Chapter 6

ON THE SUBTLETIES OF THE PRINCIPAL-AGENT MODEL

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Abstract: In this essay I focus on the equilibrium relation between the "risk" in a performance measure and the "strength" of the controlling agent's "incentives." The main motivation is that a large (mainly empirical) literature has developed postulating that the key implication of the principal-agent model is that this relation be negative. I first show that a standard principal-agent model, e.g., Holmström (1979), offers no equilibrium prediction about the relation between "risk" and "incentives." Next, I show that except in the highly stylized limiting Brownian version of Holmström and Milgrom (1987), this model doesn't yield a directional prediction for the equilibrium relation between "risk" and "incentives" either. This is due to the general property that risk arises endogenously in such principal-agent models. This, in turn, establishes that while the mixed empirical evidence on this relation may be useful from a descriptive vantage point, it does not shed any light on the validity of the principal-agent theory.

Keywords: Agency Theory, Incentives, Risk.

1. Introduction.

One of the key advances in modern accounting thought was due to the eventual realization that fully understanding accounting without understanding the nature of the demand for accounting is not a possibility. The move to build a new understanding of accounting practices and principles from rigorous theoretical models of settings in which accounting information has real economic implications was, to a large part, due the efforts of Joel Demski starting in the second half of the nineteen sixties. The formal foundation for much of his and related work is the principal-agent model. While seemingly simple, this model, even in its most basic form, has proven to contain enough richness to identify missed subtleties and other shortcomings of relying on common wisdom

and/or (casual) economic intuition in developing accounting theory. This in turn has led to a much richer understanding of the role of accounting numbers in facilitating economic exchanges.

Unfortunately, however, as strands of the literature has moved away from its origin, the theory itself has been assigned attributes that originate in casual economic intuition - not in the model itself. This is particularly true for the empirical literature that has focused on testing the validity of the principal-agent theory. A key catalyst for the development of the empirical principal-agent literature was Jensen and Murphy (1990). In their study they documented an average pay-performance sensitivity for a sample of CEO's of only around 0.3%. This number, they concluded, is much too low to provide any significant incentives and, more importantly, not consistent with the levels predicted of principal-agent theory. Jensen and Murphy base this latter conclusion on the observation that in the case of a risk neutral agent, the pay-performance sensitivity predicted by agency theory is 100%. It is implausible, they argued, that the 99.7 percentage point difference between \first-best" and observed incentives can be accounted for by managerial risk-aversion.

In response to the conclusion of Jensen and Murphy (1990), Haubrich (1994) provided a calibration study based on the model developed formally by Holmström and Milgrom (1987). His numerical examples demonstrate that pay performance sensitivity of 0.3% may well arise in this model for plausible parameter values, thereby rendering this part of Jensen and Murphy's (1990) conclusion invalid. Haubrich's (1994) study also made it evident that attempts to assess the predictive ability of principal-agent theory based on the absolute strength of the pay-performance relation are unlikely to be fruitful. This in turn prompted Garen (1994) to develop and test a set of comparative statics predictions about the pay-performance relation of a model also based on Holmström and Milgrom (1987). Most notably for this study, Garen (1994) predicts an inverse relation between inherent risk and the strength of the incentives provided to the agent, a prediction for which he finds only weak support in the data.

The weak nature of the empirical evidence in studies such as that of Garen (1994) appears to have motivated others to reexamine the empirical relation between risk and incentives.[1] Aggarwal and Samwick (1999), for example, suggest that the weak results reported by prior studies could be due to econometric problems. Specifically, a failure to control for differences in variance across firms.[2] After including such a control they find a strong negative association between pay-performance sensitivity and stock return volatility as measured by its variance. Since they argue that \[i]n most principal-agent models, the pay-performance sensitivity will be decreasing in the riskiness or variance of the firm's performance," they, in turn, interpret their empirical findings as providing strong support for the principal-agent paradigm.