

Research Proposal: Innovation and Contract Horizon

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Recent theories on the provision of incentives show that pay-for-performance schemes, although optimal to induce managerial effort (e.g., Harris and Raviv (1979); Holmstrom (1979)), can have adverse effects on innovation because they punish early failure excessively (Manso, 2009). They argue that in contrast, a certain degree of managerial entrenchment, as the one provided by long-term employment contracts, can be optimal to motivate innovation by executives. Partly because of the challenge in collecting data on contracts, however, the empirical validity of this argument remains understudied. Existing empirical work on the provision of innovation incentives has instead focused on more readily available ex-post compensation-based measures (e.g., Ittner, Lambert, and Larcker (2003); Carter and Lynch (2001); and Yanadori and Marler (2006); Lerner and Wulf (2007)). In this project, we take up this challenge and explore the relation between executive contract length, executive contract horizon and innovation. The main contribution to the literature is exploring the role of ex-ante contractual arrangements in the provision of innovation incentives.

We hand-collect novel data on explicit Chief Executive Officer (CEO) contracts and separation dates from several sources including: Securities and Exchange Commission (SEC) filings' exhibits, proxy filings, 10ks and The Corporate Library, ExecuComp, Risk Metrics, or BoardEx (Schwab and Thomas (2005); Gillan et al. (2009)). We also gather data on Research and Development (R&D) expenditures from the SEC filings, and characterize innovation using patent-based metrics (Hall et al. (2001)) based on information from the United States Patent Office that was cleaned and made available by Kogan, et al. (2012). We measure innovation production using patent filings, innovation efficiency using the ratio between innovation production and R&D, and innovation quality using the number of citations made to patents with-in three years of issuance. In addition, we measure innovation diversity (novelty) using the generality (originality) index of Hall et al., (2001), which is based on distribution across technology classes of the citing (cited) patents. We also measure variety of innovation using the variance of citations made to patents.

Our empirical approach compares quantity, efficiency, quality, diversity, novelty and variety of innovation along contract-horizon within firms. We run Poisson regressions at the company (and patent level) of the innovation characteristics against our hand-collected data on contract-horizon and contract length. Preliminary regressions point to two main findings: long-horizon executives that are at beginning of their contract, file higher-quality, more diverse patents, and, invest more in R&D than short-horizon executives. We check that these findings are not driven by the CEO's tenure as they hold for the subsample of renewed contracts. Results also continue to hold after controlling further for compensation structure, including executive fixed-effects, vintage effects and adjusting our measures of innovation for time effects (for example, using scaled measures of citations as in Lerner et al., 2010).

These findings are consistent with a horizon-effect in CEO contracts.¹ Companies appear to explore and be more innovative when CEO contracts are initialized. As contracts mature, however, CEOs face more pressure to deliver positive returns and reduce exploration. One implication from this interpretation is that optimal provision of incentives for innovation involves commitment to long-term contracts which provide tolerance for failure. This implication is consistent with Manso (2009), and is important for policy makers, as confirmed by the several practitioners we have contacted throughout the project, given recent proposals to adopt regulations that restrict CEO contract length.²³

We are currently seeking funds to expand our research in several dimensions. First, we plan to collect novel information on contract length for other executives that are more closely related to innovation decisions inside a company such as CROs and CTOs. This additional information can help us sharpen identification by focusing on variation across contract horizon for different executives in the same firm (a la Lerner and Wulf (2007)). This is also the first collection of its kind and can be useful for many follow up projects. The data will be hand-collected directly from company SEC filings and the other sources mentioned above. This extension is complex and requires a research assistant. Several PhD students that work with us on related projects and have relevant expertise have already expressed interest in this project and can be recruited and trained immediately. Based on our prior work with similar data we estimate a total cost of 18,850 USD over 10 months. Second, because the horizon-effect in CEO contracts can also be at least partially attributed to companies anticipating innovation cycles, we plan to isolate the causal effect exploiting sudden executive deaths as natural experiments. If in fact the horizon-effect is explained by innovation cycles we should observe no relation between innovation and contract-horizon for the replacements of executives, particularly if sudden deaths are concentrated in the later stage of the deceased executives' contract. We plan to collect this information from Google FACTIVA, and CAPITAL IQ searches. Based on quotes from data processing firms with related experience we estimate a cost of total 1,000 USD over a 3 month period. Finally, we plan to distinguish companies backed by Venture Capital (VC) and examine whether their relative innovative advantage over traditional corporations is CEO-contract based. We estimate to spend 150 USD engaging a data processing firm for 1 week. In total, we seek 20,000 USD in funds to be spent over a period of 10 months. We expect to have a first draft at the end of 18 months.

Juanita Gonzalez-Uribe is an assistant professor at the London School of Economics (LSE). Her research focuses on entrepreneurship and innovation. Her work on the interaction between Venture Capital and Innovation has won several prizes including the Kauffman Dissertation Award (2012) and the Collier Prize Award (2013). Moqi Xu is an assistant professor also at the LSE. Her work focuses on CEO career concerns, compensation and risk taking. She has several related papers in the pipeline, and her research won the FRA Barclay Award.

¹ The findings resemble the fixed-horizon effect of PE funds on their propensity to invest in innovative companies (Barret (2013)) and the life-cycle effects on academic productivity (Levin and Stephan, (1991).

² Bebchuk and Fried (2004) and "Rewards for Failure," British DTI consultation, June 2003.

³ We have contacted several lawyers and regulators including Sir Mervyn King and Sir David Walker