Appendix

A Simplified Smets and Wouters (2003) Model Skelton

A.1 Model Description (Log-linearized version)

A.1.1 Consumer/Investor's Equilibrium Conditions

1. Consumption Euler equation:

$$\hat{c}_t = \frac{\theta}{1+\theta}\hat{c}_{t-1} + \frac{1}{1+\theta}E_t\hat{c}_{t+1} - \frac{1-\theta}{(1+\theta)\sigma_c}(\hat{R}_t - E_t\hat{\pi}_{t+1}) + \frac{1-\theta}{(1+\theta)\sigma_c}(1-\rho^c)u_t^c \tag{2.29}$$

   where we set $E_t u_{t+1}^c = \rho^c u_t^c$.

2. Investment Euler equation:

$$\widehat{inv}_t = \frac{1}{1+\beta}\widehat{inv}_{t-1} + \frac{\beta}{1+\beta}E_t\widehat{inv}_{t+1} + \frac{\varphi}{1+\beta}\hat{q}_t + \frac{\beta}{1+\beta}(1-\rho^{inv})u_t^{inv} \tag{2.30}$$

   where we set $E_t u_{t+1}^{inv} = \rho^{inv} u_t^{inv}$.

3. Asset pricing Euler equation:

$$\hat{q}_t = -(\hat{R}_t - E_t\hat{\pi}_{t+1}) + \frac{1-\tau}{1-\tau+\bar{r}^k}E_t\hat{q}_{t+1} + \frac{\bar{r}^k}{1-\tau+\bar{r}^k}E_t\hat{r}_{t+1}^k + \varepsilon_t^q \tag{2.31}$$

4. Wage setting equation.:

$$\begin{aligned}\hat{w}_t = {} & \frac{\beta}{1+\beta}E_t\hat{w}_{t+1} + \frac{1}{1+\beta}\hat{w}_{t-1} + \frac{\beta}{1+\beta}E_t\hat{\pi}_{t+1} - \frac{1+\beta\gamma_w}{1+\beta}\hat{\pi}_t + \frac{\gamma_w}{1+\beta}\hat{\pi}_{t-1} \\ & - \frac{1}{1+\beta}\Psi_w\left[\hat{w}_t - \sigma_L\hat{L}_t - \frac{\sigma_c}{1-\theta}(\hat{c}_t - \theta\hat{c}_{t-1}) - u_t^L - \varepsilon_t^w\right]\end{aligned} \tag{2.32}$$

   where $\Psi_w = \frac{(1-\beta\xi_w)(1-\xi_w)}{\left(1+\frac{(1+\lambda_w)\sigma_L}{\lambda_w}\right)\xi_w}$

A.1.2 Firm's Equilibrium Conditions

1. Production function:

$$\hat{y}_t = \phi u_t^a + \phi\alpha\hat{k}_{t-1} + \phi\alpha\psi\hat{r}_t^k + \phi(1-\alpha)\hat{L}_t \tag{2.35}$$

2. Labor demand:

$$\hat{L}_t = -\hat{w}_t + (1+\psi)\hat{r}_t^k + \hat{k}_{t-1} \tag{2.34}$$

3. Price setting equation.:

$$\hat{\pi}_t = \frac{\beta}{1+\beta\gamma_p}E_t\hat{\pi}_{t+1} + \frac{\gamma_p}{1+\beta\gamma_p}\hat{\pi}_{t-1} + \frac{1}{1+\beta\gamma_p}\Psi_p\left[\alpha\hat{r}_t^k + (1-\alpha)\hat{w}_t - u_t^a + \varepsilon_t^p\right] \tag{2.36}$$

   where $\Psi_p = \frac{(1-\beta\xi_p)(1-\xi_p)}{\xi_p}$

A.1.3 Miscellaneous Equilibrium Conditions

1. Resource constraint:

$$\hat{y}_t = (1 - \tau k_y - g_y)\hat{c}_t + \tau k_y \widehat{inv}_t + \bar{r}^k \psi k_y r_t^k + g_y u_t^g \tag{2.38}$$

2. Capital accumulation equation:

$$\hat{k}_t = (1 - \tau)\hat{k}_{t-1} + \tau \widehat{inv}_{t-1} \tag{2.33}$$

3. Monetary policy rule:

$$\hat{R}_t = \rho_m \hat{R}_{t-1} + (1 - \rho_m)\left[\mu_\pi \hat{\pi}_{t-1} + \mu_y \hat{y}_t\right] + \varepsilon_t^m \tag{2.39}$$

Persistent Shocks

1. : preference shock: $u_t^c = \rho^c u_{t-1}^c + \varepsilon_t^c$
2. : investment shock: $u_t^{inv} = \rho^{inv} u_{t-1}^{inv} + \varepsilon_t^{inv}$
3. : labor shock: $u_t^L = \rho^L u_{t-1}^L + \varepsilon_t^L$
4. : productivity shock: $u_t^a = \rho^z u_{t-1}^a + \varepsilon_t^a$
5. : government spending shock: $u_t^g = \rho^g u_{t-1}^g + \varepsilon_t^g$

Forecast Errors

1. Inflation forecast error: $\hat{\pi}_t = E_{t-1}\hat{\pi}_t + \eta_t^\pi$
2. Wage forecast error: $\hat{w}_t = E_{t-1}\hat{w}_t + \eta_t^w$
3. Q forecast error: $\hat{q}_t = E_{t-1}\hat{q}_t + \eta_t^q$
4. Investment forecast error: $\widehat{inv}_t = E_{t-1}\widehat{inv}_t + \eta_t^{inv}$
5. Consumption forecast error: $\hat{c}_t = E_{t-1}\hat{c}_t + \eta_t^c$
6. Capital cost forecast error: $\hat{r}_t^k = E_{t-1}\hat{r}_t^k + \eta_t^{rk}$

A.1.4 Endogenous Variables

y_t : output
π_t : inflation rate
w_t : nominal wage
k_t : capital stock
q_t : shadow price of capital stock

inv_t : physical investment
c_t : consumption
R_t : nominal interest rate
r_t^k : rental rate on capital (cost of capital)
L_t : labor input
$u_t^c, u_t^{inv}, u_t^L, u_t^a, u_t^g$: persistent shocks to consumption, investment, labor, productivity, and government spending, respectively.

A.1.5 Exogenous Shock Variables, (i.i.d. Normal distribution)

ε_t^c : preference shock
ε_t^{inv} : investment shock
ε_t^q : equity premium shock
ε_t^L : labor shock
ε_t^w : wage mark-up shock
ε_t^a : productivity shock
ε_t^p : price mark-up shock
ε_t^g : government spending shock
ε_t^m : monetary policy shock

A.1.6 Forecast Errors

η_t^π : forecast error of inflation
η_t^w : forecast error of real wage
η_t^q : forecast error of equity premium
η_t^{inv} : forecast error of investment
η_t^c : forecast error of consumption
η_t^{rk} : forecast error of rental rate

A.2 Preliminary Settings

A.2.1 Estimated Parameters

θ: habit formation, σ_c: inverse long-run IES, σ_L: inverse labor supply elasticity, φ: inverse adj.cost, ϕ: fixed cost share, ψ: capital utilization cost, γ_p: price indexation, γ_w: wage indexation, ξ_p: Calvo price no-revise prob., ξ_w: Calvo wage no-revise prob., ρ_m: lagged interest rate, μ_π: reaction on inflation, μ_y: reaction on output, ρ_c: persitence, preference , ρ_{inv}: persistence, investment, ρ_L: persistence, labor supply, ρ_a: persistence, productivity, ρ_g: persistence, government spending, ε_c: S.D., preference shock, ε_{inv}: S.D., investment shock, ε_q: S.D., equity premium shock, ε_L: S.D, labor supply shock, ε_w: S.D., wage markup shock,

ε_z: S.D., productivity shock, ε_p: S.D., price markup shock, ε_g: S.D., gov. spending shock, ε_m: S.D., monetary policy shock.

A.2.2 Values of Calibrated Parameters

discount factor: $\beta = 0.99$,
depriciation rate of capital: $\tau = 0.025$,
share of capital: $\alpha = 0.3$,
capital-output ratio: $k_y = 2.2$,
government spending-output ratio: $g_y = 0.2$,
wage markup: $\lambda_w = 0.05$,
steady-state rental rate: $\bar{r}^k = \frac{1}{\beta} - 1 + \tau$, (Smets and Wouters 2003, p1135)

A.3 Canonical LRE Form

$$\Gamma_0 \begin{bmatrix} y_t \\ \pi_t \\ w_t \\ k_t \\ q_t \\ inv_t \\ c_t \\ R_t \\ r_t^k \\ L_t \\ E_t\pi_{t+1} \\ E_t w_{t+1} \\ E_t q_{t+1} \\ E_t inv_{t+1} \\ E_t c_{t+1} \\ E_t r_{t+1}^k \\ u_t^c \\ u_t^{inv} \\ u_t^L \\ u_t^a \\ u_t^g \end{bmatrix} = \Gamma_1 \begin{bmatrix} y_{t-1} \\ \pi_{t-1} \\ w_{t-1} \\ k_{t-1} \\ q_{t-1} \\ inv_{t-1} \\ c_{t-1} \\ R_{t-1} \\ r_{t-1}^k \\ L_{t-1} \\ E_{t-1}\pi_t \\ E_{t-1} w_t \\ E_{t-1} q_t \\ E_{t-1} inv_t \\ E_{t-1} c_t \\ E_{t-1} r_t^k \\ u_{t-1}^c \\ u_{t-1}^{inv} \\ u_{t-1}^L \\ u_{t-1}^a \\ u_{t-1}^g \end{bmatrix} + \Psi \begin{bmatrix} \varepsilon_t^c \\ \varepsilon_t^{inv} \\ \varepsilon_t^q \\ \varepsilon_t^L \\ \varepsilon_t^w \\ \varepsilon_t^a \\ \varepsilon_t^p \\ \varepsilon_t^g \\ \varepsilon_t^m \end{bmatrix} + \Pi \begin{bmatrix} \eta_t^\pi \\ \eta_t^w \\ \eta_t^q \\ \eta_t^{inv} \\ \eta_t^c \\ \eta_t^{rk} \end{bmatrix}$$

where coefficient matrices Γ_0, Γ_1, Ψ, and Π are set as follows.

$$
\Gamma_0 = \begin{array}{l}
\begin{array}{cccccccc}
y_t & \pi_t & w_t & k_t & q_t & inv_t & c_t & R_t
\end{array} \\
\left[\begin{array}{cccccccc}
0 & 0 & 0 & 0 & 0 & 0 & 1 & \frac{1-\theta}{(1+\theta)\sigma_c} \\
0 & 0 & 0 & 0 & -\frac{\varphi}{1+\beta} & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 \\
0 & \frac{1+\beta\gamma_w}{1+\beta} & 1+\frac{\Psi_w}{1+\beta} & 0 & 0 & 0 & -\frac{\sigma_c\Psi_w}{(1+\beta)(1-\theta)} & 0 \\
1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & -\frac{\Psi_p(1-\alpha)}{1+\beta\gamma_p} & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & 0 & 0 & 0 & -\tau k_y & -(1-\tau k_y-\tau g_y) & 0 \\
0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\
-(1-\rho_m)\mu_y & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\
0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0
\end{array}\right.
\end{array}
$$

$$
\begin{array}{ccccccccccccc}
r_t^k & L_t & E_t\pi_{t+1} & E_t w_{t+1} & E_t q_{t+1} & E_t inv_{t+1} & E_t c_{t+1} & E_t r_{t+1}^k & u_t^c & u_t^{inv} & u_t^L & u_t^a & u_t^g
\end{array}
$$

$$
\left.
\begin{array}{ccccccccccccc}
0 & 0 & -\frac{1-\theta}{(1+\theta)\sigma_c} & 0 & 0 & 0 & -\frac{1}{1+\theta} & 0 & -\frac{(1-\theta)(1-\rho^c)}{(1+\theta)\sigma_c} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & -\frac{\beta}{1+\beta} & 0 & 0 & 0 & -\frac{\beta(1-\rho^{inv})}{1+\beta} & 0 & 0 & 0 \\
0 & 0 & -1 & 0 & -\frac{1-\tau}{1-\tau+Rk^*} & 0 & 0 & -\frac{Rk^*}{1-\tau+Rk^*} & 0 & 0 & 0 & 0 & 0 \\
0 & -\frac{\sigma_L\Psi_w}{1+\beta} & -\frac{\beta}{1+\beta} & -\frac{\beta}{1+\beta} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\Psi_w}{1+\beta} & 0 & 0 \\
-\phi\alpha\psi & -\phi(1-\alpha) & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\phi & 0 \\
-(1+\psi) & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
-\frac{\Psi_p\alpha}{1+\beta\gamma_p} & 0 & -\frac{\beta}{1+\beta\gamma_p} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\Psi_p}{1+\beta\gamma_p} & 0 \\
-Rk^*\psi k_y & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -g_y \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1
\end{array}
\right]
$$

$$
\Gamma_1 = \begin{array}{c}
\begin{array}{cccccccc} y_{t-1} & \pi_{t-1} & w_{t-1} & k_{t-1} & q_{t-1} & inv_{t-1} & c_{t-1} & R_{t-1} \end{array} \\
\begin{bmatrix}
0 & 0 & 0 & 0 & 0 & 0 & \frac{\theta}{1+\theta} & 0 \\
0 & 0 & 0 & 0 & 0 & \frac{1}{1+\beta} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \frac{\gamma_w}{1+\beta} & \frac{1}{1+\beta} & 0 & 0 & 0 & -\frac{\sigma_c \Psi_w \theta}{(1+\beta)(1-\theta)} & 0 \\
0 & 0 & 0 & \phi\alpha & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\
0 & \frac{\gamma_p}{1+\beta\gamma_p} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 1-\tau & 0 & \tau & 0 & 0 \\
0 & (1-\rho_m)\mu_\pi & 0 & 0 & 0 & 0 & 0 & \rho_m \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0
\end{bmatrix}
\end{array}
$$

$$
\begin{array}{c}
\begin{array}{ccccccccccccc}
r^k_{t-1} & L_{t-1} & E_{t-1}\pi_t & E_{t-1}w_t & E_{t-1}q_t & E_{t-1}inv_t & E_{t-1}c_t & E_{t-1}r^k_t & u^c_{t-1} & u^{inv}_{t-1} & u^L_{t-1} & u^a_{t-1} & u^g_{t-1}
\end{array} \\
\left.\begin{array}{ccccccccccccc}
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \rho^c & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \rho^{inv} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \rho^L & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \rho^z & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \rho^g
\end{array}\right]
\end{array}
$$

$$
\Psi = \begin{array}{c}
\begin{array}{ccccccccc} \varepsilon_t^c & \varepsilon_t^{inv} & \varepsilon_t^q & \varepsilon_t^L & \varepsilon_t^w & \varepsilon_t^a & \varepsilon_t^p & \varepsilon_t^g & \varepsilon_t^m \end{array} \\
\begin{bmatrix}
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \frac{\Psi_w}{1+\beta} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \frac{\Psi_p}{1+\beta\gamma_p} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0
\end{bmatrix}
\end{array}, \qquad
\Pi = \begin{array}{c}
\begin{array}{cccccc} \eta_t^\pi & \eta_t^w & \eta_t^q & \eta_t^{inv} & \eta_t^c & \eta_t^{Rk} \end{array} \\
\begin{bmatrix}
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0
\end{bmatrix}
\end{array}
$$