Danmarks Statistik
MODELGRUPPEN

Arbejdspapir*

Dawit Sisay

16 November 2010

Shortening the crowding-out time in Dec09-model version

Resumé:

The paper tries to shorten the crowding-out time in the model version – December 2009. This is achieved by changing some of the parameters in the central relations. Empirical support for the change in parameters is provided through re-estimation of the equations.

DSI161110

Nøgleord: Re-estimation, Multiplier analysis, Crowding out

1. Introduction

One of the differences between the model versions– Apr08 and Dec09- is that the latter has a longer crowding out period relative to the former. The main reasons lie on differences in the formulation of the central relations and the corresponding parameter estimates that determine the crowding out time. It is well known that raising the long run elasticities and adjustment speeds for relations such as exports and wages reduces the crowding out time. It is important to ask if such changes in parameters have empirical support. This paper re-estimates the central relations in the model and motivates having higher long run elasticities and adjustment speeds in an attempt to have a shorter crowding out time in Dec09-model.

2. Re-estimation

The re-estimation is made for imports, exports, wage, and house price equations. To save space, the estimation output is report in the appendix and here the basic differences are reported. Table 1 summarizes the important changes in the re-estimation process. The long run price elasticity has increased from 0.912 to 1.531 in imports and from 1.857 to 2.541 in exports. The gain in import elasticity is achieved by getting a significant coefficient to the logistic trend in the import equation.[1] The export equation is estimated in two steps due to the endogeneity of prices. Different specifications are tried for the deterministic components in the price equation.[2] This together with a restriction on the German reunification dummy explains the gain in export elasticity, see table 1 and 2 in the appendix.

Table 1 summary, the main changes in the re-estimation

Relation	Dec09	Dec09 re-estimated
Manufactured imports: *Long run price elasticity*	-0.912	-1.531
Manufactured exports: *Long run price elasticity*	-1.857	-2.541
Wages: *Adjustment speed*	-0.45	-0.65
House price: *Long term house price elasticity*	0.18	0.30

The gain in the numerical value of the coefficients in wage and house price equations is achieved through restricted estimation. In the restricted estimation, the long-term house price elasticity and the adjustment coefficient in the wage equation are restricted to the higher end of the confidence interval from the

[1]The importance of the logistic trend in the import equation can be informally judged from the graphs of import volume and logistic trend, see figure 1A in the appendix.

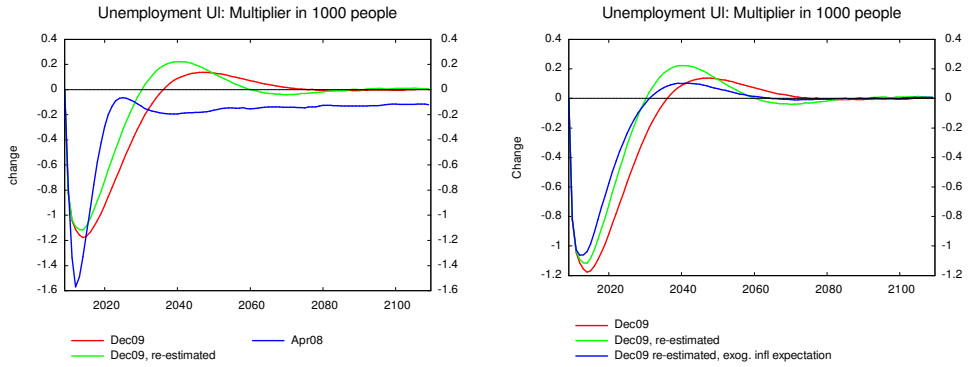
[2]Figure 1B in the appendix shows prices indices for imports, exports, and domestic prices. A common feature among the price indices is that they exhibit a non-zero growth rate until the mid-1980s and level off afterwards. This corresponds to the European Monetary System (EMS). A broken linear trend in level corresponds to a level shift in first differences. We took this into consideration in re-estimating the export price equation.

unrestricted estimation. The restrictions do not significantly distort the overall model property, see table 3 in the appendix.

3. Multiplier Analysis

Here we make a standard public purchase experiment with the new set of parameter values in Dec09. But because of concerns in the import and export elasticities, we raise industrial export elasticity only to 2, no change in import elasticity, and the changes in wage and house price are included. And the long term elasticity on service exports is raised from 1.5 to 2.[3] The public purchase of goods and services is raised by 1 billion krone, figure 1 illustrates. The increase in public expenditure boosts aggregate demand and reduces unemployment. In the medium to long term loss of competitiveness reduces exports and unemployment returns to the baseline. The higher export elasticities lead to a faster fall in exports and shorten the time it takes for employment to return to the baseline. This is reinforced by the higher adjustment speed in wage equation. The crowding out time is shortened from 29 to 21 years.

Figure 1. The effect on unemployment



The higher parameter values produce over-shootings, see the green line. The higher house price elasticity partly moderates the fluctuation. Further, the overshooting in the model with higher parameter values can be reduced by exogenizing inflation expectations in the construction sectors: private sector (*rpibpe*) and housing sector (*rpibhe*). Figure 1 (right-panel) illustrates.

4. Conclusion

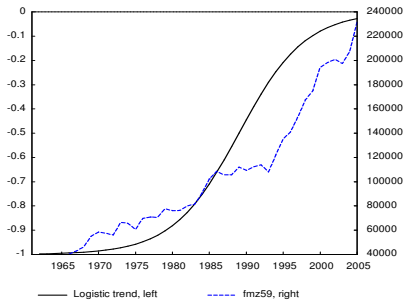
Reduction in the crowding-out time in December 2009 model version can be empirically motivated.

[3] The relation for service exports is not estimated, it takes the average export elasticities from the other groups.

Appendix

Figure 1, import volume, logistic trend, and price indices

(A) import volume & logistic trend



(B) price indices

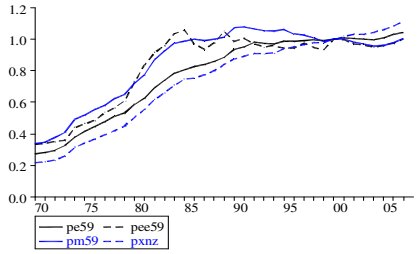


Table 1 Import and export equations

Dec09	**Dec09, re-estimated**
Manufactured Imports	
dlog(fmz59) = 1.24*dlog(fam59) - 0.95*dlog(pxm59) (14.9) (6.35) **-0.18***(log(fmz59.1/fam59.1) + (-4.95) **0.91***log(pxm59.1) (8.39) **0.00***logt.trend - 12.109) (.) (278.4) SP:1962-2005, Adj.R^2=0.87,DW = 1.58	dlog(fmz59) = 1.26*dlog(fam59) – 1.05*dlog(pxm59) (15.59) (6.88) **-0.34***(log(fmz59.1/fam59.1) + (-3.47) **1.53***log(pxm59.1) (5.28) **0.31***logt.trend - 12.107) (2.00) (476.7) SP:1962-2005, Adj.R^2=0.88,DW = 1.54
Manufactured exports	
dlog(fe59) = 0.62*dlog(fee59) (7.2) -0.73*(dlog(pe59)-dlog(pee59)) (-7.74) - 0.05*(d-d.1) (.) - 0.15*(log(fe59.1)/fee59.1) (.) +**1.86***log(pe59.1)/pee59.1) (3.94) -0.27*d.1 - 12.74) (-2.67) (239.9) SP: 1971-2005, R^2 = 0.84, DW = 1.73	dlog(fe59) = 0.66*dlog(fee59) (6.64) -0.75*(dlog(pe59)-dlog(pee59)) - (-9.95) -0.12*(d-d.1) (.) - 0.15*(log(fe59.1)/fee59.1) (.) +**2.54***log(pe59.1)/pee59.1) (4.65) -0.42*d.1 - 12.74) (-3.54) (207.2) SP: 1971-2005, R^2 = 0.86, DW = 1.75

Note: all variables are as defined in ADAM

Table 2. Export Price Equation

Dec09	**Dec09, re-estimated**
dlog(pe59) = 0.767*log(pwe59nv/pwe59nv.1) (11.389) + 0.134*log(pee59.1/pee59.2) (2.620) - 0.15*(log(pe59.1/pwe59w.1) (.) -0.052) (2.091) **Adj-R2 = 0.829** SP: 1972-2005	dlog(pe59) = 0.546*log(pwe59nv/pwe59nv.1) (7.541) + 0.098*log(pee59.1/pee59.2) (2.094) - 0.15*(log(pe59.1/pwe59w.1) (.) **+0.024*t85**-0.455) (4.307) (5.657) **- 0.06*D85s** (-5.112) **Adj-R2 = 0.904,** SP: 1972-2005
All variables are as defined in ADAM, t-values are given in parentheses, t85 is a broken linear trend (zero after 1985), and D85 is a shift dummy (0 before 1985, 1 otherwise).	

Table 3. Wage and House price, before and after

Wage:

Dec09

Dlog(lna1) = 0.3556*diff(dlog(lna1(-1)))
+0.350*dlog(pcpn**.5*pyfbx**.5)
-0.144*diff(bul1) + 0.02838 * d87
-0.450*(bul1(-1)-bulw(-1)) +0.032

Dec09, re-estimated

Dlog(lna1) = 0.341*diff(dlog(lna1(-1)))
(3.034)
+0.400*dlog(pcpn**.5*pyfbx**.5)
(.)
-0.31708*diff(bul1) + 0.019 * d8587
(1.908) (3.157)
-**0.650***(bul1(-1)-bulw(-1)) + 0.170
(.) (7.485)

Adj R. Sq 0.8538 ,
Breusch/Godfrey LM: AR/MA1 = 3.18239 [.074]
Breusch/Godfrey LM: AR/MA2 = .640270 [.726]
Note: d87 is a blip dummy, d8587 is a transitory blip dummy of the form (..0,-0.5,-0.5,10..), (.) t-values not available as the coefficients are restricted.

House price:

Dec09

fKbhw = Exp(Log(Cpuxh/pcpuxh)
+0.376697/(1+(exp(0.014956*tid-25.14886)/exp(4.3))**(-25))
+**0.18756***log(pcpuxh/(buibhx*phk)) +0.873954)
Dlog(phk) = 1.66115*Dlog(Cpuxh/pcpuxh) -6.16943*Dif(buibhx) +
Dlog(pcpuxh) -1.59852*Log(fKbh(-1)/fKbhw(-1))
+0.087485*d06+gphk
-0.537720*(-Dlog(phk(-1))
+(1.66115*Dlog(Cpuxh(-1)/pcpuxh(-1))
-6.16943*Dif(buibhx(-1)) + Dlog(pcpuxh(-1))
-1.59852*Log(fKbh(-2)/fKbhw(-2))
+0.087485*d06(-1)+gphk))

Dec09, re-estimated

Dlog(phk/pcpuxh) = 1.334*dlog(fcpuxh) -5.953*diff(buibhx)
(5.672) (8.096)
- 1.031*(log(fkbh(-1)/fcpuxh(-1))
(3.192)
- **0.309***log(buibhx(-1)/phk(-1))/pcpuxh(-1) + 0.079*d06
(.) (1.864)
+ 0.951
(3.089)
Adj R. Sq 0.786, D.W.(1) 1.8248, D.W.(2) 2.3631
Note: The re-estimated relation can be rewritten to the form above, the major difference is that here the house price elasticity is 0.309/1.031 = 0.30 in contrast to 0.187 in Dec09.

Note: all variables are as defined in ADAM