"WE OWN WHAT YOU THINK": SIDE PROJECTS AND HIGH-GROWTH ENTREPRENEURSHIP– EVIDENCE FROM A QUASI-NATURAL EXPERIMENT

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Abstract

This paper provides causal evidence on how institutional constraints on side projects affect high-growth entrepreneurship, measured by the rate of VC-backed firms. We exploit the Alcatel v. Brown ruling, which expanded employer ownership claims over employee side projects in states lacking statutory protections. The ruling caused a significant decline in VC activity—fewer deals, smaller investments, and lower exit rates. It also reduced the number of hybrid entrepreneurs with graduate education. These findings suggest that legal restrictions on side projects deter entrepreneurial experimentation and shrink the pool of high-quality startup founders.

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ABSTRACT

This paper provides causal evidence on how institutional constraints on side projects affect high-growth entrepreneurship, measured by the rate of VC-backed firms. We exploit the Alcatel v. Brown ruling, which expanded employer ownership claims over employee side projects in states lacking statutory protections. The ruling led to a significant decline in VC activity, characterized by fewer deals, smaller investments, and lower exit rates. It also reduced the number of hybrid entrepreneurs with graduate education. These findings suggest that legal restrictions on side projects deter entrepreneurial experimentation and shrink the pool of high-quality startup founders.

Key words: hybrid entrepreneurship, side projects, high-growth entrepreneurship, entrepreneurial barriers, intellectual property rights, venture capital, entrepreneurial experimentation.

The best startups almost have to start as side projects, because great ideas tend to be such outliers that your conscious mi
Who owns your thoughts? According to the 219th Judicial District Court of the State of Texas, your employer might. La

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INTRODUCTION

Side projects have emerged as a fertile ground for the creation of high-growth, disruptive businesses in the modern economy (Davis et al., 2013). Their growing prevalence is fuelled by the rise of the gig economy and the normalization of remote work arrangements (Kwan et al., 2025). This trend is particularly pronounced

in the Information Technology (IT) sector, where a culture of experimentation fosters widespread engagement in side projects (Stack Overflow, 2024). When these initiatives demonstrate potential, their creators often formalize them into business ventures while retaining their salaried employment—a pathway referred to as hybrid entrepreneurship.**Hybrid entrepreneurship offers a low-risk environment to test, refine, and scale innovative ideas, serving as a critical bridge between ideation and full-time entrepreneurial commitment (Folta et al., 2010; Thorgren et al., 2014; Luc et al., 2018).** Many successful firms–**including Apple, eBay, Twitter, Slack, Craigslist, and Trello–originated as side projects developed outside of working hours. Around 20% of the CEOs on Inc. magazine's list of the 500 fastest-growing companies started their ventures while still employed (Wu et al., 2024; Inc. staff, 1997; Raffiee & Feng, 2014).**

Despite the growing prevalence of hybrid entrepreneurship (Minniti, 2010), institutions and policy makers have largely overlooked them or even hindered them (Schulz et al., 2016; Folta et al., 2010; Welter, 2004). A key institutional factor determining hybrid entrepreneurship is the regulation of intellectual property (IP) rights (Alyavi & Schulz, 2024). For side projects to thrive, employees must be confident they will retain ownership of independently developed ideas, while employers need assurances that core proprietary knowledge is protected. This delicate balance was disrupted by Alcatel v. Brown, a Texas court case in which a software developer was required to assign ownership of a personal project, created outside work hours and before employment, to his employer, based on a broad IP clause in his contract (Lobel, 2014a). The ruling significantly expanded the enforceability of employer claims over employee ideas, introducing new legal uncertainty around side ventures (Armstrong et al., 2024; Wu et al., 2024).

This institutional shift offers a unique opportunity to causally examine whether constraints on side projects suppress or enhance the rate of high-growth ventures in the economy, measured as Venture Capital (VC) backed firms11Startups that receive venture capital (VC) financing are widely recognized as a reliable proxy for high-growth firms. Venture capitalists typically invest in startups with strong growth potential, disruptive technologies, and a high likelihood of profitable exits (Lerner & Nanda, 2020). As a result, VC-backed firms are often considered among the most valuable and scalable ventures in the broader entrepreneurial population (Castellaneta et al., 2016). Empirical evidence supports this view: VC-backed firms tend to grow more rapidly, generate more patents, exhibit higher productivity, and are more likely to go public than their non-VC-backed counterparts (Wright & Robbie, 1998).. On the one hand, constraints on side projects may reduce the prevalence of high-growth ventures, as side projects enable individuals to explore and test new business ideas while retaining the security of paid employment. This pathway is particularly important for developing disruptive or uncertain innovations that may not emerge through traditional entrepreneurial routes (Folta et al., 2010; **Raffiee & Feng, 2014**). When legal risks discourage side ventures, this experimentation process is curtailed. Moreover, hybrid pathways are often used as a route into entrepreneurship for highly skilled individuals with substantial opportunity costs–those in well-compensated paid positions who are less likely to leave their jobs to pursue unproven ideas. By deterring these individuals from engaging in entrepreneurial activity, institutional barriers to side projects could suppress the prevalence of high-growth ventures (Folta et al., 2010; Raffiee and Feng, 2014; Panos et al., 2014).

jabbrv-ltwa-all.ldf jabbrv-ltwa-en.ldf**On the other hand, such institutional constraints may serve as a filtering mechanism. By increasing the costs and risks associated with entrepreneurship, they can discourage marginal or low-commitment entrants while selectively encouraging individuals with strong motivation, higher expected returns, and more robust business models (Conti et al., 2022; Branstetter et al., 2014). In this sense, legal barriers to engaging in side projects may increase the prevalence of high-growth entrepreneurial ventures.**

We find that institutional barriers to engaging in side projects, particularly the Alcatel v. Brown ruling, had a pronounced causal dampening effect on high-growth entrepreneurship. In states where the ruling was adopted as legal precedent 11A legal precedent refers to a judicial decision that establishes a principle or rule of law, which is then cited and followed in subsequent cases involving similar facts or issues. This practice—central to the doctrine of stare decisis—ensures consistency

and predictability in legal decision-making (Hart, 2012; Horwitz, 1977; Landes and Posner, 1976)**, VC activity declined significantly: the number of deals, average and median investment amounts, and successful exits all decreased. These effects were especially salient in early-stage financing and within the IT sector, precisely the domains most closely associated with side projects.**

jabbrv-ltwa-all.ldf jabbrv-ltwa-en.ldf**While our main analyses are conducted at the state level to capture broad institutional effects, we also complement this with individual-level analysis. At the individual level, we find that the ruling led to a decline in the number of hybrid entrepreneurs with graduate education, those particularly likely to engage in innovative side projects.**

Overall, our findings suggest that institutional barriers to side projects disincentivize entrepreneurial experimentation and deter capable individuals from entering hybrid entrepreneurship. The reduction in early-stage experimentation likely contributes to the observed decline in high-growth, VC-backed startups.

This paper makes two main contributions. First, it advances the literature on hybrid entrepreneurship and institutional constraints by providing causal evidence on how institutional changes that deter employees from engaging in side projects affect the rate of high-growth startups, as proxied by VC activity. In doing so, we respond to calls for greater attention to how hybrid entrepreneurs respond to institutional change (Schulz et al., 2016) and demonstrate the importance of regulatory clarity in employment contracts and IP law (Alyavi & Schulz, 2024). Our results underscore the need for entrepreneurship policies that explicitly account for the institutional environment facing hybrid entrepreneurs, a group that often operates in a legal and regulatory gray zone despite its economic relevance. Since side projects serve as a low-risk platform for experimentation, policies that undermine this process risk dampening broader entrepreneurial dynamism (Alyavi & Schulz, 2024).

Second, we contribute to the literature on IP and entrepreneurship by shifting the focus from how IP protections benefit incumbent firms to how they may inhibit employee-driven ventures. While prior studies highlight how IP laws secure incentives for established innovators (Wu et al., 2024; Png, 2015; Png & Samila, 2015), our findings reveal that the same legal instruments can suppress entrepreneurial entry—especially among hybrid entrepreneurs—by limiting the attractiveness of engaging in side projects. This trade-off emphasizes that IP law is not neutral: rules that protect incumbents may simultaneously hinder the prevalence of high-growth ventures, particularly in innovation-driven sectors.

THEORETICAL DEVELOPMENT AND HYPOTHESES

This section develops the theoretical foundation for understanding how institutional barriers to side projects can influence the rate of high-growth ventures. We begin by outlining the importance of side projects and hybrid entrepreneurship as a pathway for experimentation, learning, and scalable business creation, emphasizing its prevalence among professionals with high educational levels in the IT industry. Next, we examine the role that institutions have either enabling or constraining employees from pursuing side projects, with particular attention to IP ownership. We then focus on the landmark Alcatel v. Brown case, which significantly altered the legal treatment of side projects by expanding employer claims over employee-generated innovations. Finally, we theorize how such institutional constraints may decrease or increase the rate of high-growth entrepreneurship.

jabbrv-ltwa-all.ldf jabbrv-ltwa-en.ldfHybrid entrepreneurship and institutional barriers to side projects

Some employees who engage in side projects eventually formalize these efforts by launching ventures while continuing to hold their primary job. These individuals are known as hybrid entrepreneurs (Folta et al., 2010). While some may engage in hybrid entrepreneurship for supplemental income or personal fulfilment, empirical evidence indicates that it is primarily used as a transitional, low-risk pathway to full-time self-employment (Folta et al., 2010). Rather than being driven by necessity, hybrid entrepreneurship is often opportunity-

driven, allowing individuals to test and refine new business ideas while maintaining the financial stability of salaried work (Schulz et al., 2016; Alyavi & Schulz, 2024). This dual arrangement offers the flexibility and security needed to experiment before making a full entrepreneurial commitment (Folta et al., 2010; Benitez et al., 2023; Thorgren et al., 2014; Luc et al., 2018). Side projects are especially common in the IT sector; for instance, 88% of software developers report working on side projects alongside their primary employment (**Stack Overflow, 2024**).

Engagement in side projects provide employees with valuable opportunities to acquire and apply new skills (Sonmez, 2017). Moreover, such projects can serve as a source of groundbreaking innovation (Burgelman 1983; Davis et al. 2013). As a result, they may generate positive spillover effects for employers by enhancing employee motivation, skill development, innovative capacity, and access to broader professional networks (Ferreira, 2020; Marshall, 2019; Sessions et al., 2021). However, concerns over misuse of proprietary knowledge lead many firms, especially in IT, to require broad IP assignment agreements, which often claim ownership of innovations developed outside work. These contracts create legal uncertainty that may deter hybrid entrepreneurship. Balancing IP protections with employee freedom to innovate is crucial, and institutional frameworks play a key role in shaping this balance. The next section explores Alcatel v. Brown, a landmark case that redefined legal boundaries for side projects.

The Alcatel v. Brown case

The Alcatel v. Brown case marked a pivotal moment in the legal interpretation of side project ownership, establishing a precedent with far-reaching implications for entrepreneurship. The dispute involved Evan Brown, a software developer in Texas, who claimed to have conceived a software idea—- with potential to serve as the foundation for a new venture—- before his employment at DSC Communications, a company later acquired by Alcatel. Aware of the possible conflict with his employment terms, Brown formally requested that DSC release him from his invention disclosure obligations to independently pursue the project. Both Brown and DSC acknowledged the commercial value of the idea, but after nearly a year of unsuccessful negotiations, DSC terminated Brown's employment and filed a lawsuit asserting full ownership. The company alleged that Brown had violated the terms of his employment agreement by failing to disclose the idea and sought a declaratory judgment that would not only assign ownership to DSC but also compel Brown to fully disclose the software concept (Lobel, 2014a; Armstrong et al., 2024). In 2002, the Texas court ruled in Alcatel's favour, upholding the validity of the IP assignment clause and establishing that even undeveloped or conceptual ideas could be subject to employer ownership if contractually specified, regardless of whether company resources were used (Armstrong et al., 2024; Wu et al., 2024).

This ruling marked a significant decline in employer rights, shifting the legal interpretation of ownership from tangible innovations (e.g., patents or trade secrets) to include early-stage and abstract ideas (Lai, 2003; Lobel, 2014a). The Alcatel v. Brown decision thus created a powerful, nationwide precedent that informed the future decisions of other state and federal courts on employer claims. It introduced a chilling effect on employee-led side projects, particularly in the IT industry, where entrepreneurial ideas are often conceptual and portable. The ruling attracted widespread media attention, with headlines such as "We Own What You Think"11Nachtigal, J. (2004, August 18). We own what you think. Salon. Retrieved May 30, 2025, from https://www.salon.com/2004/08/18/evan_brown/ or "My Ideas, My Boss's Property" underscoring its controversial implications for potential hybrid entrepreneurs (Armstrong et al., 2024; Wu et al., 2024; Lobel, 2014b).

The impact of institutional barriers to side projects on high-growth entrepreneurship

Institutional constraints that limit side project activity, by increasing the legal risks for employees, **particularly** the risk of losing ownership over ideas developed outside of their primary employment, may have opposing effects on high-growth entrepreneurship. On one hand, such constraints may discourage early-stage experimentation and deter highly capable individuals from engaging in hybrid entrepreneurship. This should decrease the high-growth entrepreneurs. On the other hand, these barriers may function as a filtering mechanism, discouraging marginal or less-committed entrepreneurs while allowing only the most promis-

ing, high-growth ventures to advance. Consequently, the net effect of institutional barriers on high-growth entrepreneurship remains theoretically ambiguous, highlighting the need for empirical investigation.

First, we argue that institutional barriers to side projects may decrease the rate of high-growth ventures because they limit experimentation. Hybrid entrepreneurship serves as a critical transitional pathway to full self-employment, **allowing founders to test their entrepreneurial capabilities and refine their business models while mitigating the financial risks associated with full-time venture creation. In this sense, it serves as a low-risk experimentation phase that can enhance the viability and effectiveness of entrepreneurial ideas (Folta et al., 2010** ; Thorgren et al., 2014; Luc et al., 2018**). This experimentation is particularly vital for disruptive or novel business concepts, where uncertainty is high and real-world implementation is often the only means of assessing value and refining the model (Kerr et al., 2014). Without this transitional, low-risk pathway to entrepreneurship, many promising and potentially transformative ideas would likely remain unexplored (Folta et al., 2010; Raffiee & Feng, 2014).** Therefore**, when institutional barriers restrict hybrid entrepreneurship, potential founders lose an essential opportunity to try, acquire knowledge, and refine their ventures** ,

particularly those that are more uncertain precisely because they are more disruptive.

Institutional barriers that increase the risks associated with engaging in side projects also affect the composition of the entrepreneurial pool. When testing a business idea through hybrid entrepreneurship becomes riskier, some individuals may choose not to pursue entrepreneurship at all. High human capital individuals face greater opportunity costs associated with leaving secure employment and are therefore disproportionately deterred by such constraints (Folta et al., 2010; Raffiee & Feng, 2014). The IT sector may be especially affected by these regulations, as it employs many highly skilled professionals. As a result, institutional barriers to side projects may exclude some of the most capable potential founders from the entrepreneurial pipeline. Thus, regulations—particularly those that restrict access to hybrid entrepreneurship—may inhibit entrepreneurial activity among well-educated individuals seeking to test and refine innovative ideas in the market, potentially preventing the ventures with significant growth potential (Panos et al., 2014; Folta et al., 2010).

The legal risks of engaging in side projects are especially pronounced for commercially valuable innovations. High-potential ideas are more likely to attract employer claims, as firms have greater incentives to assert ownership over ventures with significant value. This uneven threat of litigation can lead individuals to abandon or avoid their most promising entrepreneurial pursuits. As a result, institutional barriers that elevate legal uncertainty around side projects may systematically discourage ambitious innovation, ultimately reducing the emergence of high-growth ventures. Based on these insights, we hypothesize:

H1a: Increases in institutional barriers to hybrid entrepreneurship will lead to a decrease in the rate of high-growth ventures.

Conversely, institutional barriers to side project/ hybrid entrepreneurship may increase the rate of high-growth ventures. Individuals who do not transition directly to full-time entrepreneurship are often marginal entrepreneurs—those for whom expected returns are relatively low (Schulz et al., 2016). By raising the cost of entry, institutional constraints may act as a filter, deterring low-commitment or "hobbyist" entrepreneurs who are less likely to build scalable ventures. This view aligns with prior research suggesting that when the attractiveness of wage employment rises (Conti et al., 2022) or the costs of starting a business increase (Branstetter et al., 2014), overall entry declines but the quality of ventures increases. Under such constraints, only the most capable and committed individuals—those with strong conviction in their ideas—may be willing to accept the increased risk of launching a business, anticipating high returns. Moreover, high-ability individuals may have more bargaining power to negotiate favourable employment terms, such as exemptions from restrictive IP clauses. As a result, they may be less affected by institutional barriers and still be

able to pursue entrepreneurial opportunities despite legal constraints. **Building on this reasoning, we propose that institutional constraints limiting side projects may enhance the rate of high-growth entrepreneurship by filtering out less committed individuals. This leads to our second hypothesis:**

jabbrv-ltwa-all.ldf jabbrv-ltwa-en.ldf*H1b: Increases in institutional barriers to hybrid entrepreneurship lead to an increase in the rate of high-growth ventures.*

EMPIRICAL STRATEGY AND DATA

Research Design

Identifying the causal impact of institutional barriers to engage in side projects on high-growth entrepreneurship, specifically, restrictions on side projects, presents significant empirical challenges. Engagement in side project activity is not randomly assigned; it is shaped by both firm-level policies and individual characteristics. Some firms adopt more permissive attitudes toward side projects, while others impose stringent IP restrictions. Similarly, individuals differ in their motivations, skills, risk preferences, and access to resources, all of which influence their likelihood of pursuing side ventures (Wu et al., 2024). These firm- and individual-level factors are also correlated with the propensity to engage in high-growth entrepreneurship, making it difficult to isolate the effect of institutional barriers on engaging in side projects on high-growth entrepreneurship.

To address this, we exploit a quasi-natural experiment stemming from the Alcatel USA, Inc. v. Evan Brown ruling, a landmark legal case that redefined the enforceability of IP assignment clauses in employment contracts. The ruling acted as an exogenous institutional shock, altering the legal landscape for employee-initiated side projects in states governed primarily by common law. Crucially, its impact varied across states due to pre-existing statutory protections.

Specifically, eight states—California, Delaware, Illinois, Kansas, Minnesota, North Carolina, Utah, and Washington—had already enacted statutes protecting employee ownership of IP created outside the scope of employment. In these states, the ruling had no material effect, providing a natural control group. In contrast, the remaining states were directly affected by the new precedent, forming the treatment group. Table 1 summarizes the relevant statutory protections and their enactment years.

Table 1 . US States with Statutory Protection for Employees' IP Ownership.

State	Protection	Enacted year
California	California Labor Code §2870 & §2872	1979
Delaware	Delaware Code, 19 §805	1984
Illinois	Illinois Trade Secrets Act, 765 ILCS 1062/2	1983
Kansas	Kansas Statutes Annotated §44-130	1986
Minnesota	Minn. Stat. § 181.78	1977
North Carolina	North Carolina General Statutes § 66-57.1	1981
Utah	Utah Code Annotated § 34-39-3	1989
Washington	Washington Revised Code § 49.44.140-145	1979

This legal heterogeneity enables a Difference-in-Differences (DiD) strategy, comparing entrepreneurial outcomes before and after the ruling between affected and unaffected states. By leveraging this jurisdictional variation, we isolate the causal effect of institutional barriers to side projects on high-growth entrepreneurship.

Data and Estimation Strategy

To test our hypotheses, we use data from Refinitiv EIKON (formerly VentureXpert), a comprehensive platform that tracks VC investment activity. This dataset provides detailed information on VC backed deals

worldwide, making it well-suited for our analysis of high-growth entrepreneurship. This database is used extensively in academic research (Castellaneta et al., 2016; Conti et al. 2022; Hsu, 2007; Shafi et al. 2020). We transform our data to state-year level to capture VC activities at the level of treatment (state).

Our sample consists of state-year-level US VC investments in the IT industry11In supplementary analyses, we also examine VC investment patterns in non-IT industries to provide a comparative perspective., which includes "Computer Software and Services" and "Internet Specific". The focus in this sector is motivated by three primary considerations. First, the IT industry exhibits a high prevalence of side projects and hybrid entrepreneurship (Bretz et al., 2015; Wu et al., 2024; Folta et al., 2010). Second, the IT industry was particularly affected by the legal precedent set in Alcatel v. Brown. Prior to the ruling, IP agreements in the sector were difficult to enforce due to the abstract and intangible nature of software-based innovations. The court's decision clarified that IP ownership agreements could indeed extend to such intangible assets, making them legally enforceable and significantly reshaping the regulatory environment for IT professionals engaged in side-projects (Wu et al., 2024). Third, a substantial portion of the US's most influential business ideas originates from IT-related side projects (e.g. Slack and Twitter), illustrating the sector's capacity to generate high-growth ventures.

Our main dependent variable, Deals, measures the total number of first round VC deals in a each U.S. state-year. The key explanatory variable is the interaction between Post and Treatment. The variable Post is a binary indicator equal to 1 for years following 2002 (the year of the*Alcatel v. Brown* ruling), and 0 otherwise. Treatment is equal to 1 for the 42 states that lacked preexisting legal protections for employee-developed IP, and 0 for the 8 states that had such protections in place prior to the ruling—namely, California, Delaware, Illinois, Kansas, Minnesota, North Carolina, Utah, and Washington (see Table 1).

We estimate the effect of the ruling on VC activity using a Poisson pseudo–maximum likelihood model (PPML), using the state-year as they unit of analysis. The model is specified as follows:

$$\text{Deals}_{st} = f\left(\beta_0 + \beta_1 \text{Treated}_{st} + \beta_2\ \text{Post}_t + \beta_3\ \text{Treated}_{st}\ \text{Post}_t + \varphi_s + \tau_t + C_{st} + \varepsilon_{st}\right) \quad (1)$$

φ_s represents state fixed effects that control for time-invariant state characteristics, and τ_t captures year fixed effects, accounting for macroeconomic trends. The term C_{st} denotes a vector of time-varying state-level controls sourced from the U.S. Census Bureau that has been extensively used in state level data analysis (Conti et al., 2022; Conti & Valentini, 2018). First, we control for state population size (in log), as state changes in the population size could influence the rate of high-growth entrepreneurship. Second, we include state-level GDP growth to reflect changes in macroeconomic conditions. Third, we control for the tax burden, measured as the ratio of total state tax revenues to GDP22Washington, D.C., is excluded from analyses involving this variable due to data unavailability.. Finally, we include a measure of education level, proxied by the share of the adult population holding at least a college degree, to account for differences in the availability of human capital across states and years. The term ε_{st} is the error term. Standard errors are clustered at the state level to account for serial correlation within states over time.

We assess the robustness of our findings using alternative measures of high-growth entrepreneurship. Specifically, we estimate additional models using (1) the number of successful exits, defined as the number of VC-backed firms that underwent a M&A or IPO; and (2) the log-transformed average and median VC deal sizes33Number observations drop for average and median investment size due to missing values.. These measures provide complementary insights into the quality and scale of entrepreneurial outcomes beyond deal count and help validate the consistency of our main results across a broader set of state-level performance indicators. For the average and median deal size we use OLS models with fixed effect. Tables 2 shows the definitions and Table 3 shows the descriptive statistics of these variables.

Table 2. Variable definitions (Main Dataset).

Variable Name	Variable Description
Deals	Total number of first round VC deals per state-year

Variable Name	Variable Description
Succ. exits	Total number of successful exits per state-year
Avg/Med deal (ln)	Natural logarithm of the annual average/median VC deal size (in thousands USD) per state-year
Early-stage Deals	Total number of first round VC deals classified by Refinitiv Eikon as early-stage (i.e., seed, early stage
Late-stage Deals	Total number of first round VC deals classified by Refinitiv Eikon as late-stage (i.e., expansion and lat
Post	A binary variable equal to 1 if the year is after 2002, and 0 otherwise
Treatment	A binary variable equal to 1 for U.S. states without statutory protections for employees' intellectual p
Population (ln)	Natural logarithm of the state population size per state-year
GDP Growth	Annual percentage growth rate of real Gross Domestic Product (GDP) per state-year
Taxation	Ratio of total state tax revenues to GDP per state-year
College or above	Share of the adult population holding at least a college degree per state-year

Table 3. Descriptive Statistics for the Main Sample.

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	N	SD	Mean	P10	P25	P50	P75	P99
Deals	391	61.01	21.22	1	2	5	15	267
Succ. Exits	391	16.393	5.013	0	0	1	3	87
Avg deal (ln)	382	1.001	8.199	7.048	7.824	8.367	8.829	10.101
Median deal (ln)	382	1.01	7.86	6.745	7.49	8.006	8.412	10.101
Population	391	.88	15.429	14.077	14.89	15.508	15.973	17.387
GDP Growth	391	.023	.03	.005	.014	.027	.045	.094
Taxation	391	1.017	5.413	4.305	4.795	5.313	5.917	8.214
College or above	391	4.548	23.432	17.4	20.3	22.9	26.6	33.2

Note: the sample is restricted to IT-related industries. The table displays the number of observations (N), standard deviation (SD), mean, and selected percentiles (P10, P25, P50, P75, P99).

RESULTS

Test of Parallel Trend Assumption

A key identifying condition for the validity of the DiD research design is the parallel trends assumption. This assumption requires that, in the absence of treatment, the treated and control groups follow similar pre-existing trends in the outcome variable. In our context, this implies that—prior to the Alcatel v. Brown ruling—states ultimately affected by the ruling (treated group) and those unaffected (control group) would have exhibited parallel trajectories in the outcome variable. Under this condition, any post-treatment divergence between the two groups can be plausibly attributed to the legal intervention rather than to pre-existing differences in trend dynamics.

To test the parallel trends assumption, we estimate an event-study specification that interacts the treatment indicator with a full set of year dummies, using the year 2002 as the reference period. Figure 1 presents the results, plotting the estimated coefficients for each year relative to the treatment. Crucially, we find no statistically or economically significant differences in the pre-treatment trends of the total number of VC deals between treated and control states. The treatment effect emerges only after the Alcatel v. Brown ruling in 2002, reinforcing the causal interpretation of our findings.

Figure 1. Graph on parallel trends (DV: VC deals).

Hosted file

image1.emf available at https://authorea.com/users/939111/articles/1309121--we-own-what-you-think-side-projects-and-high-growth-entrepreneurship-evidence-from-a-quasi-natural-experiment

Main Results:

Table 4 reports the regression estimates for our main dependent variable—the number of VC deals—as well as for three additional state-level outcomes: the number of successful exits, and the log-transformed average and median VC deal sizes. Columns 1–4 present specifications that include state and year fixed effects but exclude time-varying control variables to address concerns related to bad controls. Columns 5–8 introduce state-level control variables that can vary in every state over time, including population, GDP growth, tax burden, and educational attainment.

Across all specifications, we observe a statistically significant decline in entrepreneurial outcomes in treated states following the legal shock, providing strong support for our hypothesis. Specifically, the PPML estimates in Column 1 indicate that, relative to the control states, treated states experienced a 25.1% decline in the expected number of VC deals after the Alcatel v. Brown ruling (IRR = e-0.289 = 0.749; $p < 0.001$). When we include the full set of control variables in Column 5, the estimated effect remains virtually unchanged: a 24.6% decline (IRR = $e^{-0.284}$ = 0.753;p = 0.005). These results confirm that the ruling substantially dampened the total deal-making activity in states without prior statutory protections for employees' ideas.

To evaluate the robustness of our findings across alternative dimensions that reflect the prevalence of high-growth entrepreneurship, we include additional dependent variables at the state level. Specifically, we examine the number of successful exits, i.e., M&A or IPOs, as well as the log-transformed average and median VC deal sizes. The results show that the ruling had a substantial dampening effect on all these outcomes. Model 6 shows treated states experienced a 37.1% decline in successful exits relative to control states following the Alcatel v. Brown ruling (IRR = $e^{-0.486}$ = 0.629, $p < 0.001$), holding other factors constant11Results also hold for the number of VC-backed firms that can have more than one round of investments, follow-on VC Deals (Table A1 in the Appendix).. So, startups that received investments are less likely to have a successful exit after the shock. In addition, we find that the average deal size declined by 33.2% (p = 0.051), while the median deal size dropped by 54.4% (p = 0.011) in treated states relative to controls. Results hold when we include the control variables.

The consistent negative effects observed across all dependent variables reinforce the conclusion that legal constraints on side project ownership reduce the prevalence of high-growth entrepreneurial ventures. These findings support Hypothesis 1a and reject the alternative view that such institutional barriers might serve as a quality filter, increasing the likelihood of high-growth outcomes by deterring only low-commitment entrepreneurs.

Table 4. Main Regression Results: PPML and OLS Estimates on VC Activity and Deal Size.

Post							
Post * Treatment							
Population (ln)							
GDP Growth							

Taxation

College or above

Constant

Year FE
State FE
N obs
N clust
F-stat
Adj. R-squared
Note: Analysis based on state-level data from Refinitiv EIKON, restricted to the IT industry. The number of total VC deal

Additional Analysis:

Having found strong support for Hypothesis 1a that institutional constraints on side projects, i.e the Alcatel v. Brown ruling, significantly reduced the rate of high-growth ventures—we next turn to a set of supplementary analyses aimed at unpacking the underlying mechanisms. While individual-level data linking VC-backed firms to hybrid entrepreneurs are unavailable, we draw on additional sources and empirical strategies to explore whether the observed effects plausibly stem from a decline in hybrid entrepreneurship. Moreover, we conduct a series of robustness checks to rule out alternative explanations and to strengthen the causal interpretation of our findings, ensuring that the estimated effects are attributable to the Alcatel v. Brown decision rather than to other contemporaneous events or trends.

First, we examine whether early-stage investments—which are more likely to be affected from experimental efforts of side projects—were more negatively affected by the legal change than late-stage investments. Second, we assess whether the observed effects are concentrated in the IT sector, where side projects are especially prevalent and often serve as a pipeline for innovative ideas. Third, we add individual data from Current Population Data to check whether the ruling that constrained side projects affects entrepreneurship in the expected way, i.e. reducing the rate of hybrid entrepreneurship. Finally, we examine whether the negative effect on hybrid entrepreneurship is concentrated among individuals with higher opportunity costs—specifically, those with elevated levels of human capital. If the deterrent effect of the legal shock is disproportionately borne by this group, it would suggest that the ruling discouraged precisely the type of individuals most likely to initiate high-potential, growth-oriented startups. Such a finding would further support the interpretation that institutional constraints on side projects undermine not only the quantity but also the quality of entrepreneurial entry, that could eventually impact the rate of high-growth firms.

Differential Impact on Early- vs. Late-Stage Investments

Our first theoretical argument posits that institutional constraints on side projects could hinder high-growth entrepreneurship by limiting opportunities for early experimentation. Hybrid entrepreneurship often serves as a platform for testing and refining business ideas before full commitment, effectively functioning as an experimentation phase for new ventures (Folta et al., 2010; Thorgren et al., 2014; Luc et al., 2018). If this mechanism is disrupted, we expect the negative effects to be more pronounced for nascent firms—-which rely more on early experimentation with their business idea, than for more mature, established companies.

To test this prediction, we examine whether the impact of the Alcatel v. Brown ruling varies across different phases of the investment cycle. Specifically, we compare early-stage deals, which target newly formed ventures, with late-stage deals, which typically involve firms that have already achieved a certain level of operational maturity.11In an alternative analysis we used the age of start-ups instead of stage of development. In this case we compared VC investment in young firms (two years old or younger at the time of investment) and older firm. The results remain consistent and shows that institutional constraints on side project ownership disproportionately hinder the younger high-growth entrepreneurship.

The findings, presented in Table 5, support our argumentation. The ruling had a significantly stronger negative effect on early-stage deals (IRR = $e^{-0.330} = 0.719$), representing a 28.1% decline (p = 0.011), compared to a smaller and marginally significant effect on late-stage deals (IRR = $e^{-0.187} = 0.829$), corresponding to a 17.1% decline (p = 0.067). These results suggest that institutional restrictions on side projects disproportionately hinder high-growth ventures at the earliest stages of development, when experimentation is most critical.

Table 5. OLS Estimates on the Differential Effects Across VC Investment Stages.

Post	
Post * Treatment	
Population (ln)	
GDP Growth	
Taxation	
College or above	
Constant	
Year FE	
State FE	
N	
N_clust	

Note: Analysis is based on state-level data from Refinitiv EIKON, restricted to the IT industry. Control variables are sourc

jabbrv-ltwa-all.ldf jabbrv-ltwa-en.ldf*Main Analysis Excluding the IT Industry*

To strengthen the causal interpretation of our results, we next aim to rule out alternative explanations and assess whether the observed effects are indeed driven by the Alcatel v. Brown ruling, rather than by other contemporaneous factors. If the ruling, which expanded employers' rights to claim ownership over employees' side projects, primarily affected hybrid entrepreneurs, its impact should be most pronounced in

industries where side project activity is particularly common. Hybrid entrepreneurship is especially prevalent in IT industry, where employees frequently engage in side ventures while maintaining full-time employment (Schulz et al, 2016; Bretz et al., 2015; Folta et al., 2010). As previously noted, approximately 88% of software developers report participating in side projects (Stack Overflow, 2024), underscoring the centrality of such activity in this domain. Moreover, the Alcatel v. Brown case itself involved a software developer, directly implicating the IT sector and reinforcing expectations that the ruling would exert its strongest effects in this industry (Wu et al., 2024). Our main regression analysis (Table 4) confirmed a significant negative effect on the VC activity of the IT industry.

If this effect is indeed driven by the legal shock, we should observe negligible or statistically insignificant effects outside the IT industry. To test this, we conduct a falsification test by restricting the sample to non-IT industries. As shown in Table 6, none of the interaction terms between Post and Treatment are statistically significant in the non-IT subsample. This null result suggests that the ruling's impact was largely confined to the IT sector, lending further support to our interpretation that the Alcatel v. Brown decision was the key institutional driver behind the observed decline in high-growth entrepreneurial activity, and that the mechanism driving our results is a reduction of side projects.

Table 6. Non-IT Sector Analysis: PPML and OLS Estimates on VC Activity and Deal Size.

Post							
Post * Treatment							
Population (ln)							
GDP Growth							
Taxation							
College or above							
Constant							
Year FE							
State FE							
N obs							
N clust							
F-stat							
Adj. R-squared							

Note: Analysis based on state-level data from Refinitiv EIKON, restricted to the non-IT industries. Control variables are sc

Impact of the Ruling on Hybrid Entrepreneurship Among College-Educated Employees

The following analysis demonstrates that the Alcatel v. Brown ruling—stemming from a legal dispute concerning employee-led side projects—has tangible effects on hybrid entrepreneurship. Hybrid entrepreneurship typically represents a formalization stage in which employees, having initially explored new ideas through informal side projects, formalize these efforts constituting a venture while maintaining their primary employment. This pathway allows individuals to further commit to promising ideas without immediately foregoing the security of a salaried position (Folta et al., 2010). Although side projects are often informal and unreported, hybrid entrepreneurship serves as a measurable proxy for these activities done outside of their employment. We thus expect the Alcatel v. Brown ruling to disproportionately discourages hybrid entrepreneurship compared to other forms of entrepreneurship.

To empirically examine whether the ruling disproportionately affected hybrid entrepreneurs within the overall pool of entrepreneurs, we utilize individual-level data from the Current Population Survey (CPS), accessed through IPUMS (Floods et al., 2021). The CPS is a nationally representative monthly survey that covers approximately 65,000 households and 130,000 individuals. Each respondent is interviewed eight times over a 16-month period (in four consecutive months, followed by an eight-month gap, and then four additional monthly interviews). This rotating panel structure allows us to track transitions in employment status and entrepreneurial activity over time. This data has been used in research on hybrid entrepreneurship[11]This adds some complexities to create the hybrid entrepreneurship variable. We overcome them by following the steps suggested by Gänser-Stickler et al. (2022) in their Appendix. (e.g., Gänser-Stickler et al., 2022; Schulz et al., 2021). We create hybrid entrepreneurship as a binary variable equal to 1 if an individual was in full-time paid employment during the previous wave and reports multiple job holdings in the current wave—specifically, full-time employment as the primary job and self-employment as a secondary activity[22]This definition explicitly designates self-employment as a secondary job. In this paper, we adhere to Folta et al.'s (2010) original definition that is frequently used in the literature (e.g. Schulz et al., 2021), considering only those whose self-employment constitutes a secondary job. However, some scholars adopt a broader perspective, classifying individuals as hybrid entrepreneurs regardless of whether self-employment serves as their primary or secondary occupation (e.g., Raffiee & Feng, 2014; Schulz et al., 2016). Results hold when we do not differentiate whether individuals report being self-employed in the primary or secondary job.. The variable is coded as 0 for self-employed, non-hybrid individuals, i.e. those that report self-employment without maintaining a wage job.

To control for factors influencing entrepreneurial behaviour, we include a set of individual-level covariates: age, gender, marital status, race (white, black), parental status, and a binary indicator for high household income (above $75,000). These controls account for demographic and socioeconomic characteristics that may shape both the likelihood of entrepreneurial engagement and the opportunity costs associated with it. Descriptive statistics of the CPS variables used are reported in the Appendix, Table A2.

We estimate the effect of the Alcatel v. Brown ruling on transitions into entrepreneurship using a linear probability model. Columns 1 and 2 of Table 7 report estimates of the likelihood that individuals transition from full-time employment to any form of self-employment, while Columns 3 and 4 isolate transitions specifically into hybrid entrepreneurship, using transitions into other forms of entrepreneurship as the reference category. To address concerns regarding bad controls, we present results both without the full set of controls (Columns 1 and 3) and with them (Columns 2 and 4).

Importantly, Table 7 restricts the analysis to individuals with at least a college degree. This subgroup is of particular interest given theoretical expectations that the ruling would disproportionately affect more educated individuals for two reasons. First, the legal change specifically concerns ownership over innovative outputs, and its consequences are therefore most salient among knowledge workers—those with higher educational attainment and a greater likelihood of generating IP (Wu et al., 2024). Second, hybrid entrepreneurship is commonly employed as a strategy to reduce the risks associated with entrepreneurial entry for individuals facing higher opportunity costs, such as those with higher levels of human capital (Folta et al., 2010; Panos et al., 2014). We therefore expect the ruling's effects to be especially pronounced within this

segment of the workforce.

Consistent with this expectation, we find a statistically significant decline in entrepreneurial entry following the ruling. Specifically, the probability that a full-time employee transitions into any form of self-employment falls by approximately 0.1 percentage points ($p = 0.046$) in treated states after the ruling. Given a baseline entry rate of 0.6%, this corresponds to a relative decline of roughly 16.7%. This result remains robust when controlling for a rich set of demographic and socioeconomic characteristics. These findings offer initial evidence that the institutional constraints introduced by the ruling significantly dampened entrepreneurial activity among college-educated workers.

We then examine whether the ruling disproportionately affected hybrid entrepreneurship—defined as self-employment concurrent with wage employment. The results show a pronounced decline: the probability of transitioning into hybrid entrepreneurship falls by 4.1 percentage points ($p = 0.031$) in treated states. This effect also remains robust to the inclusion of covariates. Given a baseline rate of hybrid entry of 6.3%, the estimate reflects a substantial relative decline of approximately 65%.

Taken together, the CPS-based results provide compelling support for our theoretical argument: the Alcatel v. Brown ruling constrained entrepreneurship, particularly among hybrid entrepreneurs with higher levels of human capital. These individuals, who typically leverage hybrid entry to manage risk and opportunity costs, appear to have been disproportionately deterred by the increased legal uncertainty surrounding side project ownership. While we cannot directly demonstrate that the Alcatel v. Brown ruling reduced high-growth entrepreneurship by shrinking the pool of individuals with high levels of education from entering into entrepreneurship, the findings offer suggestive evidence that this mechanism may play an important role.

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Table 7. OLS Estimates of the Probability of Transitioning from Full-Time Employment to Self-Employment or Hybrid Entrepreneurship—-CPS Sample.

Post	
Post*Treatment	
Age	
Female	
Married	
White	
Black	
With children	

Fam income over 75,000$	
Fam income missing	
Constant	
State, Industry & Year FE	
N	
N clust	
Adj. R-squared	

Note: Analysis is based on Current Population Survey (CPS) individual-level data. Sample is restricted to respondents with

jabbrv-ltwa-all.ldf jabbrv-ltwa-en.ldf*Impact of the Ruling on Hybrid Entrepreneurship Among Non-College-Educated Employees*

We conduct a falsification test by repeating our analysis for individuals without a college degree. Unlike the significant negative effects observed for college-educated hybrid entrepreneurs, we find no impact of the ruling—neither on overall entrepreneurship nor on hybrid entrepreneurship—for less educated individuals (in Appendix, Table A3). This reinforces our argument that the Alcatel v. Brown ruling primarily constrained high human capital employees, who are more likely to pursue high-growth ventures through hybrid entrepreneurship. While we cannot directly link this mechanism to the observed decline in VC-backed startups due to data limitations, our findings suggest that reduced participation of educated hybrid entrepreneurs likely contributed to the drop in high-growth entrepreneurial activity.

jabbrv-ltwa-all.ldf jabbrv-ltwa-en.ldf**DISCUSSION AND CONCLUSION**

Side projects—and their eventual evolution into hybrid entrepreneurship— have become increasingly common, accompanied by a growing body of research recognizing their importance (Folta et al., 2010; Schulz et al., 2016; Petrova, 2012; Burke et al., 2008). These side efforts allow individuals to test and refine innovative ideas while retaining the financial security of salaried employment. Employers may benefit from such activity through enhanced motivation, creativity, and expanded networks among their employees (Ferreira, 2020; Marshall, 2019). However, they may also attempt to restrict side projects due to concerns over IP loss. In this context, institutional factors that define the boundaries of employer-employee IP rights are crucial (Alyavi & Schulz, 2024).

This paper leverages a quasi-natural experiment—the Alcatel v. Brown ruling in the U.S.—to provide causal evidence on how institutional constraints on side projects affect high-growth firms, measured as VC backed firms. We find that in states where the ruling became binding precedent (i.e., those lacking prior statutory protection for employee IP rights), there was a significant decline in the prevalence of VC backed firms. This includes reductions in the number of deals, average and median investment amounts, and successful exits. These effects are especially pronounced in the IT sector and in early-stage financing, both areas where side projects are more prevalent. Our findings suggest that restricting side projects undermines low-risk experimentation and narrows the pipeline of high-potential ventures.

We acknowledge the limitation posed by the absence of individual-level data that would allow us to identify which VC backed startups were founded by hybrid entrepreneurs. However, we try to causally assess the impact of the Alcatel v. Brown ruling—which restricted side project activity—on hybrid entrepreneurship.

Our findings show that the ruling significantly reduced entrepreneurial activity among hybrid entrepreneurs with graduate level education. This suggests that institutional constraints discourage high human capital individuals from experimenting with new business ideas through side ventures.

Taken together, our findings demonstrate that the Alcatel v. Brown ruling causally reduced both the prevalence of hybrid entrepreneurship and VC-backed startups in affected states. This contradicts the "filtering effect" hypothesis, which suggests that stricter legal barriers would elevate the high-growth ventures in affected states. Instead, we show that such constraints disproportionately discourage educated individuals from entering entrepreneurship via hybrid entrepreneurship, and that these legal barriers to join in side projects ultimately stifling the prevalence of high-growth, VC backed firms. The contraction in early-stage VC activity, particularly within the IT sector, points to a broader chilling effect on entrepreneurial ecosystem, with potential long-term consequences for innovation and economic dynamism.

jabbrv-ltwa-all.ldf jabbrv-ltwa-en.ldf**This paper makes several contributions to the literature on hybrid entrepreneurship and institutional constraints. First, by leveraging a quasi-natural experiment—the Alcatel v. Brown ruling—we provide causal evidence that institutional barriers to side projects significantly reduce high-growth entrepreneurial activity, measuring it as VC backed ventures. While we cannot directly observe whether VC backed firms were founded by hybrid entrepreneurs, the pronounced decline in VC activity in industries and regions where hybrid entrepreneurship is more prevalent offers suggestive evidence that such entrepreneurs play a meaningful role in seeding scalable startups. This supports the view that hybrid entrepreneurs' ability to experiment and de-risk ideas may make them especially attractive to early-stage investors (Cumming & Zhang, 2023; Petty et al., 2023), countering claims that their ongoing wage employment may signal low commitment. Hybrid entrepreneurship remains a valuable, often overlooked mechanism for innovation and economic growth—especially in knowledge intensive sectors and among individuals with high levels of education. Recognizing and supporting this form of entrepreneurial activity is essential for building a more inclusive, dynamic, and resilient entrepreneurial ecosystem (Schulz et al., 2016; Folta et al., 2010).**

Second, we contribute to the literature on the role of IP protection in shaping entrepreneurial ecosystems (Alyavi & Schulz, 2024**). Our results highlight a critical policy trade-off: while IP rules are designed to protect employers, they may also unintentionally hinder innovation by reducing the entrepreneurial options of ambitious and highly skilled individuals. Legal frameworks that fail to account for the realities of hybrid entrepreneurship risk suppressing the experimentation of highly capable individuals that could fuel the entrepreneurial landscape.**

Third, our analysis complements emerging work on the broader consequences of employer IP control. While Wu et al. (2024) examine the effects of such constraints on innovation performance, and Armstrong et al. (2024) explore their impact on disclosure behavior and inventor-employer matching, we focus on the effect on entrepreneurship and VC. Our study extends this literature by documenting how institutional constraints influence the prevalence of high-growth startups, thereby connecting employment law with entrepreneurial ecosystem dynamics.

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APPENDIX

Table A1. PPML Regression Results on Follow-On Venture Capital Deals

Post	
Post * Treatment	
Population (ln)	
GDP Growth	
Taxation	
College or above	
Constant	
Year & State FE	
N	
N Clusters	

Note: Analysis is based on state-level data from Refinitiv EIKON, restricted to the IT industries. Control variables are sou

Table A2. Descriptive Statistics of CPS Data

	N	Mean
Self-employment	504055	.006
Hybrid entrepreneurship11This includes only sample of individuals that transitioned to self-employment.	2826	.063
Treated	949860	.773
Age	989391	41.482
Female	989391	.477
Married	989391	.699
White	989391	.866
Black	989391	.062
Fam income >75,000$	989391	.461

Note: sample restricted to individuals with college degree or above; and individuals between 25 and 59 years old to mitigates confounding influences that are specific to younger individuals who are still in their qualification phase and older individuals who are approaching retirement (Schulz et al., 2021; Gänser-Stickler et al., 2022).

Table A3. OLS Estimates of the Probability of Transitioning from Full-Time Employment to Any Self-Employment or Hybrid Entrepreneurship (Below College Degree)

Post	
Treated*Post	
Age	
Female	
Married	
White	
Black	
With children	
Fam income >75,000$	
Fam income missing	
Constant	
State, Industry, Year FE	
N	
N clusters	
Adj R-squared	

Note: Analysis is based on Current Population Survey (CPS) individual-level data. Sample is restricted to respondents with