Diffusion of Innovations in Contract Language: The Case of Syndicated Loans

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Abstract:

What are the mechanisms by which new ideas enter the language of contracts? We propose to study this question in the context of contracts in the syndicated loan market. Syndicated loans are an important form of financing for companies. Origination volumes in this market topped $2.4 trillion in 2017. A syndicated loan is originated by a lead bank(s) which sells shares of the loan to participants which may include other banks, mutual funds, and structured investment vehicles. Syndicated loan agreements are legal documents that can span hundreds of pages and contain many complexities, for example, describing what constitutes a default and what remedies are available to lenders in such circumstances (Roberts & Sufi, 2009). As noted by legal scholars, contracts are rarely bespoke and often contain a significant amount of boilerplate language (Choi, Gulati, & Posner, 2013). However, boilerplate language is not static but evolves over time.

We are interested in understanding the diffusion and propagation of new contract language in syndicated loan agreements. Developments in contracting are often associated with substantive changes in the nature of corporate credit markets. For example, Becker & Ivashina (2016) and Berlin, Nini, & Yu (2018) tie the rise of so-called "covenant-lite" loans to the increased presence of non-bank investors in the market. Therefore it is important to understand the process by which specific contract terms enter the universe of language that has the potential for inclusion in these complex contracts. At the same time, these contracts, when matched with data on syndicates, provide a rich and unique dataset to test theories of diffusion of innovations across networks, since we can precisely identify participants and the timing of decisions to use and not use specific language, as well as combine this with data on the relationships between banks that participate in loan syndication.

Research Strategy:

We have collected the text of loan contracts starting in 1996 from the SEC's EDGAR electronic filing system. We will match the contracts to detailed data from DealScan on the

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leaders and participants in each syndicate that issues the loan. We are developing algorithmic techniques for identifying potential new common contract language across a large set of text documents. Finding such clauses, which may have some differences in language, across a large dataset of thousands of irregularly formatted loan agreements, each at least hundreds of pages long, can be complicated. Our current approach is to find relatively small "signature phrases" that co-occur, and then to find *clusters* of these new phrases in a principled way, using techniques from machine learning and artificial intelligence. While there has been plenty of attention in recent years to textual analysis using documents represented as word or phrase occurrence vectors, or as distributions over latent topics, there has been much less work on finding and tracking the spread of novel language, a technically challenging problem. While we continue to refine our methods, we note that we have already achieved some success with, finding nine novel clusters of clauses that enter into contract language after the year 2000 and then become relatively common across loan contracts.

The second main step of our research will be to use the data, in combination with data from Dealscan on syndicated loan networks in order to study the diffusion of contract language. One working hypothesis is that novel language disseminates in part through the process of co-arranging loans, i.e., a bank that co-leads a loan with another that has already used the novel language would be more likely to use that language in future deals. This could occur for several reasons – for example commonalities in loan portfolios or learning – and part of the work will be to identify the underlying economic drivers of diffusion. We expect this work to have important implications for bank supervision and systemic risk.

Computing languages and resources:

The proposed work is a collaboration between a financial economist (Dlugosz), and computer scientists (Das and Li). The computational approach involves collection of data from Edgar through webscraping tools and analysis of large quantities of text data in Python, using scikit-learn and other appropriate libraries. Statistical analysis will be carried out using custom-designed software in Python and in Stata. We have access to significant computational resources through the clusters at the McKelvey School of Engineering at WashU.

References:

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