Appendix A

Some Results for the Alternative Technology

The purpose of this appendix is to show that the two technologies discussed in section 5.2 lead to similar results. The first technology is represented by Equations (5.1) and (5.2), and the second technology is represented by Equations (5.3) and (5.4). The measurement of excess capital and excess labor for both technologies is described in section 5.2. Both technologies lead to estimates of the capital stock (K_t^a), of the minimum amount of capital needed to produce the output of the period ($KMIN_t$), of the physical depreciation of the capital stock during the period (denoted here as $DEPK_t$), and of the number of worker hours required to produce the output of the period ($M_t H_t^M$).

$DEPK_t$ for the first technology is simply $\delta_K K_{t-1}^a$. $DEPK_t$ for the second technology can be obtained as $INV_t - (K_t^a - K_{t-1}^a)$, where INV_t is gross investment for period t and $K_t^a - K_{t-1}^a$ is net investment. As discussed in section 5.2, K_t^a is obtained for this technology by summing past values of gross investment back to the age of the oldest machine in existence (m_t in section 5.2). Two sets of estimates of $M_t H_t^M$ were obtained for the second technology, one for values of $\bar{\mu}\bar{H}/\bar{\lambda}$ and δ_λ of 118894.4 and 0.005204, respectively, and one for values of $\bar{\mu}\bar{H}/\bar{\lambda}$ and δ_λ of 121927.8 and 0.005602, respectively.

The results of estimating the investment equation for the two technologies are presented in Table A-1. The estimates for the first technology are the same as the ones presented in Table 2–3. The estimates are TSLS estimates for the 1954I–1974II period. The equations for the two technologies differ only in the values used for K_{t-1}^a, $KMIN_{t-1}$, and $DEPK_t$. As can be seen in the table, the results for the two technologies are close, with the results for the first technology being slightly better.

The results of estimating the employment and hours equations for the two technolgies are presented in Tables A–2 and A–3. The estimates

Table A–1. Estimates of the Investment Equation for the Two Technologies
(The top set of estimates is for the alternative technology)

								DW	R^2
	−0.000469		+0.0236						
	(0.39)		(0.69)					1.86	0.567
$INV_t - INV_{t-1} =$	−0.00256(K^a_{t-1}	− $KMIN_{t-1}$)	− 0.0272(Y_t	− Y_{t-1})				1.89	0.579
	(0.80)		(0.78)						
	+0.0797		+0.0257		+0.0566				
	(3.21)		(1.18)		(2.68)				
	+0.0782(Y_{t-1}	− Y_{t-2})	− 0.0241(Y_{t-2}	− Y_{t-3})	+ 0.0558(Y_{t-3}	− Y_{t-4})			
	(3.11)		(1.09)		(2.52)				
	−0.0115		−1.07		+0.498				
	(1.01)		(3.87)		(1.68)				
	−0.0155(INV_{t-1}	− $DEPK_t$)	− 1.04$D704_t$		+ 0.509$D711_t$				
	(0.82)		(3.74)		(1.75)				

Table A–3. Estimates of the Hours Equation for the Two Technologies
(The top set of estimates is for the alternative technology)

								$\hat{\rho}$	DW	R^2
	1.90	−0.345						−0.195	1.93	0.374
	(4.35)	(4.26)						(1.80)		
log HPF_t − log HPF_{t-1} =	1.42	− 0.269 log HPF_{t-1}						−0.221	1.96	0.345
	(4.15)	(4.15)						(2.06)		
	−0.0427									
	(2.97)									
	−0.0438(log $JOBF_{t-1}$	− log $M_{t-1}H^M_{t-1}$)								
	(2.70)									
	−0.000377	+ 0.138								
	(4.26)	(4.28)								
	−0.000253t	− 0.162(log Y_t	− log Y_{t-1})							
	(4.20)	(5.22)								

for the first technology are also the same as the ones presented in Table 2–3, and both sets of estimates are TSLS estimates for the 1954I–1974II period. The equations for the two technologies differ only in the values used for $M_{t-1}H^M_{t-1}$. The values used for $M_{t-1}H^M_{t-1}$ for the second technology are the ones based on values of $\bar{\mu}\bar{H}/\bar{\lambda}$ and δ_λ of 118894.4 and 0.005204.

Table A–2. Estimates of the Employment Equation for the Two Technologies (The top set of estimates is for the alternative technology)

	$\hat{\rho}$	DW	R^2
$\log JOBF_t - \log JOBF_{t-1} =$ -0.181 -0.0292 (1.40) (1.38)	0.340 (3.28)	1.95	0.715
-0.489 $-0.0780(\log JOBF_{t-1} - \log M_{t-1}H_{t-1}^M)$ (2.86) (2.85)	0.307 (2.92)	1.96	0.737
$+0.0000293$ $+0.211$ (1.07) (3.53)			
$+0.0000971t$ $+0.215(\log Y_t - \log Y_{t-1})$ (2.97) (3.67)			
$+0.195$ (4.27)			
$+0.172(\log Y_{t-1} - \log Y_{t-2})$ (3.84)			
$+0.0810$ -0.0109 (1.88) (2.94)			
$+0.0725(\log Y_{t-2} - \log Y_{t-3})$ $-0.00945\ D593_t$ (1.79) (2.22)			
$+0.00142$ (0.34)			
$+0.00196\ D594_t$ (0.49)			

The results for the two technologies are again close, with the results for the first technology being slightly better for the employment equation in Table A–2 and slightly worse for the hours equation in Table A–3. When the alternative values of $\bar{\mu}\bar{H}/\bar{\lambda}$ and δ_λ were used for the second technology, the results were little changed. The estimate for the coefficient of the excess labor variable was −0.0298 in the employment equation (versus −0.0292 in Table A–2) and −0.0431 in the hours equation (versus −0.0427 in Table A–3.)

It appears to be fairly clear from the results in Tables A–1, A–2, and A–3 that the properties of the model would be little changed regardless of which technology was used. The first technology is computationally easier to work with, since it does not require keeping track of as many past values of investment, and this is the primary reason for its use in this study.