When Are Fiscal Contractions Successful? Lessons for Countries Within and Outside the EMU

Göran Hjelm

Working Paper No. 92, May 2004

Published by
The National Institute of Economic Research
Stockholm 2004

NIER prepares analyses and forecasts of the Swedish and international economy and conducts related research. NIER is a government agency accountable to the Ministry of Finance and is financed largely by Swedish government funds. Like other government agencies, NIER has an independent status and is responsible for the assessments that it publishes.

The *Working Paper* series consists of publications of research reports and other detailed analyses. The reports may concern macroeconomic issues related to the forecasts of the Institute, research in environmental economics in connection with the work on environmental accounting, or problems of economic and statistical methods. Some of these reports are published in final form in this series, whereas others are previous versions of articles that are subsequently published in international scholarly journals under the heading of *Reprints*. Reports in both of these series can be ordered free of charge. Most publications can also be downloaded directly from the NIER home page.

NIER
Kungsgatan 12-14
Box 3116
SE-103 62 Stockholm
Sweden
Phone: 46-8-453 59 00, Fax: 46-8-453 59 80
E-mail: ki@konj.se, Home page: www.konj.se

ISSN 1100-7818

When Are Fiscal Contractions Successful? Lessons for Countries Within and Outside the EMU

Göran Hjelm¤

June 16th, 2004

Abstract

In the past 25 years, many OECD countries have implemented fiscal contractions to strengthen their public finances. The macroeconomic outcomes of these efforts have varied. With the aid of an econometric model, this paper seeks to identify the factors that make contractions successful from a macroeconomic standpoint. The findings suggest, among other things, that favorable changes in the real exchange rate prior to the period of fiscal contraction and in the real quantity of money during this period play an important part in the macroeconomic outcome. This indicates in turn that it may be more difficult to implement successful fiscal contractions within the EMU. The findings also show that the composition of the contraction in regard to the relative proportions of tax increases and expenditure cutbacks, respectively, is probably less important than has usually been assumed.

Keywords: Fiscal Contractions; Fiscal Policy; Real Exchange Rate; EMU.
JEL: C20; E62; E63; H30.

¤National Institute of Economic Research (NIER), Box 3116, SE-103 62 Stockholm, Sweden. Phone: +46-8-4535926, fax: +46-8-4535980, Email:Goran.Hjelm@konj.se. I thank Henrik Hansen for suggesting the econometric approach applied in the paper. I am also grateful to Mikael Apel, Henrik Braconier, Per Jansson, Tomas Lindström, Kristian Nilsson, and participants in NIER seminars for valuable comments.

1 Introduction

Particularly in the 1970's, the 1980's and the first half of the 1990's, there were substantial deficits in the public finances of many OECD countries. This meant that the gross debt of the general-government sector in relation to GDP soared, even exceeding 100 percent in Belgium, Greece, Ireland and Italy. As the deficits and the increase in debt persisted for a long time, the problem was structural rather than cyclical. Since this trend was unsustainable, many countries responded with so-called fiscal contractions in order to reduce the structural deficits.

This paper analyzes the question why some of these fiscal contractions have been more successful than others, in the sense that macroeconomic indicators like household consumption and unemployment developed favorably despite the tighter fiscal policy.[1] A so-called Probit Model is estimated, thus making it possible to calculate the probability of how the macroeconomic outcome will be affected by changes in the explanatory variables (listed below).

The relevance of the question itself is debatable now that all EU countries are bound by the rules of the Stability and Growth Pact (SGP), perhaps limiting the need for fiscal contractions in the future. However, recent events have shown that several countries (e.g., France, Germany and Italy) have major budget problems and that the SGP rules may be relaxed later on. It therefore seems likely that fiscal contractions will still be required in the future – both within and outside the EU/EMU. Consequently, what history tells us about the causes of their macroeconomic effects may be of interest.

The findings indicate that aside from the well-known composition effect of the fiscal contraction (weight on tax increases and expenditure cuts, respectively), changes both in the real exchange rate and in the real quantity of money are of importance for the macroeconomic outcome.[2] Membership in the EMU may therefore have direct implications for the outcome of a fiscal contraction since a member country no longer controls its national exchange rate or national monetary policy. The explanatory variables analyzed in the paper (including motivation) are the following:[3]

---

[1] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, the UK and the US are included in this study. Period covered: 1970-1997. As we are including exchange rates and the money supply, the EMU-period is of less interest when evaluating individual countries.

[2] See also Hjelm (2002a,b) and Lambertini and Tavares (2000).

[3] The size and duration of the fiscal contraction is of minor importance and is excluded in the presentation. For an analysis, see the Appendix.

(i) *Prior change in the real effective exchange rate*. The two best-known fiscal contractions with favorable macroeconomic effects (those in Denmark and Ireland) were both preceded by nominal as well as real depreciations, and the question is whether this is a general pattern. In Keynesian theory, real depreciations cause economic upturns and, hence, strong macroeconomic performance during fiscal contractions may partly be due to prior exchange rate movements. Descriptive information regarding exchange rate systems applied before and during the periods of fiscal contraction is also presented in connection with this question.

(ii) *The mix of tax increases and expenditure cutbacks in the fiscal contraction*. The significance of the composition of the contraction is the finding in the literature that has attracted the greatest attention. The so-called 'composition effect' therefore deserves to be studied together with other potentially important variables.

(iii) *The change in the real quantity of money*.[4] In theory, an expansionary monetary policy may have positive short-run effects on output and employment. When data on this variable, (together with the exchange rate and the mix of measures – see (i) and (ii) above) are also included, information is obtained on monetary, fiscal and exchange-rate policies. In the regression analysis, we try to sort out their separate effects on the macroeconomic outcome of fiscal contractions.

A brief review of the literature follows in Section 1.1. In Section 2.1, fiscal contraction is defined and in Section 2.2 the macroeconomic outcomes of the contractions are categorized. Section 2.3 describes the data that were used. The findings of the Probit Model are analyzed in Section 3, and the conclusions of the paper are summarized in Section 4.

1.1 Previous Studies

The opening shot was fired by Giavazzi's and Pagano's (1990) article, where the authors examined two case studies of fiscal contractions – those of Denmark and Ireland

[4] A possible alternative to the money supply would have been to include the interest rate. The real quantity of money could entail problems of endogeneity. A Hausman test shows, however, that this is not the case. See section 3.1 and Appendix A3.

in the 1980's.[5] They found that these programmes, contrary to the expectations of many politicians and economists with the Keynesian model imprinted in their mindset, resulted in substantial macroeconomic improvement in the actual period of fiscal contraction. During the contraction in Denmark (Ireland) in 1982–86 (1987–89), the structural budget balance strengthened by about 12 (6) percentage points, while total GDP growth in the same period exceeded the OECD average by some 4 (4) percentage points.

The theoretical literature in the area has provided a synthesis between the Keynesian and neoclassical approaches to the macro-economic effects of fiscal policy.[6] Models have been developed that accommodate both neoclassical and Keynesian effects, depending on the initial state of the economy. One example is Sutherland (1997), where Keynesian effects of unfinanced tax reductions arise when central-government debt is initially low, while neoclassical effects arise when central-government debt is initially high. To simplify somewhat, the explanation is that individuals find the link between increased central-government indebtedness and future tax hikes to be weaker if debt is initially low, and that consequently they see no need to set aside funds for future tax payments. Thus, the effect of increased central-government debt is not countered by reduced household consumption. By contrast, if indebtedness is high, individuals will expect taxes to be raised soon and will therefore save more.

The empirical literature has sought to determine whether fiscal contractions lead to permanent reduction of the central-government debt ratio, as well as what macro-economic effects result from these programmes. The latter question is the starting point for this paper. One apparently robust finding is that fiscal contractions focused on reducing expenditure rather than raising taxes will more likely result in a favorable macroeconomic tendency (see, for example, Alesina and Ardagna, 1998, Alesina and Perotti, 1996, and Zaghini, 2001). In this paper, this composition effect is confronted with changes in the real exchange rate and in the real quantity of money before and during the period of fiscal contraction (see also Hjelm, 2002a,b).

---

[5] See Fels and Froelish (1987) and Hellwig and Neumann (1987) for earlier contributions.

[6] See Blanchard (1990), Bertola and Drazen (1993), Perotti (1999) and Sutherland (1997) for theoretical models representing this synthesis. The "Keynesian approach" means that an expansionary fiscal policy has positive ripple effects that increase economic activity. The "neoclassical approach", to simplify somewhat, means that a policy of fiscal expansion is counteracted by a reduction of individual consumption in anticipation of higher taxes in the future. Thus, the overall effect on the economy needs not be positive.

2 Macroeconomic Outcomes of Fiscal Contractions

The primary purpose of this paper is to determine the degree to which the probability of a favorable and an unfavorable macroeconomic outcome, respectively, depend on the factors mentioned in the Introduction above. For this purpose, the method used consists of the following steps:

(i) Definition of fiscal contraction (Section 2.1).
(ii) Definitions of favorable and unfavorable outcomes (Section 2.2).
(iii) A look at data subsequently used in the Probit Model. More specifically, the relationship between macro-outcome (Point (ii)) and the variables listed above in the Introduction (see also Section 2.3)
(iv) Estimating the Probit Model and calculating the variation in the probability of different macro-outcomes according to the explanatory variables (Section 3).

2.1 Definition of Fiscal Contraction

A fiscal contraction entails political decisions to increase taxes and/or reduce expenditure. However, since public finances are also affected by other factors, the budget balance as such does not only reflect the fiscal-policy measures actually taken. Consequently, one should focus on the primary balance (that is, the balance excluding costs of interest) adjusted for cyclical effects, which is customarily termed the primary structural budget balance. The OECD calculations of this balance are used (see Giorno et al., 1995), and fiscal contraction is defined in accordance with Giavazzi and Pagano (1996):

> *A period of time is called a fiscal contraction period if the cyclically adjusted primary budget deficit (in proportion to potential GDP) falls by:*
>
> *(i) five percent in four consecutive years,*
>
> *(ii) four percent in three consecutive years,*
>
> *(iii) three percent in two consecutive years, or*
>
> *(iv) three percent in one year.*

The fiscal contractions so defined that were implemented in the OECD area during the

period 1970–97 are shown in Table 1.[7] Included are the well-known contractions in Denmark and Ireland, as well as two periods of fiscal contraction in Sweden.

Table 1: Fiscal Contractions in the OECD, 1970–97

Country	Period	Country	Period
Australia	86–88	Italy	76–77
Belgium	82–87	Italy	82–83
Belgium	93–94	Italy	91–93
Canada	93–97	Italy	95–97
Denmark	83–87	Netherlands	91–93
Finland	75–76	Portugal	82–87
Germany	82–83	Spain	96–97
Greece	82–83	Sweden	84–87
Greece	86–87	Sweden	94–97
Greece	90–97	UK	79–82
Ireland	81–84	UK	94–97
Ireland	86–89		

Note: See footnote 1 for countries included in the OECD and Section 2.1 for definition of fiscal contraction.
Source: OECD Fiscal Positions and Business Cycles 1998.

2.2 Macroeconomic Outcomes

Fiscal contractions are characterized below according to macroeconomic outcome. To obtain a relatively broad picture of the outcome, four variables are used: growth in consumption, investment, net exports[8], and change in unemployment. A natural starting point for categorization is to compare the data with the OECD averages for these variables during the respective period of fiscal contraction. If a country performs better than the OECD average during a contraction, it is an indication of a good outcome. Since the business cycles of individual countries and the OECD are not perfectly correlated, cyclical factors would play a role in some cases. Consequently, there is also a comparison with the country's own averages for these variables during peri-

[7] Note that the actual fiscal contraction periods can exceed four years, see Table 1. For example, a country may fulfill the four year criteria in the definition above and, in the year after that period, the contraction may continue for one year and fulfill the one year criteria.
[8] Defined here as growth in exports minus growth in imports.

ods without fiscal contraction.[9] Although the comparison with the OECD average is most important in the decision rule set forth below, a reasonable balance should be struck between the two measures of comparison. The following categorization is applied:

(i) If a period of fiscal contraction brings *(a)* outcomes as good as, or better than, the OECD's and/or the country's own mean for *three* of the four variables as well as *(b)* an outcome as good as, or better than, the OECD's for *two* of the four variables, the macroeconomic outcome is considered a "+".

(ii) If a period of fiscal contraction brings *(a)* outcomes as good as, or better than, the OECD's and/or the country's own mean for *two* of the four variables as well as *(b)* an outcome as good as, or better than, the OECD's for *one* of the four variables, the macroeconomic outcome is considered a "0".

(iii) The remaining fiscal-contraction periods have the least favorable macroeconomic outcomes and are categorized as "-".

Of course, a categorization like this one does not provide an optimal picture of the macroeconomic outcome. It is necessary, however, for the econometric analysis, and it should provide a rough estimate of the macroeconomic tendency.[10] Table 2 shows which fiscal contractions are included in the three categories. An "X" in Table 2 means that the mean value of the contraction is equal to, or better than, the OECD's (the "(1)" columns) and the country's own mean (the "(2)" columns).[11]

It may be noted that, as expected, the known cases of successful fiscal contractions in Ireland and Denmark are included in the "+" category together with the two Swedish contractions.

---

[9] For example, the variables for Spain's of fiscal contraction in 1996-97 are compared with the mean values for the period 1970-95 when there was no fiscal contraction.

[10] Estimates of Probit Models and similar definitions of outcome are frequently found in this literature. See, for example, Alesina and Ardagna (1998), Alesina and Perotti (1996) and Zaghini (2001).

[11] For changes in unemployment, it is not fruitful to compare with the country's own mean. A "X" in column 2 means, instead, that unemployment decreased during the period of contraction.

Table 2: Macroeconomic Outcomes During Periods of Fiscal Contraction

Contraction and category	Cons.		Invest.		Net exports		Unempl.	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
"+"								
Belgium 82-87			X		X	X	X	
Canada 93-97	X		X		X	X	X	X
Denmark 83-87		X	X	X	X		X	X
Ireland 86-89	X		X	X	X			X
Italy 76-77	X	X	X	X	X	X		
Netherlands 91-93	X				X	X	X	
Spain 96-97				X	X	X	X	X
Sweden 84-87		X	X	X			X	X
Sweden 94-97		X	X	X	X	X		X
UK 94-97	X	X	X	X	X	X	X	X
"0"								
Australia 86-88					X	X		X
Germany 82-83			X		X	X		
Greece 86-87					X	X		X
Italy 82-83					X	X	X	
Italy 91-93					X	X	X	
Portugal 82-87					X	X	X	X
"-"								
Belgium 93-94					X	X		
Finland 75-76			X					
Greece 82-83								
Greece 90-97			X					
Ireland 81-84					X	X		
Italy 95-97				X				
UK 79-82								

Note: "Cons."= growth in household consumption, "Invest."= growth in investment (not owner-occupied homes), "Net exports" = growth in exports less growth in imports, "Unempl." = change in unemployment rate. The (1)-columns compare with the OECD mean during the contraction period. The (2)-columns compare with the mean during noncontractionary periods for the respective country. "X" means that the outcome of the contraction is as good as, or better than, the respective mean values for the OECD and for the same country. "X" in column (2) for unemployment means that unemployment decreased during the contraction.

Sources: OECD Fiscal Positions and Business Cycles 1998 and OECD Economic Outlook, various issues.

2.3 Data

The central question now, of course, is why some fiscal contractions show better outcomes than others. Are there any patterns that can help us both to understand the outcomes and to provide recipes for successful economic policy-making in the future? Table 3 lists the contractions in each group ("+", "0", and "-", respectively) together with data before ("B") and during ("D") the periods of fiscal contraction used in the econometric analysis. The following observations may be noted:

(i) There is a substantial difference between the three groups in regard to changes in real effective exchange rates (REER) before the fiscal contraction began.[12] In the group with the best macroeconomic outcomes ("+"), all fiscal contractions were preceded by real depreciation averaging -10.3 percent. The corresponding data for the two other categories are -1.1 percent ("0", i.e. depreciation) and 2.9 percent ("-", i.e. appreciation).

(ii) Contractions with more favorable outcome have higher growth in the real quantity of money, M2, during the contractions while there is no clear pattern for growth in M2 before the contractions started.

(iii) The column "(REV+EXP)" measures the relative importance of an increase in structural tax revenue ("REV") and a decrease in structural expenditure ("EXP") as a percentage of potential GDP (that is, the composition of the contraction). If "(REV+EXP)" is positive (negative), the contraction consists mainly of an increase (decrease) in structural tax revenue (expenditure). Here the categories differ. The better the macroeconomic outcome, the more the contraction has consisted primarily of expenditure cutbacks, a finding consistent with previous results in the literature.

[12] Refers to the total percentage change in the two years immediately preceding each fiscal contraction. For example, the change in REER prior to Sweden's fiscal contraction in 1984-87 is measured by comparing the value for REER in 1983 with the value for 1981. During ("D") the contraction period, the average percentage change per year is used to avoid dependence on the duration of the period.

Table 3: Macroeconomic Conditions for Fiscal Contractions

Contraction and	REER		M2		(REV+EXP)	Exchange-rate system	
category	B	D	B	D		B	D
"+"							
Belgium 82-87	-13.9	-3.0	0.5	4.1	-6.0	F(ERM) ↓	F(ERM) ↓
Canada 93-97	-1.8	-1.9	5.8	4.1	-6.0	FL	FL
Denmark 83-87	-8.9	3.8	1.7	9.3	3.5	F(ERM)↓	F(ERM)
Ireland 86-89	-6.0	-3.8	0.9	8.3	-10.0	F(ERM)	F(ERM) ↓
Italy 76-77	-14.0	-5.6	4.4	2.6	1.0	FL	FL
Netherlands 91-93	-5.6	0.3	14.2	1.1	2.1	F(ERM)	F(ERM) ↑
Spain 96-97	-7.8	0.9	4.9	-5.5	-0.4	F(ERM)	F(ERM)
Sweden 84-87	-18.4	0.7	-9.3	1.6	-0.4	F(Basket) ↓	F(Basket)
Sweden 94-97	-18.1	2.8	-1.0	0.4	-3.6	F(Basket)/FL	FL
UK 94-97	-8.2	4.3	4.0	5.2	-1.2	F(ERM)/FL	FL
Mean	***-10,3***	***-0,2***	***2,6***	***3,1***	***-2,1***		
"0"							
Australia 86-88	-13.2	-1.1	17.2	3.5	-3.3	FL	FL
Germany 82-83	-8.2	3.4	-4.0	0.3	-3.0	F(ERM)	F(ERM)↑
Greece 86-87	2.7	-9.9	11.8	-1.0	-2.0	MFL↓	MFL↑
Italy 82-83	-2.4	2.0	-14.7	0.7	3.0	F(ERM) ↓	F(ERM)
Italy 91-93	6.9	-5.5	9.0	2.6	3.3	F(ERM)	F(ERM)/FL
Portugal 82-87	7.4	-1.2	18.8	0.2	-2.4	F(Basket) ↓	F(Basket) ↓
Mean	***-1,1***	***-2,1***	***6,4***	***1,1***	***-0,7***		
"-"							
Belgium 93-94	0.5	0.1	6.3	0.4	0.4	F(ERM) ↑	F(ERM)
Finland 75-76	1.1	0.6	-2.4	0.3	16.0	F($)	F($)
Greece 82-83	7.2	5.2	8.4	4.7	4.2	MFL↓	MFL↓
Greece 90-97	15.7	1.8	14.4	-2.6	3.2	MFL↓	MFL↓ /ERM
Ireland 81-84	-1.0	-4.2	4.0	-4.4	2.8	F(ERM)	F(ERM) ↓
Italy 95-97	-21.3	3.4	-2.1	-10.5	-0.9	FL	FL/F(ERM)
UK 79-82	17.8	10.1	-0.9	3.9	5.6	FL	FL
Mean	***2,9***	***2,4***	***4,0***	***-1,2***	***4,5***		

Note:: "REER" ("M2") = percentage change in real effective exchange rate (real quantity of money per capita, M2). M3 is used for Belgium for the contraction in 93-94. "B" = two years *before* the fiscal contraction (a negative figure means depreciation). REER for Finland in 75-76 and Italy in 76-77 is based on the nominal effective exchange rate because of data availability. "D" = *during* the period of fiscal contraction. "(REV+EXP)" = change in cyclically adjusted general-government revenue and expenditure in proportion to potential GDP. A positive (negative) figure means that tax increases (expenditure cutbacks) predominated. "F"(FL) = fixed (floating) exchange rate. "MFL" = managed float. ↓ (↑) = devaluation (revaluation) beyond the norm with a fixed rate, see footnote 13. 'Basket'=basket of currencies.
Source: IFS 2001, OECD Fiscal Positions and Business Cycles 1998 and Annual Report on Exchange Rate Restrictions, IMF, annual issues for 1973-1998.

"Exchange-rate system" provides supplementary information on the changes in real exchange rates shown in the first two columns. For example, "F(ERM)↓" in column "D" for Ireland in 1986-89 means that Ireland had a fixed exchange rate ("F") within the ERM during ("D") the contraction period and depreciated ("↓") beyond the permitted variation of ±2.25 percent.[13] "Exchange-rate systems" are to some extent an undefined concept, and there is a rough scale from fully floating ("FL") to "managed float" ("MFL") to fixed ("F") rates. It is clear, however, that in the group with the best outcomes ("+") only one country (Netherlands) revalued its' fixed rate. Other countries within this group have either had floating rates both before and during contraction (Canada and Italy), had a fixed exchange rate and then devalued/depreciated (Sweden's two contractions and the UK) or devalued within the ERM (Belgium, Denmark, Ireland and Spain[14]). For categories "0" and "-", by contrast, there are no clear patterns.

In summary, the data in Table 3 suggests at least two sources of why some fiscal contractions generate favorable macroeconomic outcomes: (i) a depreciated/devalued currency prior the contraction; (ii) more weight on expenditure cuts compared to tax increases. The data in Table 3 also indicates, however, that these two factors coincide and the econometric analysis below will confirm this indication to some extent.

3 Econometric Analysis

Probit Models are frequently found in the literature on this subject.[15] Alesina and Ardagna (1998), for example, estimate a Probit Model where the probability of a certain macro outcome is determined by the size (not significant) and composition (significant) of the fiscal contraction. The so-called composition effect is confronted below with changes in the real exchange rate prior to the start of the contraction and with

[13] 'Fixed' is hence not an entirely satisfactory term as the currencies within the ERM were allowed to vary ±2.25 percent. Italy's exchange rate was allowed to vary by ±6 percent. Beginning in August 1993, all ERM currencies were allowed to vary by ±15 percent.

[14] Spain depreciated its currency by about 8 percent within the ERM between 1993 and 1994. Since the ERM interval was then +/- 15 percent, Spain's depreciation is not considered to have exceeded the permitted range of variation within the ERM. In reality, however, this means of course that Spain's depreciation reinforces the pattern for the countries in category "+".

[15] See Long (Ch. 5, 1997) for an extensive textbook description of the model, and Appendix A.1 for a short technical description of the model.

real growth in the quantity of money during the contraction period.[16] By estimating both simple and multiple regressions, an indication was obtained of the covariation, if any, among the three variables. Assume the following general relationship:

$$y^* = \beta' x + \varepsilon \tag{1}$$

where y^* is a so-called latent nonobservable dependent variable. In our case, it represents the "macroeconomic outcome of fiscal contractions" and is reflected in the observable variable y, where $y = 0$ for contractions with the worst macroeconomic outcome, ("-"), $y = 2$ for the best outcomes ("+") and $y = 1$ for the other outcomes ("0"). Furthermore, x in Equation 1 represents the independent variables. The Probit analysis consists of two steps. First, simple and multiple regressions are estimated; these provide only information about the *direction* taken by the probability (toward better or worse outcomes) when there is a change in the respective independent variable. Then so-called predicted probabilities are calculated; these tell us how the probability of a certain macro outcome ("+", "0" or "-", respectively) varies with the size of the explanatory variables.

3.1 Results of the Regressions

The simple regressions in Table 4 (columns (1)-(3)) provide an indication of the direction in which the three variables affect the probability of better macroeconomic outcomes. The definition of y above means that the higher y is, the better the outcome. A real appreciation, where ΔREER(B) increases before ("B") the contraction period, means a higher probability of a less favorable macroeconomic outcome (see regression (1)). Higher growth in the real quantity of money during ("D"), the actual contraction period, means a higher probability of a better outcome (see regression (2)).[17] Finally, a larger proportion of tax increases means a higher probability of a less favorable macroeconomic outcome (i.e. (REV+EXP) increases; see regression (3)). In short, successful contractions are associated by preceding depreciations, expansionary monetary policy, and the use of spending cuts (instead of increases in taxes).

---

[16] The real exchange rate *during* the contraction period, the real growth in the quantity of money *prior* to the contraction period and the duration and size of the contraction were also studied. However, no significant effects were found for these variables. See Appendix A2.

[17] See footnote 2 and the Appendix concerning test for endogeneity of the money supply.

Regressions (4)–(7) show the results for all combinations of these three variables. In these multiple regressions, it can be seen that the significance of some parameters decreases, whereas pseudo-R^2 (which is generally low in these models) increases. This suggests some degree of covariation among the variables; in other words, their separate effects are obscured by problems of multicollinearity. The signs of the coefficients, however, are the same as in the simple regressions, and the coefficients are also of approximately the same magnitude.

Both the real exchange rate variable and the money supply variable keep their significance (at least at the 10 percent level) in the multiple regressions. It is worth noting in regression (7) when all three explanatory variables are included, the 'composition effect' (REV+EXP) is not significant and the magnitude is smaller compared to the more parsimonious regressions. Hence, the heralded 'composition effect' seems not to be an important determinant of successful fiscal contractions. Previous studies, not taking exchange rate and monetary policy fully into account, have probably overestimated the effect of composition.

Table 4: Ordered Probit Regressions

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ΔREER(B)	-0.074*			-0.101*	-0.054**		-0.080*
	(0.025)			(0.046)	(0.032)		(0.035)
ΔM2(D)		0.148*		0.205*		0.159*	0.196*
		(0.066)		(0.072)		(0.072)	(0.077)
(REV+EXP)			-0.195**		-0.138	-0.228	-0.135
			(0.116)		(0.128)	(0.141)	(0.090)
Pseudo R^2	0.16	0.10	0.18	0.34	0.25	0.29	0.40

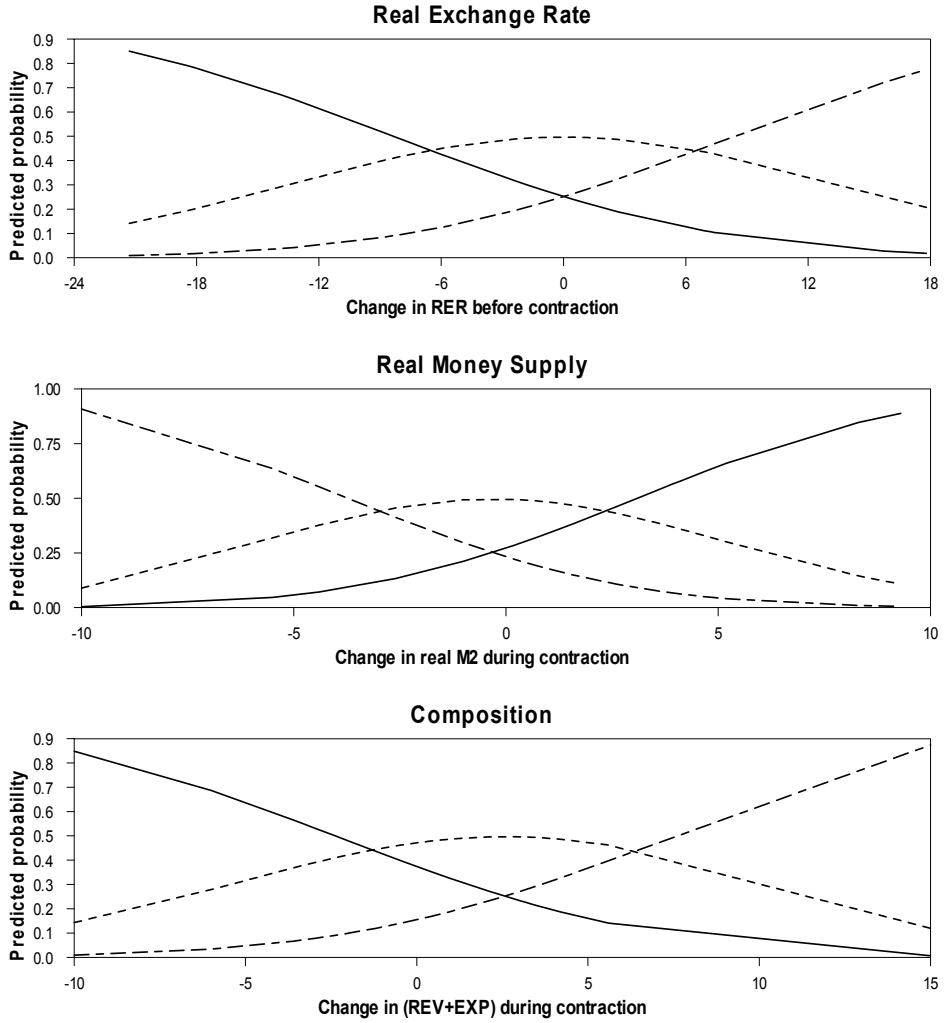
Note: For the dependent variable "Macroeconomic outcome", see Section 2.2. Standard error in parentheses. "*","**" shows significance at 5- and 10-percent level, respectively. Estimates are made in Eviews 4 with robust covariance matrices (GLM) and BHHH algorithms.

3.2 Predicted Probabilities

Here the variation is calculated for the three macroeconomic outcomes according to the size of the independent variables, in view of regression (7) in Table 4.[18] One independent variable at a time is analyzed, with each of the others set at its mean. The uppermost graph in Figure 1 shows how the probabilities of macro outcomes "+", "0" and "-" vary with change in the real exchange rate before the fiscal contractions. The

[18] Predicted probabilities have also been calculated from the simple regressions, with similar results.

Figure 1: Predicted Probabilities Calculated from Regression 7; see Table 4. "+" outcomes, solid lines; "0" outcomes, short-dashed lines; "-" outcomes, long-dashed lines.



results show, for example, that the probability of the best macro outcome ("+", solid line) is about 80 percent when the contraction is preceded by a real depreciation of 20 percent (i. e. -20 percent on the x-axis). The probability of the worst macro outcome ("-", long dashed lines) is roughly 50 percent when the contraction is preceded by a real appreciation of 5 percent.

The middle graph in Figure 1 shows how the macroeconomic outcomes vary with the average growth of the real quantity of money during the periods of fiscal contraction. With an average decrease of 5 percent in the real quantity of money, the proba-

bility of the worst macro outcome is roughly 60 percent. Further, real growth in M2 of 5–10 percent per year means that the probability of the best macro outcome is between 60 and 80 percent.[19]

The importance of the composition of the contraction, or the mix of fiscal-policy components, is measured by the variable (REV+EXP), which is the sum of the changes in structural revenue and expenditure in percent of potential GDP during the period of fiscal contraction. The lowest graph in Figure 1 shows that the probability of the best macroeconomic outcome exceeds 60 percent when the reduction in expenditure is 5 percent larger than the strengthening of revenue – i. e. when (REV+EXP) = -5. In addition, the probability of the worst macro outcome is some 60 percent when (REV +EXP) is 10 percent.

4 Conclusion

It is obvious that fiscal contractions have generated widely differing macroeconomic outcomes for the OECD countries in the last 25 years. One important question, therefore, is whether there are any circumstances that statistically distinguish contractions with favorable macroeconomic effects. A seemingly robust finding in the literature, and one that is also corroborated to some extent in this paper, is that contractions focused on reducing expenditure rather than raising taxes are more likely to produce a good macroeconomic outcome. It should be noted, however, that the significance of this composition effect disappeared in the multiple regression when controlling for preceding changes in the real exchange rate and changes in the money supply during the contractions. Thus, the composition effect has probably been overestimated in previous studies that did not consider these two additional variables.

The findings show further that depreciation in the real exchange rate before a contraction begins has positive macroeconomic effects, lending support to previous findings by Hjelm (2002a,b) and Lambertini and Tavares (2000). The explanation is simple. The initial enhancement of competitive strength gives the economy an expansionary push. The fiscal contraction then helps to dampen inflationary and wage

[19] This variable is endogenous (not directly subject to influence by politicians/central banks) with a fixed exchange rate and free capital movements – the actual situation of many countries in the study. More specifically, the nominal quantity of money with a fixed exchange rate is largely demand-determined, whereas with a flexible exchange rate it largely supply-determined. Thus, only in the latter case can politicians/central banks directly affect the quantity of money.

pressure that could erode competitiveness, with a positive effect on the economy. It is difficult to imagine, for example, that Sweden's two periods of fiscal contraction (1984–87 and 1994–97) would have had such favorable macroeconomic outcomes without the substantial real depreciations that occurred in 1982 and 1992. Data on the system of exchange rates before and during the contractions show that the group with the best macroeconomic outcomes is distinguished by the fact that all countries in it (except the Netherlands) either had floating exchange rates or had devalued their fixed rates. Finally, growth in the real quantity of money also appears to increase the probability of a favorable macroeconomic tendency during the contraction period, confirming standard results of positive short-run effects of monetary policy.

The apparent significance of changes in the real exchange rate, as well as changes in the real quantity of money, for the macroeconomic outcome of fiscal contractions has certain implications for a country considering membership in the EMU. Since the new member would lose its power over the nominal exchange rate, it would have to accomplish changes in the real exchange rate (and thus in competitiveness) by adjusting prices and wages. However, since prices and wages are slow to change, this process takes a long time. Moreover, the country's power over monetary policy, and thus over the quantity of money, would also be removed. Taken together, these factors mean that within the EMU it would be harder to use fiscal contractions to achieve favorable macroeconomic ends. The first conclusion, therefore, is that a country that has joined, or is planning to join, the EMU has an additional reason to maintain sound general-government finances. The second conclusion is that EMU-countries who need to carry out fiscal contractions in the near future (France, Germany and Italy, for example) is less likely to achieve a favorable macroeconomic outcome during the contractions due to the lack of country-specific exchange rate and monetary policies.

References

Alesina, A, & Ardagna, S, [1998], "Tales of Fiscal Adjustments", Economic Policy, Vol. 27, pp. 489-545.

Alesina, A, & Perotti, R, [1996], "Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects", NBER working paper 5730.

Bertola, G, & Drazen, A, [1993], "Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity", American Economic Review Vol. 83, pp. 1170-1188.

Blanchard, O.J, [1990], Comments on F. Giavazzi's & M. Pagano's (1990) article, "Can Severe Fiscal Contractions be Expansionary? Tales of Two Small European Countries", NBER Macroeconomic Annual, pp. 111-116.

Davidson, R, & MacKinnon, J.G, [1993], Estimation and Inference in Econometrics, Oxford University Press.

Davidson, R, &MacKinnon, J.G, [1989], "Testing for Consistency using Artificial Regressions", Econometric Theory, Vol. 5, pp. 363-384.

Fels, G, & Froelish, H-P, [1987], "Germany and the World Economy: a German View", Economic Policy, Vol. 4, pp. 195-200.

Giavazzi, F, & Pagano, M, [1990], "Can Severe Fiscal Contractions be Expansionary? Tales of Two Small European Countries", NBER Macroeconomic Annual, pp. 75-110.

Giorno,C, Richardson, P, Roseveare, D, & van den Noord,P, [1995], "Estimating Potential Output, Output Gaps and Structural Budget Balances", OECD Working paper 152.

Hausman, J.A, [1978], "Specification Tests in Econometrics", Econometrica, Vol. 46, pp. 1251-1272.

Hellwig, M, & Neumann, J.M, [1987], "Economic Policy in Germany: Was There a Turnaround?", Economic Policy, Vol. 5, pp. 105-140.

Hjelm, G, [2002a], ”Effects of Fiscal Contractions: the Importance of Preceding Exchange Rate Movements”, Scandinavian Journal of Economics, Vol. 104, pp. 423-441.

Hjelm, G, [2002b], ”Is Private Consumption Growth Higher (Lower) During Periods of Fiscal Contractions (Expansions)?”, Journal of Macroeconomics, Vol. 24, pp. 17-39.

IFS CD-rom September 1998.

IFS Yearbook 2001.

IMF Annual Report on Exchange Rate Restrictions, annual issues 1973-1998.

Lambertini, L. & Tavares, J. [2000], “Exchange Rates and Fiscal Adjustments: Evidence from the OECD and Implications for EMU”. Mimeo, University of California, Los Angeles.

Long, J.S, [1997], Regression Models for Categorical and Limited Dependent Variables, SAGE Publications, United States.

OECD Fiscal Positions and Business Cycles 1998 disc.

OECD Economic Outlook, various annual issues.

Perotti, R, [1999], ”Fiscal Policy in Good Times and Bad”, Quarterly Journal of Economics, Vol. 114, pp. 1399-1436.

Sutherland, A, [1997], ”Fiscal Crises and Aggregate Demand: Can High Public Debt Reverse the Effects of Fiscal Policy?”, Journal of Public Economics, Vol. 65, pp. 147-162.

Zaghini, A, [2001], ”The Economic Policy of Fiscal Consolidations: the European Experience”, Applied Economics, Vol. 33, pp. 613-624.

Appendix

A.1 Technical Information About the Model

Assume that the following general relationships apply:

$$y^* = \beta' x + \varepsilon, \tag{2}$$

where y^* is a so-called latent nonobservable dependent variable. In our case it represents the "macroeconomic outcome of fiscal contractions". This variable, y^*, is reflected in the observable variable y, where:

$$\begin{aligned} y &= 0 \text{ if } y^* \leq \text{'}-\text{'}, \\ &= 1 \text{ if "0"} < y^* < \text{'}+\text{'}, \\ &= 2 \text{ if "}+\text{"} \leq y^*. \end{aligned} \tag{3}$$

In other words, $y = 0$ for contractions with the worst macroeconomic outcomes, $y = 2$ for the best outcomes and $y = 1$ for other outcomes. Further, x in Equation (1) represents the independent variables. With a normal distribution, the following probabilities apply:

$$\begin{aligned} \Pr(y=0) &= \Phi(\mu_0 - \beta' x), \\ \Pr(y=1) &= \Phi(\mu_1 - \beta' x) - \Phi(\mu_0 - \beta' x), \\ \Pr(y=2) &= \Phi(\mu_2 - \beta' x) - \Phi(\mu_1 - \beta' x), \end{aligned}$$

where Φ is the cumulative normal distribution while μ_0, μ_1, μ_2, and β are parameters that are estimated.

Predicted Probabilities

Here calculations are made of the variation in the three macroeconomic outcomes according to the size of the independent variables. One independent variable at a time is analyzed, with the others set at their means. The probability of outcome *m* is as follows:

$$\widehat{\Pr}(y = m, x_*) = \Phi(\hat{\mu}_m - \hat{\beta}' x_*) - \Phi(\hat{\mu}_{m-1} - \hat{\beta}' x_*), \qquad m = 0, 1, 2. \quad (4)$$

A.2 Test of Several Variables

Section 3.1 showed the regression results for variables that appear to have a certain significant effect on macroeconomic outcomes. Shown below are regression results for the following variables that proved not to have significant effects:

- Change in the real exchange rate during the contraction period (ΔREER(D)).
- Change in the real quantity of money before to the contraction period (ΔM2(B)).
- Size of the contraction. Refers here to the total change in the structural balance in proportion to potential GDP.
- Duration (in years) of the contraction.

Table 5: Ordered Probit Regressions

Variables				
ΔREV XL(D)	-0.059			
	(0.064)			
ΔM2(B)		-0.012		
		(0.041)		
Size			0.043	
			(0.069)	
Duration				0.079
				(0.129)
Pseudo R^2	0.02	0.00	0.01	0.01

Note: For the dependent variable "Macroeconomic outcome," see Section 2.2. Standard error in parentheses. The estimates were made in Eviews 4 with robust covariance matrices (GLM) and the BHHH algorithm.

Table 5 shows only simple regressions. All of the variables above, however, were included in multiple regressions with the variables that proved to have a significant effect (see Table 4). None of the variables above showed any significance, while the variables in Table 4 did not lose significance.

A.3 Hausman Test

Shown below is a Hausman test for possible endogeneity between growth in the real quantity of money and macroeconomic outcome (see Hausman, 1978, and Davidson & MacKinnon ,1989, 1993). The test is based on regression (7) in Table 4 and consists of two steps. First, a regression is estimated with growth in the real quantity of money during the contraction periods as the dependent variable, the other independent variables in regression (7) in Table 4, and an instrument. The instrument is to be chosen so that it is correlated with the real quantity of money but not with the macroeconomic outcome (that is, the dependent variable in regression (7)). Here the system of exchange rates is used as the instrument, (VX_SYS), and is coded as a binary variable that assumes the value of 1 (0) if the country had a floating (fixed) exchange rate during the contraction period.[20] The result is shown in Table 6, and VX_SYS are significant – a floating exchange rate means higher growth in the real quantity of money.

Table 6: Hausman Test, Step 1

Variables	
ΔREV XL(D)	0.020
	(0.117)
(REV+EXP)	-0.134
	(0.150)
VX_SYS	2.366*
	(0.590)
R^2	0.06

Note: The dependent variable is Growth in Real Quantity of Money, M2. Standard error in parentheses. "*" shows significance at the 5 percent level. This linear equation was generated in Eviews 4 with a Newey-West adjusted covariance matrix.

[20] As can be seen in Table 3, any categorization of exchange-rate systems is somewhat unclear since certain countries changed systems during the contraction period. The following contractions are coded with 1, and the countries concerned are therefore considered to have had floating exchange rates during the contraction period: Canada, Italy 76-77, Sweden 94-97, UK 94-97, Greece 86-87, Italy 91-93, Australia 86-88, Greece 82-83, Greece 90-97, UK 79-82.

Step 2 in the Hausman test is again to estimate regression (7) in Table 4, this time with the residuals (RES) from Step 1 as an independent variable. If RES is significant in this regression, the null hypothesis of exogeneity is rejected – i.e., there is then problems of endogeneity. The result is shown in Table 7, and the coefficient for RES is not significant; therefore, exogeneity cannot be rejected.

Table 7: Hausman Test, Step 2

Variables	
ΔREV XL(D)	-0.075
	(0.062)
ΔM2(B)	0.067
	(0.312)
(REV+EXP)	-0.164
	(0.179)
RES	0.148
	(0.388)
Pseudo R^2	0.41

Note: The dependent variable is Macroeconomic Outcome. Standard error in parentheses. The estimates were made in Eviews 4 with robust covariance matrices (GLM) and the BHHH algorithm.

Titles in the Working Paper Series

No	*Author*	*Title*	*Year*
1	Warne, Anders and Anders Vredin	Current Account and Business Cycles: Stylized Facts for Sweden	1989
2	Östblom, Göran	Change in Technical Structure of the Swedish Economy	1989
3	Söderling, Paul	Mamtax. A Dynamic CGE Model for Tax Reform Simulations	1989
4	Kanis, Alfred and Aleksander Markowski	The Supply Side of the Econometric Model of the NIER	1990
5	Berg, Lennart	The Financial Sector in the SNEPQ Model	1991
6	Ågren, Anders and Bo Jonsson	Consumer Attitudes, Buying Intentions and Consumption Expenditures. An Analysis of the Swedish Household Survey Data	1991
7	Berg, Lennart and Reinhold Bergström	A Quarterly Consumption Function for Sweden 1979-1989	1991
8	Öller, Lars-Erik	Good Business Cycle Forecasts- A Must for Stabilization Policies	1992
9	Jonsson, Bo and Anders Ågren	Forecasting Car Expenditures Using Household Survey Data	1992
10	Löfgren, Karl-Gustaf, Bo Ranneby and Sara Sjöstedt	Forecasting the Business Cycle Not Using Minimum Autocorrelation Factors	1992
11	Gerlach, Stefan	Current Quarter Forecasts of Swedish GNP Using Monthly Variables	1992
12	Bergström, Reinhold	The Relationship Between Manufacturing Production and Different Business Survey Series in Sweden	1992
13	Edlund, Per-Olov and Sune Karlsson	Forecasting the Swedish Unemployment Rate: VAR vs. Transfer Function Modelling	1992
14	Rahiala, Markku and Timo Teräsvirta	Business Survey Data in Forecasting the Output of Swedish and Finnish Metal and Engineering Industries: A Kalman Filter Approach	1992
15	Christofferson, Anders, Roland Roberts and Ulla Eriksson	The Relationship Between Manufacturing and Various BTS Series in Sweden Illuminated by Frequency and Complex Demodulate Methods	1992
16	Jonsson, Bo	Sample Based Proportions as Values on an Independent Variable in a Regression Model	1992
17	Öller, Lars-Erik	Eliciting Turning Point Warnings from Business Surveys	1992
18	Forster, Margaret M	Volatility, Trading Mechanisms and International Cross-Listing	1992
19	Jonsson, Bo	Prediction with a Linear Regression Model and Errors in a Regressor	1992
20	Gorton, Gary and Richard Rosen	Corporate Control, Portfolio Choice, and the Decline of Banking	1993
21	Gustafsson, Claes-Håkan and Åke Holmén	The Index of Industrial Production – A Formal Description of the Process Behind it	1993
22	Karlsson, Tohmas	A General Equilibrium Analysis of the Swedish Tax Reforms 1989-1991	1993
23	Jonsson, Bo	Forecasting Car Expenditures Using Household Survey Data- A Comparison of Different Predictors	1993

24	Gennotte, Gerard and Hayne Leland	Low Margins, Derivative Securitites and Volatility	1993
25	Boot, Arnoud W.A. and Stuart I. Greenbaum	Discretion in the Regulation of U.S. Banking	1993
26	Spiegel, Matthew and Deane J. Seppi	Does Round-the-Clock Trading Result in Pareto Improvements?	1993
27	Seppi, Deane J.	How Important are Block Trades in the Price Discovery Process?	1993
28	Glosten, Lawrence R.	Equilibrium in an Electronic Open Limit Order Book	1993
29	Boot, Arnoud W.A., Stuart I Greenbaum and Anjan V. Thakor	Reputation and Discretion in Financial Contracting	1993
30a	Bergström, Reinhold	The Full Tricotomous Scale Compared with Net Balances in Qualitative Business Survey Data – Experiences from the Swedish Business Tendency Surveys	1993
30b	Bergström, Reinhold	Quantitative Production Series Compared with Qualiative Business Survey Series for Five Sectors of the Swedish Manufacturing Industry	1993
31	Lin, Chien-Fu Jeff and Timo Teräsvirta	Testing the Constancy of Regression Parameters Against Continous Change	1993
32	Markowski, Aleksander and Parameswar Nandakumar	A Long-Run Equilibrium Model for Sweden. The Theory Behind the Long-Run Solution to the Econometric Model KOSMOS	1993
33	Markowski, Aleksander and Tony Persson	Capital Rental Cost and the Adjustment for the Effects of the Investment Fund System in the Econometric Model Kosmos	1993
34	Kanis, Alfred and Bharat Barot	On Determinants of Private Consumption in Sweden	1993
35	Kääntä, Pekka and Christer Tallbom	Using Business Survey Data for Forecasting Swedish Quantitative Business Cycle Varable. A Kalman Filter Approach	1993
36	Ohlsson, Henry and Anders Vredin	Political Cycles and Cyclical Policies. A New Test Approach Using Fiscal Forecasts	1993
37	Markowski, Aleksander and Lars Ernsäter	The Supply Side in the Econometric Model KOSMOS	1994
38	Gustafsson, Claes-Håkan	On the Consistency of Data on Production, Deliveries, and Inventories in the Swedish Manufacturing Industry	1994
39	Rahiala, Markku and Tapani Kovalainen	Modelling Wages Subject to Both Contracted Increments and Drift by Means of a Simultaneous-Equations Model with Non-Standard Error Structure	1994
40	Öller, Lars-Erik and Christer Tallbom	Hybrid Indicators for the Swedish Economy Based on Noisy Statistical Data and the Business Tendency Survey	1994
41	Östblom, Göran	A Converging Triangularization Algorithm and the Intertemporal Similarity of Production Structures	1994
42a	Markowski, Aleksander	Labour Supply, Hours Worked and Unemployment in the Econometric Model KOSMOS	1994
42b	Markowski, Aleksander	Wage Rate Determination in the Econometric Model KOSMOS	1994
43	Ahlroth, Sofia, Anders Björklund and Anders Forslund	The Output of the Swedish Education Sector	1994
44a	Markowski, Aleksander	Private Consumption Expenditure in the Econometric Model KOSMOS	1994

44b	Markowski, Aleksander	The Input-Output Core: Determination of Inventory Investment and Other Business Output in the Econometric Model KOSMOS	1994
45	Bergström, Reinhold	The Accuracy of the Swedish National Budget Forecasts 1955-92	1995
46	Sjöö, Boo	Dynamic Adjustment and Long-Run Economic Stability	1995
47a	Markowski, Aleksander	Determination of the Effective Exchange Rate in the Econometric Model KOSMOS	1995
47b	Markowski, Aleksander	Interest Rate Determination in the Econometric Model KOSMOS	1995
48	Barot, Bharat	Estimating the Effects of Wealth, Interest Rates and Unemployment on Private Consumption in Sweden	1995
49	Lundvik, Petter	Generational Accounting in a Small Open Economy	1996
50	Eriksson, Kimmo, Johan Karlander and Lars-Erik Öller	Hierarchical Assignments: Stability and Fairness	1996
51	Url, Thomas	Internationalists, Regionalists, or Eurocentrists	1996
52	Ruist, Erik	Temporal Aggregation of an Econometric Equation	1996
53	Markowski, Aleksander	The Financial Block in the Econometric Model KOSMOS	1996
54	Östblom, Göran	Emissions to the Air and the Allocation of GDP: Medium Term Projections for Sweden. In Conflict with the Goals of SO_2, SO_2 and NOX Emissions for Year 2000	1996
55	Koskinen, Lasse, Aleksander Markowski, Parameswar Nandakumar and Lars-Erik Öller	Three Seminar Papers on Output Gap	1997
56	Oke, Timothy and Lars-Erik Öller	Testing for Short Memory in a VARMA Process	1997
57	Johansson, Anders and Karl-Markus Modén	Investment Plan Revisions and Share Price Volatility	1997
58	Lyhagen, Johan	The Effect of Precautionary Saving on Consumption in Sweden	1998
59	Koskinen, Lasse and Lars-Erik Öller	A Hidden Markov Model as a Dynamic Bayesian Classifier, with an Application to Forecasting Business-Cycle Turning Points	1998
60	Kragh, Börje and Aleksander Markowski	Kofi – a Macromodel of the Swedish Financial Markets	1998
61	Gajda, Jan B. and Aleksander Markowski	Model Evaluation Using Stochastic Simulations: The Case of the Econometric Model KOSMOS	1998
62	Johansson, Kerstin	Exports in the Econometric Model KOSMOS	1998
63	Johansson, Kerstin	Permanent Shocks and Spillovers: A Sectoral Approach Using a Structural VAR	1998
64	Öller, Lars-Erik and Bharat Barot	Comparing the Accuracy of European GDP Forecasts	1999
65	Huhtala , Anni and Eva Samakovlis	Does International Harmonization of Environmental Policy Instruments Make Economic Sense? The Case of Paper Recycling in Europe	1999
66	Nilsson, Charlotte	A Unilateral Versus a Multilateral Carbon Dioxide Tax - A Numerical Analysis With The European Model GEM-E3	1999

67	Braconier, Henrik and Steinar Holden	The Public Budget Balance – Fiscal Indicators and Cyclical Sensitivity in the Nordic Countries	1999
68	Nilsson, Kristian	Alternative Measures of the Swedish Real Exchange Rate	1999
69	Östblom, Göran	An Environmental Medium Term Economic Model – EMEC	1999
70	Johnsson, Helena and Peter Kaplan	An Econometric Study of Private Consumption Expenditure in Sweden	1999
71	Arai, Mahmood and Fredrik Heyman	Permanent and Temporary Labour: Job and Worker Flows in Sweden 1989-1998	2000
72	Öller, Lars-Erik and Bharat Barot	The Accuracy of European Growth and Inflation Forecasts	2000
73	Ahlroth, Sofia	Correcting Net Domestic Product for Sulphur Dioxide and Nitrogen Oxide Emissions: Implementation of a Theoretical Model in Practice	2000
74	Andersson, Michael K. And Mikael P. Gredenhoff	Improving Fractional Integration Tests with Bootstrap Distribution	2000
75	Nilsson, Charlotte and Anni Huhtala	Is CO_2 Trading Always Beneficial? A CGE-Model Analysis on Secondary Environmental Benefits	2000
76	Skånberg, Kristian	Constructing a Partially Environmentally Adjusted Net Domestic Product for Sweden 1993 and 1997	2001
77	Huhtala, Anni, Annie Toppinen and Mattias Boman,	An Environmental Accountant's Dilemma: Are Stumpage Prices Reliable Indicators of Resource Scarcity?	2001
78	Nilsson, Kristian	Do Fundamentals Explain the Behavior of the Real Effective Exchange Rate?	2002
79	Bharat, Barot	Growth and Business Cycles for the Swedish Economy	2002
80	Bharat, Barot	House Prices and Housing Investment in Sweden and the United Kingdom. Econometric Analysis for the Period 1970-1998	2002
81	Hjelm, Göran	Simultaneous Determination of NAIRU, Output Gaps and Structural Budget Balances: Swedish Evidence	2003
82	Huhtala, Anni and Eva Samalkovis	Green Accounting, Air Pollution and Health	2003
83	Lindström, Tomas	The Role of High-Tech Capital Formation for Swedish Productivity Growth	2003
84	Hansson, Jesper, Per Jansson and Mårten Löf	Business survey data: do they help in forecasting the macro economy?	2003
85	Boman, Mattias, Anni Huhtala, Charlotte Nilsson, Sofia Ahlroth, Göran Bostedt, Leif Mattson and Peichen Gong	Applying the Contingent Valuation Method in Resource Accounting: A Bold Proposal	
86	Gren, Ing-Marie	Monetary Green Accounting and Ecosystem Services	2003
87	Samakovlis, Eva, Anni Huhtala, Tom Bellander and Magnus Svartengren	Air Quality and Morbidity: Concentration-response Relationships for Sweden	2004
88	Alsterlind, Jan, Alek Markowski and Kristian Nilsson	Modelling the Foreign Sector in a Macroeconometric Model of Sweden	2004

89	Lindén, Johan	The Labor Market in KIMOD	2004
90	Braconier, Henrik and Tomas Forsfält	A New Method for Constructing a Cyclically Adjusted Budget Balance: the Case of Sweden	2004
91	Hansen, Sten and Tomas Lindström	Is Rising Returns to Scale a Figment of Poor Data?	2004
92	Hjelm, Göran	When Are Fiscal Contractions Successful? Lessons for Countries Within and Outside the EMU	2004