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Juuso Vataja

Initial economic experiences in EMU The case of Finland

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ABSTRACT

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Some ten years ago Finland was considering her view of deepening European integration to monetary union and possible participation in EMU. Due to the importance of the issue, the expert work group was founded. The final report of the expert group was published in spring 1997. Regarding Finland's possible EMU participation, the following main conclusions were reached regarding monetary union: 1) Credible monetary policy may reduce interest rates and interest rate volatility, 2) Exchange rate volatility may decrease, and 3) Asymmetric shocks were seen as the main problem for Finland.

Motivated by the issues raised up in the Finnish expert report (1997), the purpose of this article is to evaluate Finland's macroeconomic development in EMU and compare it to European non-EMU countries, Sweden, Denmark and the UK. The analysis is carried out for three central variables of macroeconomic stability: interest rates, exchange rates and business cycles.

The results suggest that development in interest rates and volatility of effective exchange rates have been positive in EMU. Regarding business cycles, clear tendency of convergence to euro-area business cycle was found in all the countries of the sample, but significant effect of membership in monetary union could not be detected. As the whole first five years in EMU may be regarded as favorable for Finland, but quantitatively the differences in interest rates between EMU and the non-EMU area have been rather small.

KEYWORDS: European integration, monetary integration, macroeconomic stability.

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1. INTRODUCTION

When considering the degrees of economic integration, monetary union represents the second highest degree of integration process. Within monetary union member countries share a common currency but not a single economic policy, which would take place within economic union, the most advanced type of economic integration.

Evaluations of economic consequences of monetary union usually distinguish between microeconomic efficiency gains and influences of macroeconomic stability of monetary union. Microeconomic efficiency is enhanced by such factors as diminishing of exchange rate risks and transaction costs, increasing competition and comparability of prices, as well as increasing efficiency of financial markets. Channels related to macroeconomic stability include, among others, possible positive effect on credibility of monetary policy and thus fall in interest rates and diminishing of excessive volatility of exchange rates. On the other hand losing of independent monetary policy implies narrower scope for independent national economic policy. Consequently, when evaluating macroeconomic influences of monetary union, it is worth noting that in theory the influences may be positive or negative leaving ambiguity to the net results.

Some ten years ago Finland was considering her view of deepening European integration and possible participation in Economic and Monetary Union (EMU). Due to the importance of the issue, the expert work group was founded¹. The final report, “*Monetary Union and Finland – Challenges of the Economy*”, was published in spring 1997. Regarding Finland’s possible EMU participation, the expert work group reached the following conclusions, among others:

- Credible monetary policy in monetary union may reduce the level and variability of interest rates.
- Variability of exchange rates between euro and non-EMU countries may be reduced.
- Possibility of asymmetrical shocks was identified as the central problem of Finland’s participation.

¹ Prior Finland, Sweden had set up expert work group regarding Sweden’s possible participation in EMU. See SOU (1996) and Calmfors *et al.* (1997).

Regarding Finland's participation, the participation of Sweden and the UK in EMU was seen as desirable. If these countries remained outside, the gains of participation were lower for Finland.

In spring 1998 Finland decided to participate in monetary union, while Sweden and the UK stayed outside. The third stage of monetary union, in which the monetary policy of member countries was transferred to European Central Bank, started in the beginning of 1999 and the common currency, euro, entered into circulation and became the only legal means of payment from the beginning of 2002.²

Now that Finland has been a member of monetary union for over half decade, the time period seems long enough to scrutinize how the issues raised by the expert working group have materialized. The purpose of this article is to evaluate Finland's macroeconomic development in EMU and compare it to countries outside the EMU, especially to Sweden. Also the two other central non-EMU countries, Denmark and the UK, were included in the analysis. The EMU-area aggregate business cycle acts as a reference for the business cycle analysis, and the US business cycle was also included in to the analysis.

The analysis is carried out for three central variables of macroeconomic stability: *interest rates*, *exchange rates* and *business cycles*. The source of data is OECD Main Economic Indicators. From the beginning of the third stage of EMU, the exchange rates of member countries were connected to each other permanently. Thus, the EMU-period in this study means the period starting from the beginning of 1999. Since the number of observations from the EMU-period is rather scant, the main analysis method is descriptive and is based on the first and second moments of the time series.

² For a coverage account of the stages of Finland's EU-membership, see Widgren (2002).

2. MACROECONOMIC STABILITY BEFORE AND AFTER THE CREATION OF EMU

In this paper evolution of macroeconomic stability is evaluated by comparing the development in interest rates, exchange rates and business cycles before and after the creation of EMU in January 1999. Regarding interest and exchange rates, the analysis is done between the EMU-member Finland and three European non-EMU countries, Sweden, Denmark and the UK, and the US. The setting is interesting, since after the exchange rate turmoil of 1992, Finland and Sweden abandoned their peg to ECU and allowed the markka and the krone to float. The floating of the markka ended in October 1996 as Finland joined ERM with 15% fluctuation bands, but Sweden continued with independent floating and inflation targeting. This was also the solution for the pound sterling after the EMS crisis of the 1992-1993. Since the start of EMU the Danish krone has participated in the European Exchange Rate Mechanism, ERMII, and pursued fixed exchange rate policy against the euro with +/-2.25% fluctuation band.³

2.1. Development of interest rates

When capital movements are free, national interest rates can be taken to be determined on the basis of international interest rates, expected exchange rates and inflation and risk premium related to unexpected changes in exchange rates. If monetary union manages to pursue credible monetary policy, the level of interest rates can be expected to fall in EMU due to lower risk premium and inflation uncertainty. The influence on interest rates may be significant to countries such as Finland, whose credibility of economic policy and inflation history leaves a lot to be desired. Baldwin (1989) has emphasized that even small permanent drops in interest rates have significant positive influence in the economy in the long run⁴.

Since Sweden and the UK have adopted flexible exchange rates and consequently independent monetary policy, it is interesting to see how the Swedish and British

³ Mayes and El-Agraa (2004b) provide a detailed description of development phases of the European monetary integration.

⁴ The medium term model of the Bank of Finland predicts that 1% permanent drop in interest rates increases the economic growth by 0.3% (The EMU expert report 1997).

interest rates have behaved compared to the EMU-area interest rates. Moreover, since the Danish krone is pegged to euro, the interest spread with the EMU interest rates tells something about the credibility of the Danish peg.

Short-term interest rates

Consider first the behavior of 3-month interest rates in Finland and the non-EMU countries Sweden, Denmark and the UK. The US interest rates are included in the analysis for the sake of comparison. Finland has practiced pegged exchange rates during 1989:1-1992:8,⁵ 1992:9-1996:9 floating rates, 1996:10-1998:12 ERM-membership with 15% fluctuation bands, and since 1999:1 EMU-membership. Although the main interest in this study is in the EMU-period, attention is also paid to the floating and the ERM-periods rate.

Figure 1 shows the graphs of the short-term interest rates and the interest differentials with respect Finland (3-month Helibor 1989:1-1998:12 and 3-month Euribor 1999:1-2005:3). It is clearly visible how uncertainty concerning the fixed rates policy kept the short-term interest rates high in the beginning of the 1990s and how the uncertainty was eliminated rapidly through fluctuation of the Finnish mark from September 1992 on and already at the beginning of 1994 Finnish short rates were at a lower level compared with Sweden, Denmark and the UK. One may also infer that the EMU-period, starting from January 1999, with the euro-area interest rates has not brought about very drastic changes compared the interest rates of the EMU-outsiders Sweden and Denmark. However, from the second half of 1990s the behavior of the British interest rates seems to have been quite different from the other interest rates in the sample.

⁵ First currency index peg and since 1991:6-1992:9 the ECU peg.

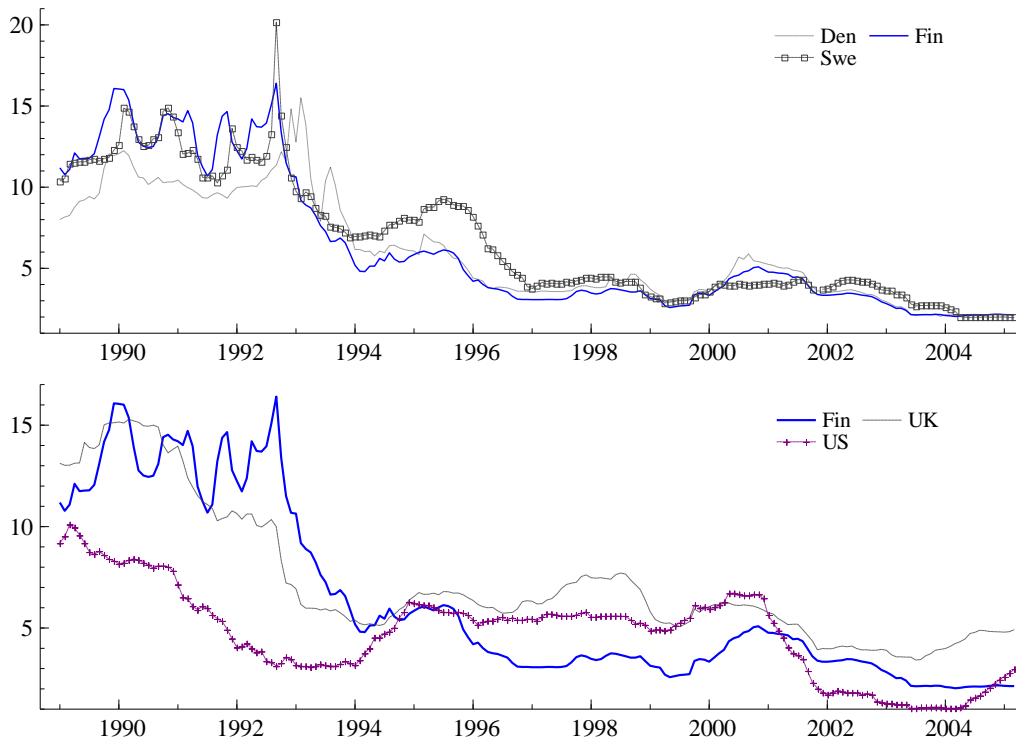


Figure 1a. Short (3-month) interest rates.

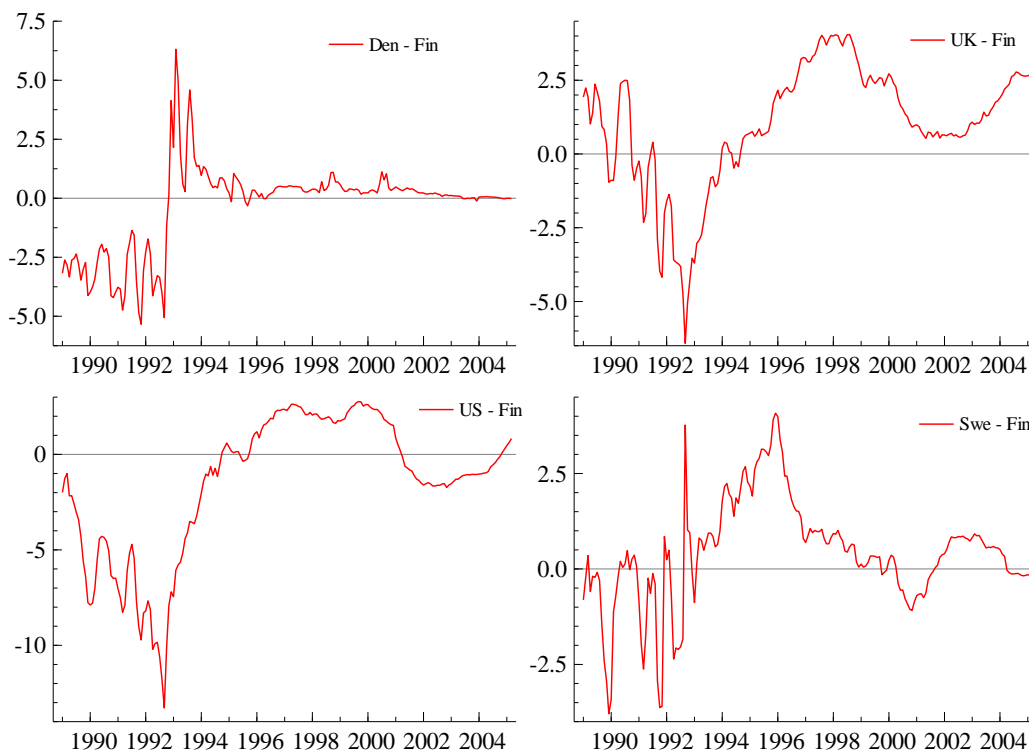


Figure 1b. Interest (3-month) differentials.

Tables 1 and 2 present the mean and volatility⁶ of the short interest rate levels and their spreads vis-à-vis the non Euro-area (Finnish 1992:9-1998:12) interests rates. It is seen that during the last 12 years the average short interest rates have come down in all the countries. Also the volatility of interest rates has decreased in Finland, Sweden and Denmark, remained about the same level in the UK and clearly increased in the US. During the EMU-period, the lowest average interest rates are found in the EMU-area (Finland 3.19%), but the average difference between the non-EMU members Sweden and Denmark have been rather small (+0.14% for Sweden, +0.23% for Denmark). Regarding the volatility of interest rates in the EMU-period, Sweden has the lowest volatility, but again the differences between the EMU-area are small. As to the third non-EMU member, the UK, the behavior of interest rates has been clearly different. Since 1997 the UK short interests rates have been higher than in the other countries in the sample, but the volatility has been considerably smaller.

Overall, during the first five years of EMU the behavior of short interest rates in non-EMU members Sweden and Denmark has been very similar than in the EMU-area. This implies among others that the Swedish monetary policy has not differed markedly from European Central Bank's policy. The Danish short interest rates have been about 0.20% higher than the euro-area interest rates. This may be interpreted as rather small interest premium implying that the Danish euro-peg has been credible.

⁶ Volatility is measured by standard deviation here.

Table 1. Short (3-month) interest rates.

1992:9-1996:9	FINLAND	SWEDEN	DENMARK	UK	US
Mean	6.38	8.33	7.29	6.20	4.62
Std.Dev.	2.58	2.40	3.05	0.85	1.19
Std.Dev.(%)	40.44	28.81	41.84	13.71	25.76
1996:10-1998:12					
Mean	3.37	4.17	3.86	6.98	5.53
Std.Dev.	0.26	0.26	0.33	0.57	0.16
Std.Dev.(%)	7.72	6.24	8.55	8.17	2.89
1999:1-2005:3					
Mean	3.19	3.32	3.42	4.80	3.30
Std.Dev.	0.96	0.78	1.13	0.88	2.07
Std.Dev.(%)	30.09	23.49	33.04	18.33	62.73

Table 2. Short (3-month) interest rate spreads.

1992:9-1996:9	SWE - FIN	DEN - FIN	UK - FIN	US - FIN
Mean	1.94	0.91	-0.18	-1.76
Std.Dev.	1.14	1.70	2.07	3.41
1996:10-1998:12				
Mean	0.80	0.50	3.62	2.16
Std.Dev.	0.31	0.21	0.38	0.29
1999:1-2005:3				
Mean	0.14	0.23	1.61	0.11
Std.Dev.	0.53	0.22	0.82	1.58

Long interest rates

On the basis of the expectations theory of the term structure⁷, long interest rates can be regarded as an average of short interest rates expected to occur over the maturity of long rates. If short interest rates are expected to rise in future, long rates will also rise. Interest rates may rise, among others, due to rising inflation expectations. Thus, if the monetary policy of the European Central Bank is credible, this creates possibilities for lowering long interest rates in EMU.

In this study the behavior of long interest rates is considered by means of the yields of 10-year government bonds. The country group and the analysis period are the same as for short interest rates. Figure 2 illustrates clearly how the long rates have converged strongly irrespective of whether a country belongs to the EMU.

⁷ See e.g. Mishkin (2001).

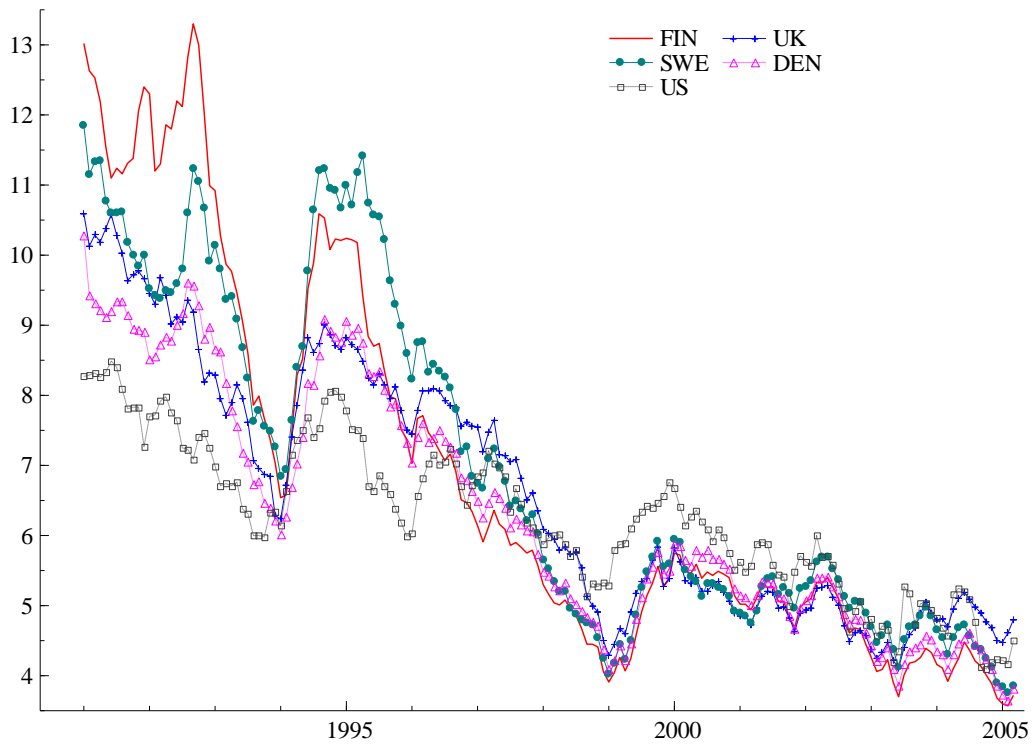


Figure 2a. Long interest rates.

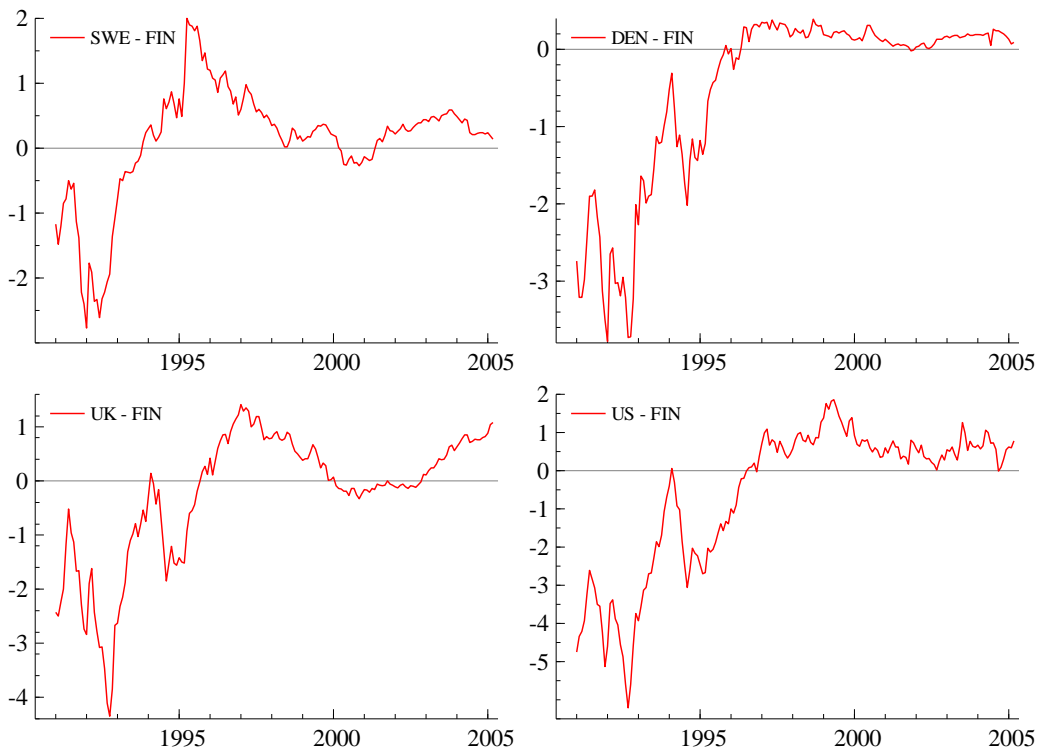


Figure 2b. Long interest spreads.

Table 3. Long (10-year government bonds) interest rates.

1992:9-1996:9	FINLAND	SWEDEN	DENMARK	UK	US
Mean	8.87	9.33	7.83	8.00	6.94
Std.Dev	1.64	1.36	0.91	0.68	0.59
Std.Dev(%)	18.49	14.58	11.62	8.50	8.50
1996:10-1998:12					
Mean	5.49	5.95	5.77	6.43	6.19
Std.Dev	0.72	0.96	0.74	0.94	0.60
Std.Dev(%)	13.11	16.13	12.82	14.62	9.69
1999:1-2005:3					
Mean	4.70	4.92	4.84	4.93	5.40
Std.Dev	0.61	0.53	0.60	0.37	0.71
Std.Dev(%)	12.98	10.77	12.40	7.51	13.15

Table 4. Long interest spreads.

1992:9-1996:9	SWE - FIN	DEN - FIN	UK - FIN	US - FIN
Mean	0.46	-1.05	-0.87	-1.93
Std.Dev	0.95	0.97	1.25	1.39
1996:10-1998:12				
Mean	0.45	0.28	0.94	0.70
Std.Dev	0.27	0.07	0.26	0.28
1999:1-2005:3				
Mean	0.22	0.14	0.22	0.70
Std.Dev	0.23	0.07	0.39	0.42

Tables 3 and 4 present the development of long interest rates. During the floating rate period (1992:9-1996:9) the Finnish long rates were higher on average than in Denmark, the UK and the US, but in the ERM-period (1996:10-1998:12) the situation changed and the Finnish long rates have been lower than in the other countries of the sample. The same has continued in the EMU-period, but as in the case of short interest rates, the differences have been rather small. The volatility of long interest rates has decreased in Finland and Sweden, and during the EMU-period the Swedish volatility has been lower than in euro-zone. Interestingly the long interest spread between Denmark and Finland is smaller and considerably smaller between the UK and Finland than for the short rates during the EMU-period implying high credibility for the British inflation targeting.

2.2. Development of exchange rates

Independent national monetary and exchange rate policy is lost in monetary union. Exchange rate policy, in turn, is often linked to the question of asymmetric shocks, since exchange rate changes could be used to dampen the influence of asymmetric shocks. The Finnish EMU expert report (1997) highlighted asymmetric shocks as the central problem of the Finnish EMU-membership. Finnish business cycle has been found to be connected more to Swedish, British and the US cycles than to cycles of the EMU core countries⁸. If a severe asymmetric shock hit the Finnish and Swedish economies, outside the monetary union Sweden could dampen the influences of shock by depreciating the krona. Naturally the corresponding policy would be impossible for Finland in monetary union. However, the Finnish EMU expert report did not emphasize possibilities of independent exchange rate policy, but merely stressed problems caused by excessive exchange rate volatility for small open countries such as Finland. Excessive volatility may lead to rise of unexpected inflation, risk premiums and interest rates. Recent research has shown the negative influence of excessive exchange rate variability on foreign trade⁹. Thus, if the volatility of the euro is smaller than volatility of the non-EMU member countries currencies, participation in EMU can be seen as favorable for Finland.

In this paper development of exchange rates are analyzed by comparing bilaterally the volatility of euro, the Swedish and Danish krona, the British Pound, and the US dollar¹⁰. To reveal a broader view, behavior of effective exchange rates were also considered. Since time series of the effective exchange rates were not available, they were proxied by the effective real exchange rates calculated by OECD. The exchange rate data are monthly and cover the period 1990:1-2005:3 and illustrated in Appendix 1 and 2.

Bilateral exchange rates

⁸ During 1971-1995 44% of shocks to Finnish economy were of domestic origin, 36% originated from Sweden and the UK mainly, 10% from the US, and only about 10% originated from the EMU core countries (The EMU expert report 1997).

⁹ E.g. Barr, Breedon & Miles (2003), Micco, Stein & Ordoñez (2003), and Rose (2002), which contains an up-to-date overview of the topic.

¹⁰ The monthly data are based on monthly averages calculated by OECD.

The Finnish EMU expert group emphasized potential harmfulness of excessive exchange rate volatility to the stability of economy. Tables 5 and 6 present the mean and volatility of the monthly and annual rate of change of the exchange rates. Monthly changes may be seen as reflecting short term and annual changes as long term variability of the exchange rates.

Tables 5 and 6 reveal that the behaviour of the bilateral exchange rate changes has been very similar, no matter whether the monthly or annual behaviour is considered. Generally the volatility has decreased over time in all cases excluding the Danish krona/the US dollar rate, for which the volatility has increased somewhat. The differences in volatility between the euro and non-EMU currencies have been very small. During the EMU-period all the currencies have appreciated against the US dollar. The average short run (monthly) appreciation rate has been largest for the Swedish SEK/USD (0.21%) and smallest for the euro/USD and the Danish DNK/USD (0.16%). Correspondingly, the long run (annual) appreciation rate has been largest for the Danish DNK/USD rate (1.98%) and smallest for the Swedish SEK/USD rate (1.50%). As the whole, during the EMU-period one cannot find any systematic differences between the behaviour of euro and non-EMU currencies in our sample. Especially the fact that the non-EMU countries exchange rate volatility has not been larger than the volatility of euro seems noteworthy.

Table 5. Mean and volatility of monthly rate of change of exchange rates.

1992:9-1996:9	EUR/USD	SEK/USD	DNK/USD	GBP/USD	EUR/SEK
Mean	0.27	0.47	0.07	0.45	-0.20
Std.Dev.	3.37	3.11	2.34	2.64	2.61
1996:10-1998:12					
Mean	0.42	0.72	0.34	-0.25	-0.30
Std.Dev.	2.22	2.11	2.30	1.89	1.32
1999:1-2005:3					
Mean	-0.16	-0.21	-0.16	-0.18	0.05
Std.Dev.	2.50	2.49	2.52	1.88	1.16
1992:9-1996:9	DNK/SEK	GBP/SEK	EUR/DNK	EUR/GBP	DNK/GBP
Mean	-0.39	-0.02	0.19	-0.18	-0.37
Std.Dev.	2.52	2.85	2.41	2.17	2.21
1996:10-1998:12					
Mean	-0.38	-0.96	0.08	0.67	0.59
Std.Dev.	1.40	2.09	0.42	2.10	2.20
1999:1-2005:3					
Mean	0.05	0.03	-0.00	0.02	0.02
Std.Dev.	1.22	1.78	0.28	1.51	1.52

Note: The figures are based on logarithmic differences. All the figures are multiplied by 100.

Table 6. Mean and volatility of annual rate of change of exchange rates.

1992:9-1996:9	EUR/USD	SEK/USD	DNK/USD	GBP/USD	EUR/SEK
Mean	1.40	3.51	-1.97	3.80	-2.11
Std.Dev.	17.70	16.48	9.96	9.13	11.06
1996:10-1998:12					
Mean	7.49	7.53	7.07	-3.17	-0.05
Std.Dev.	6.70	6.13	7.25	3.12	4.83
1999:1-2005:3					
Mean	-1.95	-1.50	-1.98	-1.72	-0.45
Std.Dev.	11.53	12.10	11.58	7.56	4.98
1992:9-1996:9	DNK/SEK	GBP/SEK	EUR/DNK	EUR/GBP	DNK/GBP
Mean	-5.47	0.30	3.37	-2.41	-5.77
Std.Dev.	11.95	10.30	12.38	10.04	8.01
1996:10-1998:12					
Mean	-0.47	-10.70	0.42	10.66	10.23
Std.Dev.	4.77	7.48	1.67	7.75	8.63
1999:1-2005:3					
Mean	-0.48	-0.22	0.03	-0.23	-0.26
Std.Dev.	5.06	6.26	0.34	6.17	6.21

Note: The figures are based on logarithmic differences. All the figures are multiplied by 100.

Real effective exchange rates

Tables 7 and 8 present the means and volatility of short run (monthly) and long run (annual) rates of changes of the real effective exchange rates. Compared to the bilateral exchange rates, one can find significant differences in the development of the real effective rates.

The short-term volatility of all European real rates has decreased unambiguously (Table 7), but for the Finnish real rates the fall in volatility has been the greatest. During the EMU-period Denmark has the smallest short run volatility (0.64). The second lowest volatility is found for Finland (0.74), and the difference between Finland and the two other non-EMU countries, Sweden and the UK, appears worth noting (Sweden 1.21, the UK 1.16).

The development of the long-term volatility accords with the monthly volatility. The average volatilities have fallen consistently in all European countries of the sample. In US the long term volatility shows an increasing pattern. During the EMU-period the difference between the Finnish (3.08) and Swedish volatilities (5.02) is also remarkable. The Finnish and the Swedish real rates have depreciated in real terms¹¹ during 1992:9-1996:9 and 1996:10-1998:12, but during the EMU-period euro has appreciated slightly (0.14%), while Swedish krona has depreciated about 0.7% annually on average. The real depreciation of krona during the EMU-period may be regarded as favourable for Sweden, but the development in volatility has been advantageous for Finland unambiguously.

The real effective exchange rates consist of effective exchange rates and (aggregate) foreign and domestic price levels. In principle the favorable development in real rates in Finnish case might be due to favorable development in Finnish price level instead of favorable behavior of effective exchange rates. However, since the analysis period 1992-2005 cannot be characterized as a high inflation period in most of the industrialized countries, it seems very unlikely that lower volatility of real effective exchange rates in Finland would be due to favorable price level development. Rather it

¹¹ Due to definition by OECD, fall in time series means real depreciation here and vice versa.

reflects the fact that in EMU the influence of nominal exchange rate changes have been reduced from the member countries real effective exchange rates.

Table 7. Monthly rate of change of real effective exchange rates.

1992:9-:9	FINLAND	SWEDEN	DENMARK	UK	US
Mean	0.34	-0.33	0.04	-0.35	0.11
Std.Dev.	2.28	2.38	0.95	1.89	1.22
1996:10-1998.12					
Mean	0.01	-0.53	0.07	0.76	0.39
Std.Dev.	1.11	1.37	0.79	1.72	1.39
1999:1-2005:3					
Mean	-0.03	0.01	0.03	0.07	-0.06
Std.Dev. 1996	0.74	1.21	0.64	1.16	1.11

Note. The figures are based on logarithmic differences. All the figures are multiplied by 100.

Table 8. Annual rate of change of real effective exchange rates.

1992:9-1996:9	FINLAND	SWEDEN	DENMARK	UK	US
Mean	-4.31	-3.88	1.05	-4.63	0.59
Std.Dev.	11.28	10.79	3.30	6.29	2.96
1996:10-1998.12					
Mean	-1.75	-3.48	-0.49	11.26	5.86
Std.Dev.	3.81	3.94	2.83	5.48	3.30
1999:1-2005:3					
Mean	0.14	-0.73	0.70	0.55	-0.61
Std.Dev.	3.08	5.02	2.78	3.45	4.59

Note. The figures are based on logarithmic differences. All the figures are multiplied by 100.

2.3. Development of business cycles

Although the Finnish EMU expert work group (1997) regarded asymmetric shocks as the key problem for the Finnish membership in the EMU, in terms of optimal currency area it is worth noting that deepening economic integration over time may bring about economic convergence making a country better suited to currency area. Put differently, the criteria of optimum currency area could be regarded as endogenous (Frankel & Rose 1998; Eichengreen 2002).

Has the Finnish business cycle possibly connected more closely to the EMU-area business cycle now that the Finnish membership in the EU has lasted over 10 years and

in EMU over five years?¹² To find out this, the Finnish business cycle is compared to the whole EMU-area¹³, the Swedish, the British as well as the US business cycles¹⁴. The business cycle is measured by the annual percentage growth of gross domestic product. Quarterly, seasonally adjusted data were used over the period 1980:1-2004:3. Compared to the other time series in this paper, the business cycle data cover longer period, since the exceptionally severe depression of the Finnish economy in the beginning of 1990s otherwise would have biased the results. The business cycle data is displayed in Appendix 3.

Table 9 presents the means and the standard deviations of the economic growth in the sample period. During the first half of the sample period (1981.1-1992.2) economic growth has been strongest in the US on average. However, elimination of only one year and quarter of the first half of the sample reveals the severity of the Finnish economic depression in the beginning of 1990s, during 1981:1-1991:1 the Finnish economic growth was even higher than in the US and variability of business cycle lowest in the sample. During the second half of the sample period (1992:3-2004:3) average growth has been stronger in the UK and lower in EMU-area compared to the first half of sample, while the average US growth has remained at about the same level than in the 1980s. During the last ten years of the sample the average growth has been strongest in Finland and the US, but during the 2000s economic growth appears to have decreased somewhat in all of the sample countries. As to magnitude of business cycles, variability shows decreasing pattern in general and the dampening of cycles appear remarkable especially for the UK and Denmark. Excluding 1980s, the Finnish business cycle volatility has been highest in the sample.

¹² The Finnish EMU expert report (1997: 56) referred to previous studies according to which the Finnish production structure had not converged to the production structure of the core EMU-countries, but some convergence to Sweden had happened.

¹³ Since the Finnish GDP is included in the whole EMU-area figures, the EMU-area GDP contains same elements. However, since the weight of Finland as a part of the EMU-area's GDP is very small, the common component in the EMU-area figures should not hamper the comparison significantly.

¹⁴ Sweden, the UK and the US were selected as a comparison countries, since the Finnish business cycle has previously been found to be connected more strongly to these countries business cycle than to the core-EMU countries business cycle.

Table 9. Economic growth and business cycle variability.

		FINLAND	SWEDEN	DENMARK	UK	US	EMU-AREA
1981:1-1992:2	Mean	1.85	1.77	1.51	2.13	2.89	2.34
	Std.dev.	3.52	1.87	2.11	2.26	2.44	1.24
1981:1-1990:1	Mean	3.39	2.32	1.52	2.78	3.34	2.24
	Std.dev.	1.18	1.62	2.30	1.99	2.44	1.32
1992:3-2004:3	Mean	2.86	2.32	2.12	2.79	3.26	1.83
	Std.dev.	2.49	2.13	1.60	0.89	1.24	1.27
1995:1-2004:3	Mean	3.49	2.82	2.13	2.79	3.23	2.11
	Std.dev.	1.75	1.32	1.07	0.66	1.34	1.00
1999:1-2004:3	Mean	2.76	2.76	1.77	2.67	2.94	1.91
	Std.dev.	1.56	1.39	1.14	0.78	1.53	1.19

Note. The figures are based on logarithmic differences. All figures are multiplied by 100.

Next comovement of business cycles is evaluated by means of correlations of the growth rates. Table 10 shows the correlation coefficients of the (annual) growth rates between the aggregate EMU-area and the sample countries. It can be seen that all the correlations have risen markedly during the second half of the sample. This may reflect deepening economic integration during the sample period. Especially the remarkable increase in correlation between the Danish and the EMU-area business cycle is striking. The exceptionally deep depression of the Finnish economy in the beginning of 1990s is also visible. Overall, during the sample period the Finnish business cycle seems to have connected closer to the EMU-area business cycle, but possible influence of the EMU-membership on business cycle convergence could not be detected.

Table 10. Business cycle correlations between the EMU-area and the sample countries.

	DENMARK	FINLAND	UK	SWEDEN	US
1981:1-1992:2	0.08	0.03	0.35	0.33	0.32
1981:1-1990:1	0.06	0.44	0.57	0.53	0.46
1992:3-2004:3	0.67	0.76	0.64	0.86	0.49
1995:1-2004:3	0.68	0.64	0.73	0.74	0.61
1999:1-2004:3	0.79	0.67	0.77	0.87	0.64

3. CONCLUSIONS

This paper aimed to evaluate Finland's macroeconomic during the first five years in EMU and compare it to the macroeconomic development outside the monetary union. The analysis is motivated by the issues raised up by the Finnish expert work group some ten years ago. The expert work group concluded (1997), among others, that participation in EMU might bring about lower interest rates and reduced interest and exchange rate volatility. The greatest concern regarding Finland's participation dealt with the Finnish business cycle behavior, which previously had been found to differ significantly from the EMU-core countries' business cycle. However, since economic integration should be seen as an endogenous dynamic process, the business cycles may converge over time. Thus, the purpose of this paper was to compare the interest and exchange rate and business cycle development in EMU member Finland and in non-EMU countries Sweden, Denmark and the UK during the first five years of EMU. Since the EMU-period is still rather short, the analysis was carried out descriptively by analyzing the first and second moments of the data.

The results indicate that on average (i) short and long interest rate levels have been somewhat lower in EMU than in the non-EMU countries of the sample, but systematic differences in volatilities of interest rates could not be detected, (ii) exchange rate volatility was not systematically lower for bilateral euro exchange rates, but volatility of real effective exchange rates was lower for EMU member Finland unambiguously, (iii) all of the sample countries' business cycles have connected more closely to the EMU-area business cycle over time, but no indication of increased convergence due to membership in monetary union could be detected.

The results may be interpreted as favorable for participation in monetary union, but it must be admitted that the detected differences in interest and exchange rate behavior between the EMU member Finland and the non-EMU countries Sweden, Denmark and the UK have been rather small during the first five years of EMU. Apparently five years is still too short a period to reveal significant economic differences inside or outside monetary union and at least another half a decade of data is needed before the real differences can be exposed. Although this study has dealt with

European monetary integration, the results may be of general interest for likely short run influences of participation in monetary union for industrialized countries.

REFERENCES

SOU (1996). Sverige och EMU. *Statens Offentliga Utredningar* 1996:158. Finansdepartment, Stockholm.

An independent report into the economic consequences of the UK saying no to the euro. (2003). *The Consequences of Saying No*. WWW: <http://195.157.85.85/Begg.bdf>.

Baldwin, R. (1989). *The Growth effects of 1992*. Economic Policy, 9.

Barr, D., F. Breedon & D. Miles (2003). *Life on the Outside: Economic Conditions and Prospects Outside Euroland*. Economic Policy 18: 573–613.

Calmfors, L. *et al.* (1997). EMU – A Swedish Perspective Report of the Calmfors Commission. Kluwer, Dordrecht.

Eichengreen, B. (2002). *Lessons of the Euro for the Rest of the World*. WWW: <http://emlab.berkeley.edu/users/eichengr/policy/viennajan2-03.pfd>.

EMU-asiantuntijatyöryhmän raportti (1997). *Rahaliitto ja Suomi – talouden haasteet*. Valtioneuvoston kanslian julkaisusarja 27. Helsinki.

Frankel, J. & A. Rose (1998). *The Endogeneity of the Optimum Currency Area Criterion*. Economic Journal, 108: 1009-1025.

Mayes, D. & A. El-Agraa (2004a). *The Theory of Monetary Integration*. In A. El-Agraa (ed.) *The European Union. Economics & Politics*. 7th ed, Prentice Hall, p. 144–156.

– “ – (2004b). *The Development of EU Economic and Monetary Integration*. In A. El-Agraa (ed.) *The European Union. Economics & Politics*. 7th ed, Prentice Hall, p. 157–184.

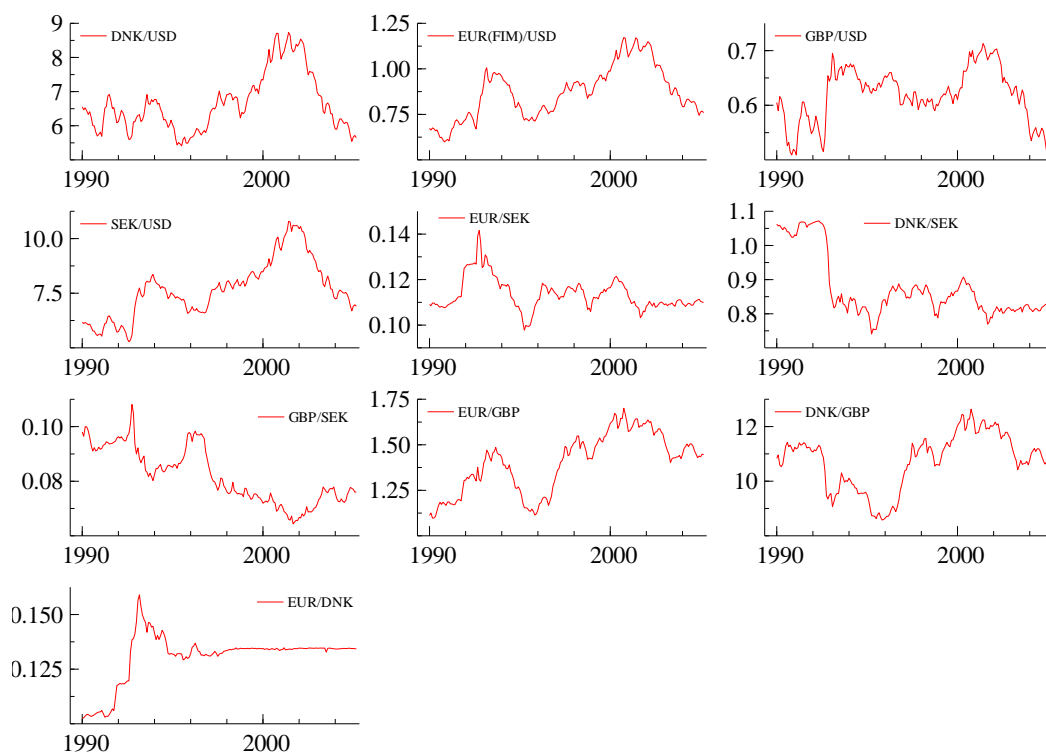
Micco, A., E. Stein & G. Ordoñez (2003). *The Currency Union Effect on Trade: Early Evidence from EMU*. Economic Policy 18: 315–356.

Mishkin, F. (2001). *The Economics of Money, Banking, and Financial Markets*. 6th Edition. Addison Wesley Longman.

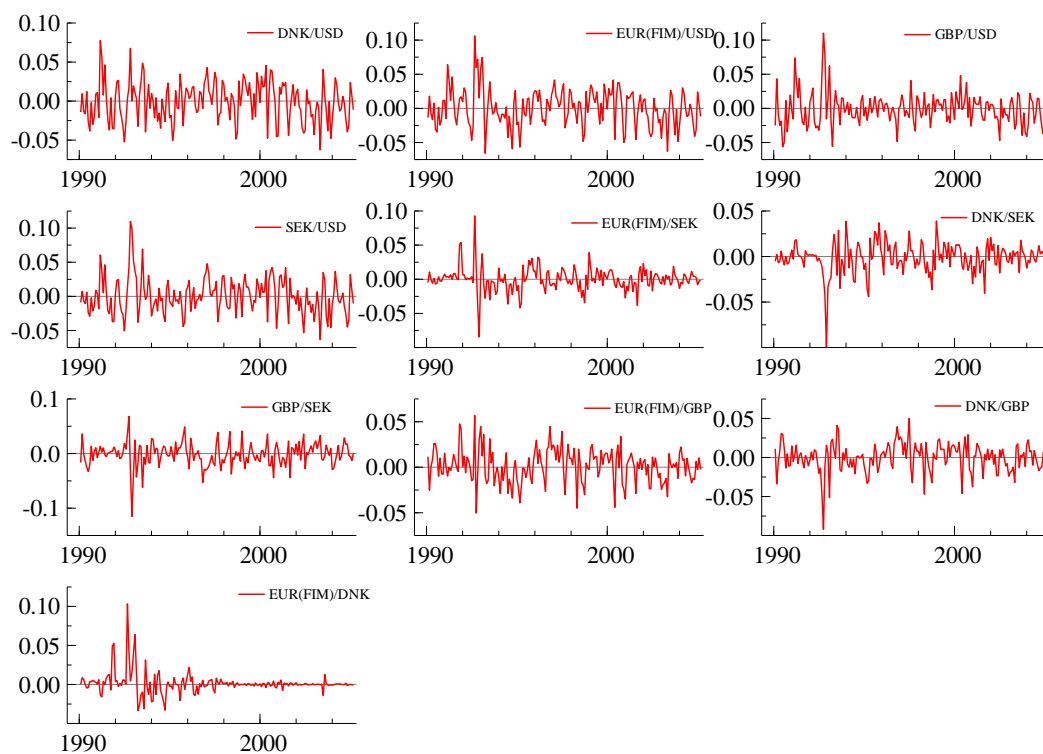
Rose, A. (2002). *The Effect of Common Currencies on International Trade: Where Do We Stand?* WWW: <http://faculty.haas.Berkeley.edu/arose/MASO02.pdf>.

Widgrèn, M. (2001). *Suomi EU:n jäsenenä*. Teoksessa *Kansantaloutemme – rakenteet ja muutos*, s. 91–130, toim. H. Loikkanen, J. Pekkarinen & P. Vartia. Helsinki, Taloustieto Oy.

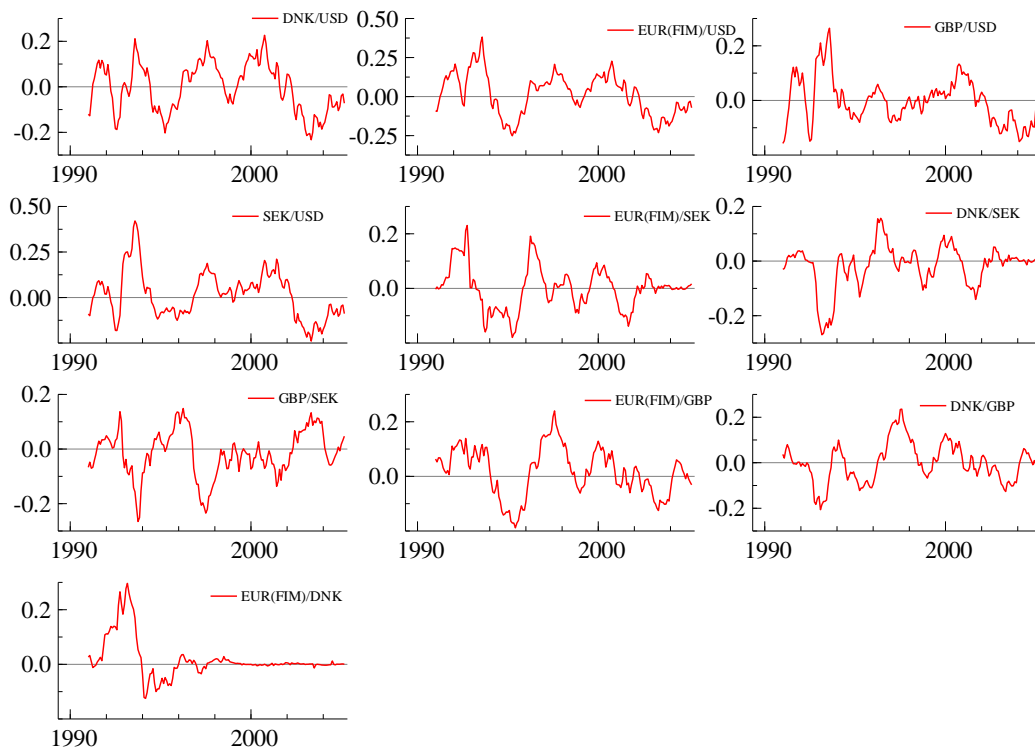
Appendix 1a. Bilateral exchange rates.



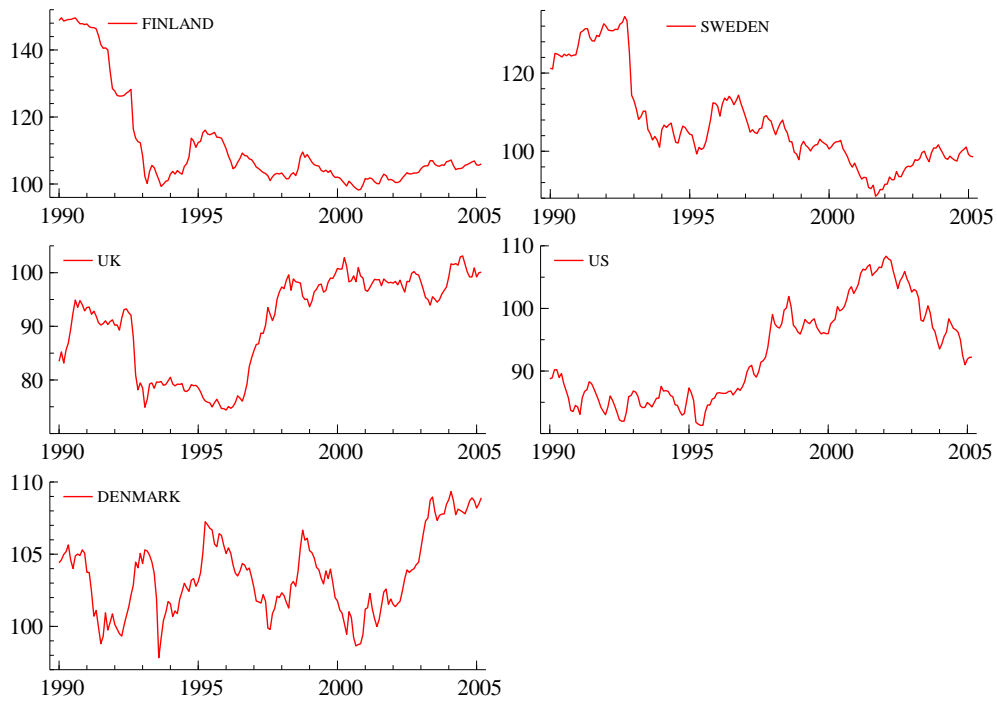
Appendix 1b. Monthly rate of change of exchange rates.



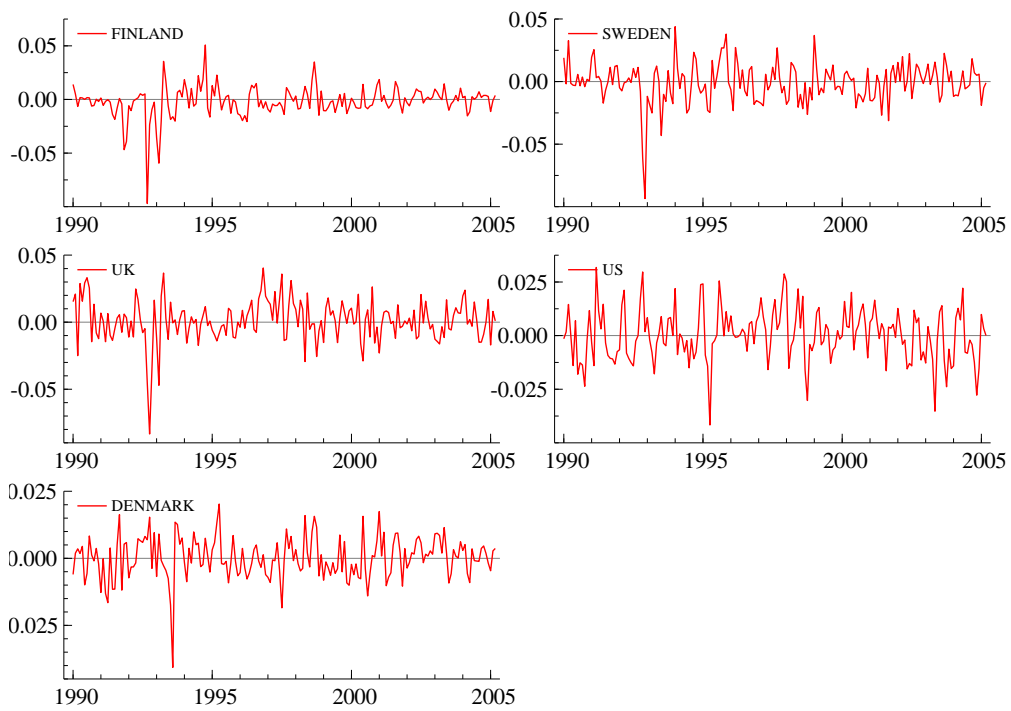
Appendix 1c. Annual rate of change of exchange rates.



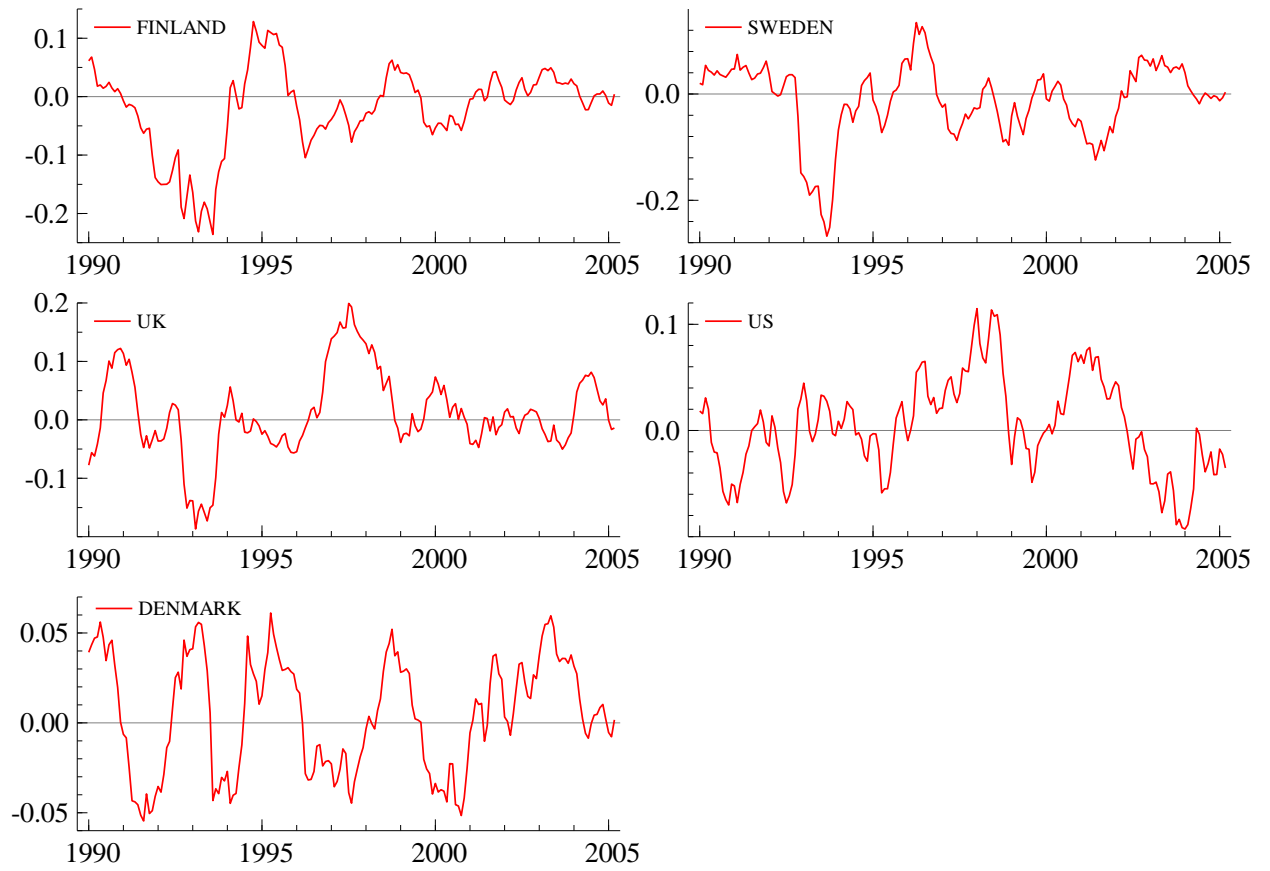
Appendix 2a. Real effective exchange rates.



Appendix 2b. Monthly rate of change of real exchange rates.



Appendix 2c. Annual rate of change of real exchange rates.



Appendix 3. Annual growth of the gross domestic products.

