The model is solved algebraically, except for a cubic root which is solved numerically. The method of solution is undetermined coefficients. The notation in this note corresponds to the notation in the program.

The model is given by:

(1) $\lambda_t = \alpha\gamma_{t+1} - \eta_t$

Here, λ_t is the ex ante excess return on the foreign deposit (relative to the home deposit) as in the paper. γ_{t+1} is the home less foreign interest rate differential (expressed as $i_t - i_t^*$ in the paper. The t+1 subscript is useful because we can think of this as a predetermined variable if we were to use the Blanchard-Kahn solution technique.)

(2) $\lambda_t = E_t q_{t+1} - q_t - \gamma_{t+1} + E_t\pi_{t+1}$

This is the definition of the excess return. π_{t+1} is home less foreign inflation.

(3) $\pi_t = \delta\left(q_t - \overline{q}_t\right) + \beta E_t\pi_{t+1}$

This is the (home less foreign) Phillips curve.

(4) $\gamma_{t+1} = \sigma\pi_t + \rho\gamma_t$

This is the (home less foreign) Taylor rule.

The following equations are the stochastic processes for the exogenous variables:

(5) $\overline{q}_t = \xi\overline{q}_{t-1} + \varepsilon_t$

(6) $\eta_t = \mu\eta_{t-1} + u_t$

The program takes as input the values of the parameters α, δ, β, σ, ρ, ξ, μ, and the variances of $\overline{q}_t$ and η_t, which are entered in **lines 18 through 26** in the program.

We posit an undetermined coefficients solution for the interest differential, the real exchange rate and the relative inflation rates:

(7) $\gamma_{t+1} = a\overline{q}_t + b\eta_t + c\gamma_t$

(8) $$q_t = d\overline{q}_t + e\eta_t + f\gamma_t$$

(9) $$\pi_t = g\overline{q}_t + h\eta_t + k\gamma_t$$

Using equations (5)-(9), we have:

(10) $$q_{t+1} = d\xi\overline{q}_t + d\varepsilon_{t+1} + e\mu\eta_t + eu_{t+1} + fa\overline{q}_t + fb\eta_t + fc\gamma_t$$

Taking expectations:

(11) $$E_t q_{t+1} = \left(d\xi + fa\right)\overline{q}_t + \left(e\mu + fb\right)\eta_t + fc\gamma_t$$

Then again using equations (5)-(9), we have:

(12) $$\pi_{t+1} = g\xi\overline{q}_t + g\varepsilon_{t+1} + h\mu\eta_t + hu_{t+1} + ka\overline{q}_t + kb\eta_t + kc\gamma_t$$

Taking expectations:

(13) $$E_t\pi_{t+1} = \left(g\xi + ka\right)\overline{q}_t + \left(h\mu + kb\right)\eta_t + kc\gamma_t$$

Now use (7) and (9) to make substitutions into equation (4):

$$a\overline{q}_t + b\eta_t + c\gamma_t = \sigma\left(g\overline{q}_t + h\eta_t + k\gamma_t\right) + \rho\gamma_t$$

Matching coefficients, we have:

(14) $$a = \sigma g$$
(15) $$b = \sigma h$$
(16) $$c = \sigma k + \rho$$

Next use (7), (9) and (13) to make substitutions into equation (3):

$$g\overline{q}_t + h\eta_t + k\gamma_t = \delta\left(d\overline{q}_t + e\eta_t + f\gamma_t\right) - \delta\overline{q}_t + \beta\left(\left(g\xi + ka\right)\overline{q}_t + \left(h\mu + kb\right)\eta_t + kc\gamma_t\right)$$

Matching coefficients, we have:

(17) $$g = \delta\left(d - 1\right) + \beta\left(g\xi + ka\right)$$
(18) $$h = \delta e + \beta\left(h\mu + kb\right)$$
(19) $$k = \delta f + \beta kc$$

Eliminate λ_t by equating (1) and (2), then use equations (7), (8), (11) and (13):

$$\alpha\left(a\overline{q}_t + b\eta_t + c\gamma_t\right) - \eta_t = \left(d\xi + fa\right)\overline{q}_t + \left(e\mu + fb\right)\eta_t + fc\gamma_t - \left(d\overline{q}_t + e\eta_t + f\gamma_t\right)$$
$$- \left(a\overline{q}_t + b\eta_t + c\gamma_t\right) + \left(g\xi + ka\right)\overline{q}_t + \left(h\mu + kb\right)\eta_t + kc\gamma_t .$$

Matching coefficients, we have:

(20) $\left(1+\alpha\right)a = \xi d + fa - d + g\xi + ka$

(21) $\left(1+\alpha\right)b - 1 = \mu e + fb - e + \mu h + kb$

(22) $\left(1+\alpha\right)c = fc - f + kc$

Equations (14)-(22) are nine equations that allow for us to solve for the nine undetermined coefficients: *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h* and *k*.

Equations (16), (19) and (22) allow us to solve for *c*, *f*, and *k*. First, solve for *k* from (16):

$$k = \frac{c-\rho}{\sigma} .$$

Then substitute this into (19):

$$\left(1-\beta c\right)\left(\frac{c-\rho}{\sigma}\right) = \delta f ,$$

and solve for *f:*

$$f = \left(1-\beta c\right)\left(\frac{c-\rho}{\delta\sigma}\right)$$

Then substitute this into equation (22) to get:

$$\left(1+\alpha\right)c = \left(1-\beta c\right)\left(\frac{c-\rho}{\delta\sigma}\right)\left(c-1\right) + \left(\frac{c-\rho}{\sigma}\right)c$$

This gives us the equation:

$$0 = \left(1-\beta c\right)\left(c-\rho\right)\left(1-c\right) + \delta\sigma c\left(1+\alpha\right) - \delta c\left(c-\rho\right).$$

The program solves this equation in **line 31**. There are three roots to this cubic equation. We use the solution that is less than one in absolute value, which is given in **line 34**.

Then from above, the program solves for k in **line 39** using $k = \frac{c-\rho}{\sigma}$. And in **line 40**, the program solves for f using $f = (1-\beta c)\left(\frac{c-\rho}{\delta\sigma}\right) = (1-\beta c)\frac{k}{\delta}$.

We have solved for c, f, and k. Then equations (14), (17) and (20) let us solve for a, d and g. From (14) we have $g = \frac{a}{\sigma}$. From (20), we have:

$$(\xi - 1)d = -\left(f - (1+\alpha) + k + \frac{\xi}{\sigma}\right)a \text{, so } d = \frac{\sigma(1+\alpha - f - k) - \xi}{\sigma(\xi - 1)}a \ .$$

Substituting these expressions for g and d into (17), we get:

$$a = \frac{(\xi-1)\sigma\delta}{(1-\xi)(1-\beta(\xi+\sigma k)) + \delta(\sigma(1+\alpha-f-k)-\xi)}.$$

This is the solution for a in **line 41** of the program. Then **line 42** gives us d as $d = \frac{\sigma(1+\alpha-f-k)-\xi}{\sigma(\xi-1)}a$, and **line 43** gives us g as $g = \frac{a}{\sigma}$.

Next, equations (15), (18), and (21) will allow us to solve for b, h and e. From equation (15), we have $h = \frac{b}{\sigma}$. From (21) we get $(f + k - 1 - \alpha)b + 1 + \mu h = (1-\mu)e$, so

$$e = \frac{(\sigma(f+k-1-\alpha)+\mu)b + \sigma}{\sigma(1-\mu)}$$

Substituting these into (18) we get:

$$\frac{b}{\sigma} = \delta\frac{(\sigma(f+k-1-\alpha)+\mu)b+\sigma}{\sigma(1-\mu)} + \beta\left(\frac{b}{\sigma}\mu + kb\right)\text{, or}$$

$$b = \frac{\delta\sigma}{(1-\mu)(1-\beta(\mu+\sigma k)) - \delta(\sigma(f+k-1-\alpha)+\mu)}$$

which is **line 44** of the program.

Line 45 gives us h as $h = \frac{b}{\sigma}$, and **line 46** gives us e as from (18) as $e = \frac{(1-\beta\mu)h - \beta kb}{\delta} = \frac{(1-\beta\mu-\sigma\beta k)b}{\sigma\delta}$.

Next we solve for the real interest rate differential. We postulate a solution of the form

(23) $r_t = m\overline{q}_t + n\eta_t + p\gamma_t$.

We can use the fact that $r_t = \gamma_{t+1} - E_t\pi_{t+1}$ and equations (7) and (13) to write:

$$m\overline{q}_t + n\eta_t + p\gamma_t = a\overline{q}_t + b\eta_t + c\gamma_t - \left((g\xi + ka)\overline{q}_t + (h\mu + kb)\eta_t + kc\gamma_t\right)$$

Matching coefficients, we have:

$m = a - (g\xi + ka)$, which is **line 47** of the program.

$n = b - (h\mu + kb)$, which is **line 48** of the program.

$p = c(1-k)$, which is **line 49** of the program.

Then we posit a solution for the ex ante excess return:

(24) $\lambda_t = q\overline{q}_t + r\eta_t + s\gamma_t$

From equation (1), we have $\lambda_t = \alpha\gamma_{t+1} - \eta_t$. We can then substitute from (7) to get:

$$q\overline{q}_t + r\eta_t + s\gamma_t = \alpha a\overline{q}_t + \alpha b\eta_t + \alpha c\gamma_t - \eta_t$$

Matching coefficients, we have

$q = \alpha a$, which is **line 50** of the program.

$r = \alpha b - 1$, which is **line 51** of the program.

$s = \alpha c$, which is **line 52** of the program.

So we have $\lambda_t = \alpha a\overline{q}_t + r\eta_t + \alpha c\gamma_t$.

Then, $E_t\lambda_{t+1} = \alpha a\xi\overline{q}_t + (\alpha b - 1)\mu\eta_t + \alpha c\gamma_{t+1}$

$E_t\lambda_{t+2} = \alpha a\xi^2\overline{q}_t + r\mu^2\eta_t + \alpha c E_t\gamma_{t+2}$, and so on.

We have:

$$\Lambda_t = \frac{\alpha a}{1-\xi}\overline{q}_t + \frac{r}{1-\mu}\eta_t + sE_t\left(\gamma_t + \gamma_{t+1} + \gamma_{t+2} + \ldots\right).$$

Now, $\gamma_{t+1} = a\overline{q}_t + b\eta_t + c\gamma_t$.

$$E_t\gamma_{t+2} = E_t\left(a\overline{q}_{t+1} + b\eta_{t+1} + c\gamma_{t+1}\right) = a\xi\overline{q}_t + b\mu\eta_t + c\gamma_{t+1}$$

$$E_t\gamma_{t+3} = E_t\left(a\overline{q}_{t+2} + b\eta_{t+2} + c\gamma_{t+2}\right) = \left(a\xi^2 + ca\xi\right)\overline{q}_t + \left(b\mu^2 + cb\mu\right)\eta_t + c^2\gamma_{t+1}$$

$$E_t\gamma_{t+4} = E_t\left(a\overline{q}_{t+3} + b\eta_{t+3} + c\gamma_{t+3}\right) = \left(a\xi^3 + ca\xi^2 + c^2a\xi\right)\overline{q}_t + \left(b\mu^3 + cb\mu^2 + c^2b\mu\right)\eta_t + c^3\gamma_{t+1}$$

etc. Then

$$\begin{aligned}
&E_t\left(\gamma_t + \gamma_{t+1} + \ldots\right) = \\
&a\left(1 + \xi + \xi^2 + c\xi + \xi^3 + c\left(\xi^2 + c\xi\right) + \xi^4 + c\left(\xi^3 + c\left(\xi^2 + c\xi\right)\right) + \ldots\right)\overline{q}_t \\
&+b\left(1 + \mu + \mu^2 + c\mu + \mu^3 + c\left(\mu^2 + c\mu\right) + \mu^4 + c\left(\mu^3 + c\left(\mu^2 + c\mu\right)\right) + \ldots\right)\eta_t \\
&+\left(1+c\right)\gamma_t + \frac{c}{1-c}\gamma_{t+1}
\end{aligned}$$

We see that

$$E_t\left(\gamma_t + \gamma_{t+1} + \ldots\right) = \frac{a}{1-\xi}\left(1 + \xi\left(c + c^2 + \ldots\right)\right)\overline{q}_t + \frac{b}{1-\mu}\left(1 + \mu\left(c + c^2 + \ldots\right)\right)\eta_t + \left(1+c\right)\gamma_t + \frac{c}{1-c}\gamma_{t+1}$$

which can be written as:

$$E_t\left(\gamma_t+\gamma_{t+1}+\ldots\right)=\frac{a}{1-\xi}\left(1+\xi\frac{c}{1-c}\right)\overline{q}_t+\frac{b}{1-\mu}\left(1+\mu\frac{c}{1-c}\right)\eta_t+\left(1+c\right)\gamma_t+\frac{c}{1-c}\gamma_{t+1}$$
$$=\frac{a}{1-\xi}\left(1+\xi\frac{c}{1-c}\right)\overline{q}_t+\frac{b}{1-\mu}\left(1+\mu\frac{c}{1-c}\right)\eta_t+\left(1+c\right)\gamma_t+\frac{c}{1-c}\left(a\overline{q}_t+b\eta_t+c\gamma_t\right)$$
$$=\frac{a}{\left(1-\xi\right)\left(1-c\right)}\overline{q}_t+\frac{b}{\left(1-\mu\right)\left(1-c\right)}\eta_t+\frac{1}{1-c}\gamma_t$$

Then we get:

$$\Lambda_t=\frac{\alpha a}{1-\xi}\overline{q}_t+\frac{r}{1-\mu}\eta_t+\alpha c\left(\frac{a}{\left(1-\xi\right)\left(1-c\right)}\overline{q}_t+\frac{b}{\left(1-\mu\right)\left(1-c\right)}\eta_t+\frac{1}{1-c}\gamma_t\right)$$
$$=\frac{\alpha a}{\left(1-\xi\right)\left(1-c\right)}\overline{q}_t+\frac{1}{1-\mu}\left(r+\frac{\alpha cb}{1-c}\right)\eta_t+\frac{\alpha c}{1-c}\gamma_t$$
$$=\frac{\alpha a}{\left(1-\xi\right)\left(1-c\right)}\overline{q}_t+\frac{r+c}{\left(1-\mu\right)\left(1-c\right)}\eta_t+\alpha c\left(\frac{1}{1-c}\gamma_t\right)$$

So we can write

(25) $\Lambda_t=v\overline{q}_t+w\eta_t+x\gamma_t$, where

$v=\dfrac{\alpha a}{\left(1-\xi\right)\left(1-c\right)}$, which is **line 53** of the program.

$w=\dfrac{r+c}{\left(1-\mu\right)\left(1-c\right)}$, which is **line 54** of the program

$x=\dfrac{\alpha c}{1-c}$, which is **line 55** of the program.

Next, we calculate some variances and covariances.

$$\operatorname{cov}\left(\gamma_{t+1},\overline{q}_{t+1}\right)=\operatorname{cov}\left(a\overline{q}_t+b\eta_t+c\gamma_t,\xi\overline{q}_t+\varepsilon_{t+1}\right)=a\xi\operatorname{var}\left(\overline{q}_t\right)+c\xi\operatorname{cov}\left(\gamma_t,\overline{q}_t\right).$$

Hence, $\operatorname{cov}\left(\gamma_t,\overline{q}_t\right)=\dfrac{a\xi}{1-c\xi}\operatorname{var}\left(\overline{q}_t\right)$, which is **line 56** of the program.

Then, $\operatorname{cov}(\gamma_{t+1}, \eta_{t+1}) = \operatorname{cov}(a\bar{q}_t + b\eta_t + c\gamma_t, \mu\eta_t + u_{t+1}) = b\mu \operatorname{var}(\eta_t) + c\mu \operatorname{cov}(\gamma_t, \eta_t)$.

Hence, $\operatorname{cov}(\gamma_t, \eta_t) = \dfrac{b\mu}{1 - c\mu} \operatorname{var}(\eta_t)$, which is **line 57** of the program.

$$
\begin{aligned}
\operatorname{var}(\gamma_{t+1}) &= \operatorname{var}(a\bar{q}_t + b\eta_t + c\gamma_t) \\
&= c^2 \operatorname{var}(\gamma_t) + a^2 \operatorname{var}(\bar{q}_t) + b^2 \operatorname{var}(\eta_t) + 2ac \operatorname{cov}(\bar{q}_t, \gamma_t) + 2bc \operatorname{cov}(\eta_t, \gamma_t) \\
&= \frac{a^2}{1-c^2} \operatorname{var}(\bar{q}_t) + \frac{b^2}{1-c^2} \operatorname{var}(\eta_t) + \frac{2ac}{1-c^2} \operatorname{cov}(\bar{q}_t, \gamma_t) + \frac{2bc}{1-c^2} \operatorname{cov}(\eta_t, \gamma_t)
\end{aligned}
$$

This is **line 58** of the program.

$$
\begin{aligned}
&\operatorname{cov}(\lambda_t, r_t) = \operatorname{cov}(q\bar{q}_t + r\eta_t + s\gamma_t, m\bar{q}_t + n\eta_t + p\gamma_t) \\
&= qm \operatorname{var}(\bar{q}_t) + rn \operatorname{var}(\eta_t) + ps \operatorname{var}(\gamma_t) + (pq + ms) \operatorname{cov}(\bar{q}_t, \gamma_t) + (pr + ns) \operatorname{cov}(\eta_t, \gamma_t)
\end{aligned}
$$

which is **line 59** of the program.

$$
\begin{aligned}
&\operatorname{cov}(\Lambda_t, r_t) = \operatorname{cov}(v\bar{q}_t + w\eta_t + x\gamma_t, m\bar{q}_t + n\eta_t + p\gamma_t) \\
&= vm \operatorname{var}(\bar{q}_t) + wn \operatorname{var}(\eta_t) + xp \operatorname{var}(\gamma_t) + (pv + mx) \operatorname{cov}(\bar{q}_t, \gamma_t) + (pw + nx) \operatorname{cov}(\eta_t, \gamma_t)
\end{aligned}
$$

which is **line 60** of the program.

$$
\begin{aligned}
&\operatorname{var}(r_t) = \operatorname{var}(m\bar{q}_t + n\eta_t + p\gamma_t) \\
&= m^2 \operatorname{var}(\bar{q}_t) + n^2 \operatorname{var}(\eta_t) + p^2 \operatorname{var}(\gamma_t) + 2mp \operatorname{cov}(\bar{q}_t, \gamma_t) + 2np \operatorname{cov}(\eta_t, \gamma_t)
\end{aligned}
$$

which is **line 61** of the program.

$$
\begin{aligned}
&\operatorname{var}(\lambda_t) = \operatorname{var}(q\bar{q}_t + r\eta_t + s\gamma_t) \\
&= q^2 \operatorname{var}(\bar{q}_t) + r^2 \operatorname{var}(\eta_t) + s^2 \operatorname{var}(\gamma_t) + 2qs \operatorname{cov}(\bar{q}_t, \gamma_t) + 2rs \operatorname{cov}(\eta_t, \gamma_t)
\end{aligned}
$$

which is **line 62** of the program.

Then the regression coefficient for regressing λ_t on r_t is given by $\dfrac{\operatorname{cov}(\lambda_t, r_t)}{\operatorname{var}(r_t)}$, which is **line 63** of the program. The regression coefficient for regressing Λ_t on r_t is given by $\dfrac{\operatorname{cov}(\Lambda_t, r_t)}{\operatorname{var}(r_t)}$ which is **line 64** of the program.

Next, we have:

$$\begin{aligned}&\operatorname{var}(\pi_t)=\operatorname{var}(g\overline{q}_t+h\eta_t+k\gamma_t)\\&=g^2\operatorname{var}(\overline{q}_t)+h^2\operatorname{var}(\eta_t)+k^2\operatorname{var}(\gamma_t)+2gk\operatorname{cov}(\overline{q}_t,\gamma_t)+2hk\operatorname{cov}(\eta_t,\gamma_t)\end{aligned}$$

which is **line 65** of the program.

$$\begin{aligned}&\operatorname{cov}(\pi_{t+1}\pi_t)=\operatorname{cov}(g\overline{q}_{t+1}+h\eta_{t+1}+k\gamma_{t+1},g\overline{q}_t+h\eta_t+k\gamma_t)\\&=\operatorname{cov}(g\xi\overline{q}_t+g\varepsilon_{t+1}+h\mu\eta_t+hu_{t+1}+ka\overline{q}_t+kb\eta_t+kc\gamma_t,g\overline{q}_t+h\eta_t+k\gamma_t)\\&=\operatorname{cov}((g\xi+ka)\overline{q}_t+(h\mu+kb)\eta_t+kc\gamma_t,g\overline{q}_t+h\eta_t+k\gamma_t)\\&=g(g\xi+ka)\operatorname{var}(\overline{q}_t)+h(h\mu+kb)\operatorname{var}(\eta_t)+k^2c\operatorname{var}(\gamma_t)\\&+(k(g\xi+ka)+gkc)\operatorname{cov}(\overline{q}_t,\gamma_t)+(h(h\mu+kb)+hkc)\operatorname{cov}(\eta_t,\gamma_t)\end{aligned}$$

which is **line 66** of the program.

The serial correlation of inflation is given by $\frac{\operatorname{cov}(\pi_{t+1}\pi_t)}{\operatorname{var}(\pi_t)}$, which is **line 67** of the program.

Then,

$$\operatorname{cov}(\gamma_{t+1},\gamma_t)=\operatorname{cov}(a\overline{q}_t+b\eta_t+c\gamma_t,\gamma_t)=c\operatorname{var}(\gamma_t)+a\operatorname{cov}(\gamma_t,\overline{q}_t)+b\operatorname{cov}(\gamma_t,\eta_t),$$

which is **line 68** of the program.

The serial correlation of the nominal interest rate is given by $\frac{\operatorname{cov}(\gamma_{t+1}\gamma_t)}{\operatorname{var}(\gamma_t)}$, which is **line 69** of the program.

$$\begin{aligned}&\operatorname{cov}(\gamma_{t+1},r_t)=\operatorname{cov}(a\overline{q}_t+b\eta_t+c\gamma_t,m\overline{q}_t+n\eta_t+p\gamma_t)\\&=am\operatorname{var}(\overline{q}_t)+bn\operatorname{var}(\eta_t)+cp\operatorname{var}(\gamma_t)+(pa+mc)\operatorname{cov}(\overline{q}_t,\gamma_t)+(pb+nc)\operatorname{cov}(\eta_t,\gamma_t)\end{aligned}$$

which is **line 70** of the program.