

Crowding out mechanism in OECD's new global model

Resumé:

It is of interest to see what influences the crowding out process in OECD's new global model and compare to ADAM. A fiscal shock is crowded out much faster in OECD's model than in ADAM. The OECD model has adaptive expectation like ADAM and smaller price elasticities in foreign trade than ADAM. In addition, foreign trade plays a smaller role for e.g. the euro area and for the rest of OECD Europe, which are among the regions described by the OECD model. However, the OECD model contains both a fiscal and a monetary reaction function. Such functions are not present in standard ADAM calculation and the reaction of taxes and interest rates could explain the fast crowding out of a permanent fiscal expenditure shock. The OECD model is much slower to crowd out a permanent shock to non-OECD demand. This shock does increase the interest rate, but taxes are not increased because there is no negative effect on primary public budget. Consequently, we may conclude that the fiscal reaction function is particularly important for the relatively fast crowding out of fiscal shocks to OECDmodel.

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Key words: a fiscal shock, crowding out, OECD's model

Modelgruppepapirer er interne arbejdsrapporter. De konklusioner, der drages i papirerne, er ikke endelige og kan være ændret inden opstillingen af nye modelversioner. Det henstilles derfor, at der kun citeres fra modelgruppepapirerne efter aftale med Danmarks Statistik.

1. Introduction

The paper attempts to examine the crowding out mechanism in the OECD's new global macro-econometric model and compare it to ADAM. The new global model is rather compact and less detailed than ADAM. But, the basic structure resembles ADAM. One clear difference is that New Global Model (NGM) includes policy reaction functions. In NGM, the long-term stability of the public debt is ensured through an endogenous fiscal rule. In ADAM, we do not have an automatic budget stabilizing reaction function. Also unlike ADAM, the interest rate is endogenous in NGM and determined by a Taylor rule. These two policy reaction functions influence the crowding out process in NGM. Specifically, we observe that the fiscal reaction matters to determine the speed of crowding out. With a view to the crowding out process, we also note that NGM has adaptive expectations, like ADAM, and that the foreign trade elasticity is smaller in NGM than in ADAM.

2. Properties and purposes of the new global model and ADAM

The big economies such as USA, Japan, Euro area and China are treated separately in NGM while all other OECD economies are combined in two blocks: other OECD Europe and other OECD. The non-OECD economies are split into three regional units: other (than China) non-OECD Asia, non-OECD Europe and all other regions including Africa, the Middle East and Latin America. The availability of data, trade and financial links between the different economies are the key factors for this regional grouping of the global economies.

Given the structural adjustment program and OECD's globalization effort, the NGM serves as a vehicle to examine the implications of a wide range of shocks between the different regional groupings. Compared with its predecessors including the OECD interlink model, the new global model is quarterly rather than semi-annual, offering more attention to the short-term adjustments. Moreover, the new global model comprehends the long-term effects of financial developments and global trade and closely examines the international spill-over effects of a specified shock in an economy.

The purpose of the NGM is, therefore, to illustrate the underlying mechanisms, including the crowding out mechanism and the linkages between the major regional economies. For instance, a shock to domestic demand in a non-OECD region will affect the OECD economies via export and the pass through is determined by foreign price and demand elasticities. Regional trading patterns, the evolution of domestic demand and whether the shock is global or country specific also influence the spill-over effect.

There are differences between NGM and ADAM, which influence the crowding out process. In ADAM tax rates are exogenous. However, in NGM, the long-term stability of the public budget balance, and hence the public debt, is guaranteed for each region through an endogenous fiscal rule. The rule uses the direct tax rate on households to remove deviations from baseline in public deficit as share of GDP. Consequently, the immediate effect on public debt will always evaporate in NGM.

In addition, monetary policy is endogenous in NGM. The monetary authority of each region follows a Taylor-type rule, which says that nominal interest rates respond to deviations of output from its potential and of the inflation rate from its target. Together with the fiscal reaction function, the reaction function of the monetary authority plays an important role for the dynamics of a macroeconomic model. In NGM, as in ADAM, demand shocks only affect the short term output and employment while a shock to supply side variables such as a productivity shock will have long-lasting effect on output.

Table 1 recaps the estimation results of export and import relations for NGM regions, which can be compared with our foreign trade relation in ADAM. As displayed in table 1, in all NGM regions, export prices and import prices respond to domestic costs and competitor prices respectively. We note that the pass through from competitor price to import price is considerably larger in the other-OECD Europe region compared to the pass through in the euro area. The former region includes Denmark. But, Denmark is of course only a fraction of the region. In ADAM, import prices are exogenous, which reflects Armington's small open economy assumptions. Like NGM, export prices in ADAM are determined on the basis of domestic costs and import prices, the competitor price has no influence on the long-term export price for Armington products. Thus, as in NGM, export price in ADAM is more responsive to domestic costs. In ADAM and NGM, the export relation is formulated in an error correction form with about the same speed of adjustment in ADAM as in NGM-Euroarea. The estimated long-term export price elasticities in ADAM are high compared to the elasticities in all NGM's regional models. Also, import price elasticities are higher in ADAM than in NGM.

In the long run, exports are more sensitive than imports to movements in relative prices in ADAM and in most regional models in NGM but other-OECD Europe is an exception. In ADAM, imports adjust faster than exports. This is not the case for other-OECD Europe in NGM, but it is the case for the euro area in NGM.

In NGM and ADAM, the short run dynamics of the foreign trade equations are not constrained. However, the long-run export elasticities with respect to export market volumes are restricted to unity in ADAM and also in NGM in

order to maintain balance between world exports and imports. The unity restriction ensures long-run trade consistency and the data also seems to fit the constraint in all economies. Similarly, the long-term import elasticities with respect to markets are 1 in all economies. The short-term export demand elasticities are less than unity for European economies while they are above 1 for Japan and for “other non-OECD”, which includes China. This reflects a more dynamic and cyclical sensitive export performance for the latter. As in ADAM, the short term import demand elasticities are greater than 1 in the case of euro area, US, Japan and other-OECD Europe.

3. Crowding out mechanism for NGM

Once the model properties are established as presented above, we can analyze how e.g. the euro area responds to a fiscal shock. In ADAM, we increase public purchase of goods and services by 1% of GDP in all years, where 2011 and 2030 are the first and last years of the experiment periods respectively. For NGM, the source is the OECD’s 2010 working paper series no.768, which is available online at www.oecd.org/eco/workingpapers. Table 2 offers a summary of the simulation results for euro area. Table 2 shows the deviations from baseline. The first year GDP effect is about 0.8% and it falls to only 0.1% after 5 years. By coincidence, GDP also increases by 0.8% in ADAM in the first year cf. figure 1. This GDP multiplier is obtained from ADAM’s calculation of a fiscal positive demand shock as specified above. Both models crowd out the fiscal demand shock but there is a noticeable difference in the speed of crowding out. Crowding out is clearly faster in NGM than in ADAM.

The difference in crowding out does not reflect that NGM is forward looking because it is not. Nor does it reflect that foreign trade price elasticities are higher in NGM because they are lower. There may be an important difference in the dynamics of wage and foreign trade price formation, but the most obvious reason must be the policy reactions in NGM. There are two policy reaction functions, one fiscal and one monetary. The impact of the latter is illustrated by the impact on the interest rate shown in table 2, but we cannot identify the GDP effect from the two reaction functions from table 2. Thus, we also illustrate the impact of a permanent shock to non-OECD demand. These results for euro area are shown in table 3. Table 3 indicates the euro area GDP effect of a 10% increase in non-OECD domestic demand.

In table 2, a fiscal positive demand shock in euro area is almost crowded out after 5 years. But, in table 3, the GDP effect is still rising after 5 years. The first year interest rate effect is the same in table 2 and 3 and both at the second and third years of the experiment, we see a higher increase in interest rate and GDP in table 3, suggesting that the contribution of the interest rate to crowding out in NGM is smaller than the contribution of the fiscal reaction. More

specifically, the impact of higher interest rates seems to be dominated by a presumably positive fiscal reaction as the positive demand shock from non-OECD should improve the government budget and trigger a tax decrease in the euro area.

The GDP effect increases only slowly in the fourth and fifth years, suggesting that some negative GDP effect does come from the higher interest rate. However, even if the negative impact of the interest rate becomes stronger in year 4 and 5, the crowding-out effect of the interest rate is not sufficient to keep the total GDP effect from increasing also from year 4 to 5.

It may be of interest to recapitulate how the size of foreign trade price elasticities will affect the speed of crowding out in ADAM. As shown in figures 2 and 3, crowding out is faster if export price elasticities are twice the size of ADAM's elasticities, and slower if export price elasticities are only half the size. The current account deficit also varies with the size of export price elasticities, cf. figure 4.

4. Conclusion

The paper reviews the properties and the crowding out mechanisms in OECD's new global model, NGM. We compare a couple of published OECD multipliers to ADAM and try to identify the key factors that determine the different speed of adjustment in the two models. The faster crowding out of a fiscal shock in NGM can be explained by both a fiscal and a monetary reaction, which do not appear in ADAM. In case of a non-OECD demand shock, which will lift the export of the euro area, the speed of crowding out in NGM's euro area model seems low, suggesting that the impact of the monetary rule and the interest rate is dominated by the impact of the fiscal rule and the tax rate. Thus, the foreign demand shock offers a clue in identifying the role of the fiscal rule and the monetary rule.

Table 1: Long-run elasticities of foreign trade equations for OECD countries and regions

	Country /region				
	United States	Japan	Euro area	Other OECD Europe	Other OECD
Export volumes w.r.t.					
Export markets	1.0	1.0	1.0	1.0	1.0
Export competitiveness	-0.6	-1.0	-0.51	-0.34	-0.44
ECM	-0.277	-0.130	-0.178	-0.065	-0.265
Import volumes w.r.t.					
Final expenditures	1.0	1.0	1.0	1.0	1.0
Import competitiveness	-0.32	-0.4	-0.43	-0.64	-0.53
ECM	-0.134	-0.149	-0.067	-0.152	-0.069

Table 2: Sustained increase in public expenditures in euro area (1% of GDP)

	Years after shock				
	Year 1	Year 2	Year3	Year 4	Year 5
GDP level	0.8	0.8	0.5	0.3	0.1
Inflation	0.2	0.3	0.4	0.1	0.0
Interest rate(basis points)	60	70	80	30	5
Government net lending(% of GDP)	-0.6	-0.4	-0.4	-0.4	-0.3
Current account(% of GDP)	-0.4	-0.3	0.0	0.2	0.0

Table 3: Sustained 10% increase in non-OECD domestic demand, the effect on euro area

	Years after shock				
	Year 1	Year 2	Year3	Year 4	Year 5
GDP level	0.7	1.1	1.5	1.7	1.8
Inflation	0.2	0.4	0.7	0.8	0.9
Interest rate(basis points)	60	106	178	192	206
Current account(% of GDP)	0.4	0.4	0.6	0.8	1.0

Figure 1: GDP, export, import and value added effects of permanent increase in public purchase of inputs

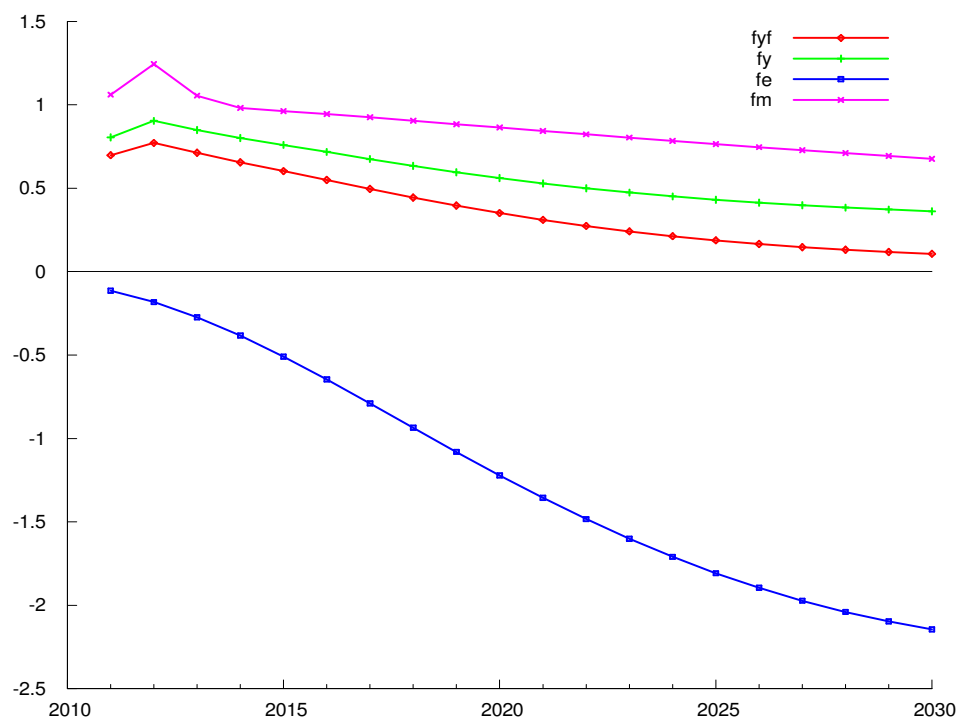


Figure 2: an increase in public purchase of inputs under high export price elasticities

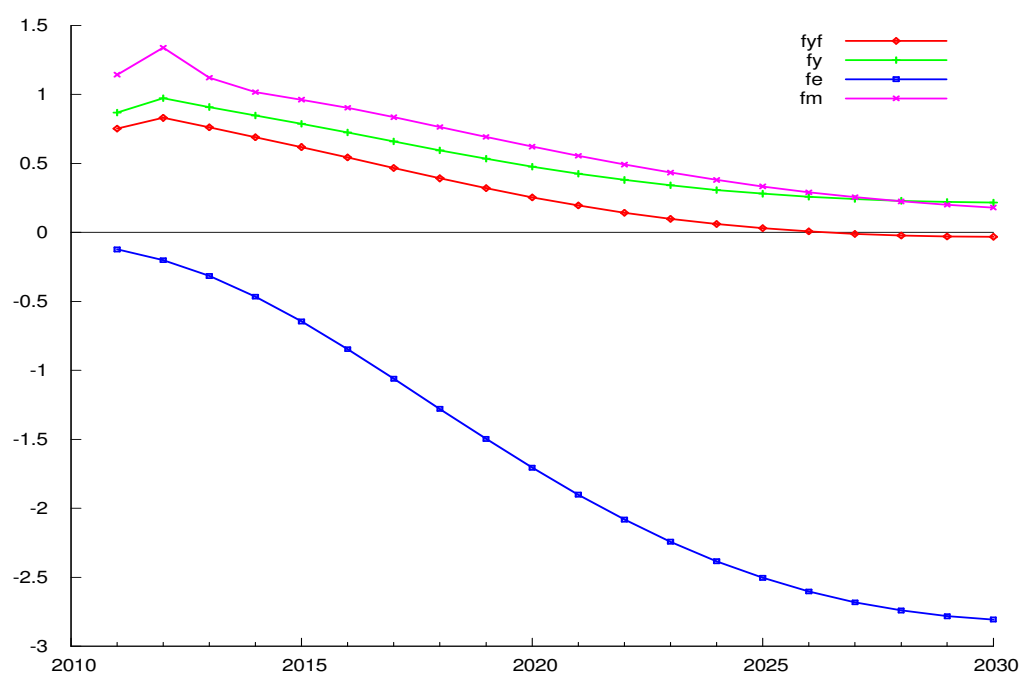


Figure 3 : an increase in public purchase of inputs under low export price ealsticties

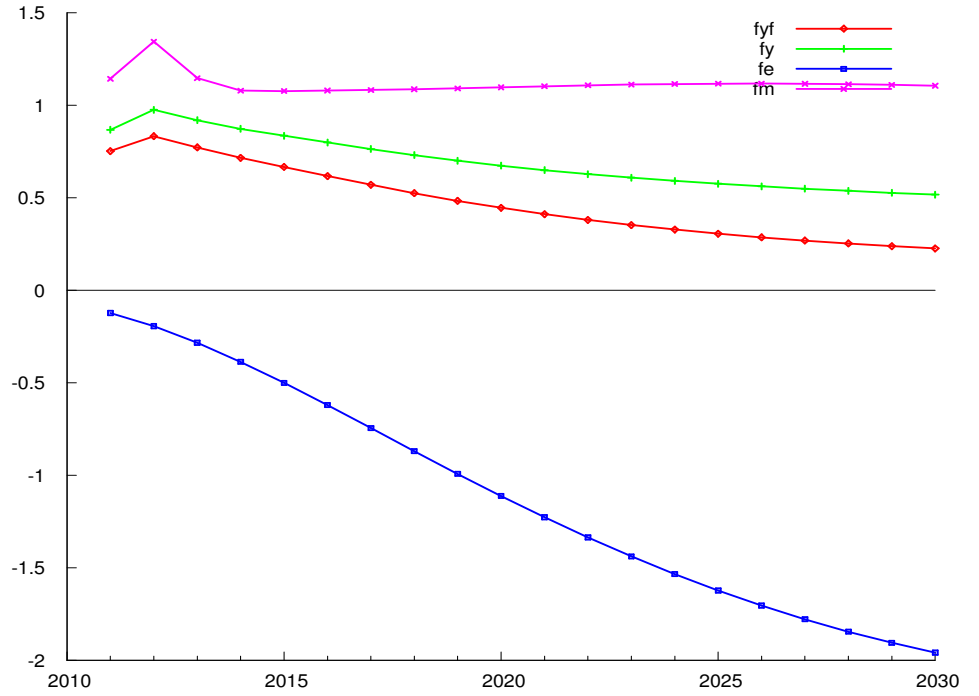


Figure 4 : Current account effect under different export price ealsticties and an increase public purchase

