

Innovation, Investment, and Unbundling: An Empirical Update

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I. Introduction

In Winter 2000 issue of this *Journal*, Thomas Jorde, Gregory Sidak, and David Teece (JST) commented on some potential economic consequences of the Telecommunications Act of 1996 as implemented by the Federal Communications Commission (FCC). The article, published early in the implementation phase of the Act, contained many general assertions about potential consequences, but contained no empirical evidence. JST did, however, offer some interesting and testable propositions. One of them suggests an important issue, for which implementation is rather straightforward: JST propose that mandatory unbundling increases the “riskiness and cyclicity of the ILEC’s [Incumbent Local Exchange Carriers] economic performance and, hence, on the ILEC’s weighted-average cost of capital. Mandatory unbundling raises both components of the weighted-average cost of capital for ILECs – equity and debt” (2000: 19). The purpose of this brief comment is to perform that empirical test and to compare our empirical results with the expectations of JST.

II. The Impact of Mandatory Unbundling: An Empirical Test

The goal of the Telecommunications Act of 1996 was to “promote competition” and “reduce regulation” (1996 Act, Preamble). As part of this effort, the Act required the ILECs to lease the elements of their networks – unbundled elements – to their rivals at prices commensurate with costs. JST conclude that mandatory unbundling will have adverse affects on the investment of both the incumbent phone companies as well as prospective entrants. One of the many alleged sources of these investment distortions was the effect of mandatory unbundling on the incumbent local exchange carriers’ (ILECs) cost of capital. With regard to the cost of equity, the authors indicate “[t]he cost of equity capital depends on the systematic or “beta” risk of the firm. ... How does mandatory unbundling affect an ILEC’s beta and thus its cost of equity? The answer depends on how unbundling affects the cyclicity of an ILEC’s return” (2000:

19). JST assert that the mandatory unbundling increases the cyclicity of the ILECs' return, so beta should increase during an economic downturn. During periods of "weak demand" (i.e., recession), according to JST, the justification of facilities deployment is more difficult for CLECs. During these periods these firms are more likely to lease unbundled elements than to construct their own facilities. Weak demand for telecommunications services compounded with an increased demand for unbundled elements, both of which lower end-user prices and thus profits, and the potential the elements are priced below costs, all "intensif[y] the cyclicity of an ILEC's returns" (2000: 19).

Assessment of the impact of a recession (or any event for that matter) on a firm's beta coefficient is straightforward, and such analysis is frequently employed. A firm's beta is estimated by:

$$R_i = \alpha_i + \beta_i R_m + \varepsilon_i \quad (1)$$

where the R_i is the stock return on firm i , R_m is the return on a broad market index, α_i is the intercept, β_i is the beta for firm i , and ε_i is the econometric disturbance term. Equation (1) is estimated by ordinary least squares (OLS), and typically employs daily or monthly returns over periods of various time intervals.

In the present context, it is not the firm beta that is of primary interest, but the difference in beta between a period of economic expansion (β^E) and economic recession (β^R). A statistical test for the non-stationarity of beta across time periods involves a slight modification to Equation (1):

$$R_i = \alpha_i + \beta_i R_m + \gamma_i D + \Delta_i D \cdot R_m + \varepsilon_i \quad (2)$$

where D is a dummy variable that equals 1.00 during the period of economic recession (0 otherwise), γ_i measures the change in the intercept during the recession, and, most importantly, Δ_i measures the change in beta during the recession period (Daves, et al., 2000). From Equation (2), the expansion and recession betas can be computed, where $\beta^E = \beta_i$ and $\beta^R = \beta_i + \Delta_i$. The JST hypothesis is that $\Delta_i > 0$, so that the $\beta^R > \beta^E$. The statistical significance of the estimated coefficient Δ_i measures the statistical significance of the null hypothesis that $\beta^R = \beta^E$.

For obvious reasons, JST did not perform this statistical test of their hypothesis regarding the cost of equity capital in their article. As the authors observe, "there has not been a recession since the Telecommunications Act of 1996, [so] the conjecture about increased systematic risk is not falsifiable" (2000:

19). At the time of publication, the U.S. was in the midst of one of the longest economic expansions in history. According to the National Bureau of Economic Research, however, this economic expansion ended in March 2001 and has continued until the present (June 2002). Thus, this empirical test of the JST hypothesis can be performed.

Equation (2) is estimated using daily stock returns for the three Regional Bell Operating Companies (RBOCs) -- BellSouth (BLS), Verizon (VZ), and Southwestern Bell (SBC) - and an index of the three companies.¹ The market index is measured by the S&P 500. Betas are computed using data for three (224 observations) and five years (328 observations) preceding the recession (March 2001), producing a total of eight regressions.² Regression results and the estimated values of β^E and β^R are summarized in Table 1. To improve efficiency of the estimates, the regressions are estimated using generalized least squares.³

¹ This index was computed as a simple average of the stock prices of the three RBOCs.

² Data for the recession period spans March 2001 through June 17, 2001 (the latter being the last reported stock price for the date the data was collected). The three-year betas were computed at the start date March 1998, and the five-year betas were computed with a start date of March 1996. The recession period includes 67 observations. Historical data is provided at no charge by finance.yahoo.com.

³ For all regressions, the null hypothesis of homoscedastic errors is rejected.

| Table 1. Regression Results | | | | | | | |
|-----------------------------|-----------------|------------------|-------------------|-------------------|----------------|-----------|-----------|
| RBOC | α_i | β_i | γ_i | Δ_i | R ² | β^E | β^R |
| BLS (3 Year) | 0.003 (0.85) | 0.320 (2.65)* | -0.005 (0.91) | -0.052 (0.25) | 0.05 | 0.32 | 0.27 |
| BLS (5 Year) | 0.003 (1.05) | 0.482 (4.89)* | -0.005 (0.97) | -0.215 (1.11) | 0.08 | 0.48 | 0.27 |
| VZ (3 Year) | 0.002 (0.46) | 0.547 (4.57)* | -0.003 (0.46) | -0.143 (0.68) | 0.11 | 0.55 | 0.40 |
| VZ (5 Year) | 0.001 (0.58) | 0.603 (6.56)* | -0.003 (0.51) | -0.198 (1.10) | 0.14 | 0.60 | 0.40 |
| SBC (3 Year) | 0.002 (0.57) | 0.695 (4.98)* | -0.006 (0.89) | -0.418 (1.71)* | 0.11 | 0.70 | 0.28 |
| SBC (5 Year) | 0.002 (0.61) | 0.719 (6.89)* | -0.006 (0.98) | -0.442 (2.16)* | 0.14 | 0.72 | 0.28 |
| Index (3 Year) | 0.002 (0.61) | 0.520 (4.84)* | -0.005 (-0.84) | -0.198 (1.05) | 0.12 | 0.52 | 0.32 |
| Index (5 Year) | 0.002 (0.75) | 0.598 (7.20)* | -0.004 (-0.93) | -0.276 (1.70)* | 0.15 | 0.60 | 0.32 |

* Statistically significant at the 5% level or better.

All the estimated betas (β_i) for the RBOCs are less than 1.00 and statistically significant. None of the constant terms (α_i , γ_i) are statistically different from zero. The estimated coefficient Δ_i is of primary interest. For all three RBOCs and an index of the companies, the estimated coefficient Δ_i is *negative*. In no case is a positive value for Δ_i observed. For three of the eight regression models, the null hypothesis of an equal beta during economic expansion and recession is rejected. For SBC (3 and 5 year) and the index (5 year only), the recession beta is less than the expansion beta ($\beta^R < \beta^E$). In no case can the JST hypothesis that $\beta^R > \beta^E$ be accepted, and in three cases it is rejected at the 5% significance level. Consistently, it appears that the recession has reduced, if anything, the variability of the RBOC stocks and, consequently, reduced the cost of equity capital.

III. Conclusion

The Telecommunications Act of 1996 was passed to promote competition in one of the most advanced technological areas of the economy. A major debate

has raged concerning the impact of mandatory unbundling as a means of introducing competition in local exchange markets. One proposed hypothesis is that mandatory unbundling increases the riskiness and cyclicity of ILECs performance, creating an adverse impact on their cost of capital. In addition to the effects of a generalized weaker demand for ILEC services during downturns, these firms would be faced with an increased demand by CLECs for unbundled elements. Such factors would both intensify the cyclicity of ILECs returns and increase capital costs.

Using a standard model for risk measurement and data for RBOC that includes periods of both expansion and recession we find no evidence that recession increases the variability and risk of ILEC stocks. Indeed, there is some evidence that the opposite might be the case. This implies that, on these grounds, mandatory unbundling does not increase the financial vulnerability of ILEC firms and their cost of equity capital.

References

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