B Technical Appendix

B.1 *The Negotiation Surplus*

The insider's bargaining surplus is

$$\begin{aligned} V^I_{\alpha,t} - V'^I_{\alpha,t} &= w_{\alpha,t}(1-\tau) + \delta\left(\left(1-\phi_{\alpha,t+1}\right)V^I_{\alpha,t+1} + \phi_{\alpha,t+1}V^S_{\alpha,t+1}\right) \\ &\quad -b_{\alpha,t} - \delta\left(\left(1-\phi_{\alpha,t+1}\right)V^I_{\alpha,t+1} + \phi_{\alpha,t+1}V^S_{\alpha,t+1}\right) \\ &= w_{\alpha,t}(1-\tau) - b_{\alpha,t}, \end{aligned} \tag{22}$$

and the firm's surplus is

$$\begin{aligned} \Pi^I_{\alpha,t} - \Pi'^I_{\alpha,t} &= \left(a^I_\alpha - \varepsilon^{MI}_\alpha - w_{\alpha,t} + \sigma_{\alpha,t}\right) + \delta\left(\left(1-\phi_{\alpha,t+1}\right)\Pi^I_{\alpha,t+1} - \phi_{\alpha,t+1}f_{\alpha,t+1}\right) - \\ &\quad \left(-f_{\alpha,t} + \delta\left(\left(1-\phi_{\alpha,t+1}\right)\Pi^I_{\alpha,t+1} - \phi_{\alpha,t+1}f_{\alpha,t+1}\right)\right) \\ &= a^I_\alpha - \varepsilon^{MI}_\alpha - w_{\alpha,t} + \sigma_\alpha + f_{\alpha,t}. \end{aligned} \tag{23}$$

For the wage bargain, the following relationship holds:

$$(1-\gamma)\left(w_{\alpha,t}\left(1-\tau\right) - b_{\alpha,t}\right) = \gamma\left(a^I_\alpha - \varepsilon^{MI}_\alpha - w_{\alpha,t} + \sigma_\alpha + f_{\alpha,t}\right)(1-\tau). \tag{24}$$

B.2 *The Labour Market System*

The labour market system for each ability group a in period t may be described as follows:

$$S_{\alpha,t} = T_{\alpha,t}S_{\alpha,t-1}, \tag{25}$$

where S_t is a vector of the labour market states:

$$S_{\alpha,t} = \left(N^I_{\alpha,t}, N^{E1}_{\alpha,t}, N^{E2}_{\alpha,t}, U^S_{\alpha,t}, U^L_{\alpha,t}\right)', \tag{26}$$

and $T_{\alpha,t}$ is a Markov matrix of transition probabilities:

$$T_{\alpha,t} = \begin{matrix} (1-\phi_{\alpha,t}) & (1-\phi_{\alpha,t}) & (1-\phi_{\alpha,t}) & 0 & 0 \\ 0 & 0 & 0 & \eta^S_{\alpha,t} & 0 \\ 0 & 0 & 0 & 0 & \eta^L_{\alpha,t} \\ \phi_{\alpha,t} & \phi_{\alpha,t} & \phi_{\alpha,t} & 0 & 0 \\ 0 & 0 & 0 & (1-\eta^S_{\alpha,t}) & (1-\eta^L_{\alpha,t}) \end{matrix} \tag{27}$$

B.3 Labour Costs and Wages

The different abilities' labour costs and wages are calculated as follows: The aggregate producer wage and gross value added per worker can be obtained from Statistische Ämter des Bundes und der Länder (2006). The aggregate producer wage is defined as the average real gross wage per employee plus social security payments. We took the 2003 values for gross value added[56] (50334 Euros) and real labour costs (32672 Euros) since the OECD numbers which we used for further calculations were only available until this point in time.

Using the wage equation (8), we calculated the average bargaining power in the economy, where the variables denote aggregate values:

$$w = (1-\gamma)\beta w + \gamma\left(\left(a - \varepsilon^{MI}\right) + \rho w\right). \tag{28}$$

[56] We interpret this a the productivity of the median insider $(a^I - \varepsilon)$.

$$\gamma = \frac{w - \beta w}{(a - \varepsilon^{MI}) + \rho w - w\beta}. \tag{29}$$

We obtain $\gamma = 0.2134$.

Ability group specific relative labour costs for Germany are calculated as follows (OECD (2005c)): High-ability workers earn 148% of their medium-ability counter-parts' wage and low-ability 87%, respectively. Low-ability workers' highest education level is lower secondary education, whereas it is upper secondary education or post-secondary non-tertiary education for medium-ability and tertiary education for high-ability. Assuming that the bargaining power is the same in all ability groups and using the respective replacement rates[57] we get for each ability group α

$$\left(a^I_\alpha - \varepsilon^{MI}\right) = \frac{w_\alpha - (1-\gamma_\alpha)\,\beta_\alpha w_\alpha - \gamma_\alpha \rho w_\alpha}{\gamma_\alpha}. \tag{30}$$

	low-skilled	medium-skilled	high-skilled	aggregate
m_α	16.6	59.4	24	100
w_α	25948	29940	44100	32672
$(a^I_\alpha - \varepsilon^{MI})$	31179	47012	75069	51109

Table 4: Relevant Labor Cost Values

Table 4 summarises the relevant values.[58] Starting from this steady state we will perform policy exercises and compare the resulting new steady states.[59]

B.4 *Linearisation*

B.4.1 *Firing Rate*

Non-linear equation:

$$\phi_{\alpha,t} = 1 - \Gamma_\alpha \left(\frac{a^I_\alpha - w_{\alpha,t} + \sigma_{\alpha,t} - \phi_{\alpha,t} f_{\alpha,t}\delta}{1 - \delta\left(1 - \phi_{\alpha,t}\right)} + f_{\alpha,t} \right), \tag{31}$$

where σ_α ist a wage subsidy for ability class α. Linearisation:

$$\begin{aligned} \phi_{\alpha,new} &= \phi_{\alpha,0} - {}_\phi\Gamma'_{\alpha,0} \left[\frac{1}{1 - \delta(1-\phi_\alpha)} \right]_0 \frac{1}{1+V_\alpha} \left[\begin{array}{c} \left(a^I_{\alpha,new} - w_{\alpha,new} + \sigma_\alpha\right) \\ - \left(a^I_{\alpha,0} - w_{\alpha,0}\right) \end{array} \right] \\ & \quad - {}_\phi\Gamma'_{\alpha,0} \left[\frac{-\phi_\alpha \delta}{(1-\delta(1-\phi_\alpha))} + 1 \right]_0 \frac{1}{1+V_\alpha} \left(f_{\alpha,new} - f_{\alpha,0}\right), \end{aligned} \tag{32}$$

with

$$V_\alpha = {}_\phi\Gamma'_{\alpha,0} \left[\frac{\delta\left(f_\alpha(\delta-1) - \left(a^I_\alpha - w_\alpha\right)\right)}{(1-\delta(1-\phi_\alpha))^2} \right]_0,$$

where variables with subscript "0" are at the old steady and variables with subscript "*new*" are at the new steady state.[60]

[57] Furthermore, we assumed that the firing costs are 60% of the labor costs, see Chen and Funke (2003).

[58] Due to the aggregation the value for the aggregate labor cost is not equal to the original value for real labor costs (50334), which we used to compile the bargaining strength and the ability group specific relative labor cost.

[59] See Appendix B.4.

[60] In the calibration, we assume for simplicity that $\frac{\delta E(\varepsilon|(1-\phi))}{\delta \phi} = 0$.

B.4.2 *Hiring Rates*

Non-linear equation:

$$\eta^S_{\alpha,t} = \Gamma_\alpha \left(a^{E1}_\alpha - w_{\alpha,t} + \sigma^S_{\alpha,t} + \sigma_{\alpha,t} + \frac{\delta\left(1-\phi_{\alpha,t}\right)\left(a^I_\alpha - w_{\alpha,t} + \sigma_{\alpha,t}\right) - \phi_{\alpha,t} f_{\alpha,t}\delta}{1-\delta\left(1-\phi_{\alpha,t}\right)} - h_{\alpha,t} \right), \quad (33)$$

where σ^S_α is the hiring voucher for short-term unemployed workers of ability class α.

Linearisation:

$$\begin{aligned} \eta^S_{\alpha,new} \quad = \quad & \eta^S_{\alpha,0} +_\eta \Gamma'_{\alpha,0}\left[\left(a^{E1}_{\alpha,new} - w_{\alpha,new} + \sigma^S_\alpha + \sigma_\alpha\right) - \left(a^{E1}_\alpha - w_{\alpha,0}\right)\right] \\ & +_\eta \Gamma'_{\alpha,0}\left[\frac{\delta\left(1-\phi_\alpha\right)}{1-\delta\left(1-\phi_\alpha\right)}\right]_0 \left[\left(a^I_{\alpha,new} - w_{\alpha,new} + \sigma_\alpha\right) - \left(a^I_{\alpha,0} - w_{\alpha,0}\right)\right] \\ & -_\eta \Gamma'_{\alpha,0}\left[\frac{\phi_2\delta}{1-\delta\left(1-\phi_2\right)}\right]_0 \left(f_{\alpha,new} - f_{\alpha,0}\right) -_\eta \Gamma'_{\alpha,0}\left(h_{\alpha,new} - h_{\alpha,0}\right) \\ & +_\eta \Gamma'_{\alpha,0}\left[\frac{-\delta\left(\left(a^I_\alpha - w_\alpha\right) + f_\alpha\left(1-\delta\right)\right)}{\left[1-\delta\left(1-\phi_\alpha\right)\right]^2}\right]_0 \left(\phi_{\alpha,new} - \phi_{\alpha,0}\right). \end{aligned} \quad (34)$$

And equivalently for the second unemployment duration group.Ability Group Specific Numbers.

B.5 *The welfare of the workforce*

The welfare (Ω) of the workforce is calculated as the sum of the utility of the workers over the various labour market states.

$$\Omega_t = \sum_\alpha w_{\alpha,t}(1-\tau) m_\alpha n_{\alpha,t} + \sum_\alpha \sum_{d_u} b_{\alpha,t} u^{d_u}_{\alpha,t} m_\alpha. \quad (35)$$