Supplement to “Expansionary Fiscal Contractions: Re–evaluating the Danish Case” by U.M. Bergman and M.M Hutchison

Stationarity and cointegration tests

Table S.1: Augmented Dickey–Fuller unit root and cointegration tests. 5–dimensional system.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\tau_\mu$</th>
<th>$\tau_\tau$</th>
<th>$\tau_\gamma$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terms-of-trade</td>
<td>−1.43</td>
<td>−2.14</td>
<td>−2.16</td>
</tr>
<tr>
<td>5% Critical value</td>
<td>−2.92</td>
<td>−3.46</td>
<td>−3.88</td>
</tr>
</tbody>
</table>

| Cointegration test | −0.86  | −0.54  | −3.99  |
| 5% Critical value  | −4.56  | −4.91  | −5.25  |

Note: $\tau_\mu$ is the ADF–test with a constant, $\tau_\tau$ with a constant and a linear trend and $\tau_\gamma$ with a constant and a second order polynomial trend. All ADF–tests are computed using 4 lags in the augmented terms. When testing for cointegration we let taxes be the independent variable in the cointegration regression.
Table S.2: Johansen’s trace tests. The implied number of cointegration vectors using the 5% level critical values.

<table>
<thead>
<tr>
<th></th>
<th>4–variable system</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>model 1</td>
<td>model 2</td>
<td>model 3</td>
<td>model 4</td>
<td></td>
</tr>
<tr>
<td>No. of cointegration vectors</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>5–variable system</th>
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<tbody>
<tr>
<td>No. of cointegration vectors</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** In model 1 there is an intercept in the cointegration vector, in model 2 we add a linear trend in the data, in model 3 we add a linear trend in the cointegration vector and finally in model 4 we add a quadratic trend in the data. Critical values are taken from H. Hansen and K. Juselius (1995), *CATS in RATS*, Estima, Evanston.
**Model with deterministic trend**

Table S.3: Estimated contemporaneous coefficients in equation (3). 4-variable model with deterministic trends.

<table>
<thead>
<tr>
<th></th>
<th>$a_2$</th>
<th>$b_2$</th>
<th>$c_1$</th>
<th>$c_2$</th>
<th>$d_1$</th>
<th>$d_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.034</td>
<td>0.008</td>
<td>−0.612</td>
<td>0.884</td>
<td>−0.585</td>
<td>0.649</td>
</tr>
<tr>
<td></td>
<td>(0.184)</td>
<td>(0.184)</td>
<td>(−4.168)</td>
<td>(4.148)</td>
<td>(−2.845)</td>
<td>(2.174)</td>
</tr>
</tbody>
</table>

**Note:** T-ratios are reported in parentheses below each coefficient estimate.

Table S.4: Estimated contemporaneous coefficients in equation (4). 5-variable model with deterministic trends.

<table>
<thead>
<tr>
<th></th>
<th>$a_2$</th>
<th>$b_2$</th>
<th>$c_1$</th>
<th>$c_2$</th>
<th>$d_1$</th>
<th>$d_2$</th>
<th>$c_3$</th>
<th>$d_3$</th>
<th>$e_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>−0.018</td>
<td>−0.005</td>
<td>−0.753</td>
<td>1.022</td>
<td>−0.522</td>
<td>0.590</td>
<td>−0.102</td>
<td>0.399</td>
<td>−0.028</td>
</tr>
<tr>
<td></td>
<td>(−0.100)</td>
<td>(−0.100)</td>
<td>(−3.975)</td>
<td>(4.055)</td>
<td>(−2.214)</td>
<td>(1.882)</td>
<td>(−0.777)</td>
<td>(2.451)</td>
<td>(−0.261)</td>
</tr>
</tbody>
</table>

**Note:** T-ratios are reported in parentheses below each coefficient estimate.
Figure S.1: Impulse response of output \((Y)\) and private consumption \((C)\) to a one standard deviation shock to taxes \((T)\) and government consumption \((G)\) during “normal” times. 4–variable system with deterministic trends.

(a) Response of \(Y\) to a \(T\) shock

(b) Response of \(Y\) to a \(G\) shock

(c) Response of \(C\) to a \(T\) shock

(d) Response of \(C\) to a \(G\) shock

Note: One standard deviation confidence bands (dashed lines) are calculated using bootstrap simulations with 500 trials.
Figure S.2: Impulse response of output and private consumption to a major fiscal consolidation. 4-variable system with deterministic trends.

(a) Taxes  

(b) Government consumption

(c) Output  

(d) Private consumption

Note: One standard deviation confidence bands (dashed lines) are calculated using bootstrap simulations with 500 trials.
Figure S.3: Forecasts of output and private consumption with and without a major fiscal consolidation. 4-variable system with deterministic trends.
Figure S.4: Impulse response of output ($Y$) and private consumption ($C$) to a one standard deviation shock to taxes ($T$), government consumption ($G$) and to major fiscal consolidation. 5–variable VAR model with deterministic trends.

(a) Response of $Y$ to a $T$ shock  
(b) Response of $Y$ to a $G$ shock  
(c) Response of $C$ to a $T$ shock  
(d) Response of $C$ to a $G$ shock  
(e) Output response to fiscal consolidation  
(f) Private consumption response to fiscal consolidation  
(g) Forecast of output  
(h) Forecast of private consumption

Note: One standard deviation confidence bands (dashed lines) are calculated using bootstrap simulations with 500 trials.
Sensitivity analysis: Exogenous variables in the VAR model

Figure S.5: Impulse response of output (Y) and private consumption (C) to major fiscal consolidation. 4-variable VAR model with stochastic trend and with interest differential to Germany (bond rate) as exogenous variable.

(a) Y response to fiscal contraction  (b) C response to fiscal contraction

Note: One standard deviation confidence bands (dashed lines) are calculated using bootstrap simulations with 500 trials.
Figure S.6: Impulse response of output (Y) and private consumption (C) to major fiscal consolidation. 4-variable VAR model with stochastic trend and with G–7 output gap as exogenous variable.

(a) Y response to fiscal contraction  
(b) C response to fiscal contraction

Note: One standard deviation confidence bands (dashed lines) are calculated using bootstrap simulations with 500 trials.

Figure S.7: Impulse response of output (Y) and private consumption (C) to major fiscal consolidation. 4-variable VAR model with stochastic trend and with log G–7 GDP as exogenous variable.

(a) Y response to fiscal contraction  
(b) C response to fiscal contraction

Note: One standard deviation confidence bands (dashed lines) are calculated using bootstrap simulations with 500 trials.
Figure S.8: Impulse response of output (Y) and private consumption (C) to major fiscal consolidation. 5–variable VAR model with stochastic trend and with interest differential to Germany (bond rate) as exogenous variable.

Note: One standard deviation confidence bands (dashed lines) are calculated using bootstrap simulations with 500 trials.

Figure S.9: Impulse response of output (Y) and private consumption (C) to major fiscal consolidation. 5–variable VAR model with stochastic trend and with G–7 output gap as exogenous variable.

Note: One standard deviation confidence bands (dashed lines) are calculated using bootstrap simulations with 500 trials.
Figure S.10: Impulse response of output (Y) and private consumption (C) to major fiscal consolidation. 5-variable VAR model with stochastic trend and with log G–7 GDP as exogenous variable.

(a) Y response to fiscal contraction  
(b) C response to fiscal contraction

Note: One standard deviation confidence bands (dashed lines) are calculated using bootstrap simulations with 500 trials.