Danmarks Statistik
MODELGRUPPEN Arbejdspapir [udkast]

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Undersøgelse af opskrivningen af CES - forbrugssystemet estimeret i to step.

Resumé:

Dette papir undersøger betydningen af at estimere $\frac{fCx_1}{fCx_{12}}$ *eller* $\frac{fCx_2}{fCx_{12}}$*. Papiret viser for de forskellige nest: de faktiske historiske værdier, de fittede værdier og værdierne for de residualt fittede værdier, som er fundet i det modsatte forhold (dvs. hvor god er* $\frac{fCx_1}{fCx_{12}}$ *ligningen til at forklare* $\frac{fCx_2}{fCx_{12}}$*)*

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Nøgleord: Forbrugssystem, CES, rekursivestimation

Indledning:

Papiret er en videre undersøgelse af betydninger af formuleringen af CES- forbrugssystemet. Det vil sige at papiret undersøger betydningen af at estimere $\frac{fCx_1}{fCx_{12}}$ eller $\frac{fCx_2}{fCx_{12}}$.

Papirets resultater bygger på Engle-Granger 2-step procedure estimationsresultater, og AIV29709 uddyber denne estimationsmetode. Estimationsresultater for de enkelte nest kan ses i bilag 1.

I bilag 2 kan man se en grafisk præsentation af de forskellige nest, faktiske historiske værdier, fittede værdier og værdierne for de residualt fittede værdier, som er fundet i det modsatte forhold (dvs. hvor god er $\frac{fCx_1}{fCx_{12}}$ ligningen til at forklare $\frac{fCx_2}{fCx_{12}}$).

I Bilag 3 kan man se, hvor man ud fra budget restriktionen kan finde de residualt fittede værdier fra det modsatte forhold.

Konklusion:

Ud fra Bilag 2 kan man se at de residualt fittede værdier stort set forklarer de historiske værdier lige så godt som de fittede værdier. Dvs. om man formulerer CES-forbugssystemet som $\frac{fCx_1}{fCx_{12}}$ eller $\frac{fCx_2}{fCx_{12}}$, tyder på at være uden den store betydning.

Bilag 1: TSP estimationsresultaterne for de enkelt nest, kan ses i nedenstående tabeller.

Tabel 1.a – 2 step estimationsresultaterne af bfcf og bfCv

	fCf/fCfv	fCv/fCfv
Konstantled	1.92868**	-3.13893**
	[17.7953]	[-25.9768]
LR – Priselasticiteten	**-0.410206****	**-0.301172**
	[-2.38677]	**[-1.62249]**
LR – Indkomstelasticiteten	-0.729184**	0.679550**
	[-24.2973]	[20.3269]
SR	0.819066**	0.898733**
	[8.35885]	[7.58981]
ECM	0.238825**	0.239662
	[2.07806]	[2.02393]
R-squared	0.658896	0.628725
Log likelihood	96-3301	92.9255

Tabel 1.b – 2 step estimationsresultaterne af bfCt og bfCs

	fCt/fCts	fCs/fCts
Konstantled	-0.268276*’	-0.031042
	[-8.44544]	[-0.753751]
LR – Priselasticiteten	**-0.461206**	**-0.464299**
	[-1.29919]	**[-1.31729]**
LR – Indkomstelasticiteten	0.187758**	-0.031617**
	[2.13311]	[-2.72565]
SR	2.37866**	2.28302**
	[4.02424]	[3.94758]
ECM	0.249087	0.267047**
		[2.13952]
R-squared	0.469913	0.453246
Log likelihood	44.2848	103.253

Tabel 1.c – 2 step estimationsresultaterne af bfCfv og bfCts

	fCts/fCtsfv	fCfv/fCtsfv
Konstantled	-3.52597**	1.67932**
	[-7.62110]	[5.44432]
LR – Priselasticiteten	**-0.526988**	**-0.818531****
	[-1.48814]	**[-2.76701]**
LR – Indkomstelasticiteten	0.640693**	-0.534105**
	[6.11679]	[-7.66976]
SR	0.573747**	0.374906**
	[4.56012]	[3.42261]
ECM	0.003788	0.187196**
	[0.722746]	[2.24250]
R-squared	0.431960	0.291545
Log likelihood	96.2907	100.005

Tabel 1.d – 2 step estimationsresultaterne af bfCe og bfCtsfv

	fCe/fCetsfv	fCtsfv/fCetsfv
Konstantled	-7.57785**	0.315288**
	[-5.27604]	[2.74052]
LR – Priselasticiteten	**-0.367255****	**-0.354364**
	[-3.38254]	**[-3.41208]**
LR – Indkomstelasticiteten	.262812**	-0.017958
	[2.79428]	[-2.40095]
LR – Graddag	0.484709**	-0.039791**
	[3.28599]	[-3.36665]
SR	0.770149**	0.783249**
	[4.88116]	[5.02207]
ECM	0.36224**	0.341895**
	[3.14838]	[2.80407]
R-squared	0.582802	0.584074
Log likelihood	54.5374	124.925

Tabel 1.e – 2 step estimationsresultaterne af bfCetsfv og bfCkdb

	fCetsfv/fCpuxh	fCkdb/fCpuch
Konstantled	-0.108302**	-2.26858**
	[-4.13685]	[-11.5295]
LR – Priselasticiteten	**-0844697****	**-0.833965****
	[-5.20879]	**[-5.12108]**
LR – Indkomstelasticiteten	-0.00389436	0.029641
	[-0.663462]	[0.672198]
SR	0.277799*	0.292579*
	[1.64801]	[1.71924]
ECM	0.137184	0.139480
	[1.21492]	[1.21578]
R-squared	0.099963	0.104826
Log likelihood	140.353	77.4078

Tabel 1.f – 2 step estimationsresultaterne af bfCdb og bfCk

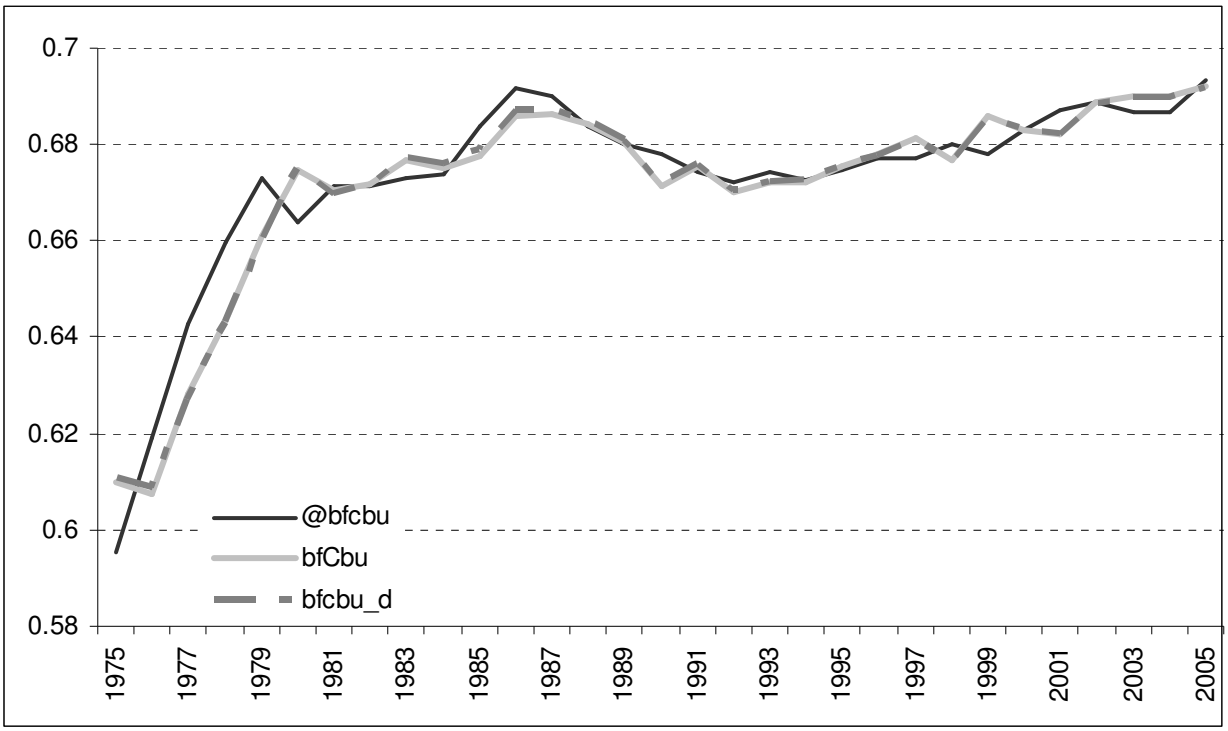
	fCdb/fCkdb	fCk/fCkdb
Konstantled	-0.754082**	0.862131
	[-4.67439]	[1.08214]
LR – Priselasticiteten	**-0.169726**	**-0.151582**
	[-0.601186]	**[-3.40447]**
LR – Indkomstelasticiteten	-0.240199**	-1.13811**
	[3.59291]	[-3.40447]
SR	0.217208	0.154778
	[]	[]
ECM	0.108864	0.076914
R-squared	0.039856	0.016097
Log likelihood	95.1238	44.6629

Tabel 1.g – 2 step estimationsresultaterne af bfCbu og bfCd

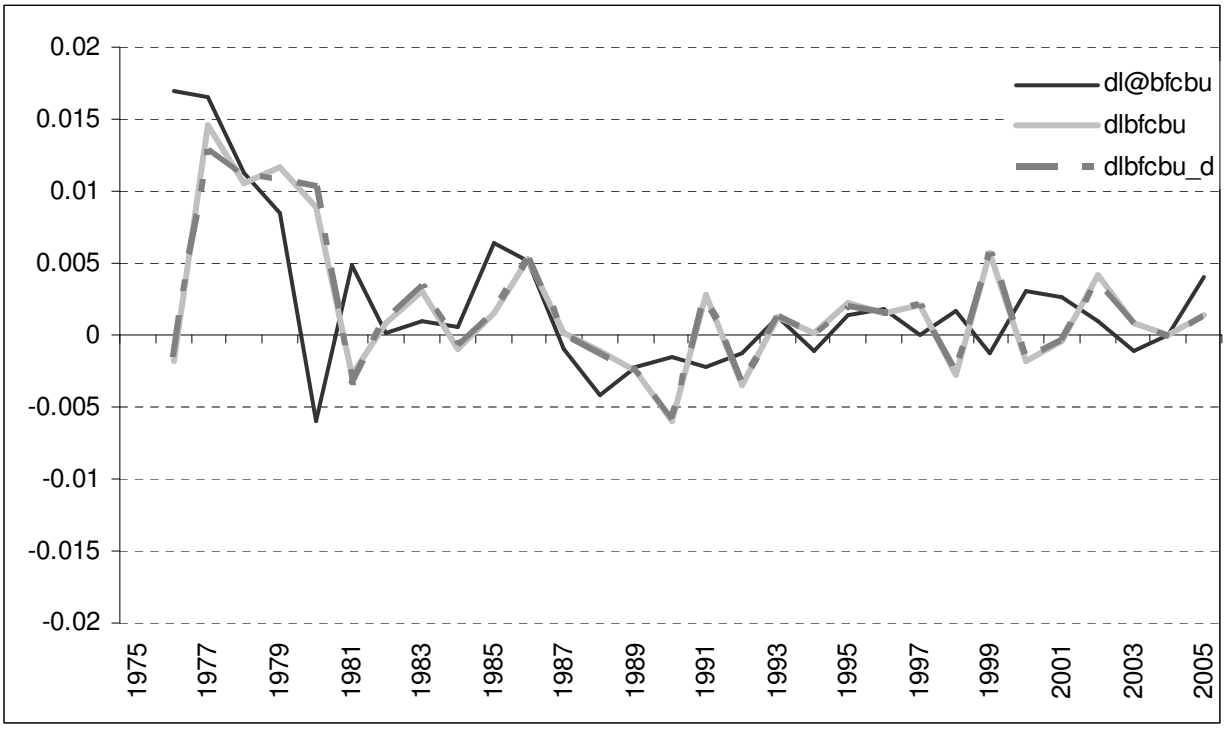
	fCbu/fCdb	fCd/fCdb
Konstantled	-0-707971**	-0.549901**
	[-22.4998]	[-9.15995]
LR – Priselasticiteten	**-0.319564****	**-0.343327****
	[-6.66171]	**[-7.11637]**
LR – Indkomstelasticiteten	0.141856**	-0.260880**
	[9.86960]	[-9.50832]
SR	0.668695	0.641894**
	[3.02573]	[3.18653]
ECM	0.377638	0.387445**
	[3.04881]	[3.11211]
R-squared	0.287957	0.306716
Log likelihood	97.7120	77.9052

Bilag 2 – Grafisk præsentation af de historiske, de fittede og de residualt fittede værdier.
Note: @ angiver historiske tal, _ angiver residualt fittede værdier fra det modsatte forhold.

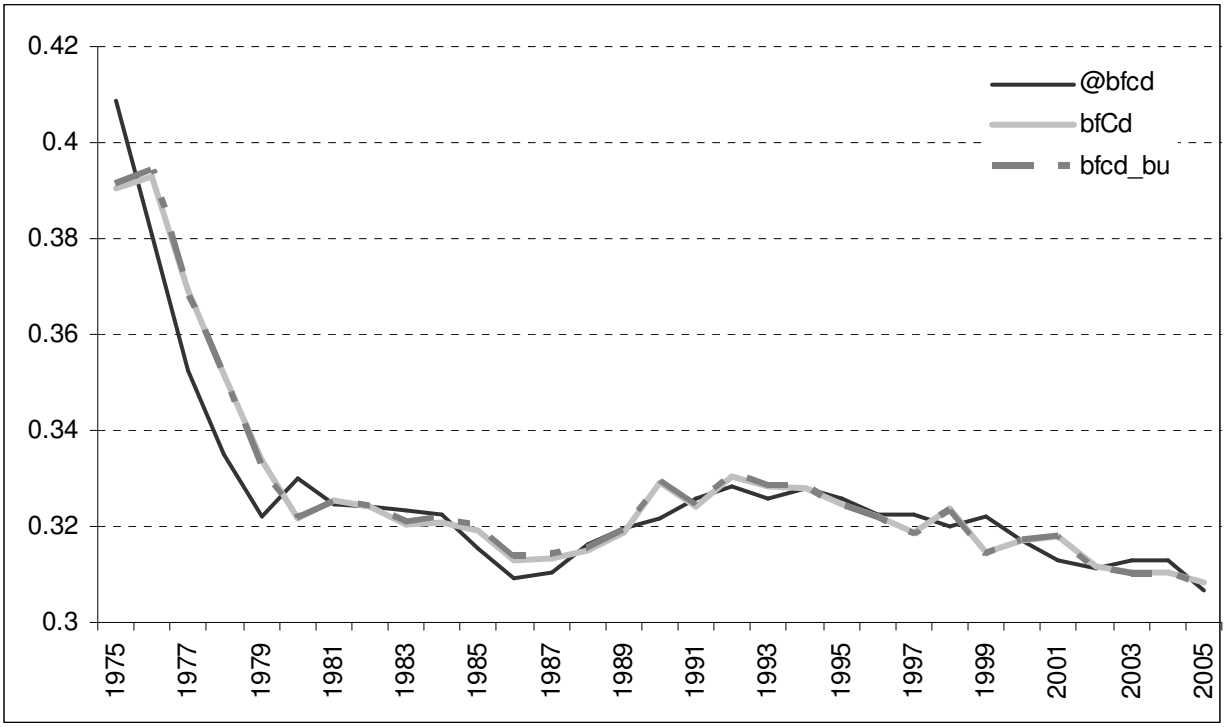
Figur 1.a - bfCbu



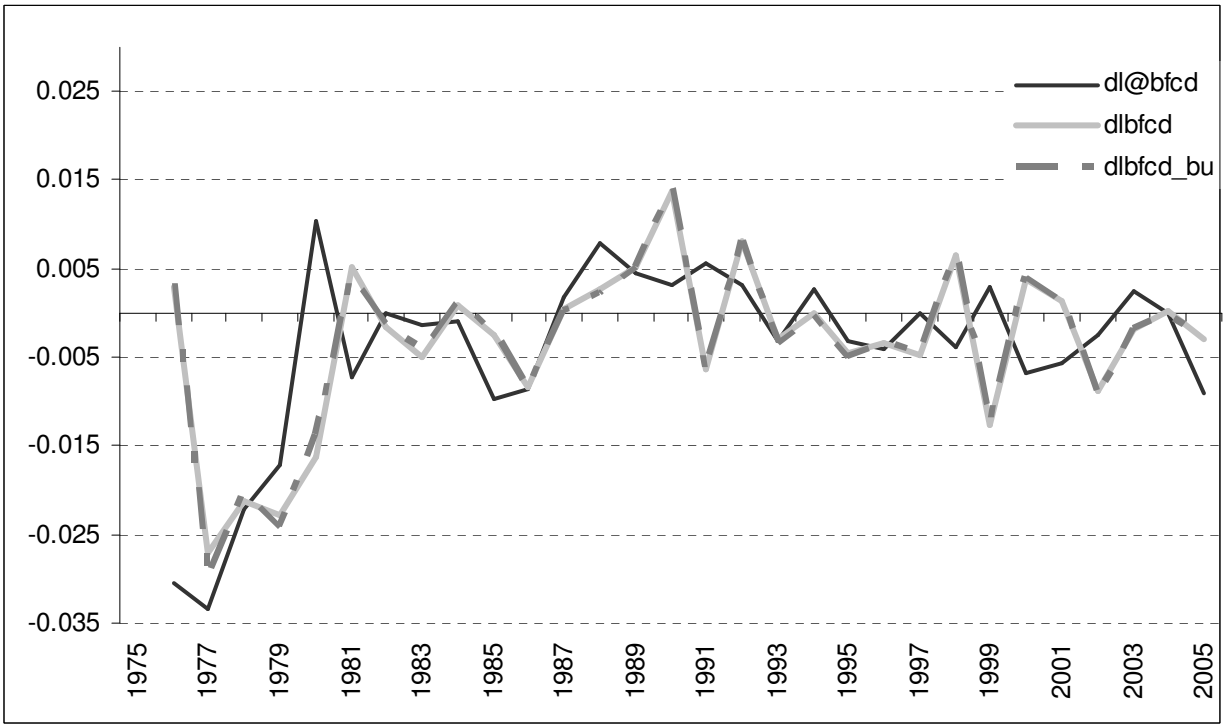
Figur 1.b - Første differencer af bfCbu



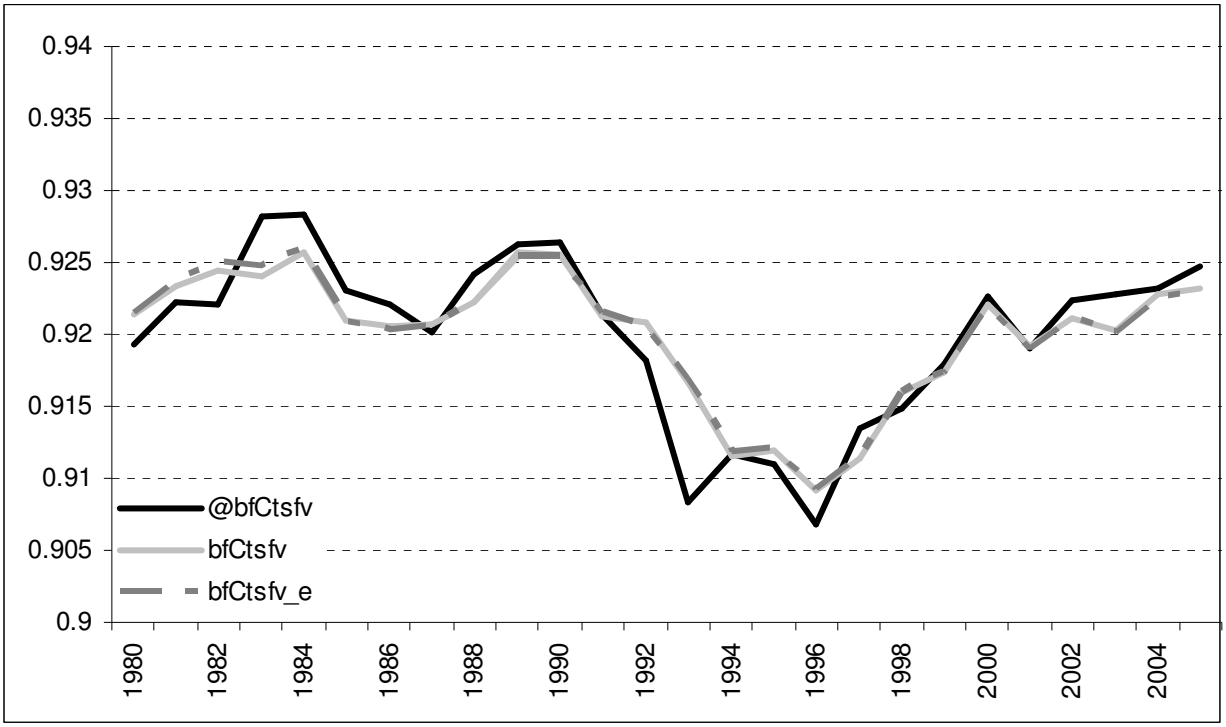
Figur 2.a - bfCd



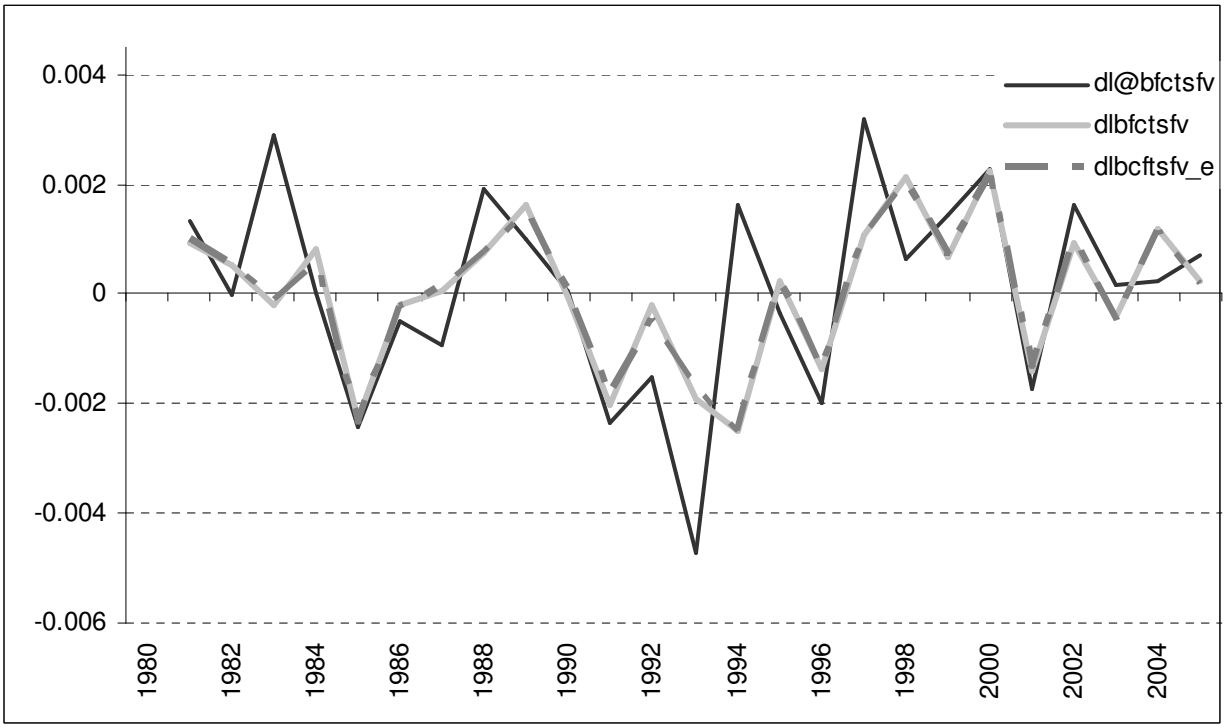
Figur 2.b - første differencer af bfCd



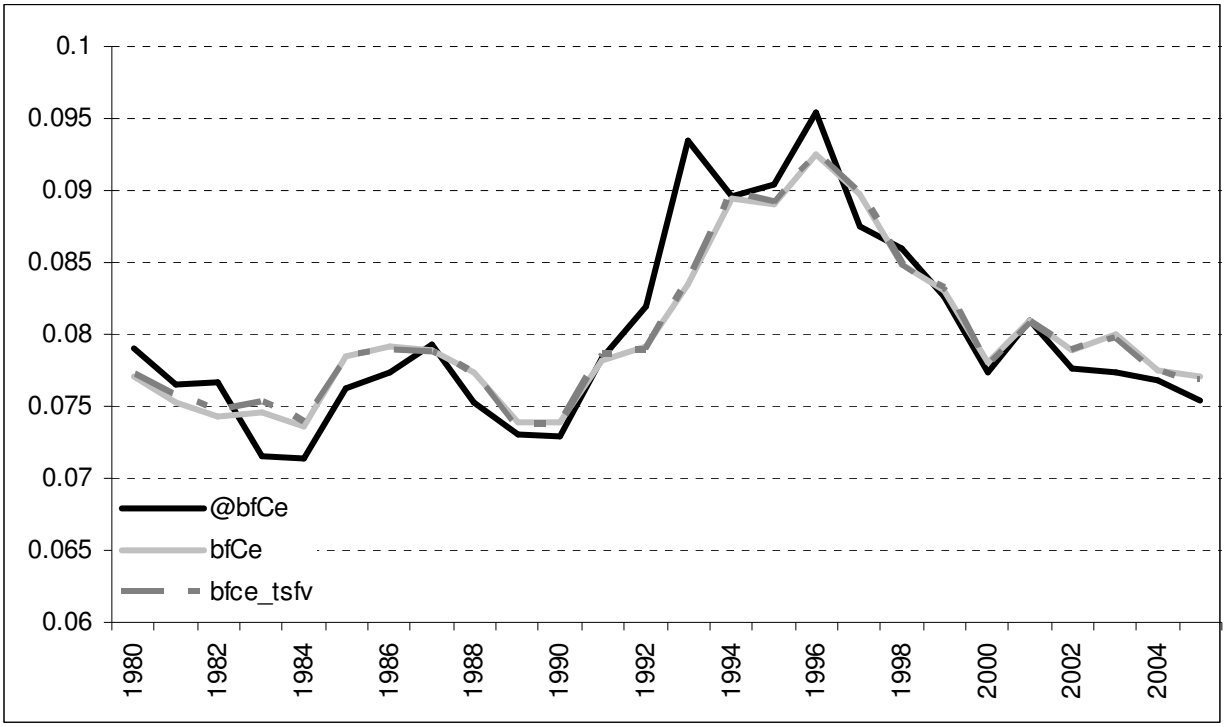
Figur 3.a - bfCtsfv



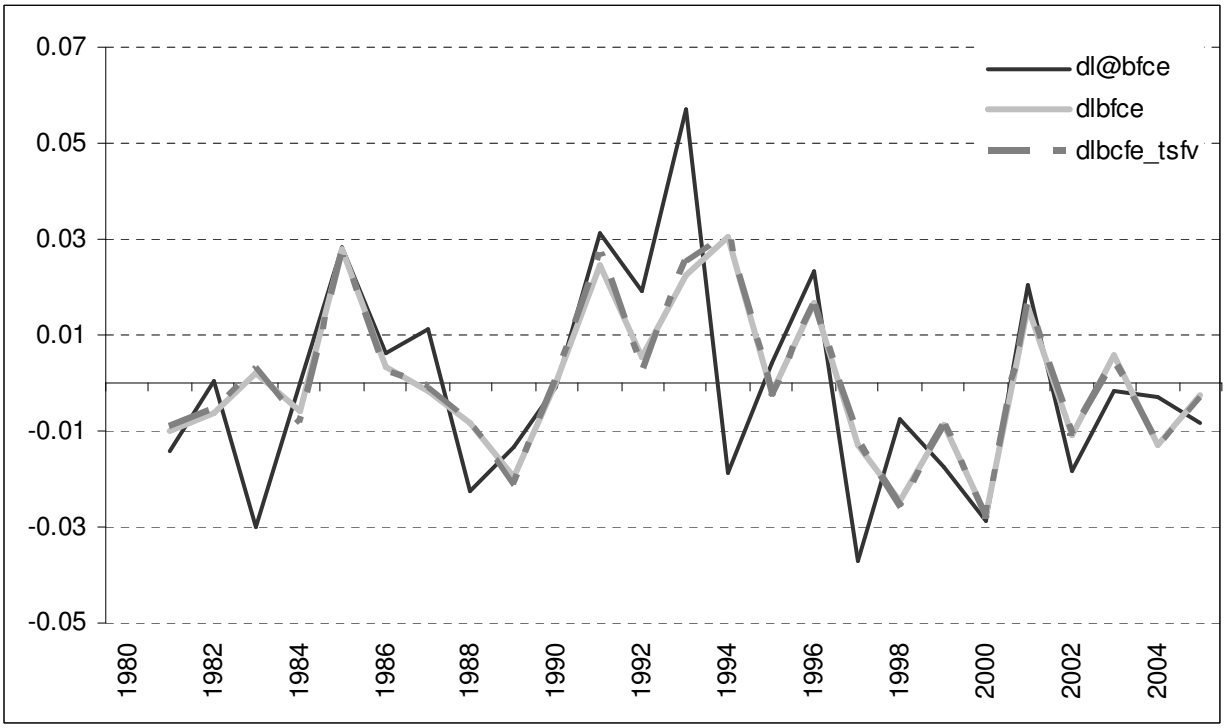
Figur 3.b - første differencer af bfCtsfv



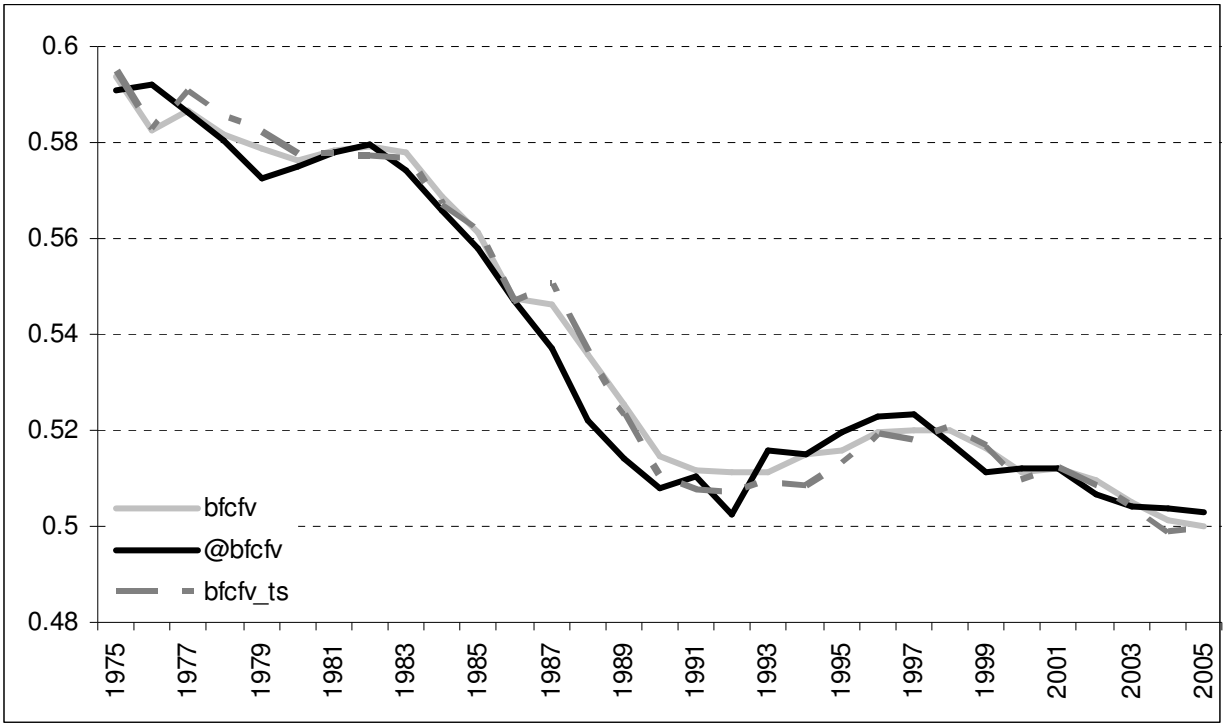
Figur 4.a - bfCe



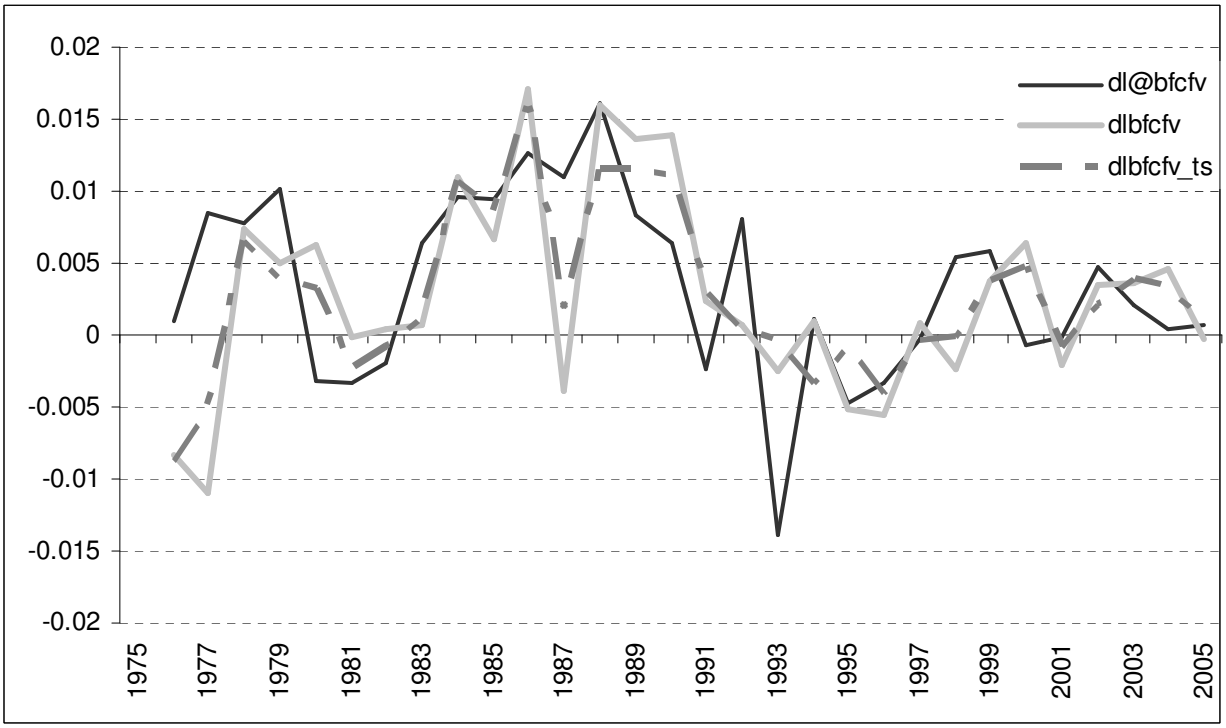
Figur 4.b - første differencer af bfCe



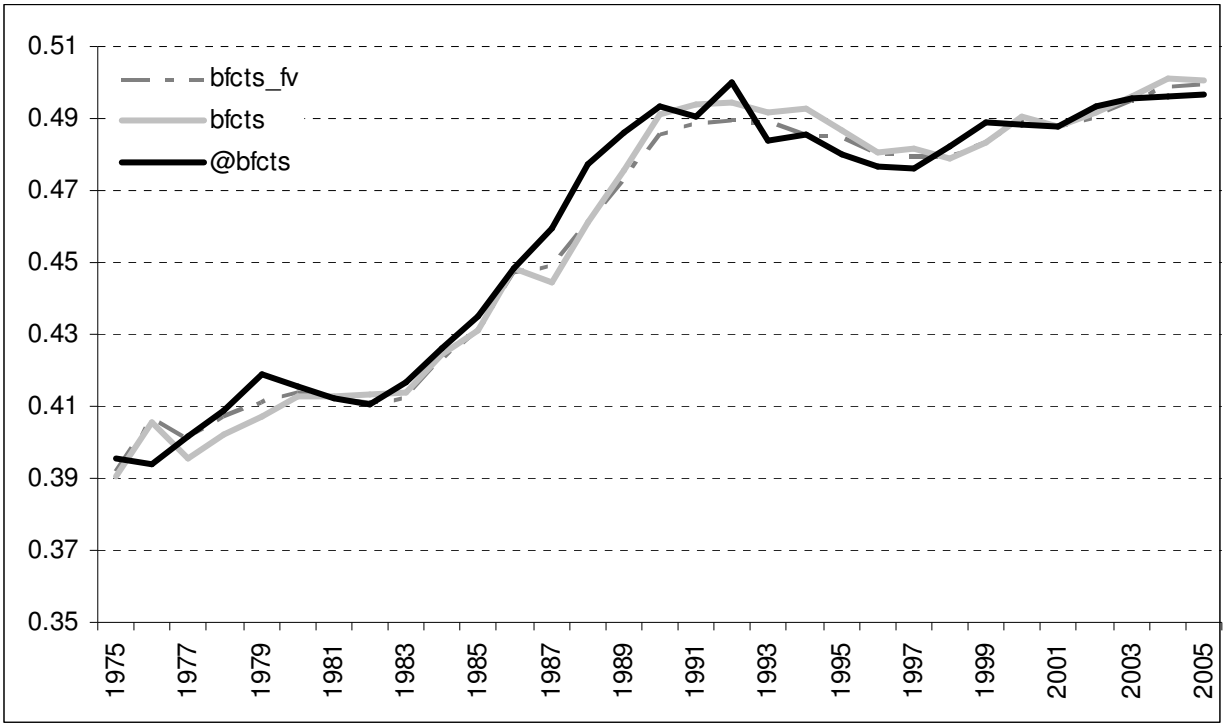
Figur 5.a - bfCfv



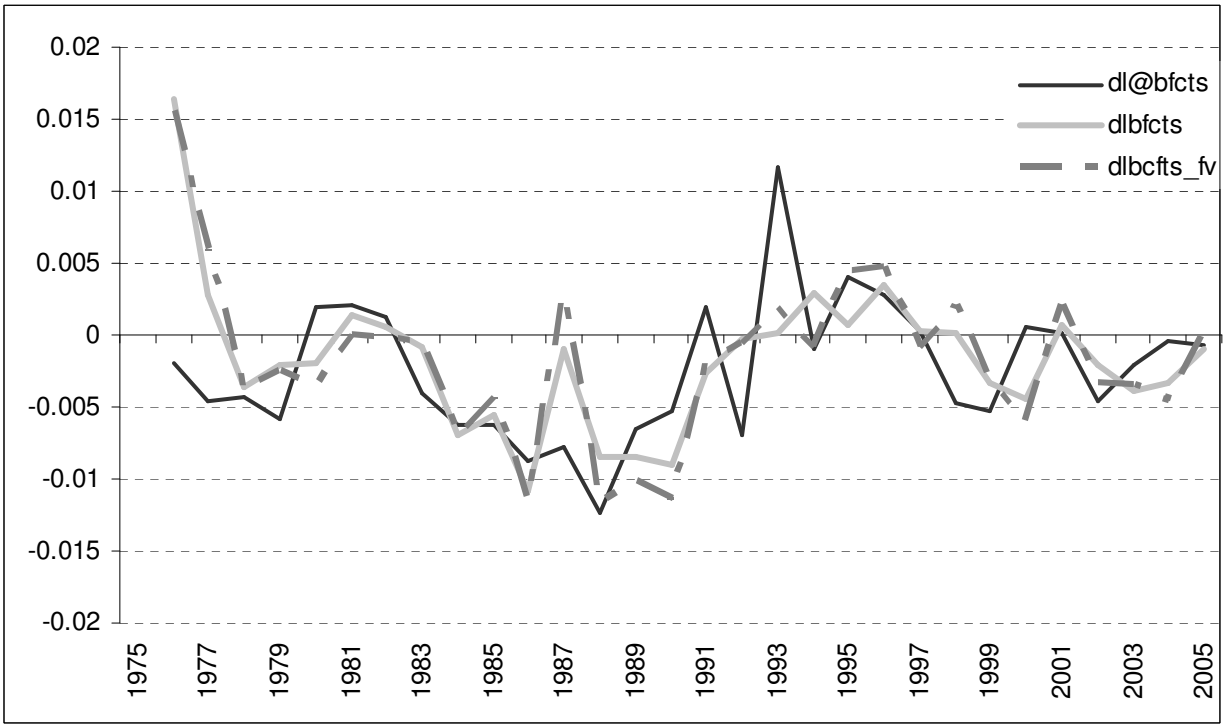
Figur 5.b - første differencer af bfCfv



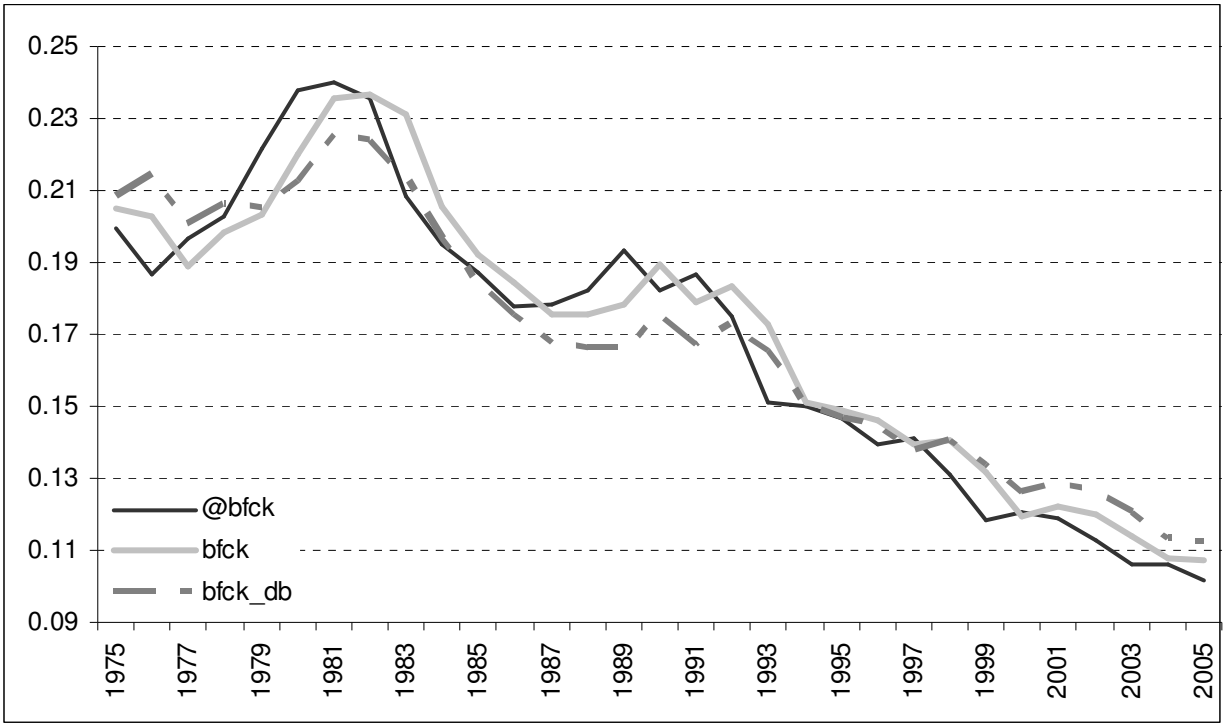
Figur 6.a - bfCts



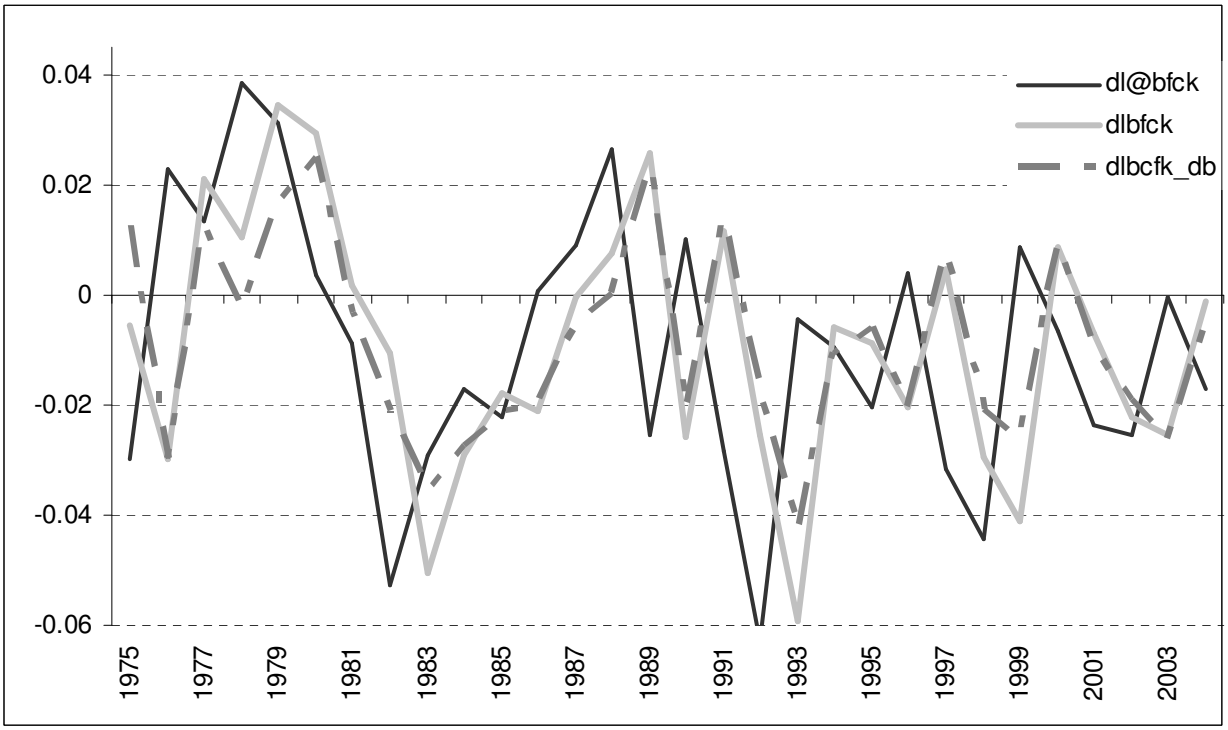
Figur 6.b - første differencer af bfCts



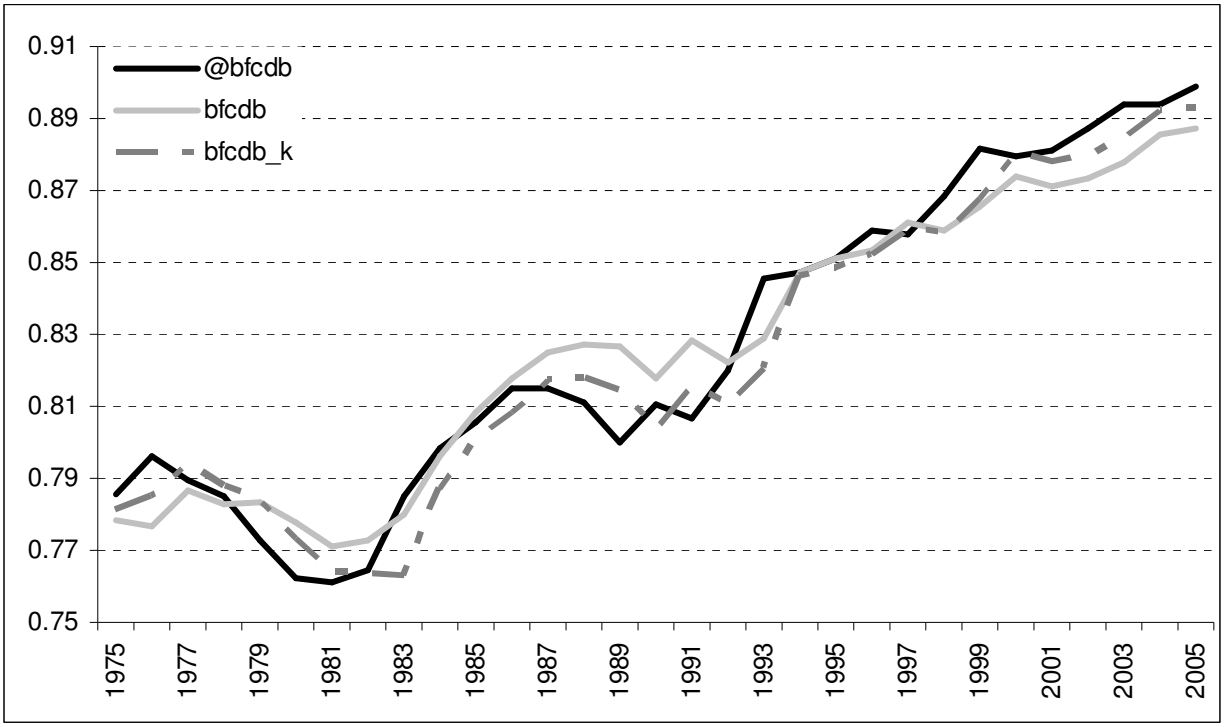
Figur 7.a - bfCk



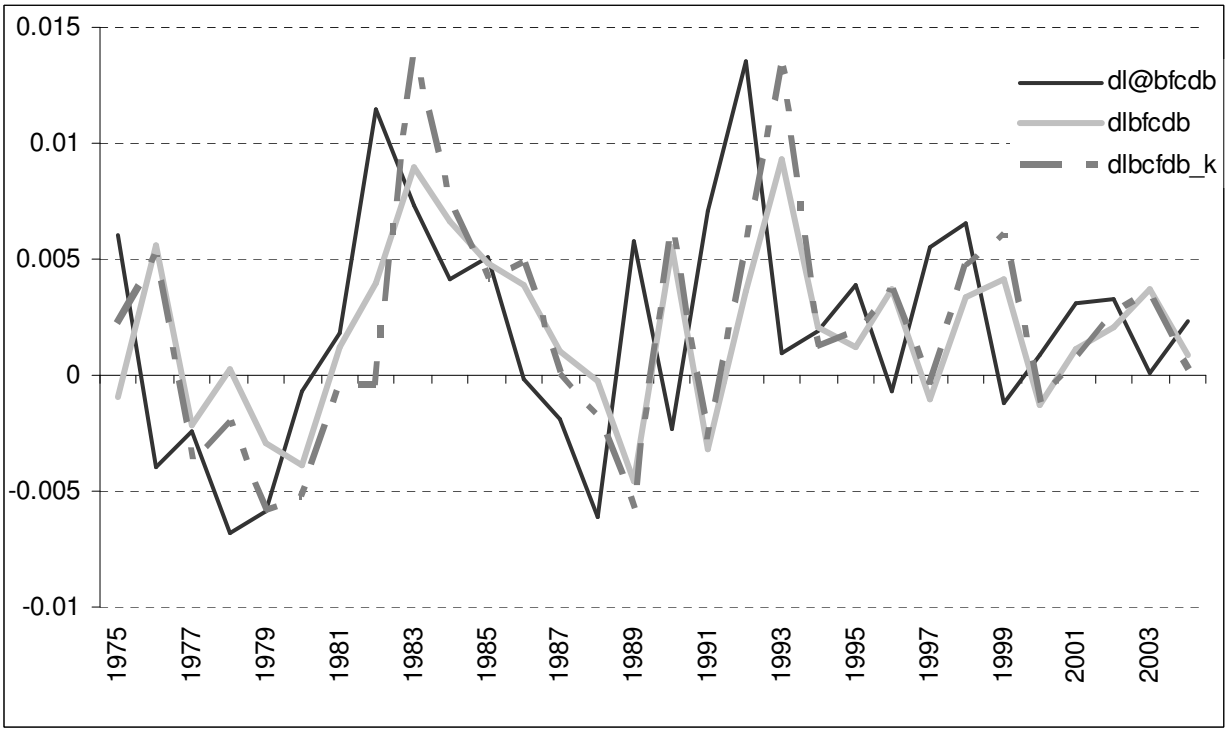
Figur 7.b - første differencer af bfCk



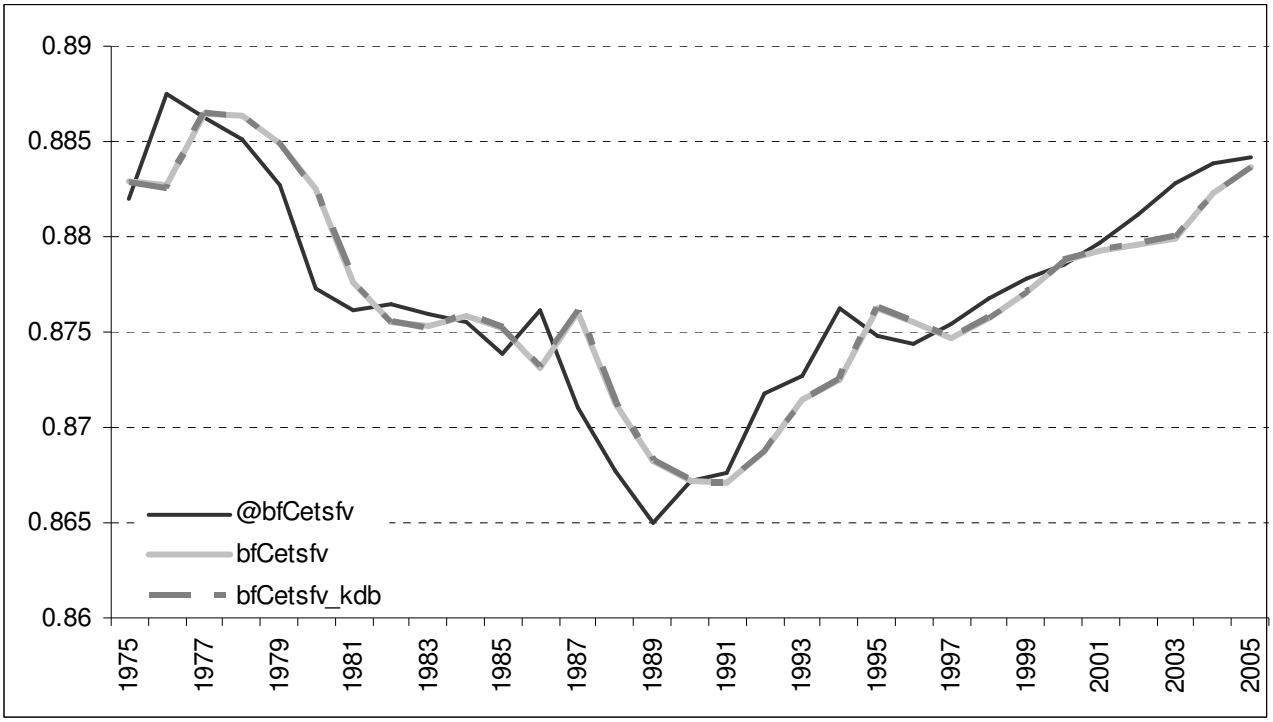
Figur 8.a - bfCdb



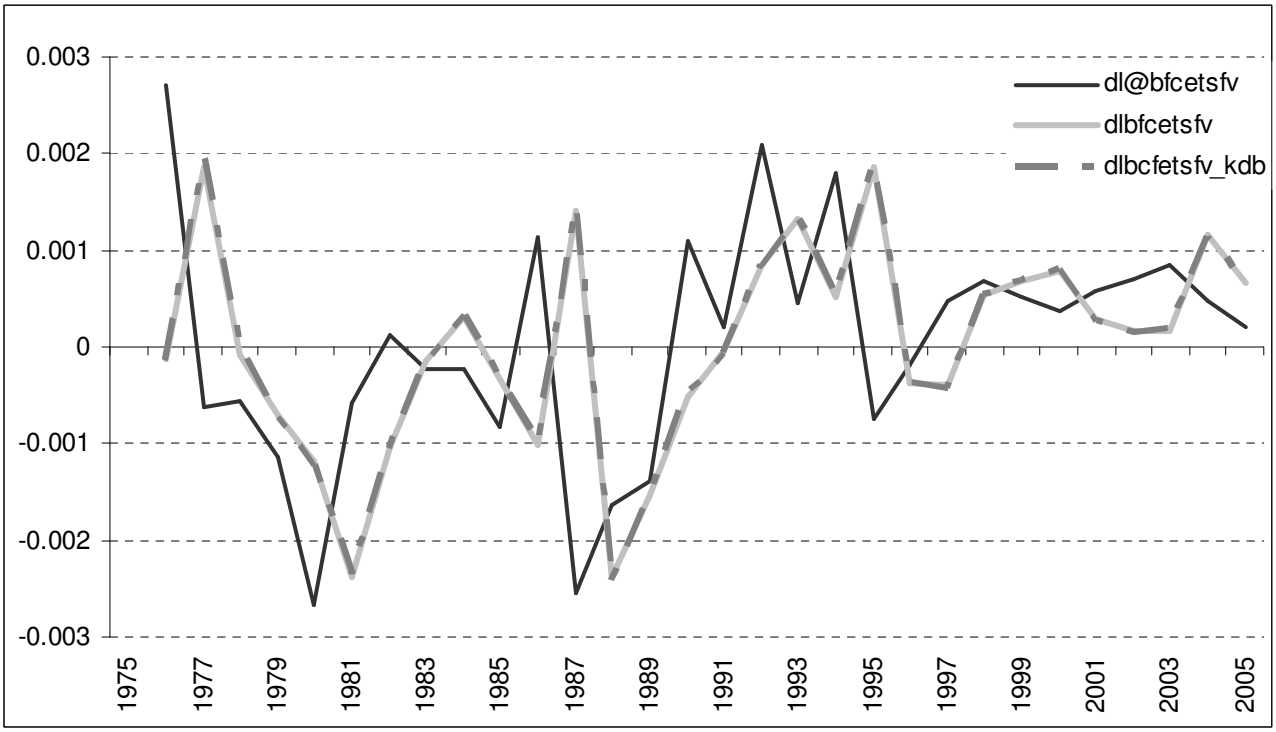
Figur 8.b - første differencer af bfCdb



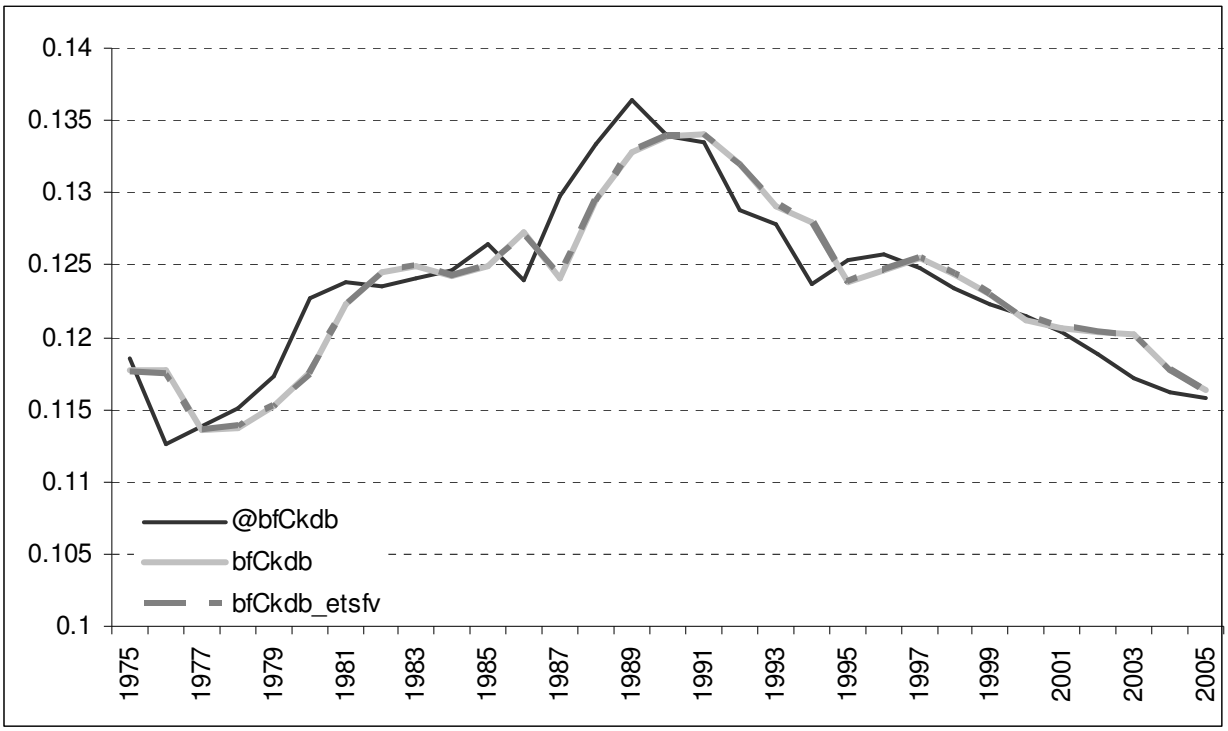
Figur 9.a - bfCestfv



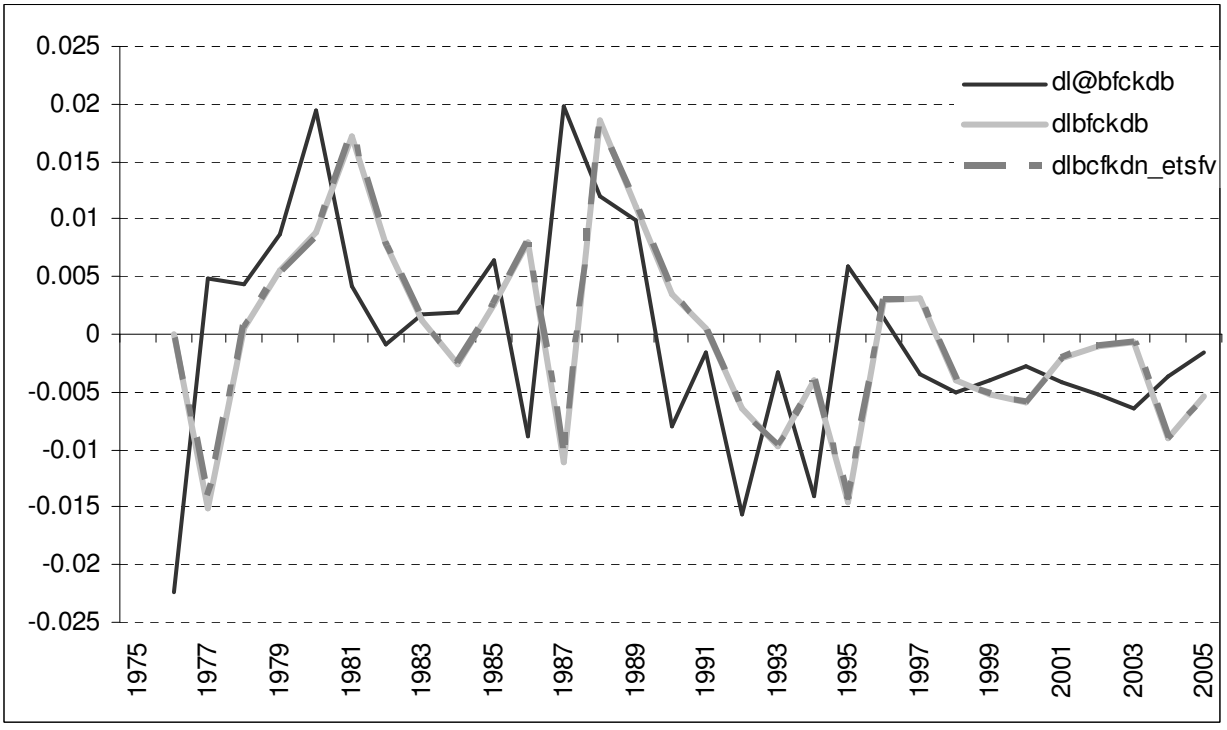
Figur 9.b - første differencer af bfCetsfv



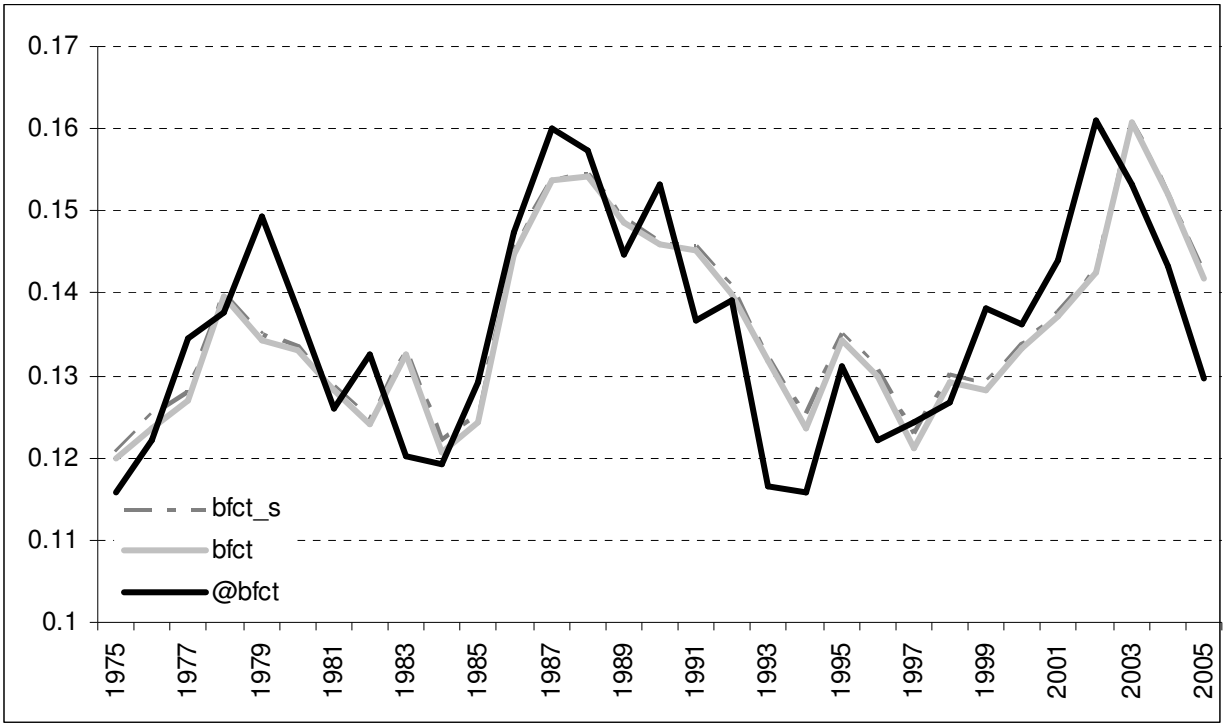
Figur 10.a - bfCkdb



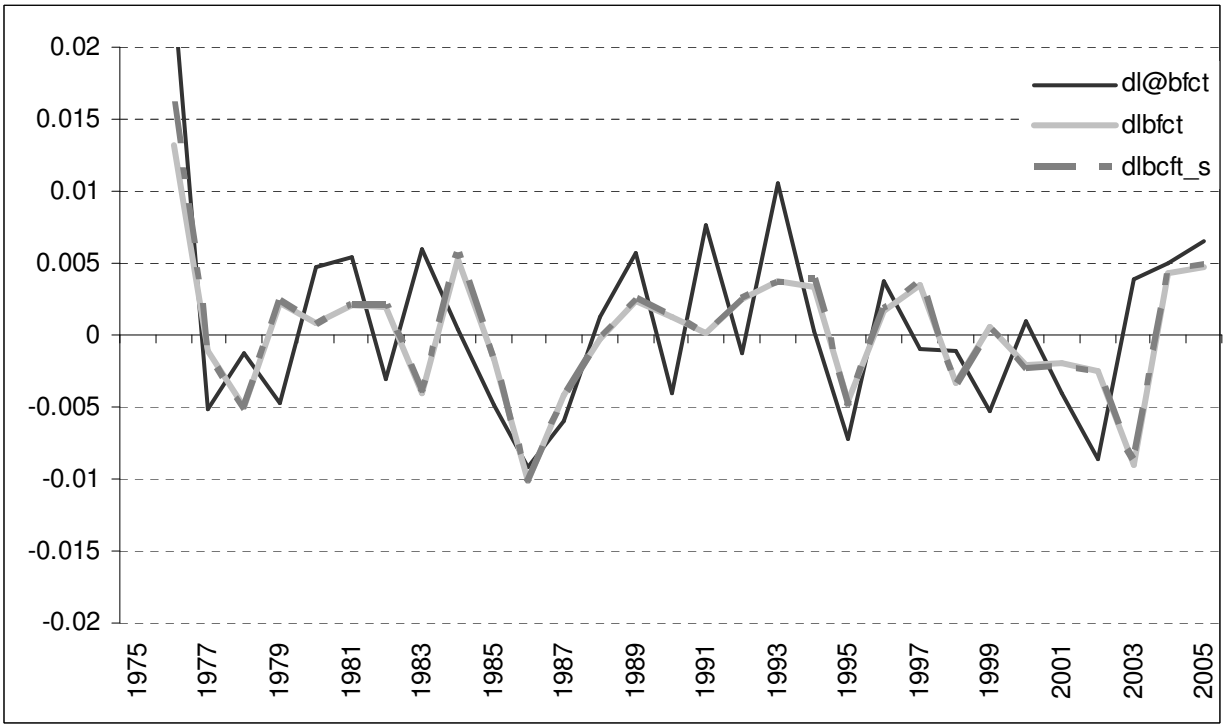
Figur 10.b - første differencer af bfCkdb



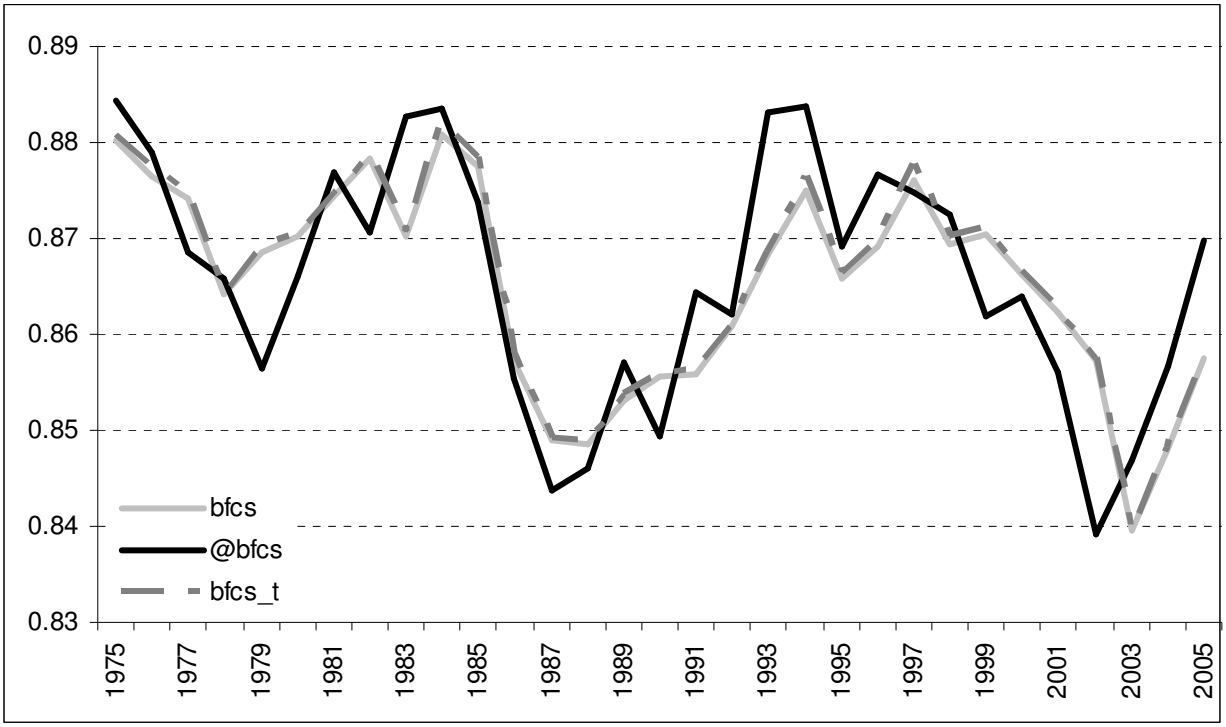
Figur 11.a - bfCt



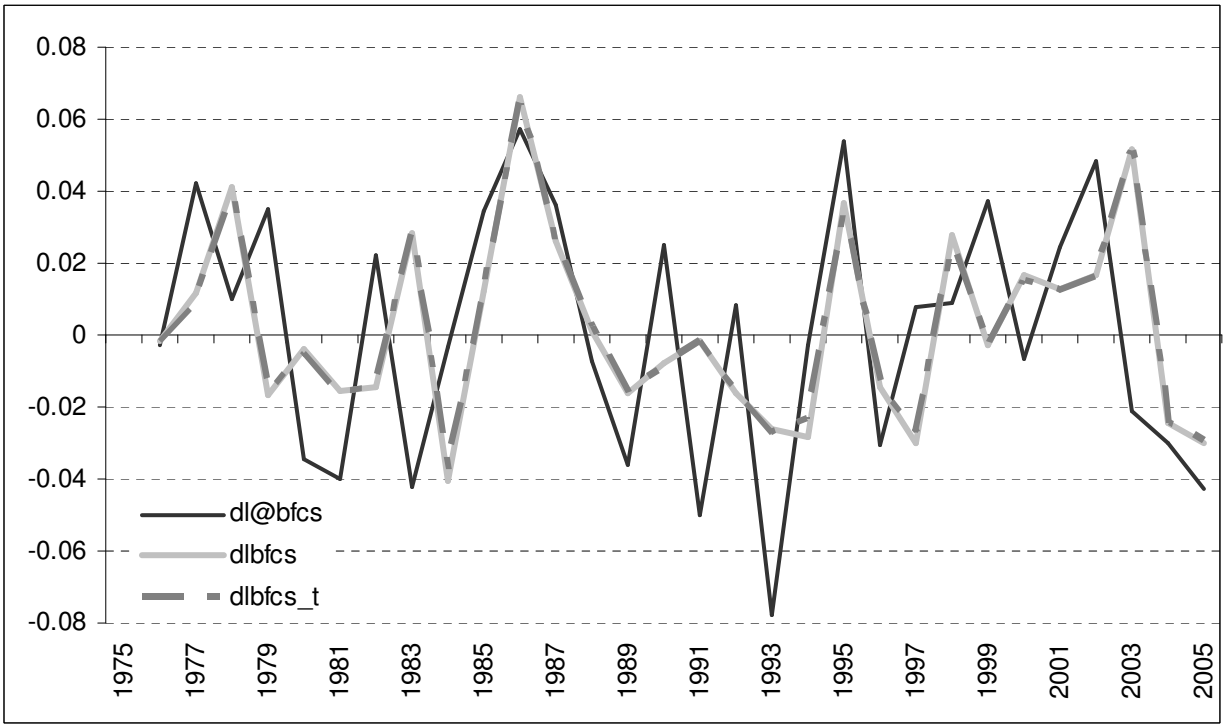
Figur 11.b - første differencer af bfCt



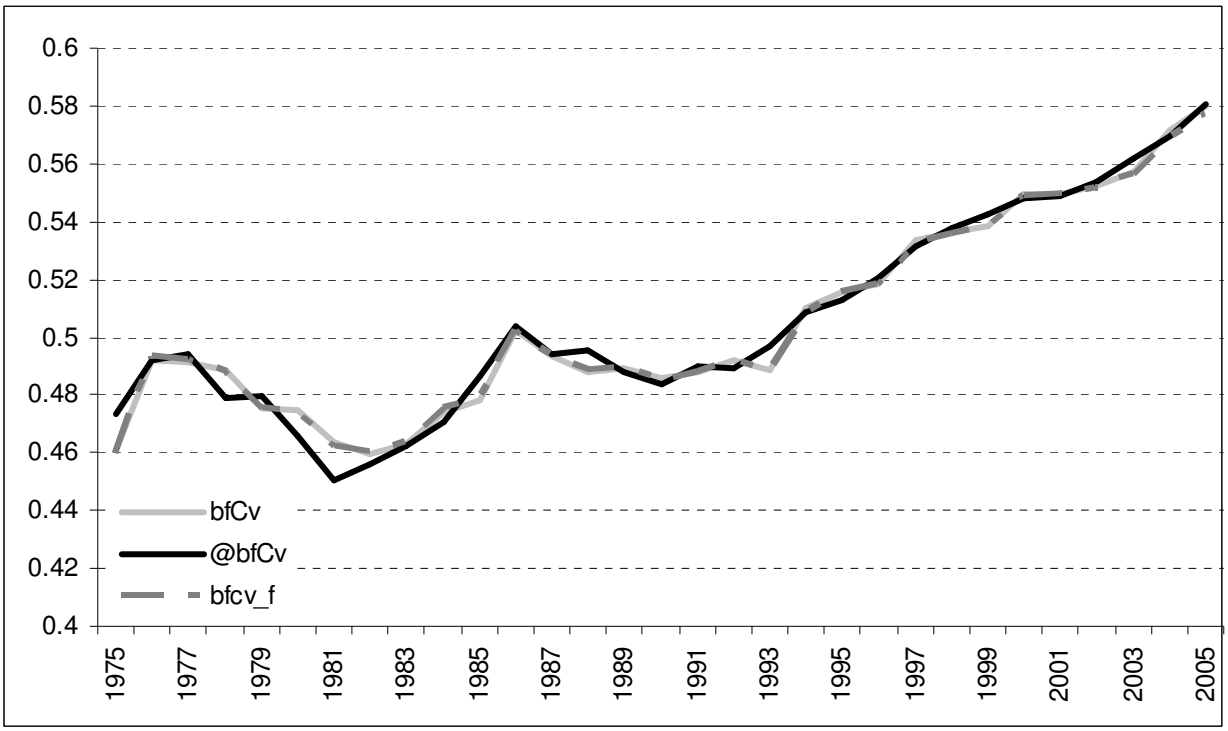
Figur 12.a - bfCs



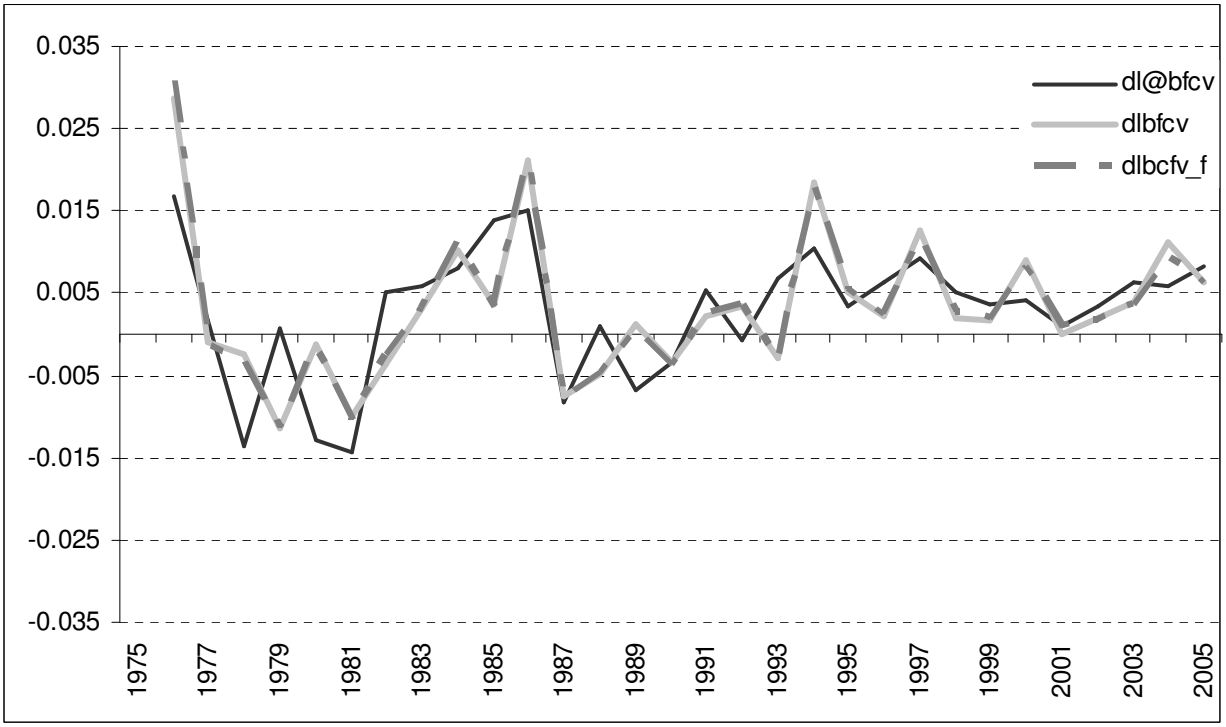
Figur 12.b - første differencer af bfCs



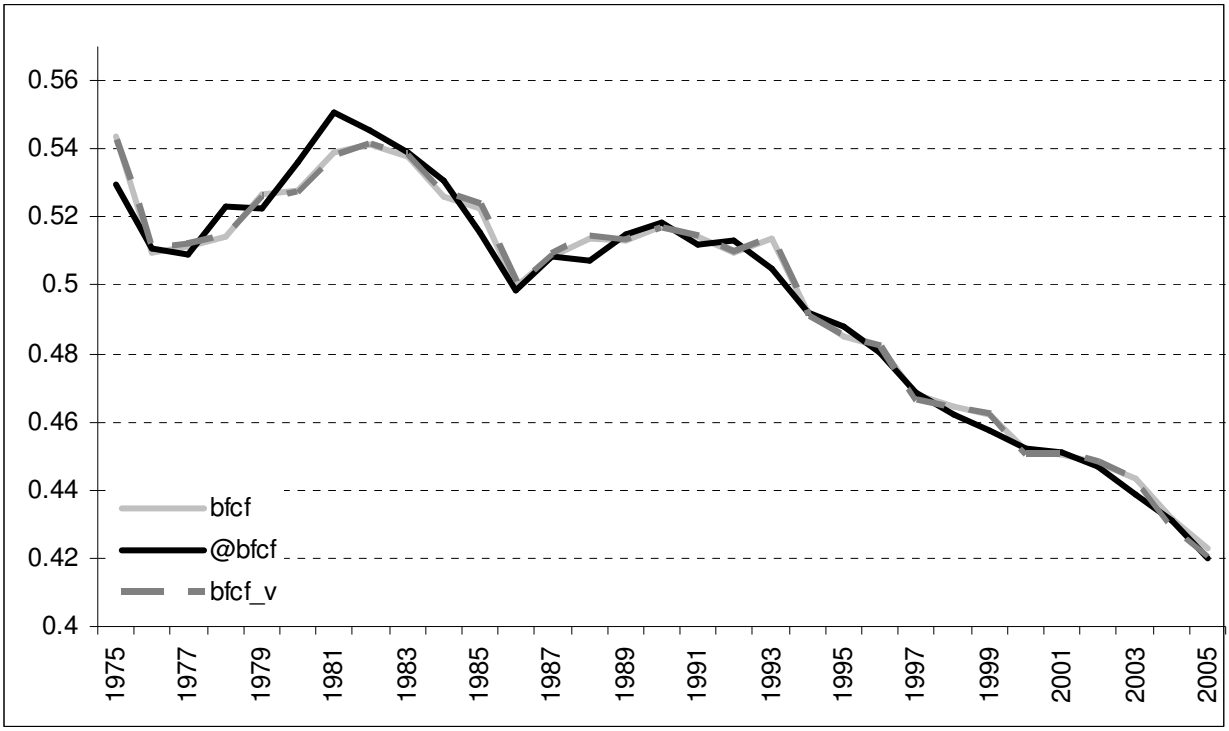
Figur 13.a - bfCv



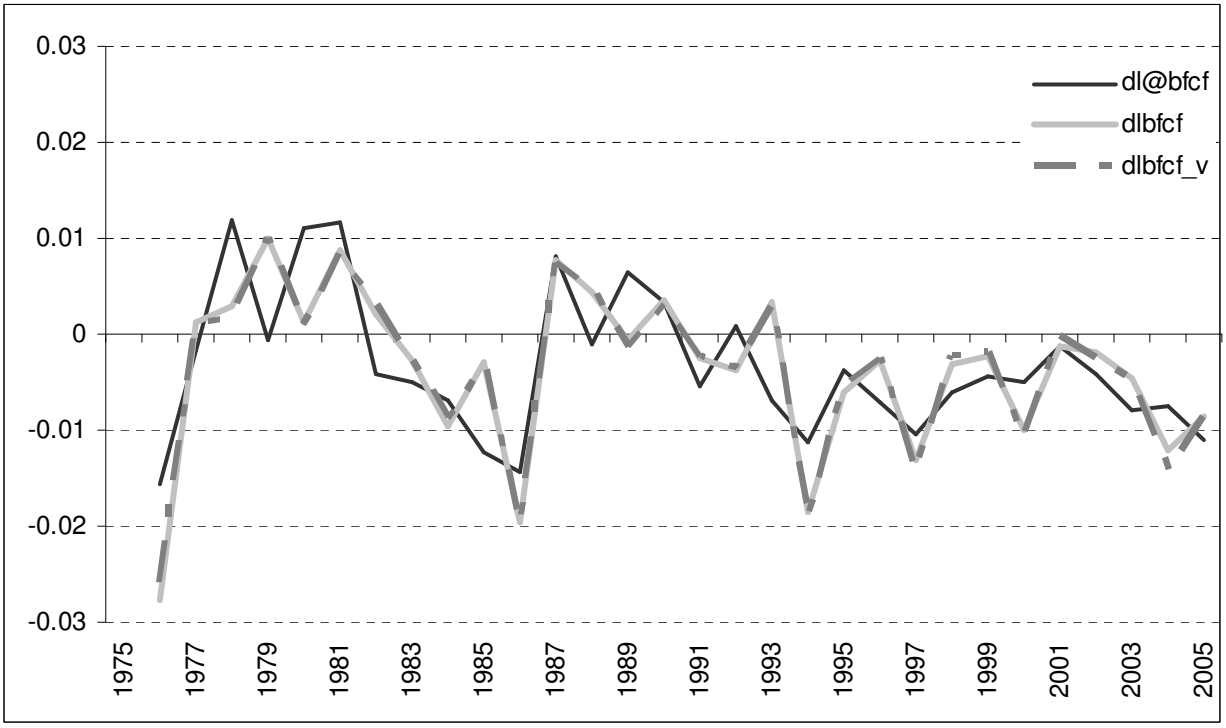
Figur 13.b - første differencer af bfCv



Figur 14.a - bfCf



Figur 14.b - første differencer af bfCf



Bilag 3 – De residualt fittede værdier

Budget betingelse:

$$px_{12} fx_{12} = px_1 fx_1 + px_2 fx_2 \Leftrightarrow$$

$$fx_2 = \frac{px_{12} fx_{12} - px_1 fx_1}{px_2}.$$

$$\log(fx_2) = \log\left(\frac{px_{12} fx_{12} - px_1 fx_1}{px_2}\right) \Leftrightarrow$$

$$\log(\hat{fx}_2) = \log\left(\frac{px_{12} fx_{12} - px_1 \hat{fx}_1}{px_2}\right) \Leftrightarrow$$

$$\log\left(\frac{\hat{fx}_2}{fx_{12}}\right) = \log\left(\frac{px_{12} fx_{12} - px_1 \hat{fx}_1}{px_2 fx_{12}}\right) \Leftrightarrow$$

$$\log\left(\frac{\hat{fx}_2}{fx_{12}}\right) = \log\left(\frac{px_{12}}{px_2} - \frac{px_1 \hat{fx}_1}{px_2 fx_{12}}\right) \Leftrightarrow$$

$$\log\left(\frac{\hat{fx}_2}{fx_{12}}\right) = \log\left(\frac{px_{12}}{px_2} - \frac{px_1}{px_2}\exp\left(\log\left(\frac{\hat{fx}_1}{fx_{12}}\right)\right)\right)$$

$$\Delta\log\left(\frac{\hat{fx}_{2,t}}{fx_{12,t}}\right) = \log\left(\frac{\hat{fx}_{2,t}}{fx_{12,t}}\right) - \log\left(\frac{\hat{fx}_{2,t-1}}{fx_{12,t-1}}\right)$$

$$\Delta\log\left(\frac{\hat{fx}_{2,t}}{fx_{12,t}}\right) = \log\left(\frac{px_{12,t}}{px_{2,t}} - \frac{px_{1,t}}{px_{2,t}}\exp\left(\log\left(\frac{\hat{fx}_{1,t}}{fx_{12,t}}\right)\right)\right) - \log\left(\frac{px_{12,t-1}}{px_{2,t-1}} - \frac{px_{1,t-1}}{px_{2,t-1}}\exp\left(\log\left(\frac{\hat{fx}_{1,t-1}}{fx_{12,t-1}}\right)\right)\right)$$

$$\Delta\log\left(\frac{\hat{fx}_{2,t}}{fx_{12,t}}\right) = \Delta\log\left(\frac{px_{12,t}}{px_{2,t}} - \frac{px_{1,t}}{px_{2,t}}\right)$$