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GRADUATE STUDY

I am a third-year Ph.D. student in Finance at Olin Business School, Washington University in St. Louis. I entered the program in Fall 2024 and have successfully completed two academic years of Ph.D. coursework. My research focuses on empirical corporate finance, entrepreneurship, and the economics of technology. My advisors are Todd A. Gormley and Margarita Tsoutsoura.

RESEARCH INTERESTS

My research studies how financing, organizational practices, and technological change shape firms' investment in intangible assets, such as software. I combine empirical corporate finance with direct observation of software production, linking full codebase histories and developer contributions to financing and employment data. The central object in my research is technical debt: the future maintenance effort embedded in software that requires repair or redesign. Measuring this liability helps distinguish rapid expansion of a codebase from investment in a durable productive asset.

My current agenda examines AI-assisted software production, venture capital and engineering practices, cybersecurity vulnerabilities, and startup acquisition prospects. These projects connect digital economics and AI to entrepreneurship, productivity, and the organization of work. I also work on political polarization in academia using linked author and voter-registration records.

CURRENT RESEARCH

Venture Capital and Engineering Quality: Evidence from Software Startups

(with João Dimas)

We investigate a novel channel of venture capital value creation: the practices through which startups build and maintain their technology. We construct a new panel of engineering quality at 569 firms by analyzing 13.2 billion lines of code across monthly codebase snapshots. We compare changes in engineering quality following first VC investment with changes at similar firms that remain without VC backing. We also construct a dollar-denominated measure of technical debt, the estimated maintenance liability embedded in software. Relative to codebase size, serious deviations from coding best practices decline by 15% and technical debt by 12%. These improvements accompany substantial codebase growth. The decline in the frequency of serious coding problems persists after matching on pre-financing growth, and quality gains extend to firms already generating revenue. In contrast, a placebo test around later financing rounds shows no evidence of quality improvement. We also analyze 5.6 million code contributions (commits). After first VC investment, teams document collaboration and copyright compliance more often, do less of their work on weekends, and their existing engineers become less likely to introduce bugs. The findings suggest that VC professionalization extends to the engineering practices through which teams build and maintain their products.

AI and Technical Debt: Evidence From 3 Billion Lines of Code

(with João Dimas and Y. Eddie Lu)

AI can help firms build intangible assets faster, but low-quality output may leave them with hidden costs of repair and maintenance. We study this trade-off in software, where the underlying code lets us examine both the quantity and quality of what firms build. We use an industry-standard tool to scan monthly snapshots of the full codebases of firm-affiliated public GitHub projects for maintainability issues, bugs, and security vulnerabilities, processing over 3.9 billion lines of code. We convert the tool's estimated repair time into a dollar measure of technical debt, the future cost of resolving maintainability issues. We compare changes in projects where we first detect AI use with changes in similar projects whose AI use is detected later or remains undetected. During the first seven months of detected AI use, codebases grow on average 6.6% more than those of comparable projects. Contrary to concerns about "AI slop," total issues and technical debt per line decline by 1.4% and 0.7% of their pre-detection means, respectively. Bugs per line also decline, while security vulnerabilities and critical issues, the most severe ones, show no statistically significant change. The findings link detected AI use to faster growth in firms' software assets alongside modest improvements in the measured quality of the average line of code.

Acquisition Prospects and Startup Strategy

(with Anushri Jain and João Dimas)

We study how acquisition prospects shape startup strategy. Acquisitions provide an important exit channel for entrepreneurial firms and can therefore affect decisions made well before an exit occurs. We examine how startups adjust product-development and hiring strategies when the likelihood of acquisition declines. Our analysis asks whether reduced acquisition prospects cause startups to invest more heavily in building durable standalone businesses and how these changes affect the composition of their workforce and product-development choices. The project provides evidence on how expected exit opportunities influence real decisions inside young firms.

Credit Negotiations

(with Manthos Delis, Maria Iosifidi, and Emmanuel Tsiritakis)

Using 357,056 SME loan applications from a systemic European bank, we study credit negotiations with contracts that distinguish bank-imposed from borrower-requested clauses. Conditional on the bank's credit score, female entrepreneurs are 3–4 percentage points less likely to obtain concessions, and lower-income borrowers negotiate substantially less. Evidence from a quasi-random dividend tax reform and ownership transitions across genders supports our inferences. The income channel appears to operate mainly through cognitive bandwidth, not financial sophistication. Negotiated contracts are more often unsecured, contain fewer covenants, and predict 1.8–2.0 percentage point higher firm ROA.

Cybersecurity Vulnerabilities and Firm Performance

(with João Dimas)

We examine whether exogenously generated cybersecurity vulnerabilities affect firm performance. Our identification strategy exploits shocks that are plausibly exogenous to any individual firm's quality—within a stacked difference-in-differences framework applied to 551 open-core software firms over 2010–2025. Exposed firms experience approximately 8 percentage points lower headcount growth and a 1.5–1.7 percentage point reduction in acquisition probability. Commit level evidence points to a crowding-out mechanism: the share of non-remediation development activity falls by 2.78 percentage points, and fix-related effort persists for twelve months, potentially displacing new feature development. Code quality degrades in parallel: technical debt—the future cost of engineering shortcuts—grows roughly 20 percentage points faster and cognitive complexity of the code rises 16–21 percentage points in affected firms. We highlight that cybersecurity vulnerabilities can impose real costs on firms through the diversion of engineering resources from innovation to maintenance, not just breaches.

INTEREST IN THE TUTORIAL

The tutorial would help me connect direct measures of software production to broader questions about AI, productivity, and firm organization. I would particularly value discussion of how researchers measure AI use and evaluate changes in output, quality, and maintenance costs. I would bring experience constructing longitudinal codebase panels and linking engineering outcomes to financing and organizational decisions.