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decrease the size of the patronage pool, leading to an increase in the price of patronage. Of course, Congress was not monolithic, and the benefits of improving productivity relative to the negative effects of a price increase for patronage will vary across members. For example, in districts where the productivity of the federal labor force, Q is relatively more important to voters, it is more likely that the first term in equation (A21) will dominate the second. The evidence presented in the text indicates that the share of federal output tended to be the highest in the areas where commercial activity was greatest. The quality of federal services, such as postal and customs, was particularly important to voters in those districts. Thus, the importance of Q in the informed-voters probability function would likely increase with increases in the share of federal output in the congressional district.

The above model was also employed in chapter 3 to show why, once having adopted a merit system, the proportion of merit system employees to total employment would expand with increases in total federal employment, why the president would take the lead in expanding merit system coverage, and why there would be continuing conflict between the president and the Congress over patronage issues.

Appendix B
Appendix to Chapter 3

In the text, it is argued that, once having adopted a merit system, the proportion of merit system employees to total employment would expand with increases in total federal employment. In particular, it is argued that the president would be in the vanguard to expand coverage. To show why, recall that, in passing the Pendleton Act, Congress gave the president the authority to expand coverage of the merit system. In effect, the president was given the power to control r, the ratio of merit system workers to total federal civilian employment. Using the same assumptions and notation as in appendix A, recall that the president's objective function is

$$\hat{V} = \sum n\hat{F}(Q, \hat{I}) + \sum (N - n)\, \hat{H}(\hat{\alpha}\hat{W}, \hat{C}). \tag{B1}$$

Given the power to control r, the president maximizes support by choosing $\hat{e}$, $\hat{W}$, and r. The first-order conditions are

$$\hat{V}_{\hat{e}} = \hat{H}_{\hat{W}}\hat{\alpha}_{\hat{m}} - \hat{H}_C = 0, \tag{B2}$$

$$\hat{V}_{\hat{W}} = \hat{F}_{\hat{I}}(-\mathrm{MR}) + \hat{H}_{\hat{W}}(\hat{\alpha} - \hat{m}\hat{\alpha}_{\hat{m}}) = 0, \tag{B3}$$

$$\hat{V}_r = \hat{F}_Q Q_r + \hat{F}_{\hat{I}}(-L\mathrm{MR}) = 0. \tag{B4}$$

Equations (B2) and (B3) are the same as before. But now equation (B4) indicates that the ability to control r gives the president the option of placing federal workers off limits to partisan use, and that can benefit the president in two distinct ways. First, increases in r raise productivity. Second, the ability to reduce the number of patronage positions means that the president can effectively control $\bar{W}$ ($\bar{W} = [1 - r]L - \hat{W}$) at a lower cost, and that means that he will always operate in the elastic proportion of the demand function (i.e., MR > 0).

Now consider the effect of a change in L on r. Once the Pendleton Act was passed, the president was in a position to control r. Evaluating the president's objective function at $\hat{e}^*$, $\hat{W}^*$, and r^*, we know from the envelope theorem that the following condition must hold:

(B5) $$\hat{V}_{\hat{W}L}\frac{\partial \hat{W}^*}{\partial L} + \hat{V}_{rL}\frac{\partial r^*}{\partial L} > 0.$$

From the first-order conditions, equations (B2) and (B4), we obtain

(B6) $$\hat{V}_{\hat{W}L} = F_I[-(1 - r)\mathrm{MR}_{\bar{W}}] + F_{II}[-(1 - r)\mathrm{MR}^2] > 0,$$

(B7) $$\hat{V}_{rL} = \hat{F}_Q Q_{rL} + \hat{F}_{QQ}Q_r Q_L + \hat{F}_{II}[-(1 - r)L\mathrm{MR}^2] - \hat{F}_I[\mathrm{MR} + (1 - r)L\mathrm{MR}_{\bar{W}}].$$

Given the underlying assumptions, the expression in equation (B6) is unambiguously positive. In equation (B7), the first three terms are positive, while the sign of the fourth term depends on the magnitude of MR. If productivity, Q, was not affected by changes in r or was not important in influencing votes, $\hat{F}_Q = 0$, then the first-order conditions indicate that the president would choose $\hat{W}$ so that MR would be equal to zero. In that case, the fourth term in equation (B7) would also be positive, and the sign of $\partial r^*/\partial L$ would be unambiguously positive. When productivity of the federal workforce is important and affected by the level of r, as we have argued that it is, MR will be positive. But, here again, the expression in equation (B7) is positive. Using equation (B4) to rewrite (B7) yields

(B8) $$\hat{V}_{rL} = \hat{F}_{QQ}Q_r Q_L + \hat{F}_{II}[-(1 - r)\mathrm{MR}^2] - \hat{F}_I(1 - r)L\,\mathrm{MR}_{\bar{W}} + \hat{F}_Q\left(Q_{rL} - \frac{Q_r}{L}\right).$$

The first three terms in equation (B8) are all positive. The sign of the fourth term depends on the underlying functional form of Q. However, we have argued that $Q_L < 0$ and that $Q_{rL} > 0$. The rationale is that loss of control over the labor force increases with organizational size and, thus, that converting to a merit system will have a greater effect on productivity the larger is the size of the federal labor force. Given these functional relations, it follows that $\partial Q_{rL}/\partial L > 0$, indicating that the average function, Q_r/L, lies below the marginal, Q_{rL}. Accordingly, $\hat{V}_{rL}$ is positive, implying that an increase in the federal labor force will induce the president to expand coverage of the merit system such that r will be a positive function of L. This implication was examined in chapter 3.