

Extended Abstract: The Impact of "Innovative SME" Certification on Financial Performance and Innovation: Evidence from Italy with Regional Perspectives.

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1. Introduction and Theoretical Framework

Innovation constitutes a fundamental driver of economic growth, productivity enhancement, and overall competitiveness in modern economies. Within this landscape, small and medium-sized enterprises (SMEs) play a particularly crucial role, serving as incubators for breakthrough technologies. However, these enterprises frequently face significant structural barriers to innovation, which predominantly include limited access to finance and deep information asymmetries. The theoretical rationale for public intervention to support SME innovation rests fundamentally on the presence of market failures, particularly those related to knowledge spillovers and capital market imperfections. Research and development activities naturally generate positive externalities that individual firms cannot fully appropriate, a dynamic that inevitably leads to an underinvestment in innovation. Furthermore, severe information asymmetries between innovative firms and external financiers create substantial financing gaps that disproportionately affect smaller enterprises. In response, governments worldwide have implemented various policy instruments designed to directly support innovation. While direct subsidies are common, certification schemes have gained increasing attention as effective mechanisms to reduce information asymmetries between innovative firms and potential external investors. This paper rigorously evaluates the causal impact of the Italian "PMI Innovativa" certification on multiple dimensions of firm performance, with a novel emphasis on the regional heterogeneity of these policy effects.

2. Institutional Context: The Italian "PMI Innovativa" Certification

The Italian government officially introduced the "PMI Innovativa" status through Legislative Decree No. 3 on January 24, 2015, establishing it as a strategic extension of the country's earlier "Startup Innovativa" program. This certification explicitly aims to identify, formally recognize, and comprehensively support established SMEs that demonstrate high innovation potential, providing them with regulatory benefits and significantly increased institutional visibility. To successfully qualify, candidate firms must first satisfy the general European criteria for SMEs, mandating fewer than 250 employees and either an annual turnover below fifty million euros or total corporate assets below forty-three million euros. Beyond these foundational requirements, candidate firms must meet at least two of three strict, innovation-specific criteria. The first criterion requires documented research and development expenditure equal to at least three percent of the greater value between the firm's total turnover and its annual production costs. The second criterion mandates the employment of highly qualified personnel; specifically, at least one-fifth of the workforce must hold a doctoral degree, or one-third must hold a master's degree. The third criterion requires the formal legal ownership of at least one patent, registered software, or other legally recognized intellectual property rights related to core business operations. Upon successful certification, these firms gain access to simplified regulatory procedures for equity

crowdfunding campaigns, attractive thirty percent tax deductions for investors, facilitated access to guarantee schemes, deferred payment of standard registration fees, flexible employment contracts, and streamlined corporate bankruptcy procedures.

3. Methodological Approach and Data Sources

To conduct a highly rigorous evaluation of this policy, researchers constructed a comprehensive empirical analysis combining rich data from multiple institutional sources. The official registry of certified innovative SMEs provided foundational baseline data, supplying specific certification dates and firm identifiers. This primary registry was supplemented by the AIDA Database, which supplied extensive financial and economic data on Italian companies, including balance sheet items, specific income statement variables, and precise sector classifications. Furthermore, PATSTAT was seamlessly integrated to provide detailed patent data from the European Patent Office. Finally, ISTAT Regional Statistics supplied vital regional-level indicators, including gross domestic product per capita and regional research intensity at the NUTS-2 geographical level. The empirical sample construction followed a highly rigorous matching procedure to ensure statistical validity. The primary treatment group consisted of firms that successfully obtained the certification between 2016 and 2021. To establish a valid counterfactual scenario, researchers carefully selected up to five uncertified control firms for each treated firm utilizing a precise propensity score matching technique based on the firm's sector, size class, organizational age, and carefully measured pre-treatment economic performance. The final analytical sample comprised 12,940 firm-year observations for analyses involving total equity and intangible assets, alongside 6,614 distinct observations dedicated to research expenditure and patent outcomes, ensuring at least two full years of both pre-treatment and post-treatment data spanning from 2015 to 2023. The identification strategy relies fundamentally on a Difference-in-Differences framework that systematically compares outcomes between certified treated firms and closely matched non-certified control firms, both before and after the official certification event occurred.

4. Empirical Findings on Direct Firm Performance

The baseline Difference-in-Differences estimates demonstrate unequivocally that the Italian certification generates statistically significant and economically substantial positive effects across all measured corporate outcome variables. On average, certified innovative firms experience a dramatic and highly significant increase in total equity capitalization when directly compared to their mathematically matched non-certified counterparts residing in the control group. Alongside this massive influx of investment capital, certified enterprises concurrently show substantial operational gains. These gains include an average verified increase in recognized intangible assets amounting to 247.5 thousand euros, a direct boost in dedicated research and development expenditure totaling 123.3 thousand euros, and a notable surge in tangible patenting activity, represented by an average measurable increase of 55.3 patent applications. The sheer overarching magnitude of the observed equity effect is particularly notable within the economic context of the study. This extraordinary financial increase strongly suggests that the certification actively performs a highly effective signaling function in the broader market, successfully attracting external venture investment by clearly validating the firm's technological competence. Furthermore, concurrent positive effects explicitly measured on intangible assets and research expenditure strongly indicate that certified firms do not merely attract more capital, but they actively reinvest these acquired funds directly into innovation-enhancing activities. This interconnected dynamic creates a highly beneficial virtuous cycle wherein the initial government

certification directly facilitates critical resource acquisition, which in turn financially supports and fundamentally enables further sustained innovation.

5. The Crucial Role of Regional Heterogeneity

A central thesis of this academic research is that these overwhelmingly positive policy impacts are not distributed uniformly across the Italian territory. The geographical distribution of the certifications heavily exhibits marked regional concentration, reflecting underlying, deeply historical disparities in basic industrial structure and aggregate innovation capacity. As documented in 2023, approximately forty-eight percent of all certified firms are firmly located in Northern Italy, with the highly industrialized region of Lombardy alone accounting for twenty-eight percent of the national total. The comprehensive regional empirical analysis definitively reveals massive and statistically significant regional heterogeneity in the actual treatment effects derived from the national policy. Firms located in the highly developed regions of Northern Italy uniquely experience certification effects that are approximately fifty-five percent larger than those identical effects observed in Southern Italy concerning the absolute growth of intangible assets. Even more striking, the positive equity capitalization effect measured in the North is fully sixty-three percent larger than the corresponding equity effect measured among firms residing in the South. The study rigorously identifies several core economic mechanisms that explain exactly why Northern Italian firms manage to extract significantly more operational benefit. First, the sophisticated development of local financial ecosystems plays a decidedly vital role. Northern regions organically host much more mature venture capital markets and highly specialized financial intermediaries, meaning the valuable economic signal provided by the government certification is much more rapidly and effectively interpreted by sophisticated investors localized in these geographic areas. Second, the historical presence of deep industrial districts in Northern Italy naturally creates thick, highly interconnected markets designed for innovation-related transactions. The data absolutely proves that physical location within an officially recognized industrial cluster directly enhances the certification effect by an impressive 68.4 thousand euros specifically applied to intangible assets. Finally, institutional complementarities dictate that the ultimate effectiveness of any national policy relies heavily on the preexisting strength of complementary regional institutions; Northern regions simply possess vastly stronger and more experienced technology transfer offices, advanced start-up incubators, and specialized corporate support services.

6. Robustness and Methodological Validity

To firmly guarantee the absolute reliability and strict statistical validity of these spatial and financial findings, the authors methodically executed a comprehensive battery of methodological robustness checks. The core validity of any Difference-in-Differences strategy absolutely relies on the fundamental parallel trends assumption, which dictates that in the strict absence of the policy treatment, the treated and control firms would have seamlessly followed essentially similar evolutionary trajectories. To meticulously assess this vital assumption, researchers conducted stringent placebo tests estimating the complex model utilizing strictly pre-treatment periods alongside a completely falsified treatment indicator. The results of these vital placebo tests are highly reassuring, particularly concerning dedicated research expenditure and total equity capitalization, where the fake treatment predictably shows absolutely zero significant statistical effect, thereby strongly supporting the foundational parallel trends assumption. Furthermore, researchers successfully conducted numerous alternative matching specifications, decisively proving that the core results remain completely stable and structurally robust even when applying

radically different caliper values and altered matching ratios during the initial statistical setup phase. To definitively ensure that aggregate macroeconomic results were not being artificially driven solely by massive urban economic hubs, researchers systematically excluded the major metropolitan areas of Milan and Rome from the entire data pool; reassuringly, the policy effects remained highly significant even in their complete absence. Intricate sector-specific estimates and deep firm-size interactions consistently demonstrated that positive financial signaling benefits are notably stronger for structurally smaller, less established enterprises, an observation that remains perfectly consistent with the concept of stronger signaling benefits being utilized by enterprises that lack long-term historical establishment.

6. Broad Policy Implications and Final Conclusions

The sweeping empirical findings of this comprehensive study carry profound, actionable implications for the future strategic design and targeted implementation of innovation policy at both national and regional levels. On a broad national scale, the sheer success of the program conclusively demonstrates that formal quality signaling mechanisms can effectively support innovative small enterprises while simultaneously maintaining relatively low administrative costs, especially when compared to direct financial subsidy programs. Crucially, the stark reality of the deeply observed regional heterogeneity strongly argues against the continued deployment of simplistic, one-size-fits-all national innovation policies. Because the national certification's ultimate effectiveness depends absolutely critically on the underlying strength of the local economic and institutional context, policymakers are urgently required to proactively consider and rapidly implement complementary regional interventions to forcefully maximize the impact of national policies in historically less developed territorial areas. Specifically, Southern Italian regions urgently require direct, heavy structural investments in localized venture capital funds, vastly improved university technology transfer offices, stronger university-industry linkages, and highly tailored business support networks dedicated to dynamically connecting isolated certified firms with necessary investors. In conclusion, while national certification schemes represent exceptionally effective and cost-efficient policy tools for promoting corporate innovation, policymakers must adopt place-sensitive approaches that gracefully combine national certification programs with powerful, complementary regional interventions to ensure that the ultimate economic benefits of innovation policy are broadly and equitably shared across all geographical territories.