Online Appendix

Some Simple Analytics of the Taxation of Banks as Corporations: Effects on Loans and Systemic Risk, Deposits, and Borrowing

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The proofs follow directly from the first order conditions. Let $\phi_L$ represent the first order condition with respect to L and $\phi_D$ represent the first order condition with respect to D. Using the implicit function theorem leads to the following.

Proposition 1 Proof:

\[
\begin{align*}
\frac{\partial L}{\partial t_s} &= -\frac{\partial \phi_L / \partial t_s}{\partial \phi_L / \partial L} = -\frac{-1}{2r_r \varphi'(L) + p^r(L) L - \varphi' C / \partial L} < 0 \\
\frac{\partial D}{\partial t_s} &= -\frac{\partial \phi_L / \partial t_s}{\partial \phi_D / \partial D} = -\frac{0}{-p(L)[\varphi' C / \partial D]} = 0
\end{align*}
\]

(A1)

Proposition 2 Proof:

\[
\begin{align*}
\frac{\partial L}{\partial t_D} &= -\frac{\partial \phi_L / \partial t_D}{\partial \phi_L / \partial L} = -\frac{0}{2r_r \varphi'(L) + p^r(L) L - \varphi' C / \partial L^2} = 0 \\
\frac{\partial D}{\partial t_D} &= -\frac{\partial \phi_D / \partial t_D}{\partial \phi_D / \partial D} = -\frac{-1}{-\varphi' C / \partial D^2} < 0
\end{align*}
\]

(A2)

Proposition 3 Proof:

\[
\begin{align*}
\frac{\partial L}{\partial t_s} &= -\frac{\partial \phi_L / \partial t_s}{\partial \phi_L / \partial L} = -\frac{-1 - k}{2r_r \varphi'(L) + p^r(L) L - \varphi' C / \partial L} < 0 \\
\frac{\partial D}{\partial t_s} &= -\frac{\partial \phi_L / \partial t_s}{\partial \phi_D / \partial D} = -\frac{-\alpha(1 - k)}{-\varphi' C / \partial D} < 0
\end{align*}
\]

(A3)
Proposition 4 Proof:

\[
\frac{\partial L}{\partial t_e} = -\frac{\partial \phi_e}{\partial t_e} - \frac{-k}{2 r_L p'(L) + p''(L) r_L L - \partial^3 C / \partial L^2} < 0
\]
\[
\frac{\partial D}{\partial t_e} = -\frac{\partial \phi_d}{\partial t_e} - \frac{-\alpha k}{\partial^3 C / \partial D^2} < 0
\]

(A4)

Proposition 5 Proof:

\[
\frac{\partial L}{\partial t_\pi} = -\frac{\partial \phi_e}{\partial t_\pi} = -\frac{-\left[p(L) r_L + r_L L p'(L) - (1-k) r - C_L\right]}{(1-t_\pi)\left[2 r_L p'(L) + p''(L) r_L L - \partial^3 C / \partial L^2\right]} < 0
\]
\[
\frac{\partial D}{\partial t_\pi} = -\frac{\partial \phi_d}{\partial t_\pi} = -\frac{-[r_D + r(1-\alpha + \alpha k) - C_D]}{-(1-t_\pi)\partial^3 C / \partial D^2} < 0
\]

(A5)