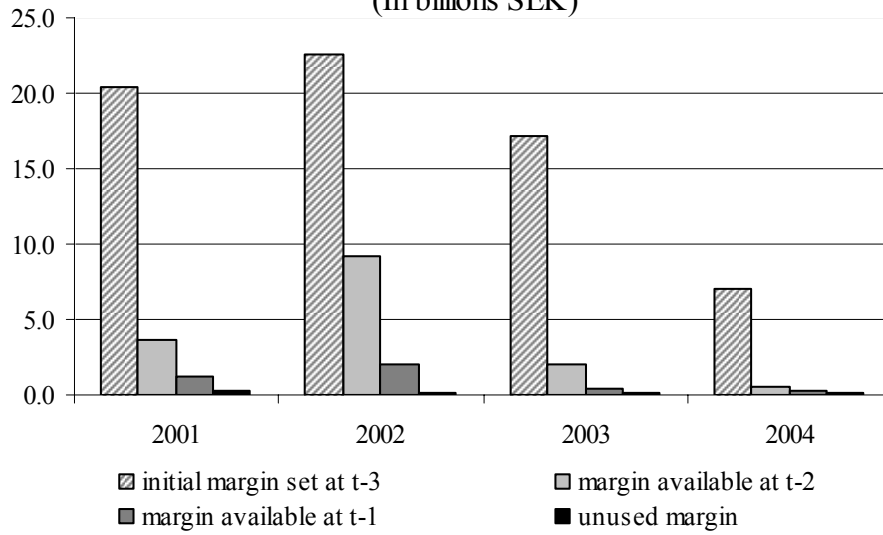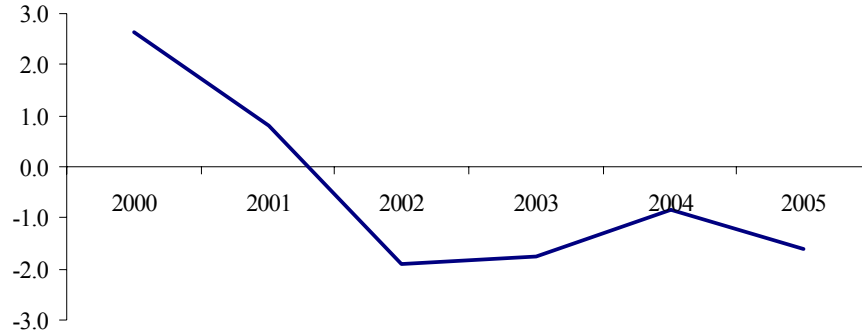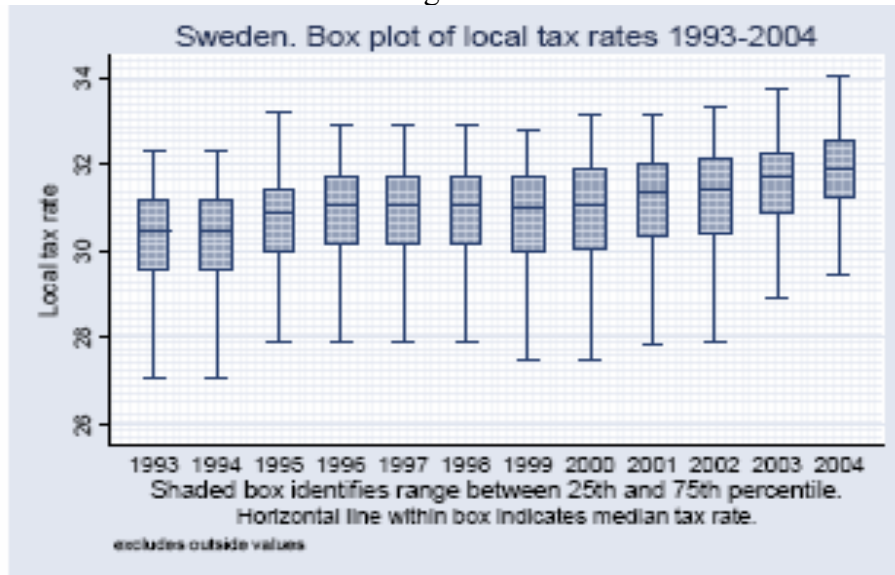(In billions SEK)

Figure 12: Central Government Balance (percent of GDP)



Source: Ministry of Finance

Figure 13



Source: Danninger (2004)

business cycle may force the authorities into a painful choice between having to forfeit stabilization policies and repudiating their medium term fiscal target, in the event of an unexpected downturn. The second option may turn out to be politically more palatable, as experience with the European Stability and Growth Pact suggests.

### E.  Policy Implications

**Surplus Target and Expenditure Ceilings**

27.      **Resolving the ambiguity concerning the interpretation of the 2 percent surplus target for the general government is a priority.** The interpretation of the 2 percent surplus objective determines which annual targets in nominal terms are consistent with the fiscal framework. Ambiguities in the interpretation therefore impair the assessment of compliance. Clear and simple targets are the cornerstone of an effective fiscal framework. They are the precondition of accountability. They allow monitoring by the public and facilitate control by technical bodies formally entrusted with the task.

28.      **All interpretations utilized in the Swedish context are consistent with the rationale of the fiscal framework.** However, there are differences in both the degree of discretion allowed and the implementation difficulties involved.

**Averages over the cycle provide flexibility, but the availability of discretion says nothing about its use**. Reliance on a target defined as an average over the cycle implicitly assumes that flexibility will be consistently used for stabilization purposes. This assumption is not supported by evidence on the cyclical asymmetry of fiscal policy.[15] If fiscal policy tends to be countercyclical in bad times and procyclical in good times, the definition of an average target will have to be supported by further guidelines to avoid procyclicality.[16] Moreover, compliance with average targets requires that policy in the early years of the cycle be guided not only by an assessment of current cyclical conditions but also by forecasts concerning the length and width of the cycle (Box 1). Interpreting the 2 percent surplus target as an annual cyclically adjusted value (possibly making it explicitly contingent upon economic circumstances) would strike a better balance between flexibility and discipline.

29.      **The main problem with the expenditure ceilings as they are currently set is that they can be circumvented through tax expenditure**.[17] Formal guidelines could be issued to

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[15] See section II (and references therein) and Footnote 10 above.

[16] See also Boije (2005).

[17] IMF (2000) recommends taking into account tax expenditure in assessing performance against expenditure ceilings (see also Boije, 2002 and 2005). Annett (2003) suggests setting the ceilings in the accounting framework provided by the national accounts where most tax expenditures are recorded as outlays.

**Box 1 - Cyclical Asymmetry in Fiscal Policy and Targets "Over the Cycle".**

**By overlooking the tendency of policy towards asymmetric procyclicality, fiscal frameworks based on targets defined as averages over the cycle may carry the seeds of their own demise.** Reference to average budgetary outcomes allows conducting relatively lose policies today and to postpone adjustments towards the end of the reference period (or to postpone the end of the reference period itself, if this is not tightly specified). The likely end game is that the fiscal framework will come under strain as soon as it requires a procyclical adjustment in bad times. The unchecked deficit bias in good times will ultimately undermine the credibility of the framework because its prescriptions will be seen as lacking economic rationale; it will be either *de facto* disregarded or repudiated outright.

**Recent developments in the European Union provide the most prominent example of this type of problems.** The difficulties of several member states in keeping their deficits within the limit set by the Maastricht Treaty arose after 2001 in an adverse macroeconomic environment. However, their origins are rooted in insufficiently ambitious policies followed over 1999-2000, when conditions were favorable (Figure 1). Nevertheless, the Stability and Growth Pact (SGP) has notoriously been labeled as "stupid", it has been put on hold and its reform has been the subject of a hot debate (Buti, Eijffinger and Franco, 2003, and Annett, Decressin and Deppler, 2005, provide succinct accounts).

**In this case, the different status of the 3 percent of GDP ceiling set for the annual nominal deficit and of the medium term objective of close to balance or in surplus may have been an augmenting factor.** While the former is defined in the Treaty and sanctions are foreseen in case of non compliance, the latter is defined in the SGP and is not backed by similar incentives. This asymmetry has allowed attention to focus on the nominal deficit ceiling at the both the policy and the monitoring levels, thus reducing pressure against the adoption of procyclical policies in good times**.** Significantly, most of the reforms proposed by policy makers aim at relaxing the nominal deficit ceiling in bad times, while little attention is paid to how to induce countercyclical behavior in good times. This tendency is also reflected in the reform proposals recently agreed upon, as described in European Council (2005).

**However pressure is also building up in the UK, where the objective to achieve a current balance surplus over the cycle is not accompanied by nominal deficit ceilings.** The cumulative current balance in this cycle is still in small surplus, so the target is likely to be met or missed by an insignificant amount (Figure 2). However, on current policies the next cycle is likely to start with a less favorable current balance position than the large initial surplus recorded at the beginning of the present cycle and there is a risk that the target may not be met in the next round (IMF, 2005).

Figure. 1: France and Germany: Cyclically Adjusted and Nominal Balances, 1998-2003
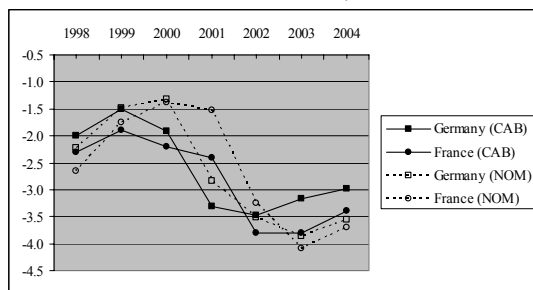
Figure 2: U.K: Current Account Balance and Output Gap, 1999-2006





(*) Source: EC (2005)
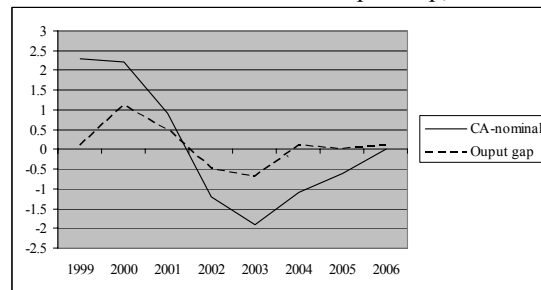
(*) Source: IMF (2005)

ensure that the ceilings are set at levels consistent with the 2 percent surplus target for general government. The elusive definition of the 2 percent target has so far proved an obstacle to the implementation of such guidelines. In this context, the introduction of a budget target for central government—to accompany the one set for general government—would be a facilitating element (ESV, 2004).[18] This option would also increase the transparency of the overall framework by spotlighting the implications for central government finances of the target set at the general government level.

31.      **A second issue relates to the absence of a specific provision for cyclical margins under the expenditure ceilings.** That the full contingency margin could be spent procyclically and leave little leeway in case of a downturn was noted early in the debate on the Swedish fiscal framework (e.g., Heeringa and Lindh, 2001). This has been relatively unproblematic so far because the Swedish economy has not undergone a serious downturn since the introduction of the expenditure rule. However, while SOU (2002:16) suggested a cyclical margin of 1 percent of GDP, overall margins are currently at 0.1 percent of GDP. One possibility is that quotas of margins under the ceilings be earmarked for different purposes. Margins under the ceiling, however, tend to work asymmetrically (Schimmelpfennig, 2002). They would be used fully during a downturn but compensating underspending would not be guaranteed in the upswing. To avoid this potential overspending bias, the ceilings, and the underlying margins, could be set at central values consistent with potential growth, allowing overruns/savings depending on output deviations from trend (Danninger, 2002). The technicalities of these and similar solutions are discussed in Schimmelpfennig (2002).

32.      **The possibility to delegate to an independent agency the estimation of the nominal balance consistent with the 2 percent surplus target could be considered.** While resolving ambiguities will increase transparency, this is only a necessary condition for the effectiveness of the fiscal framework. Transparency may enhance the reputation costs of non-compliance, but this may prove a weak incentive if, for instance, fiscal issues do not have a dominant weight in voters' choice at elections. Moreover, if the potential for deviations from

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[18] Expenditure ceilings ($G^C$) could be set according to $G^C = B^* - E(T)$ where $E(T)$ is expected revenues and $B^* = (G - T)$ is the target surplus. In this way tax expenditures could not be used to ensure compliance with the fiscal framework since they affect $E(T)$ and expenditure ceilings are defined taking them into account. There are two main obstacles to this type of arrangement. First, as discussed in the main text, the determination of $B^*$ in nominal terms depends on the interpretation of the 2 percent surplus target. Second, the surplus target from which the nominal $B^*$ is to be derived refers to the general government while $G^C$ refers to central government. Therefore it is necessary to provide indications as to how to derive a $B^*$ for central government consistent with the $B^*$ computed for the general government. A further problem is the reconciliation between the different accounting systems to which the general government surplus target and the central government expenditure ceilings refer (national accounts and public accounts, respectively).

the fiscal framework is rooted in time-inconsistency of policy, voters may well approve the governments' choice to deviate. In this respect, the literature on fiscal rules and frameworks has long stressed the importance of enforcement mechanisms.[19] More recently, with the debate on "independent fiscal councils" (IFCs), the emphasis has shifted to the possibility to delegate, at least partially, the implementation of policy. The notion of IFCs covers a wide range of arrangements, from soft versions—where IFCs simply provide monitoring of compliance—to hard ones—where IFCs are entrusted with the power to implement policy changes using selected fiscal instruments.[20] While beneficial in terms of transparency, the arrangement proposed here can be seen as a step in the direction of introducing a "soft" IFC.[21] The independent agency, by estimating the annual nominal balance consistent with the provisions of the framework, would actually be setting the envelope within which policymakers would then take decisions concerning the allocation and distribution of resources.[22] Given appropriate legal status,[23] the agency's recommendations could provide a shield against time-inconsistency problems and/or weaknesses of reputation-based incentives provided by transparency.

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[19] See, e.g., Inman (1996), Kopits and Symansky (1998) and Banca d'Italia (2001).

[20] Early discussions of IFCs can be found in Von Hagen and Harden (1994), Blinder (1997), and Gruen (1997, 2000). Among recent contributions are Wyplosz (2002, 2005) and Calmfors (2003). Hemming and Kell (2001) provide a critical evaluation of the proposal. De Brun, Hauner and Kumar (2005) offer a concise and updated review of the literature and discussion of the issues. SOU (2002:16) specifically discusses the introduction of an IFC in Sweden.

[21] The proposal is in line with the recommendation in IMF (2000) to establish a more formal process of review of the macroeconomic assumptions underlying the budget in Sweden. In Canada, for instance, a panel of experts is "polled" by the government for the macroeconomic assumptions underlying the budget. This choice has substantially contributed to the sustained improvement in Canada's fiscal balance in recent years (Mühleisen and others, 2005).

[22] Rules based fiscal frameworks are seldom explicitly framed in cyclically adjusted terms. One exception is Chile where, in 2001, the government announced a rules-based policy whereby a CAB surplus of one percent of GDP is targeted yearly. A panel of experts is assigned the task to compute potential output and to assess the implication for the budget of deviations from trend. The independent agency referred to in the main text would perform a similar task.

[23] For instance, deviations from the recommendations could be restricted to a pre-specified set of circumstances and should always be accompanied by a detailed motivation.

**Local Government Finances**

33.      **Multi-year expenditure ceilings could be introduced for the local governments and/or the balanced budget requirement could be based on potential rather than actual revenue.** This would reduce the procyclical bias resulting from the interaction between the high cyclical sensitivity of local government revenue and the balanced budget rule. SOU (2002:16), in a similar vein, suggests that "To strengthen the automatic stabilisers, local government income should be stabilised over the business cycle. The primary model  that should be considered is to calculate the local government tax base on the basis of an average of taxable income over several years. Alternatively, central government grants can be formulated so that they automatically compensate for the effects of the business cycle on the local government tax base" (p. 20).

34.      **However, budgetary pressure arising in the local government sector may have deeper roots**. As the mandate of local governments is open-ended and the determination of central government transfers allows some discretion, incentives for fiscal discipline are low. Local governments provide a large share of social services (notably health services) to which equal access must be granted across the nation. However, there is no fixed rule or mechanism to link changes in grants to changes in demand or other economic developments.[24] Central government grants are partly distributed according to tax capacity and structural costs. Nevertheless, the central government has full authority to decide over the level of transfers and budgetary risks have been specifically associated with the presence of this discretionary element within the transfer system (Johansson, 2003).[25]

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[24] The "financing principle" legislated in 1993 does however ensure that *new* measures introduced by the central government that directly affects local governments must be accompanied by a means of financing that does not involve raising local taxes.

[25] A detailed analysis of the issues involved (not necessarily specific to Sweden: see Box 2) and the formulation of specific proposals is far beyond the scope of this paper. It is worth mentioning, however, that possible solutions include: a) refining the definition of the mandate (spelling out what services local governments must provide); b) reducing the bargaining latitude within the equalization scheme (linking finance to the cost of provision of mandated services); c) providing incentives for efficient use of resources (transfers should not cover the full cost of mandated services).  A commission (Committee on Public Sector Responsibilities) has been appointed to examine the problems. It released a first report in 2003 (Ansvarkommittén, 2003): an English summary is available at http://www.sou.gov.se/ansvar.

**Box 2 – Decentralization: Equalization Schemes and Budgetary Discipline**

**A decentralized government structure offers potential allocation and cost efficiency advantages.** As responsibility for the management of services is entrusted to a level of government which is closer to the area in which the services are provided, supply can be better adjusted to the needs and preferences of the citizens (Buchanan, 1965; Cornes and Sandler, 1995). Moreover, monitoring of the conduct of elected representatives can be more effective and yardstick competition across jurisdiction can provide further efficiency-enhancing incentives (Tiebout, 1956; Salmon, 1987). Tight conditions must be met in order to actually exploit these advantages. The effectiveness of monitoring and the extent of yardstick competition depend on high standards of transparency. Dominance of local interest groups can prevent the full deployment of allocation advantages.

**Since decentralization typically involves more locally determined expenditure than revenues, the need to cover the resulting gap by central government transfers can reduce the incentives to fiscal responsibility** (Buchanan, 1967; Oates, 1972). A rigorous interpretation of the classical theory of the assignment of government functions would leave very little scope for own revenues at the local level (Musgrave, 1959; Ter-Minassian, 1997). A gap between expenditure and revenue at the local level may also result from the pursuit of a homogeneous minimum level of services across jurisdictions with an uneven distribution of tax bases.

**Central governments' financial support to local administrations is often cited as one of the factors underlying excessive growth in public expenditure** (e.g., Stein, 1998; Garcia-Milà, Goodspeed and McGuire, 1999; De Mello, 2000; Drummond and Mansoor, 2002; Rodden, 2002 and 2004; and Bordignon, 2004). The mandated level of service is usually difficult to specify clearly. Therefore, the cost implication of uniform service provision across the country are difficult to assess and the responsibility for any budget overrun becomes blurred, with the blame falling with equal plausibility on unfunded mandates and on inefficient management. In these circumstances, the probability that the central government is called to bailout the local government is high. The bargaining position of the local vis-à-vis the central government is stronger if local governments carry out a large share of social expenditure and a failure to accommodate the level of transfers entails the risk of significant disruptions in the provision of services. Allowing borrowing authority is not a solution, indeed an open bailout then becomes a possibility.

**The reaction to these problems has usually been the introduction of some form of fiscal rules for local governments** (Eichengreen and von Hagen, 1995; Ter-Minassian and Craig, 1997; Balassone and Franco, 1999; Banca d'Italia, 2001; Daban and others, 2003; Kopits, 2004). However, unless the roots of the problems are adequately dealt with, issues arise concerning the credibility and the enforcement of rules. If responsibilities are blurred and local governments have a high bargaining power the presence of formal rules can make little difference to actual behavior (Banca d'Italia, 2001; Rodden, 2004).

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## II.  THE TAX-BENEFIT SYSTEM AND LABOR SUPPLY IN SWEDEN[1]

### A.  Introduction

1.      **Sweden's high labor supply, despite its high tax wedge on labor, stands out in international comparisons** (Figures 1 and 2)**.** This apparent paradox could be, however, resolved if labor supply were viewed in the broader context of a tax-benefit system that also provides incentives for labor participation. In particular, as the authorities and staff have noted, Sweden's generous public spending on child and elderly care enables higher labor force participation by women, despite the high tax wedge. Therefore, in formulating an effective policy strategy, it is important to analyze and understand the complex interactions between the tax-benefit system and labor supply, particularly for women, taking into account the influence of various social welfare programs and labor market institutions.

2.      **The high proportion of working women accounts for Sweden's high effective labor supply.** Most of the cross-country variation in labor supply, measured in terms of labor force participation and hours worked per working age population, can be explained by the female component. Swedish women, similar to American women, work much more than other European women, both in terms of participation in the labor market and in terms of hours worked. The participation rate of working age women is around 80 percent in Sweden, compared to a mere 55 percent in the EU for the period 1983–2003. In addition, Swedish female labor supply, measured in terms of hours per working age population, has been persistently one of the highest in the OECD. While

Table 1: Labor force Participation (15-64) by gender, 1983-2003

|  | Total | Male | Female |
|---|---|---|---|
| Western European Countries |  |  |  |
| Belgium | 61.4 | 72.7 | 50.0 |
| France | 67.0 | 75.2 | 58.8 |
| Germany | 69.4 | 79.9 | 58.8 |
| United Kingdom | 76.3 | 85.9 | 66.7 |
|  |  |  |  |
| Scandinavian Countries |  |  |  |
| Denmark | 80.4 | 85.2 | 75.4 |
| Finland | 74.3 | 77.0 | 71.6 |
| Norway | 78.4 | 84.2 | 72.3 |
| Sweden | **81.1** | **83.5** | **78.6** |
|  |  |  |  |
| Other Developed Countries |  |  |  |
| EU-15 | 67.5 | 79.2 | 55.8 |
| G7 | 72.0 | 82.3 | 61.8 |
| OECD | 69.6 | 81.7 | 57.7 |
| US | 76.2 | 84.6 | 68.1 |

Source: OECD, Employment Outlook 2004.

Figure 1. Sweden and Select OECD Group of Countries: Labor force Participation Rate, 1970-
2003
(In percent)

*Swedes have one of the highest participation rates in the world...*



*Sweden works more than the original EU member countries...but its lead has been eroding...*
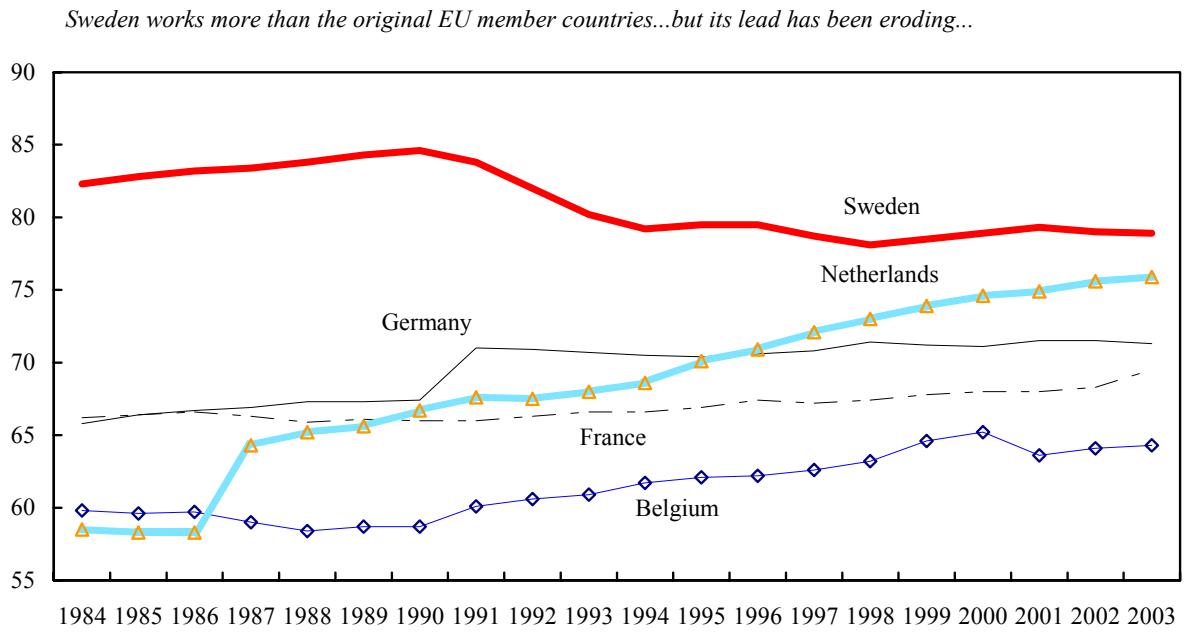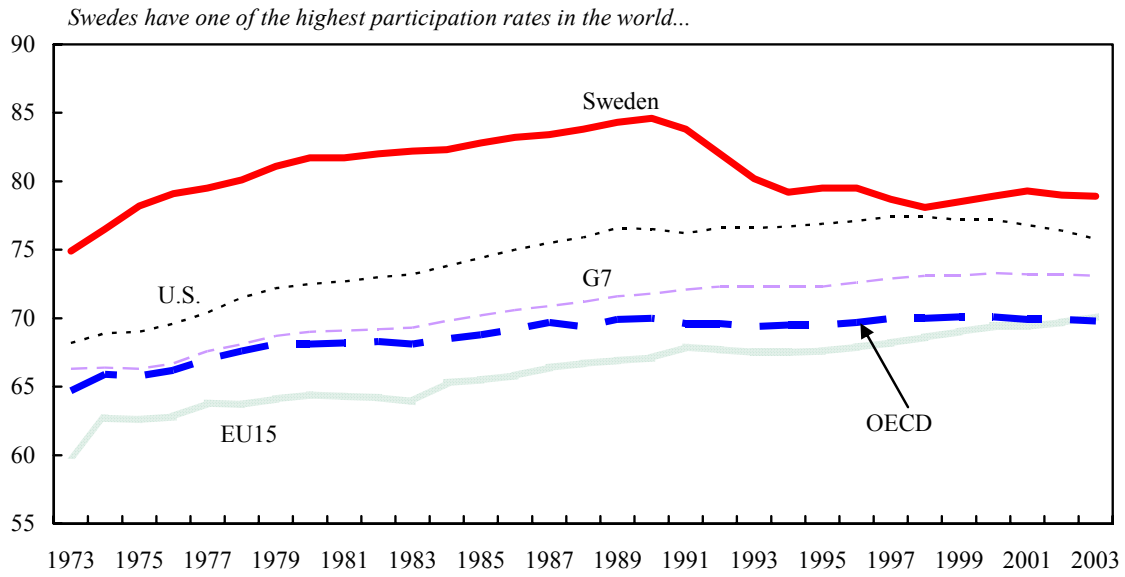


Source: OECD Employment Outlook, 2004.

Figure 2. Hours Worked per Working Age Population in Select OECD Countries, 2002
(Sweden=100)



Total Hours per working age population (16-64)

US  AUS  CAN  PRT  UK  MEX  FIN  SWE  SVK  DEN  IRL  AUT  GRC  ESP  NOR  POL  HUN  NTL  GER  FRA  ITA

Female hours worked per working age population (16-64)

CAN  US  NZL  FIN  PRT  SWE  UK  AUS  DEN  SVK  IRL  NOR  AUT  POL  HUN  MEX  FRA  GRC  GER  ESP  NTL

Male hours worked per working age population (16-64)

MEX  CAN  NZL  AUS  PRT  US  UK  GRC  ESP  IRL  SVK  FIN  AUT  SWE  NTL  DEN  NOR  POL  GER  HUN  FRA

Source: OECD and Fund staff calculations.

Sweden's aggregate labor force participation rate was almost 14 percentage points higher than the EU average in 1983–2003, male participation was only about 4 percent higher. In terms of hours worked per working age population, Swedish men worked less than most of their counterparts in the OECD; yet, in the aggregate, Swedes worked considerable more, reflecting the high labor input from Swedish women (Figure 2).

3.      **Differences in hours worked are also reflected in differences in hours allocated to "home production".** Scandinavian women spend more time in market work and less in home work. Scandinavian men, on the other hand, spend more time in home work than many other Europeans. These differences are to some extent rooted in cultural and social norms, but they also reflect economic incentives. These include the system of family taxation, government support to families in the form of child-care subsidies, child benefits and paid parental leave, flexible working-time arrangements and generous sickness leave arrangements.

Table 2: Home Work by Gender (Sweden=100)

|           | Male  | Female |
|-----------|-------|--------|
| Denmark   | 85.7  | 89.7   |
| Norway    | 90.5  | 100    |
| **Sweden** | **100** | **100** |
| U.S.      | 81    | 103.4  |
| Finland   | 85.7  | 103.4  |
| U.K.      | 85.7  | 110.3  |
| Germany   | 90.5  | 113.8  |
| France    | 85.7  | 120.7  |
| Belgium   | 100   | 124.1  |

Source: Ragan (2005).

4.      **Swedish workers continue to face a very high tax burden despite some recent reduction in income taxation.** Swedish tax revenue as a percentage of GDP has increased from 35 percent of GDP in 1965 to over 50 percent of GDP in 2002, about 10 percentage points higher than the EU average and almost double the U.S. level (Thakur et al., 2003). This is necessary to finance the highest government spending in the OECD. High taxation is regarded as a disincentive to labor supply, since individuals find it optimal to forfeit market work and participate in the tax-exempt home production.

Government Expenditure in OECD Countries, 2003 1/
(In percent of GDP)
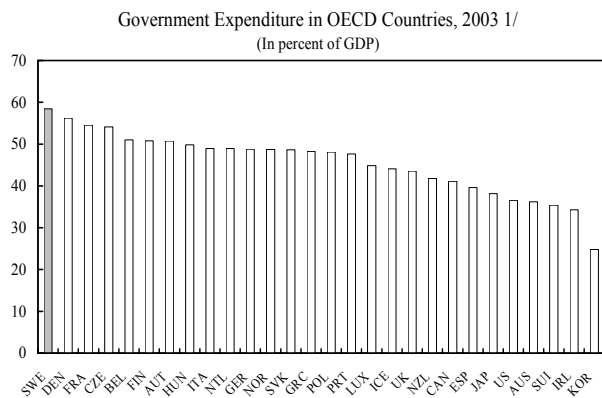
Source: OECD, National Accounts, General Government Accounts, 2004.
1/ Latest available observations were used for Iceland, Japan, Korea, Mexico, New Zeland and Switzerand.

Tax Revenue in OECD Countries, 2002
(In percent of GDP)
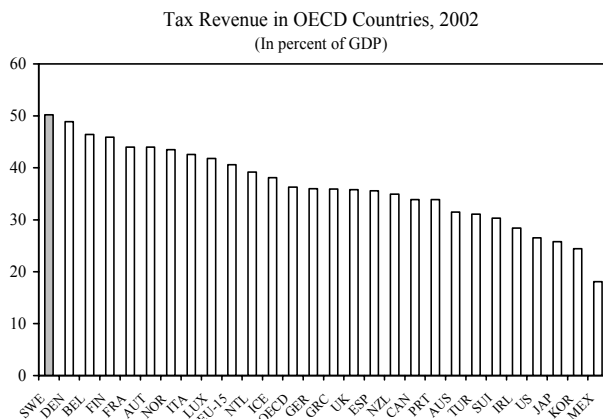
Source: OECD, Revenue Statistics, 2004.

5.      **In the context of efforts to promote employment in view of imminent aging of the population, the issue of female participation has become prominent.** Pressures for the provision of public services are expected to continue, which have initiated many OECD countries to target for an increase in the female labor supply, which traditionally falls short of the male one. All countries acknowledge that in addition to productivity growth, increasing female employment is an obvious intermediary to economic growth. As it was pointed out by Jaumotte (2003), policies helping women to reconcile work and family are also politically more acceptable than policies aiming at extending retirement age.

6.      **The objective of this paper is to analyze the complex interactions between the Swedish tax-benefit system and labor supply for both genders in a comparative OECD perspective.** Unlike previous studies, which generally focus on aggregate hours worked, we consider female and male behavior separately, using both measures of labor supply.[2] The study reviews Sweden's tax and benefit system from an international perspective and empirically explores various explanations for the cross-country differentials in labor supply. It then discusses the likely impact of a further increase in the tax burden on labor supply and whether the benefit system offsets some or all of the negative implications of high taxation for labor supply.[3] To keep our analysis tractable and suitable for cross-country comparisons, our study is focused on the macro-level.

7.      **The econometric results suggest that benefits do have a positive effect on labor supply, which, however, is partly offset by the negative impact of taxation.** The results confirm that the public provision of these services has a significant positive effect on labor supply, which helps explain the remarkable labor market outcomes in Sweden and other Nordic countries. Nonetheless, the positive impact of these benefits is smaller for countries where benefits are large, while the negative impact of taxes is stronger for countries where taxes are high. For example, in the case of Swedish males, the tax elasticity is estimated to be more than three times as high the sample average for participation and about twice as high for hours worked.

8.      **The paper is structured as follows**. Section B reviews the current Swedish tax-benefit system from an international perspective. Section C briefly reviews the existing literature that this study aims to complement and outlines the theoretical models underpinning the econometric analysis. Section D describes the econometric model and the results. Section E discusses the policy implications.

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[2] Jaumotte (2003) and Genre et al. (2005), who concentrate on female labor participation are obvious exceptions.

[3] Lundgren et al. (2005) find that 90 percent of the incidence of taxes in Sweden eventually falls on labor. In that respect, changes in the tax burden would likely lead to a substantial distortion of the labor/leisure/home production decision.

### B.   The Swedish Tax-Benefit System in an International Comparison

**The Tax System**

9.      **In Sweden, similar to many other European countries with progressive personal tax systems separate tax filing, diminishes the disincentive effects that taxes have on labor supply** (Gustafsson, 1992). In particular, the switch of the tax basis from joint filing to individual filing in 1971, greatly reduced the marginal tax rates on the earnings of secondary breadwinners. For example, for married couples earning the average manufacturing wage, the marginal tax rate on earnings of a spouse working half-time fell from 55 percent in 1970 to 32 percent in 1971 (Rosen, 1996). This switch could have contributed to the considerable increase in female labor participation in the 1970s.

10.     **However, the high tax burden on primary breadwinners could help explain the comparatively low male labor supply.** Cultural and social norms still dictate that most often males are the primary breadwinners in the family. In that respect, tax incentives for the primary breadwinner are expected to affect primarily the male labor supply.[4] The lower tax wedge in Anglo-Saxon Europe and North America as compared with Sweden could help explain their comparatively higher male labor supply mentioned above. Swedish men face a similar tax wedge as the rest of the Europeans which could partly explain the cross-country differences in hours worked. For example, primary breadwinners in France and Sweden face tax wedges which are almost twice the level of those in Canada. Reflecting these differences in tax wedges, Canadian men work 30 percent more hours than Swedish men and 40 percent more than French men.

Tax Wedge for Primary Breadwinner in OECD Countries, 2004[1/2/]
(In percent of labor costs)
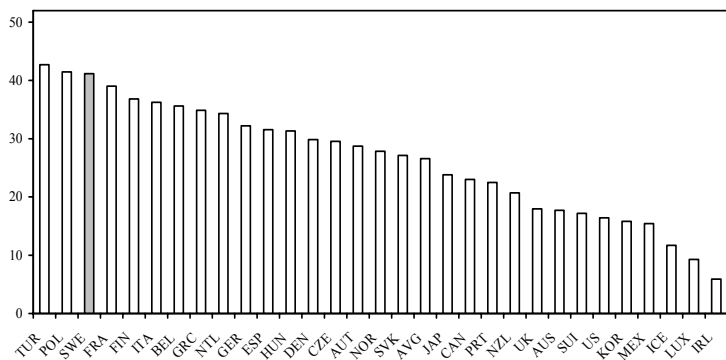


Source: OECD (2004): Taxing Wages - Historical Tax Rates.
1/ The tax wedge is defined as the combined burden of income taxes plus employee and employer social security contributions as a percentage of labour costs (gross earnings plus employer social security contributions).
2/ Primary breadwinner in a married couple with two children, where the primary earner receives 100% of APW, and the spouse does not work.

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[4] The benefit system is assumed to have a minor impact on the primary earner's labor supply decisions, since most of the benefits (such as subsidies for child and elderly care) specifically target the secondary breadwinner.

11.     **The Swedish tax wedge on secondary earners is not one of the highest in the OECD.** This favorable tax treatment, which is likely to reflect the individual filing provision and the high progressivity of the Swedish tax system, could partly account for the comparatively high Swedish female labor supply. Typically, the woman is the secondary breadwinner in the family. In that respect, the favorable tax treatment for the secondary breadwinner is expecte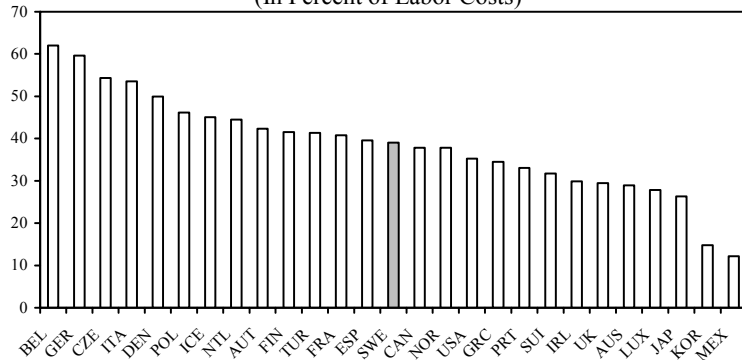d to mostly influence female labor supply. Swedish secondary breadwinners enjoy lower tax wedges than North Americans and other Europeans such as the Dutch, Belgians and Germans, which could be important in explaining the higher female

Tax Wedge for Secondary Breadwinner in OECD Countries, 1997-2004 [1]
(In Percent of Labor Costs)

Source: Jaumotte (2003), OECD (2004) Taxing Wages, and Fund staff calculations.

[1] Secondary breadwinners in a married couple with two children, where the primary earner receives 100% of APW, and the spouse earns 67% of APW.

participation rates in Sweden. Female labor force participation as a percentage of working age population in Germany and Belgium is less than 60 percent compared to 80 percent in Sweden, while their tax wedges are almost twice as high as the Swedish ones.[5]

12.     **The tax treatment for secondary breadwinners alone, is not sufficient to account for cross-country differences.** The differential in tax treatment cannot, however explain the fact that French women work much less than their Swedish counterparts, both in terms of participation rates and hours worked. Despite the fact that the French tax wedge on secondary breadwinners is lower than the Swedish one, the French female participation rate is similar to the German one and hours worked are 25 percent lower than the corresponding figure in Sweden. This suggests the importance of considering the benefit system as well.

**The Benefit System**

13.     **The tax wedge and cross-country variations in benefit systems that target the secondary earner could help explain the cross-country differences in female labor supply**. The willingness of an inactive spouse to enter the labor market and the effort that she/he puts into the market is affected by factors other than the tax wedge. Availability of

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[5] Due to the lack of available historical data on annual labor costs we ignore employer's social security contributions when estimating the tax wedge on secondary breadwinners in the econometric exercise. This simplification does not influence our results. The reader is referred to the appendix for additional information.

cheap, convenient and high-quality household goods in the market, such as child and elderly care and generous parental leave, are some of the other factors that might be relevant in shaping an inactive spouse's decision to become an active participant in the labor force.

### *Childcare*

14.     **Government benefits that assist in managing parenting and working roles could be pivotal in explaining cross-country variations in female labor supply, particularly in countries with compressed wage structure.** Wage compression raises the wages of care-givers and other providers of household goods, who tend to be concentrated at the bottom of the wage distribution, and thereby reduces access of inactive spouses (mostly mothers) to affordable market-provided childcare and other household goods. This phenomenon is observed in most European countries that do not provide publicly subsidized child and elderly care. In the US and Canada, on the other hand, the flexibility of the labor market tends to reduce wage compression and ensures that



Statutory Minimum wage in percent of APW, 2001
(In Full-Time Basis)
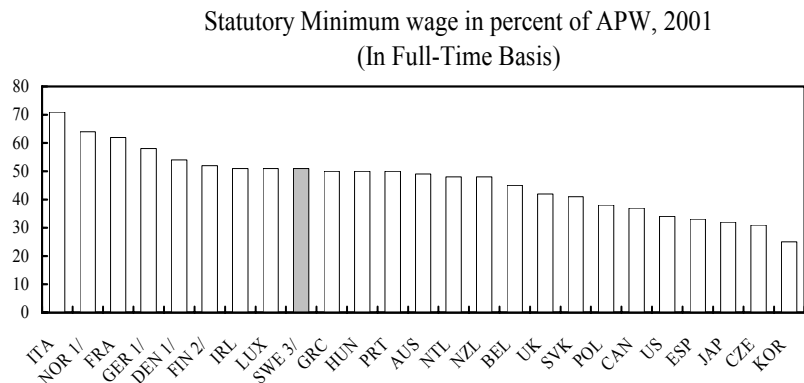
Sources: Eurostat (2004), Wascher and Neumark (2003), Immervoll et al. (2004).
1/ Data refer to 1994.
2/ Data refer to 1993.
3/ Data refer to 1992.

privately-provided household goods are affordable, despite the lack of government subsidies. Wage compression, therefore, seems to be an important factor to take into account when analyzing the impact of benefits on labor supply decisions of secondary breadwinners. It is expected that female labor supply in countries with compressed wage structures would be more responsive to publicly provided benefits than in countries with low wage compression. Indeed, studies find that the availability and cost of childcare do affect female labor supply. Although the studies differ in the way cost of childcare is measured, all find that the supply of women's labor to the market declines as the availability of appropriate childcare falls and its costs rises.[6]

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[6] Examples include Connelly (1989) and Blau and Robins (1988, 1989).

15.      **The availability of childcare varies widely across OECD countries.** In the U.S., programs for preschoolers (3-5 years old) solely target disadvantaged children[7] while in Sweden they are only available to children with working parents. In most other OECD countries, these programs are universal; freely available to all children above the age of 3 whose parents wish them to participate, regardless of parental employment status or family income (Kamerman, 2000). For example, a current German federal law allows all children between 3 years and school age a legal claim for a part-time childcare slot. Similarly, France has made day care universally available through its public nursery school system (*écoles maternelles*) for all children above the age of 3.[8] Due to lack of funding, however, these programs are not readily available to all those who are entitled. For example, in Germany about 0.3 million children between 3 and 7 years are not offered a childcare slot, although their parents would want them to be in childcare (Wrohlich, 2005). On the other hand, Sweden's childcare is readily available for everyone eligible.

Public Spending on Pre-school per Child, 1999 1/ 2/
(Sweden =100)
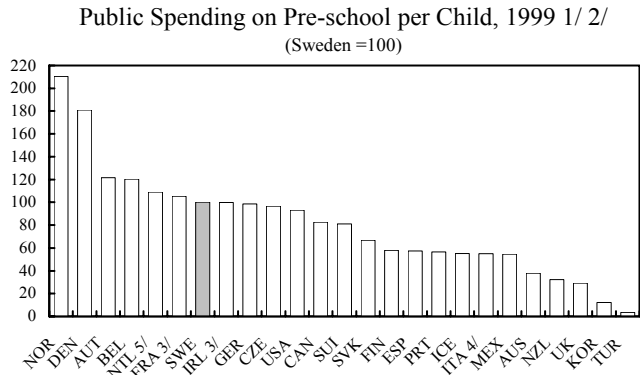


Source: Jaumotte (2003).
1/ Between age of entrance to pre-school and age of entrance to primary school.
2/ In 1995 PPP US$.
3/ Data refer to 1998.
4/ Data refer to 1989.
5/ Data refer to 1995.

16.      **Programs for younger children are rare outside Scandinavia.** The choice of women to enter the labor market shortly after childbirth is accommodated in the Nordic countries by the provision of subsidized childcare facilities for younger children (above the age of 1). France is the only non-Scandinavian country in Europe that offers some form of publicly provided childcare and subsidies for children below 3, mainly through public day care centers (*crèches*).[9] In France, however, there are too few slots available to meet the demand for day care services (Bergmann, 1996).

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[7] Programs such as the Head Start and the Family Support Act of 1988 in the U.S. are based on the idea that intervention is needed to enable disadvantaged children aged 3–5 (Gustafsson and Stafford, 1994).

[8] This system is open at no cost to all children from the age of three until the age of school entry (age six). The nursery is open for the majority of the working day: 8:30 a.m. to 4:30 p.m. daily except Wednesday. Parents can purchase daycare for times when the nursery is not in session on a fee-paying basis (Kamerman, 1991).

[9] The extension of the provision of subsidized childcare for infants, conditional on both parents working, is currently under political scrutiny in Germany, as an attempt to alleviate the unemployment problem and encourage higher female participation. The German federal

Public Spending on Formal Daycare per Child, 1999 [1/ 2/]
(Sweden =100)



Source: Jaumotte (2003).
1/ Below the age of entrance to pre-primary school.
2/ Using 1995 PPP-US$.
3/ Data refer to 1998.
4/ Data refer to 1989.
5/ Data refer to 1995.

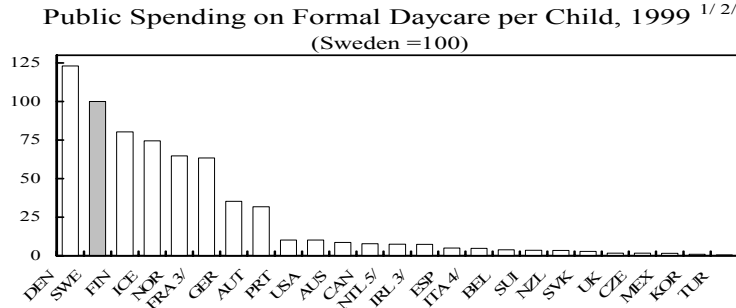17.     **Rules governing the public provision of childcare differ across countries, with employment a pre-condition in Sweden.** The Swedish benefit system is conditioned on female labor supply since it is designed under the joint condition of market work and fertility (Gustafsson and Stafford, 1994). Swedish parental leave and daycare are for the nearly exclusive use of labor market participants. Benefits are unrelated to marital status; women, whether single or married, receive the same benefits as long as they have children and work outside the house. In that respect, working without having children means that one loses out on extensive benefits, while having children without labor market attachment implies a lower standard of living (Box 1). As already noted, in most non-Scandinavian countries in Europe childcare is universal for children above three, irrespective of the parents' employment status.

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**Box 1.  The Swedish Childcare System**

**In Sweden, similar to other Nordic countries, childcare targets children below the age of six with working parents.** The Education Act obliges the municipalities to provide childcare in the form of pre-school activities and school-age childcare for children aged between one and twelve to the extent required for parents to be able to work or study (after parental leave), or if the child is in need of this activity (National Agency for Education, 2003). Eligibility is based on "substantial" market work, commonly defined as twenty or more hours per week (Gustafsson and Stafford, 1994). From July 2001, childcare is also provided to children between one and five whose parents are unemployed and from January 2002, those on parental leave. However, the latter groups are entitled to a place a minimum of three hours a day or 15 hours a week.

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government recently presented a draft law that intends to expand subsidized childcare for all children up to the age of three in case both parents are working or wish to work. The government stated that about 230,000 additional childcare slots would be provided for the implementation of this law (Wrohlich, 2005).

18.     **The cost of childcare varies across OECD countries, with Swedes enjoying one of the best values for their money.** Swedish parents incur about 10 percent of the cost of childcare (1–3 percent of their gross income), which is almost half the cost in other Scandinavian countries.[10] For example, in 2002 Danish parents paid around 30 percent of the childcare costs. The cost is also lower compared to other European countries. Parent's fees in Germany are in the range of 0 to 30 percent of the total cost of childcare; around 100 Euros per month, for a full time slot (DJI, 2002). However, the actual cost is significantly higher when the cost of private nannies or childminders ("Tagespflege") for children below three (around 800 Euros per month) is considered (Jurczyk et al., 2004). While Sweden does not offer any tax credits for the purchase of childcare, Australia, Canada, Denmark, Korea and the United Kingdom provide a partial or total compensation for certain types of childcare expenditure in the form of tax breaks. In the U.K., for instance, working families, conditional on working at least 16 hours per week, can claim up to 70 percent of the childcare cost as a tax credit.[11] Similarly, the U.S. federal government supports childcare through its dependent care tax credit; a nonrefundable income tax credit of up to 35 percent of employment related expenses on dependent care, up to a limit of $3,000 per child and $6,000 per family in 2004. In France, the state provides a small means-tested basic childcare allowance and a supplement that is only available to those with previous work experience. None of these tax breaks, however, is as generous as the subsidies provided in Sweden.

19.     **Publicly provided childcare in Sweden is of good quality compared with many other countries.** Other Scandinavian countries have childcare programs, which, while extensive by U.S. standards, have a cost per child averaging about one half that of Sweden (Gustafsson and Stafford, 1992). There appear to be quality differences, which explain at least some of the cost difference: Sweden has more staff per child, more educated staff, more children under three, more building space per child, and better food (Statskontoret, 1987; Rosen, 1996). The system is specifically designed to accommodate market work by the parents: centers provide a hot lunch for the children, are open until 6:00 p.m., and in some communities with manufacturing facilities, the schedules cover evening work by the parents (Gustafsson and Stafford, 1992).

### *Parental Leave*

20.     **Parental leave regulations could also be important in explaining the compatibility between female labor supply and motherhood in Sweden** (Sundström and Duvander, 2002). Parental leave is very generous in Sweden. This is a special form of childcare time, a paid leave of absence from work for parents who take care of their infants at home, normally when the other parent is at work. Sweden became the first country in the world in 1974 to introduce a parental-leave program which gave employed mothers and

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[10] The fees are between 9 and 11 percent of cost in pre-school and family day-care homes, in Sweden.

[11] OECD (2004a, pp. 40-3) provides a comprehensive analysis.

fathers of newborn babies the right to six months' leave of absence from work with pay equal to 90 percent of previous earnings up to a relatively high ceiling.[12] Since 1989, the entitlement period has increased to fifteen months at 80 percent, with the last three months paid at a flat rate. Parents could share the leave as they decide, with two months reserved for each parent. In practice, however, mothers take the overwhelming part of the leave (Sundström and Duvander, 2002).

21.      **Sweden is one of the most generous countries regarding parental leave in the OECD.** Parental leave varies significantly among OECD countries. For example, the U.S. has 12 weeks unpaid parental leave limited to employees in companies with 50 employees or more while in Norway, parental leave is 42 weeks at 100 percent replacement earnings (or optionally, 52 weeks at 80 percent).

Paid parental leave, 1999
(In equivalent of weeks of full pay)
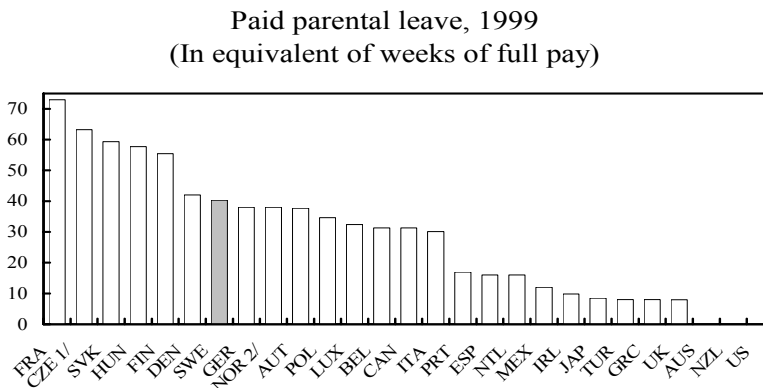


Source: Jaumotte (2004).
1/ Data refer to 1995.
2/ Data refer to 1997.

22.      **Parental leave benefits depend on previous earnings, providing a strong incentive to women to work prior to giving birth.** All parents covered by national health insurance for at least 180 days prior to the birth of their child are entitled to the benefit. However, the level of the benefit depends on the parent's earnings during the 240 days preceding the birth. This difference in benefits has given young women strong incentives to establish themselves in the labor market before giving birth and even to postpone births until earnings are sufficiently high (Sundström and Duvander, 2002).

**The Tax-Benefit Wedge**

23.      **A benefit wedge for secondary breadwinners, constructed analogous to the tax wedge, shows that Sweden has one of the highest benefit wedges.** As a mirror image to the

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[12] The other Nordic countries followed shortly afterwards; Norway in 1977, Finland in 1978 and Denmark in 1984.

tax wedge, we construct a wedge that captures the benefit incentives that women face when entering the labor market. Box 2 presents the details considered in calculating this wedge.

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### Box 2.  Constructing a Tax-Benefit Wedge

**In constructing a net tax-benefit wedge, one needs to decide whether to use average or marginal tax-benefit rates.** The marginal tax rate affects the decisions regarding working hours, while the average rate affects decisions regarding labor market participation (Koskela, 2001). We choose average tax rates for both participation rate and hours worked since they are readily available. De Haan et al. (2003) analyze the interaction between various measures of the tax burden on labor and find that this is strong. Nickell and Layard (1999) find that average and marginal tax rates are considerably correlated. We believe that their analyses could also be applied to benefits.

**Tax wedges for primary and secondary earners are constructed.** The tax wedge on the primary breadwinner is the combined burden of income taxes plus employee and employer social security contributions as a percentage of labor costs (gross earnings plus employer social security contributions), for a single earner married couple with two children with earnings equal to those of the average production worker (APW). Following Jaumotte (2003), we define the tax wedge on the secondary breadwinner (with two children) as the share of her earnings which goes into paying additional household taxes and is calculated as follows:

$$\text{Tax Secondary earner} = 1 - \frac{(\text{Household Net Income})_B - (\text{Household Net Income})_A}{(\text{Household Gross Income})_B - (\text{Household Gross Income})_A}$$

where A denotes the situation in which the household is a single earner married couple earning 100 percent of APW, and B denotes the situation where the household has two breadwinners who earn 100 and 67 percent of APW respectively.

**Only publicly-provided benefits in kind related to family care (child, youth, and elderly care) are included in the benefit wedge.** We ignore cash benefits for two reasons. First, they discourage labor supply via the income effect. Second, they are already included in the tax wedge calculation by the OECD. We construct the benefit wedge of a secondary breadwinner earning 67 percent of APW living in a household with two children and an elderly, where the primary earner receives 100 percent of APW, using the same procedure as we did with the tax wedge. The benefit wedge is constructed by calculating the benefit per child and elderly as a percent of the secondary breadwinner's labor cost. More details are available in the appendix.

**We assume that the benefit wedge targets female labor participation and thus it solely affects secondary breadwinners.** Due to data limitations, we are unable to distinguish between the benefit wedge for primary and secondary earners. Ideally, one would want to construct a benefit wedge for primary earners as well. However, given that most of the family social benefits considered tend to affect primarily women than men, we believe that this limitation does not hinder the validity of our analysis.

**Implicit income and substitution effects can be analyzed when considering benefits in kind.** Public provision of childcare indirectly raises the opportunity cost of home work, and thus creates a substitution effect. On the other hand, subsidized childcare creates an income effect since no additional income is needed to pay for childcare.

Evidence suggests that benefit incentives for secondary breadwinners vary significantly across OECD countries. In particular, they are very high in Scandinavian countries and very low in the U.S. and the other European countries. However, a comparison of the net tax-benefit wedge is more indicative, since some countries, such as Finland and Denmark have generous benefits for secondary earners, combined with high tax wedges.



Sweden and Select OECD Countries: Benefit Wedge for Secondary Earner, 2001 1/ 2/ 3/
(In percent of labor cost)
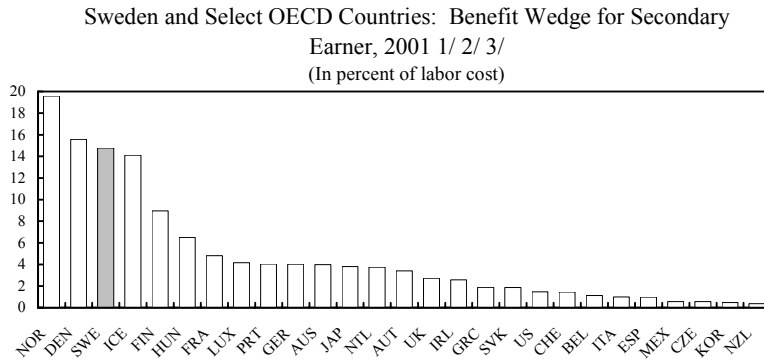
Source: OECD (2004): Social Expenditure Database and Staff Calculations.
1/ Based on a household (with two children) with earnings 67 and 100 percent of APW.
2/ Per population above 65, per 2 children aged less than 15.
3/ Benefits in kind relating to child care and elderly care.

24.     **The net tax-benefit wedge varies across OECD, with the larger European countries having the highest net tax-benefit wedge on secondary breadwinners.** Sweden and the other Scandinavian countries (except Denmark), have much lower wedges given their very generous benefit system. The large European countries are characterized by high tax wedges and low benefits while moderate tax wedges and very low benefits characterize Canada and the U.S.



Sweden and Select OECD Countries: Net Tax-Benefit Wedge, 2001
(In percent of labor costs)
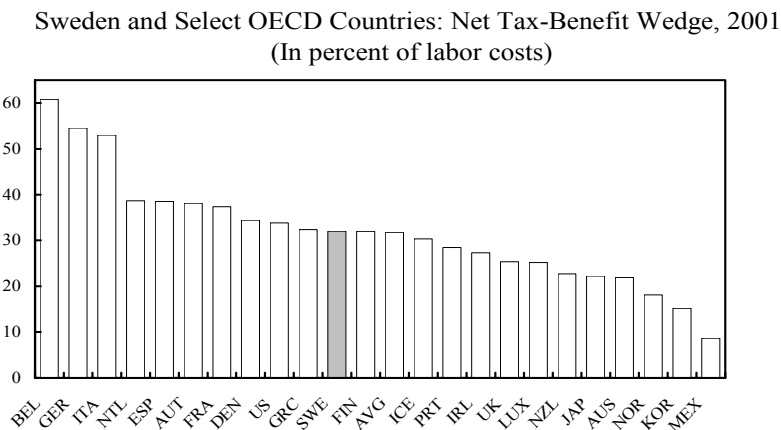
25.     **There is a negative association between the net tax-benefit wedge and female labor supply for countries with high wage compression.** The correlation coefficient of net tax-benefit wedge and female hours worked (per working age population) is -0.7 for

countries with a compressed wage structure. Similarly, the correlation for the same group of countries, when the female labor participation rate is considered is -0.49.



Net Tax-Benefit Wedge and Female Labor Supply, 2001



Net Tax-Benefit Wedge and Female Labor Supply, 2001
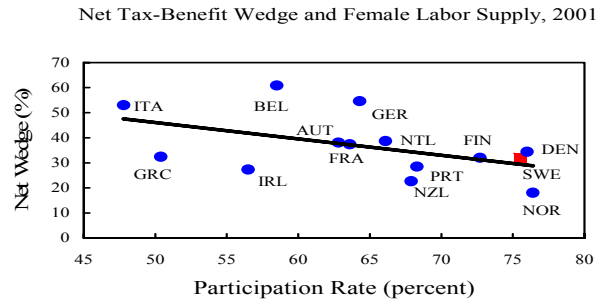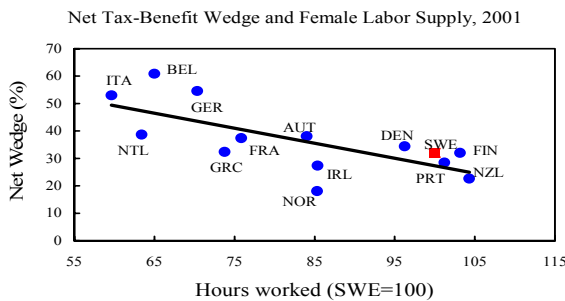
## C. Related Literature and Theoretical Framework

26.      **The Swedish "nationalization" of family has been analyzed extensively.**
Lindbeck (1988) and Rosen (1996) stress the importance of government benefits for home production by stating that the Swedish welfare state policies "nationalized" or "monetized" the household sector by offering a comprehensive system of subsidies that directly influence market and home work decisions. As it was vividly put by Rosen (1996, pp. 734–5), "...in Sweden, a large fraction of women work in the public sector to take care of the children of other women who work in the public sector to take care of the parents of the women who are looking after their children."

27.      **Recent quantitative studies, not accounting for government policies on home production, cannot explain the high labor supply in Scandinavian countries.** Prescott's (2002) analysis is based on a one-consumption-good model, which Rogerson (2003) and Prescott (2004) acknowledge is not a good abstraction for studying aggregate labor supply in the Scandinavian countries. Prescott (2004) explains that in Scandinavian countries fiscal policy affects the choice between working at home and in the market and this effect cannot be ignored. Thus, the abstraction of one-consumption-good cannot account for this important dimension in the household's budget constraint.

28.      **A study that has come close to addressing the issue of the impact of government policies on home production and taxation is Ragan (2005).** In a calibrated general equilibrium model with home production, Ragan (2005) finds that tax rates, in conjunction with subsidies to home production, can indeed explain the high labor supply in Sweden. Incorporating subsidies on home production could affect the impact of the tax wedge on labor supply. High marginal tax rates discourage labor force participation since they encourage a shift towards home production. This is especially true in the case of child and elderly care where one's own labor is a good substitute for hired labor. The tax distortion can be partially offset, however, by the government's provision of market goods that are close substitutes to home goods, such as the public provision of child and elderly care, widely used in the Nordic countries.

29.      **Ragan's (2005) analysis, however, ignores the interactions between various social welfare programs and labor market institutions on labor supply.** Labor market institutions might create wage compression, thus reducing the demand for market-provided household services. These factors are likely to be very important in explaining some of the difference in labor market performance between Europe and the US.[13] Most of the current literature ignores wage compression. Olovsson (2004), who considers wage compression for the U.S. and Sweden in a calibrated general equilibrium model with home production, is an obvious exception. Other policies, such as flexible working-time arrangements and benefits such as paid parental leave, may also affect both the decision on whether to participate in the labor market and the amount of labor (hours) to supply.

30.      **We construct a theory-based cross-country econometric framework, which tracks the effects of government taxes and benefits on labor supply explicitly,** taking into account the various welfare provisions and labor market institutions. Unlike Olovsson (2004), Jaumotte (2003) and Genre et al. (2005), we place emphasis on analyzing policies that separately target labor supply for men and women. In the remaining section, we describe a theoretical framework behind each of the labor supply measures considered. In the empirical analysis, the theoretical implications are used to suggest which variables to include in the estimation and to determine the theoretical effect on labor supply. We follow a macroeconomic approach, which while it lacks the richness of micro-based data, it provides tractability and ensures consistency for cross-country comparisons.

**Hours Worked**

31.      **We assume a standard macro model with home production, similar to Ragan (2005)**. Home production refers to the output produced for own consumption, as distinct from output produced and sold in the market. In order to analyze labor supply for primary and secondary breadwinners separately, we consider two consumption goods: home and market goods and two types of agents, $k$ and $j$. Each agent faces a labor-leisure-home production decision. The agent's preferences are given by

$$\max u(c^i, h^i, 1 - l^i) = \max a^i_c \ln c^i + a^i_h \ln h^i + (1 - a^i_c - a^i_h) \ln(1 - l^i), \text{ for } i = k \text{ and } j.$$
$$s.t.$$
$$(1 + \tau_c)c^i + g^i_h = (1 - \tau^i_l)w^i l^i_m + T^i$$
$$h^i = [a(g^i_h + s^i l^i_m)^\rho + (1 - a)(l^i_h)^\rho]^{1/\rho}$$
$$g_h \geq 0, c \geq 0, l_m \geq 0, l_h \geq 0, l^i = l^i_m + l^i_h \leq 1, s^i > 0, i = k \text{ or } j.$$

---

[13] Freeman and Schettkat (2005) reject the importance of wage compression across OECD countries in explaining the shift of traditional household production services to the market in the US. They claim that the shift was exogenously driven rather than related to wage compression.

where $c$ is the consumption of market goods, $h$ is the consumption of home goods, $w$ is the real wage rate and $\tau_c$ is the consumption tax rate. The preference parameters $a_c$ and $a_h$, which differ across agents, measure the value of market and home good consumption relative to leisure, and are such that agent $k$ will always work more hours in the market than agent $j$. We further assume that agent $j$ makes her/his decisions after agent $k$. These assumptions capture the idea that traditionally, there is one breadwinner in the family and that the number of hours worked, if any, by the secondary breadwinner are decided on a residual basis. With the weekly hours worked normalized to one for each agent, $1-l= 1- l_m- l_h$, is leisure and $l_m$ and $l_h$ refer to the time spent at market and home work, respectively.

32.     **The distinguishing feature in this analysis is that part of the household good is publicly provided for the individuals who participate in the labor market.** In that sense, time in the non-market sector is taxed, or to put it differently market work is subsidized. More specifically, the household good is produced using home work, $l_h$, and market input, $g_h$. The government publicly provides some of this input to labor market participants, in proportion to their labor supply, at the rate $0<s^i<1$. This assumption captures the workfare aspect of the family fiscal policies in the Scandinavian countries.[14] Examples include government provided child and elderly care, where subsidies are contingent and often proportional to market work.

33.     **In this framework, the labor income tax, $\tau_l^i$, differs between the two agents.** Prescott (2004) hypothesized that the relevant tax rate for switching from a 1-earner household into a 2-earner household is the tax on the secondary earner, which would be agent $j$ in our framework, and is given by:

$$\tau_l^j = \frac{T(w^k, w^j) - T(w^k, 0)}{w^j}$$

where $T(w^k, w^j)$ denotes the tax liability of a married couple with income of $(w^k, w^j)$ for the primary and secondary earner, respectively. This is the tax rate that the secondary earner would be considering when deciding his/her labor supply. This rate captures how progressive the tax schedule is and whether filing is made jointly or not. In that respect, with joint filing, we expect the labor income tax rate to have a larger impact on the secondary breadwinner's decisions since on average, the secondary breadwinner's income would fall into higher tax brackets. Any proceeds of the taxes that are not transferred back to the agents in the form of subsidies are rebated to them in the form of lump-sum transfers, T.

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[14] For some countries, such as Sweden, these benefits are taxable, so throughout the analysis, this variable captures the after-tax subsidy rate.

34.    **There is no capital in this simple economy**. Market work, $l_m = l_m^k + l_m^j$ is transformed one on one into a general good, $y$, that can be consumed, $c = c^k + c^j$, or used as an input to the home production, $g_h = g_h^k + g_h^j$. The feasibility condition is then given by: $y = l_m = c + g_h$

35.    **Using the above framework we can then construct a theory-based cross-country econometric framework to analyze labor supply by gender**, measured in hours worked per working age population of the form:

$$l_m^i = f(\tau_c, \tau_l^i, s^i, T^i, w^i, x), \text{ for } i=j, k$$

where $x$ captures other variables that might affect primary and secondary breadwinners' labor supply (e.g. women's social status, parental leave provisions, wage compression, etc.).

**Labor Force Participation**

36.    **In this analysis, we consider the impact of the tax-benefit system on the discrete choice of the household on the number of its breadwinners**. Our analysis shares some common characteristics with Bar and Leukhina (2005) who consider a model of heterogeneous households with discrete choice on the number of breadwinners. Unlike Bar and Leukhina (2005), however, we consider a decentralized general equilibrium model. In this framework, we will be able to examine whether the tax-benefit system can induce a family member to abandon home work and participate in the labor market as a secondary earner. There is a measure one of heterogeneous households, with different initial capital stock, $k$. Households consist of two people, "male" and "female."

37.    **We assume that households choose the number of breadwinners.** Their choice set is $I=\{0,1,2\}$; they could have zero, one or two breadwinners in the household. We further assume that working at home and in the market are mutually exclusive in the sense that an individual can only be involved in home or market work, but not both. We also assume that time allocated to the market can take on two values, 0 or $\bar{h}$, where without loss of generality we set $\bar{h}=1$. This is the indivisible labor assumption studied in Rogerson (1988) and employed in equilibrium macroeconomics by Hansen (1985), Cooley and Hansen (1989), and others. As a result, fluctuations in the labor input come about by fluctuations in employment rather than fluctuations in hours per employed worker.

38.    **For tractability, we assume that the utility function is separable in consumption, market and home work.** As a result, the household's problem can be simplified and is equivalent to:

$$\sum_t \beta^t (U(c_t, h_t) - v(l_{m_t}, l_{h_t}))$$

where $c$ is consumption of market good, $h$ is consumption of home good, $l_m$ is the number of household members involved in market work, and $l_h=2-l_m$ is the number of members involved in home work.

We also follow the literature and assume that households can trade employment lotteries at actuarially fair prices. Let $e_i$ be the probability that a given household chooses $i$ breadearners from the set $I$. Then, the optimization problem can be written as:[15]

$$\sum \beta^t (U(c,h) - e_1 v(1,1) - e_2 v(2,0))$$

where $v(1,1)$ is the disutility of having one breadwinner and $v(2,0)$ is the disutility from having two breadwinners in the household.

The household's budget constraint, similar to the previous framework, is given by:[16]

$$(1+\tau_c)c + g_h = e_1(1-\tau_l^1)w + 2e_2(1-\tau_l^2)w + rk + T$$
$$h = [a(g_h + (2s_2 e_2 + s_1 e_1))^\rho + (1-a)(e_1 + 2e_0)^\rho]^{1/\rho}$$
$$g_h \geq 0, c_m, c_f \geq 0, s_2 > s_1$$

Using the above framework we can then construct participation rates by gender:[17]

$$L_p = e_1 + e_2$$
$$L_v = e_2$$

where $p$ is the gender of the primary earner and $v$ is the gender of the secondary earner.

39.     **Using the above theoretical framework, we can then construct a theory-based cross-country econometric framework of the form:**

$$L_j = f(\tau_c, \tau_l^1, \tau_l^2, s_1, s_2, T, x, w), \text{ for } j = p \text{ or } v$$

where $x$ captures other variables that might affect labor participation for primary and secondary earners such as wage compression and parental leave provisions.

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[15] Assuming that $v(0,2) = 0$. Since modeling the household's capital accumulation problem is beyond the scope of this paper, we also drop the time subscript for brevity.

[16] The analyses of the budget constraint, the household good production function and the market clearing conditions closely follow the previous framework. For brevity we choose not to include them in the current writing.

[17] As a technicality we need to assume that there is a large number of *ex ante* identical households.

## D. Econometric Analysis

40. **Based on the above theoretical framework, we estimate a labor supply function augmented with measures of taxes and benefits.** The equation is estimated on a panel of 20 OECD countries using annual data for the period 1980-2001. Two measures of labor supply — labor force participation and hours worked — are regressed against measures of wages, taxes, benefits, and the square of both taxes and benefits.[18] The quadratic terms are intended to capture the non-linear impact of taxes and benefits and help alleviate the lack of a proper marginal measure (Box 2). The output gap is included to control for cyclical effects.[19] Additionally, we include a common deterministic trend.[20]

41. **Given the differences in behavior by gender, it is appropriate to look separately at male and female labor supply.** Based on the different role that men and women play within the household, the literature on labor supply has traditionally focused on different models to explain their behavior. In the household model of labor supply (Mincer, 1995), the decisions of men and women are based on different objective functions, but are interdependent. Following this tradition, we allow for the possibility of both men and women being affected in their decisions by the gender wage gap, as well as by their own wage.

42. **Demographic, institutional, and cultural characteristics may help explain labor supply.** The trade off between working at home and in the market is affected by the volume of services that households have to provide, which in turn depends on the number of children and elderlies as a share of the population. To the extent that women carry most of the burden of child and elderly care in the house, this variable is expected to have a negative impact on female labor supply. This effect can be mitigated by the benefits mentioned above as well as by other legislated provisions, like those regarding parental leave, which are expected to increase participation, particularly of women, but to depress hours worked. The effect of benefits likely depends on the availability of private child care and elderly care services on the market, which is expected to be influenced by wage compression. High relative wages for less skilled workers may reduce the demand for these services, as evident in countries like Sweden, boosting the impact of publicly-provided services, for which no alternative is available. Finally, cultural factors, like the role of women in the society, may help explain a

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[18] For a description of the data used, see the appendix.

[19] Variations of participation and hours worked are a stylized characteristic of the business cycle, which can be explained by income effects—movements in household real incomes as emphasized by the "added worker" hypothesis (see, for example, Stephens, 2001)—or by substitution effects—movements in the opportunity cost of leisure as underscored by the "discouraged worker" hypothesis (see, for example, Lindbeck and Snower, 1994).

[20] Panel unit root tests (Levin et al.(2002); Im et al. (2003)) allow to reject nonstationarity in both measures of the dependent variable.

more active female market participation as well as a higher sharing of the household burden with males. This variable is proxied by the share of women representatives in parliament.

43.     **Estimation is based on standard panel data methods.** The model to be estimated can be represented as follows:

$$y_{it} = x'_{it} \beta + z'_{it} \gamma + u_{it}$$

where, $x$ is a set of endogenous variables, $z$ is a set of exogenous variables, $i = 1,...,N$ is the country-gender unit for $N$ countries, $t = 1,...,T$ is time, and the error term is $u_{it} = \mu_i + \lambda_t + v_{it}$, where $\mu_i$ is a country-specific component, $\lambda_t$ is a time-specific component, and $v_{it}$ is white noise. As the country and time-specific components of the error term are likely to be correlated with other regressors, a fixed-effect estimator is required for consistency. Moreover, the presence of endogenous variables, like the wage and the gender wage gap, require the use of instrumental variables.

44.     **Although the labor supply curve is not clearly identified, the estimation results are broadly satisfactory** (Tables 3 and 4). The wage term is generally insignificant[21], but the wage gap is mostly significant and of the expected sign. Cyclical fluctuations are important, and more pronounced for male hours worked and female participation, consistent with the evidence of higher female mobility in and out of the labor market. While a negative trend is clearly identified for male labor supply, none can be detected for females. In line with expectations, the share of children and elderlies has a significant negative effect on female labor supply only. Not surprisingly, parental leave provisions affect only female labor supply, but with the wrong sign for participation, possibly due to the high correlation of parental leave provisions with benefits. The share of women in parliament has a clear positive impact on female labor supply, and some effects can be detected on males too.

45.     **The results show that benefits have a significant positive impact on labor supply.** The lower part of the tables presents separately the results for taxes and benefits, both for the whole sample and for Sweden only, derived as linear combinations of the estimated coefficients. For the whole sample, benefits have a clear positive influence on both measures of labor supply, and much more so for women. The effect on hours worked for males is, however, insignificant. The estimated elasticity of participation to the benefit wedge varies from 0.09 to 0.11 for female participation, and is about twice that of male participation and female hours worked. There is only weak evidence that wage compression affects the way labor supply responds to benefits.

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[21] Genre et al. (2005) are also unable to identify the labor supply equation.

Table 3. Estimation Results: Men
(standard errors in parenthesis)

| | Labor Force Participation | | | | Hours Worked | | | |
|---|---|---|---|---|---|---|---|---|
| | Fixed Effects | | FE2SLS [1] | | Fixed Effects | | FE2SLS [1] | |
| | 1-way | 2-way [2] | 1-way | 2-way [2] | 1-way | 2-way [2] | 1-way | 2-way [2] |
| Wage | 0.073 | 0.080 | -0.012 | -0.014 | 1.880 | 2.191 | 3.031 | 3.437 |
| | (0.074) | (0.075) | (0.078) | (0.080) | (2.317) | (2.361) | (2.340) | (2.462) |
| Wage gap | 26.461** | 26.324** | 31.645** | 31.572** | 189.532 | 179.611 | 155.054 | 144.007 |
| | (3.274) | (3.309) | (3.319) | (3.328) | (105.826) | (108.631) | (106.453) | (110.986) |
| Tax | 0.228* | 0.314** | 0.243* | 0.371** | -2.486** | -2.263* | -1.200* | -1.572 |
| | (0.113) | (0.117) | (0.114) | (0.118) | (0.953) | (1.021) | (0.936) | (1.023) |
| Tax$^2$ | -0.006** | -0.007** | -0.007** | -0.008** | … | … | … | … |
| | (0.002) | (0.002) | (0.002) | (0.002) | | | | |
| Benefit | 1.650* | 1.806* | -0.569 | -0.732 | 46.354 | 46.634 | 62.720 | 56.470 |
| | (0.791) | (0.796) | (0.967) | (0.987) | (30.334) | (30.920) | (32.499) | (33.925) |
| Benefit$^2$ | -0.051** | -0.056** | -0.088** | -0.082** | … | … | … | … |
| | (0.016) | (0.016) | (0.019) | (0.019) | | | | |
| Benefit*w. compr. | -0.002 | -0.003 | 0.040** | 0.041** | -0.665 | -0.666 | -0.845 | -0.757 |
| | (0.011) | (0.011) | (0.014) | (0.014) | (0.408) | (0.416) | (0.440) | (0.462) |
| Parental leave | -0.028 | -0.020 | 0.064* | 0.082* | -0.983 | -0.704 | -1.894 | -1.894 |
| | (0.025) | (0.025) | (0.032) | (0.033) | (1.269) | (1.297) | (1.667) | (1.772) |
| Women in parliament | 0.076* | 0.060 | 0.115** | 0.104** | 0.552 | 0.411 | 2.559* | 2.539* |
| | (0.034) | (0.035) | (0.037) | (0.038) | (1.003) | (1.039) | (1.083) | (1.167) |
| Children&elderlies | 0.135 | 0.073 | 0.027 | -0.039 | -1.370 | -1.950 | 2.535 | 2.021 |
| | (0.072) | (0.074) | (0.074) | (0.075) | (2.311) | (2.359) | (2.348) | (2.423) |
| Output gap | 0.176** | 0.135** | 0.186** | 0.207** | 12.257** | 11.554** | 11.621** | 11.148** |
| | (0.032) | (0.039) | (0.036) | (0.047) | (1.017) | (1.296) | (1.111) | (1.573) |
| Trend | -0.426** | -0.403** | -0.471** | -0.441** | -8.980** | -7.274** | -9.316** | -7.824** |
| | (0.042) | (0.048) | (0.043) | (0.048) | (1.435) | (1.886) | (1.394) | (1.844) |
| Constant | 57.952** | 58.881** | 55.176** | 55.165** | 1454.857** | 1442.557** | 1284.316** | 1275.847** |
| | (3.381) | (3.503) | (3.459) | (3.525) | (112.097) | (115.759) | (117.480) | (123.081) |
| Tax elasticity (sample)[3] | -0.040** | -0.031** | -0.047** | -0.033** | -0.052** | -0.047* | -0.042* | -0.033 |
| | (0.011) | (0.012) | (0.011) | (0.012) | (0.020) | (0.021) | (0.020) | (0.022) |
| Benefit elasticity (sample)[4] | 0.042** | 0.044** | 0.046** | 0.044** | -0.010 | 0.011 | 0.021 | 0.019 |
| | (0.008) | (0.008) | (0.010) | (0.010) | (0.013) | (0.013) | (0.015) | (0.015) |
| Tax elasticity (Sweden)[3] | -0.142** | -0.145** | -0.162** | -0.162** | -0.082** | -0.074* | -0.066* | -0.052 |
| | (0.031) | (0.031) | (0.029) | (0.030) | (0.031) | (0.034) | (0.031) | (0.034) |
| Benefit elasticity (Sweden)[4] | 0.023 | 0.009 | -0.007 | 0.005 | -0.034 | -0.032 | 0.002 | 0.015 |
| | (0.032) | (0.033) | (0.040) | (0.041) | (0.043) | (0.044) | (0.058) | (0.062) |
| *No. obs.* | 379 | 379 | 302 | 302 | 322 | 322 | 267 | 267 |
| *No. groups* | 20 | 20 | 17 | 17 | 20 | 20 | 17 | 17 |
| *Within R$^2$* | 0.561 | 0.591 | 0.648 | 0.682 | 0.526 | 0.551 | 0.540 | 0.563 |
| *Between R$^2$* | 0.009 | 0.005 | 0.021 | 0.011 | 0.299 | 0.285 | 0.149 | 0.115 |
| *Overall R$^2$* | 0.019 | 0.014 | 0.030 | 0.020 | 0.247 | 0.225 | 0.125 | 0.098 |
| *F* [5] | 0.000 | 0.000 | 0.000 | 0.000 | 0.243 | 0.277 | 0.623 | 0.756 |

Footnotes for Tables 3 and 4

\*=significant at the 95-percent level; \*\*=significant at the 99-percent level.
1/ Fixed effects two-stage least squares. Instruments used for wage and wage gap are multifactor productivity, employment protection, union density, and all the exogenous variables.
2/ Includes time dummies (not reported).

Table 4. Estimation Results: Women
(standard errors in parenthesis)

| | Labor Force Participation | | | | Hours Worked | | | |
|---|---|---|---|---|---|---|---|---|
| | Fixed Effects | | FE2SLS [1] | | Fixed Effects | | FE2SLS [1] | |
| | 1-way | 2-way [2] | 1-way | 2-way [2] | 1-way | 2-way [2] | 1-way | 2-way [2] |
| Wage | 0.129 | 0.020 | 0.145 | 0.083 | 2.110 | 1.949 | 2.881 | 3.286 |
| | (0.139) | (0.149) | (0.144) | (0.156) | (2.271) | (2.324) | (2.488) | (2.539) |
| Wage gap | -9.600* | -9.012* | -10.110* | -7.455 | -304.281** | -229.335** | -302.077** | -175.864* |
| | (3.814) | (3.896) | (4.071) | (4.213) | (65.718) | (68.937) | (71.491) | (74.883) |
| Tax | -0.757** | -0.605** | -0.845** | -0.739** | -1.421 | -1.259 | -1.044 | -0.877 |
| | (0.172) | (0.178) | (0.192) | (0.196) | (3.153) | (0.972) | (1.012) | (1.042) |
| Tax$^2$ | 0.013** | 0.010** | 0.014** | 0.013** | ... | ... | ... | ... |
| | (0.002) | (0.003) | (0.003) | (0.003) | | | | |
| Benefit | 2.764** | 2.143* | 2.469 | 2.224 | 50.987* | 34.891 | 54.862* | 48.880 |
| | (1.029) | (1.055) | (1.328) | (1.394) | (21.707) | (22.097) | (25.284) | (25.411) |
| Benefit$^2$ | -0.106** | -0.088** | -0.125** | -0.110** | ... | ... | ... | ... |
| | (0.021) | (0.022) | (0.026) | (0.027) | | | | |
| Benefit*w. compr. | -0.001 | 0.003 | 0.010 | 0.008 | -0.570 | -0.370 | -0.574 | -0.568 |
| | (0.015) | (0.015) | (0.021) | (0.022) | (0.294) | (0.300) | (0.349) | (0.352) |
| Parental leave | -0.131** | -0.158** | -0.118* | -0.183** | -2.425* | -2.381* | -3.311* | -4.937** |
| | (0.037) | (0.039) | (0.053) | (0.059) | (0.993) | (1.012) | (1.507) | (1.514) |
| Women in parliament | 0.151** | 0.208** | 0.171** | 0.257** | 2.634** | 3.030** | 3.000** | 4.224** |
| | (0.052) | (0.056) | (0.057) | (0.062) | (0.851) | (0.876) | (1.010) | (1.046) |
| Children&elderlies | -1.676** | -1.611** | -1.854** | -1.688** | -19.619** | -17.690** | -18.742** | -14.739** |
| | (0.143) | (0.153) | (0.157) | (0.168) | (2.927) | (2.955) | (3.457) | (3.455) |
| Output gap | 0.267** | 0.362** | 0.246** | 0.298** | 7.790** | 8.529** | 7.760** | 7.592** |
| | (0.048) | (0.061) | (0.055) | (0.076) | (0.825) | (1.074) | (0.982) | (1.326) |
| Trend | 0.121 | 0.143* | 0.084 | 0.119 | 0.186 | 2.688 | -0.357 | 2.388 |
| | (0.062) | (0.070) | (0.066) | (0.074) | (1.163) | (1.601) | (1.278) | (1.692) |
| Constant | 132.768** | 128.584** | 138.609** | 128.737** | 1939.090** | 1718.483** | 1894.137** | 1554.031** |
| | (7.828) | (8.414) | (8.316) | (9.054) | (129.424) | (147.074) | (151.800) | (170.166) |
| Tax elasticity (sample)[3] | 0.021 | 0.022 | 0.030 | 0.027 | -0.050 | -0.044 | -0.037 | -0.031 |
| | (0.027) | (0.029) | (0.028) | (0.029) | (0.033) | (0.034) | (0.036) | (0.037) |
| Benefit elasticity (sample)[4] | 0.098** | 0.085** | 0.110** | 0.096** | 0.048** | 0.037** | 0.060** | 0.042** |
| | (0.013) | (0.014) | (0.015) | (0.016) | (0.014) | (0.014) | (0.016) | (0.016) |
| Tax elasticity (Sweden)[3] | 0.011 | 0.012 | 0.017 | 0.037 | -0.040 | -0.036 | -0.030 | -0.249 |
| | (0.021) | (0.022) | (0.022) | (0.056) | (0.026) | (0.028) | (0.029) | (0.030) |
| Benefit elasticity (Sweden)[4] | -0.038 | -0.010 | -0.043 | -0.043 | 0.108** | 0.092* | 0.153** | 0.083 |
| | (0.047) | (0.049) | (0.063) | (0.065) | (0.055) | (0.037) | (0.054) | (0.055) |
| *No. obs.* | 299 | 299 | 258 | 258 | 265 | 265 | 230 | 230 |
| *No. groups* | 20 | 20 | 17 | 17 | 20 | 20 | 17 | 17 |
| *Within R$^2$* | 0.801 | 0.813 | 0.805 | 0.821 | 0.692 | 0.728 | 0.698 | 0.743 |
| *Between R$^2$* | 0.174 | 0.171 | 0.224 | 0.200 | 0.050 | 0.050 | 0.042 | 0.121 |
| *Overall R$^2$* | 0.268 | 0.258 | 0.297 | 0.270 | 0.010 | 0.010 | 0.003 | 0.019 |
| *F* [5] | 0.000 | 0.000 | 0.000 | 0.000 | 0.094 | 0.126 | 0.205 | 0.470 |

3/ Calculated as $(\bar{y}/\bar{x})(\beta_1 + 2\beta_2\bar{x})$, where $\bar{y}$ is the average labor participation rate (hours worked), $\bar{x}$ is the average tax wedge, and the $\beta's$ are the estimated coefficients for the linear term and the quadratic term, respectively.

4/ Calculated as $(\bar{y}/\bar{x})(\beta_1 + 2\beta_2\bar{x} + \beta_3\bar{z})$, where $\bar{y}$ is the average labor participation rate (hours worked), $\bar{x}$ is the average benefit wedge, $\bar{z}$ is the average wage compression measure, and the $\beta's$ are the estimated coefficients for the linear term, the quadratic term, and the interaction of the benefit wedge with wage compression, respectively.

5/ F test of the joint significance of the quadratic terms for tax and benefit (p-value).

46.      **However, the positive impact of benefits is smaller for countries where benefits are large, while the negative impact of taxes is stronger for countries where taxes are high.** The hypothesis of nonlinear effect of taxes and benefits is confirmed by the *F* test presented in the table for participation, but not for hours. The results for participation indicate that the effect of benefits is decreasing as benefits increase. The results also show significant negative effects of taxes on male labor supply, with the value of the tax elasticity ranging from -0.03 to -0.05 for both male participation and hours worked. Although consistent with the evidence of significant negative tax effects on labor market outcomes (Daveri and Tabellini, 2000; Prescott, 2002, 2004), the estimated elasticities are relatively small. However, the negative impact of taxes is increasing as the tax wedge increases. In the case of Sweden, the tax elasticity is estimated to be more than three times as high for participation, and about twice as high for hours worked than the sample average.

## E.   Conclusions and Policy Implications

47.      **Labor market outcomes in Sweden compare well with those in most countries.** A large supply of skilled labor with high levels of participation has been one of the key reasons for the enviable performance of the Swedish economy over the years. A continuous growth of labor supply is critical for the long-term growth of the economy and the survival of the extended public insurance system. With population aging now looming, it will become vital for policy to focus on how to contain the gradual erosion of labor supply.

48.      **Despite the high tax burden, policy has contributed to these achievements.** Sweden has managed to achieve and maintain high levels of participation and employment despite its high taxation, which is increasingly recognized as having significant negative effects on the supply of labor. Two factors have contributed to these accomplishments. The first is a policy that has put most of the tax burden on the primary breadwinner. The available data indicate that, unlike that for the primary earner, the tax wedge for the secondary breadwinner is not internationally high in Sweden. This is likely to encourage many women to enter the labor market. The second reason is the generous provision of high quality childcare and elderly care by the government, which substitutes for the absence of a private market for these services. By targeting the most elastic component of labor supply with a combination of a favorable tax treatment and household subsidies, the Swedish authorities have pushed to the limit the work incentives of this part of the tax-benefit system.[22]

49.      **The results of this paper support these conclusions.** This paper looks at the combined effect of tax and expenditure policy on labor supply. Focusing on measures of the tax wedge and of public provision of childcare and elderly care, the paper estimates their impact on a panel of OECD countries. The results confirm that the public provisions of these

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[22] In many other respects, the public insurance system does not provide similarly good incentives. For example, Bonato and Lusinyan (2004a, b) show how the generous sickness insurance system is affected by moral hazard problems.

services have a significant positive effect on labor supply, which helps explain the remarkable labor market outcomes in Sweden and other Nordic countries. These results are robust to different measures of labor supply and estimation methods and suggest that labor supply could be increased in countries where the public provision of child care and elderly care is low by increasing expenditure in these areas. This is likely to be particularly true for countries, like the countries of continental Europe, where these services are not available on the market at an affordable price due to high wage compression.

50.      **For countries like Sweden, where both benefits and taxes are very high, lowering taxes seems the appropriate policy instrument to stimulate labor supply**. In view of the increasing pressures set in by population ageing, the Swedish authorities will be faced with difficult choices concerning the appropriate mix of taxes and benefits if they want to maintain the current level of benefits. Based on current projections, labor supply is set to diminish over the next few decades, gradually eroding the growth potential. As the evidence presented in this paper shows, further increasing benefits in countries where benefits are high, should not be expected to yield a significant impact on labor supply, particularly on participation. Apart from additional immigration, Swedish labor supply can be increased by lowering taxes on the primary breadwinners, which are internationally very high. The results presented in this paper indicate that tax cuts are likely to be more effective in raising labor supply than a further strengthening of the benefit system.

DATA SOURCES AND DEFINITIONS

This appendix analyzes the data sources used in the empirical analysis.

**Time Period:** 1980-2001

**List of Countries:** Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the U.K. and the U.S.

**Participation Rate by gender:** Data were obtained from OECD's Labor Force Statistics database available at
http://www.oecd.org/topicstatsportal/0,2647,en_2825_495670_1_1_1_1_1,00.html
Data were interpolated for years for which data were not available.

**Total and by Gender Hours worked per working age population:** Data for annual hours worked per employee, working age population (aged 15-64) and numbers employed by average weekly hours bands by gender and for the total population were obtained from the OECD Labor Force Statistics database cited above.  Total hours worked per working age person were then computed as:
(Total employment x average actual annual hours worked per person in employment )/ population aged 15-64.

Computation of average annual hours worked by gender necessitate the use of some simplifying assumptions, which would become more apparent using an example. In particular, OECD provides data for the number employed (by gender) per average weekly hours bands. For example, in Sweden in 2001, the following men hourly band distribution were reported:

| Hourly Bands Per Week | Males Employed |
|---|---|
| 1-19 | 77,000 |
| 20-29 | 83,200 |
| 30-34 | 73,400 |
| 35-39 | 269,400 |
| 40 and over | 1,696,200 |

Assuming that each agent worked the average hours in his band (e.g., 77,000 men worked 10 hours, 83,200 men worked 25 hours per week and so on) we are able to obtain a proxy for the number of hours worked every week by men.

The same procedure is repeated for women and the total weekly hours worked are obtained by adding the two constructed series. The total average weekly hours worked are then fitted to the total annual hours worked to obtain the average numbers of weeks worked. This

number can then be multiplied with the constructed average weekly hours worked by gender to obtain the annual hours worked by gender.

**Tax Wedge:** Data on primary earner's tax wedge were obtained from OECD's Taxing Wages Statistics- Historical Tax Rates. Primary breadwinners tax wedge is defined as the tax wedge of a household with two children, with a sole breadwinner earning 100 percent of the average production wage (APW). Data were interpolated when missing. The secondary breadwinner's tax wedge was obtained from Jaumotte (2003). The reader is referred to Jaumotte (2003) for an explanation of how the series was constructed.

In the econometric analysis, we only consider the tax wedge for secondary earners using gross income rather than labor costs (i.e., we ignore social security contributions) due to the lack of available data for the pre-1996 period. We believe that this limitation does not affect our results. Even when ignoring employer's social security contributions, the Swedish tax wedge on secondary earners is not one of the highest in the OECD.



Sweden and Select OECD Countries: Tax Wedge for Secondary Breadwinner, 2003[1/][2/]
(In Percent of Gross Income)
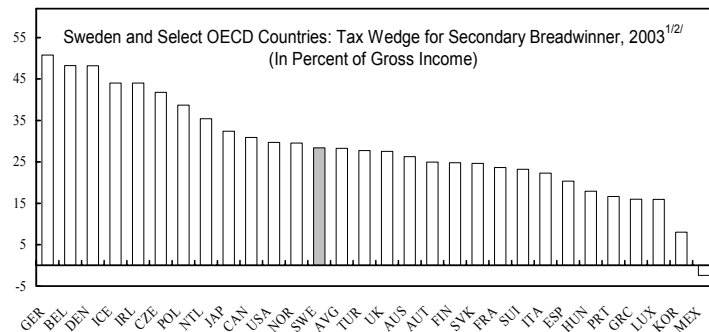
Source: Jaumotte (2004), OECD (2004): Taxing Wages, and Staff Calculations.

1/ Excluding social security contributions by employers.
2/ Secondary breadwinners in a married couple with two children, where the primary earner receives 100% of APW, and spouse earns 67% of APW.

**Benefit Wedge:** The benefit wedge series was constructed using the OECD Social Expenditure Database (2004) and OECD Labor Force Statistics. The benefit wedge which refers to a household with two children and an elderly, was constructed using the following formula:

$$\text{Benefit Wedge} = \frac{\dfrac{\text{Public Benefits in kind for old age and family}}{0.5 \times \text{Population below 15 years} + \text{Population above 65 years}}}{\text{Household Gross Income}_B - \text{Household Gross Income}_A}$$

where A denotes a household with two children and a single earner married couple earning 100 percent of APW, and B denotes a similar household with two breadwinners earning 100 and 67 percent of APW.

**Female and Male Wage Rate:** The wage rate is measured by the average hourly wages in manufacturing (in PPP) as obtained from Gauthier, A.H. (2003), "Comparative Family Benefits Database," Version 2 (University of Calgary), available at: http://www.soci.ucalgary.ca/fypp/family_policy_databases.htm

Data were interpolated for missing years.

**Wage Gap:** The wage gap used for the women is defined as the ratio of male to female wage rate. The wage gap used for men is defined symmetrically.

**Output Gap:** The output gap is measured as the percentage difference between actual GDP in constant prices and estimated potential GDP available from the OECD Main Economic Indicators.

**Parental Leave:** Data on parental leave duration (in weeks) were obtained from Gauthier, A.H. and A. Bortnik (2001), "Comparative Maternity, Parental, and Childcare Database," Version 2 (University of Calgary), available at :
http://www.soci.ucalgary.ca/fypp/family_policy_databases.htm
Data were interpolated for missing years.

**Women Parliamentary Seats:** Seats occupied by women as a percentage of total seats in parliament. Sources: E. Huber, C. Ragin and J.D. Stephens, D. Brady and J. Beckfield, 2004, "Comparative Welfare States Data Set," Northwestern University, University of North Carolina, Duke University and Indiana University and IPU (Inter-Parliamentary Union) at http://www.ipu.org.

**Wage Compression:** Wage compression was proxied by the ratio of the 10 percentile to the median of gross earnings for all employed. Data were obtained from the OECD Labor Force Statistics database cited above.

**Employment protection:** Data on employment protection were obtained from G. Allard (2003), "Jobs and Labour Market Institutions in the Postwar OECD," Ph.D. dissertation, University of California, Davis (provided by Gayle Allard).

**Unionization:** Data on trade union density were obtained from the OECD's Labor Force Statistics database cited above.

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