# Impact of financial support policies on the growth of small and medium-sized enterprises in Hanoi

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***Abstract:*** *This study evaluates the impact of concessional loans from the Small and Medium Enterprise Development Fund (SMEDF) under Government Decree No. 39/2019/ND-CP dated May 10, 2019, on the revenue growth of small and medium-sized enterprises (SMEs) in Hanoi. Using a balanced panel dataset of 1,200 enterprises for the period 2017 - 2022, including 231 firms that accessed loans from the SMEDF, the study applies a combined Propensity Score Matching and Difference-in-Differences (PSM-DiD) approach. Specifically, propensity scores are estimated using a logit regression model, followed by nearest-neighbor matching with a caliper of 0.03 to construct a comparable control group (227 borrowing firms and 227 matched control firms). Subsequently, the DiD model is estimated with control variables including asset size, labor, and firm characteristics. The results indicate that the concessional credit policy has a positive and statistically significant impact on firms' revenue growth (DiD = 0.133; p < 0.001), corresponding to an increase of approximately 13.3% relative to the control group. Robustness checks confirm the consistency of the findings. Based on these results, the study recommends maintaining and expanding concessional credit sources for SMEs, strengthening supervision of fund utilization, and combining financial assistance with non-financial support measures to enhance the effectiveness of policy implementation.*

***Keywords:*** *Small and medium-sized enterprises; financial support; concessional credit; Small and Medium Enterprise Development Fund (SMEDF); Decree No. 39/2019/ND-CP.*

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## 1. Introduction

According to a report by the General Statistics Office, as of November 2023, Vietnam had approximately 900,000 operating enterprises, of which small and medium-sized enterprises (SMEs) accounted for about 97% of the total number of firms, employed around 51% of the workforce, and contributed more than 40% of GDP. This clearly demonstrates that the

SME sector plays a crucial role in economic development, job creation, and innovation. However, one of the major constraints facing SME development is limited access to financial resources. According to a 2018 report by the General Statistics Office, approximately 62% of SMEs in Hanoi experienced difficulties accessing credit from financial institutions, mainly due to a lack of collateral or their inability to meet the stringent lending requirements of commercial banks.

To support SMEs in overcoming financial barriers, the Government issued Decree No. 39/2019/ND-CP dated May 10, 2019, on the organization and operation of the Small and Medium Enterprise Development Fund (SMEDF). The Decree took effect on July 1, 2019, to provide concessional loan capital for SMEs, particularly innovative start-ups, enterprises participating in value chains, and firms with high growth potential. The Fund's lending interest rates range from approximately 6-8% per year, which is about 3-5 percentage points lower than prevailing commercial lending rates at the same time, thereby improving SMEs' access to finance.

Although this preferential credit policy is expected to promote business operations and expansion, the actual impact of financial resources from the SMEDF on firm performance remains to be empirically verified through quantitative research. Therefore, this study raises the following research question: does access to concessional loans from the SMEDF under Decree No. 39/2019/ND-CP positively affect the revenue growth of SMEs in Hanoi? If so, to what extent does the policy influence firm performance, and are the estimated effects influenced by firms' pre-existing characteristics prior to receiving concessional financing?

To address these questions, this study employs a combined Propensity Score Matching and Difference-in-Differences (PSM-DiD) approach to evaluate the policy's causal impact. The use of this method is motivated by the fact that the approval process for loans from the SMEDF is not random but depends on several criteria, such as firm asset size, labor capacity, operational characteristics, and the firm's potential participation in value chains. Therefore, a simple comparison between firms that receive loans and those that do not may lead to selection bias. The PSM technique helps match firms with similar observable characteristics to construct an appropriate control group, while the DiD model eliminates time-invariant unobserved factors, thereby providing more reliable estimates of the policy's impact.

## 2. Literature review and methodology

### *2.1. Theoretical framework*

The theory of financial constraints suggests that small and medium-sized enterprises (SMEs) often face significant difficulties in accessing external financing due to information asymmetry between lenders and borrowers. According to Stiglitz and Weiss (1981), under conditions of imperfect information, credit institutions tend to use credit rationing mechanisms, in which lending decisions are not determined solely by interest rates but also by factors such as collateral, credit history, and the perceived risk of the enterprise. As a result, many small firms, despite having strong growth potential, still encounter substantial barriers in accessing formal credit sources.

In this context, government financial support programs are considered an important policy instrument for alleviating the financial constraints faced by SMEs. These programs typically provide financing at concessional interest rates or with more flexible lending terms than commercial credit, thereby enabling firms to expand investment and improve operational performance. Research by Banerjee and Duflo (2014) shows

that improved access to credit can stimulate investment in machinery and equipment, expand production capacity, and enhance firms' business performance.

In Vietnam, several empirical studies on preferential credit programs have also documented the positive effects of financial support policies on firm performance. However, most previous studies have mainly employed traditional regression approaches, such as Ordinary Least Squares (OLS) or Fixed Effects models, which may not adequately address endogeneity and selection bias when evaluating policy impacts. Therefore, the application of more rigorous policy evaluation methods, such as the combined PSM-DiD approach, is necessary to provide more reliable empirical evidence.

*2.2. Data description*

This study uses a balanced panel dataset consisting of 1,200 small and medium-sized enterprises in Hanoi for the period 2017 - 2022. Among them, 231 enterprises obtained loans from the SMEDF after Decree No. 39/2019/ND-CP took effect, and these firms constitute the treatment group. The remaining enterprises (969 firms) did not receive financial support from the Fund and primarily relied on internal capital or loans from commercial banks; these firms constitute the control group.

The dataset includes the following main groups of variables:

(1) *Dependent variable:* the natural logarithm of firms' annual revenue (log_revenue), used to measure revenue growth.

(2) *Main independent variable:* a binary variable indicating whether a firm received a loan from the SMEDF under Decree No. 39/2019/ND-CP (loan_39).

(3) *Control variables:* including firm asset size (asset_size), number of employees (labor), a dummy variable indicating innovative start-up firms (innovative_startup), the degree of participation in value chains (value_chain), and the firm's industry sector (industry).

The dataset is structured as a balanced panel, with each enterprise observed over 5 years. This structure allows the study to track changes in firms' business outcomes over time while also facilitating the application of policy impact evaluation methods, such as PSM-DiD, to assess the effectiveness of the concessional credit program on firms' revenue growth.

*2.3. Econometric model*

To evaluate the impact of the credit support policy provided by the SMEDF on firms' revenue growth, this study employs a combined PSM-DiD approach. This method is implemented in two stages to address selection bias and estimate the policy's causal impact.

*Step 1: Propensity Score Matching*

First, the study estimates the probability that a firm gains access to loans from the SMEDF using observable firm characteristics prior to the policy's implementation. Specifically, a logit regression model is used to estimate the propensity score as follows:

$$P(loan\_39_i = 1 | X_i) = \Lambda(\beta_0 + \beta_1 asset\_size_i + \beta_2 labor_i + \beta_3 innovative\_startup_i + \beta_4 value\_chain_i + \beta_5 industry_i)$$

Where:

$\Lambda$ is the logistic cumulative distribution function;

$X_i$ is a vector of firm characteristics in 2018 (prior to the implementation of Decree No. 39/2019/ND-CP), including asset size, number of employees, innovative start-up characteristics, degree of participation in value chains, and industry sector.

After estimating the propensity scores, the study applies Nearest Neighbor Matching with a caliper of 0.03 to match each firm in the treatment group with the most comparable firm in the control group. This matching procedure creates a more balanced sample between the two groups, thereby reducing bias

arising from differences in firms' initial characteristics.

*Step 2: Difference-in-Differences*

Based on the matched sample, the study then applies the Difference-in-Differences (DiD) model to estimate the policy impact over time. The model is specified as follows:

$$log\_revenue_{it} = \alpha + \beta_1 loan\_39_i + \beta_2 post_t + \beta_3 (loan\_39_i \times post_t) + \gamma X_{it} + \delta_t + \varepsilon_{it}$$

Where:

- $log\_revenue_{it}$ is the logarithm of the revenue of firm i at time t;
- $loan\_39_i$ is a binary variable equal to 1 if the firm received a loan from the SMEDF;
- $post_t$ is a binary variable equal to 1 for the years from 2019 onward (after the Decree took effect);
- $loan\_39_i \times post_t$ is the DiD interaction term;
- $X_{it}$ is the vector of firm-level control variables.
- $\delta_t$ represents year fixed effects controlling for macroeconomic factors that vary over time;
- $\varepsilon_{it}$ is the random error term.

In this model, the coefficient $\beta_3$ is the parameter of primary interest, representing the causal impact of the preferential credit policy on firm revenue after controlling for both observed and unobserved time-invariant factors.

*2.4. Identification strategy*

A key challenge in evaluating the impact of financial support programs is the presence of selection bias and unobserved factors. In the context of this study, enterprises approved for loans from the SMEDF may already possess more favorable characteristics than firms that were not granted loans, such as stronger managerial capacity, broader business networks, or higher growth potential. Without properly addressing this issue, direct comparisons between the two groups could lead to biased estimates of policy impacts.

To address this problem, the study employs PSM to construct a control group with characteristics comparable to those of the treated firms. Specifically, PSM matches firms based on their probability of receiving financial support (propensity score), estimated from observable firm characteristics prior to the policy's implementation (Rosenbaum & Rubin, 1983; Caliendo & Kopeinig, 2008). This approach substantially reduces the initial differences between the treatment and control groups in terms of observable characteristics.

However, PSM can only address biases arising from observable variables, while unobserved factors that are stable over time (such as managerial capability or organizational culture) may still influence the estimation results. Therefore, the study further combines PSM with the DiD method to mitigate this issue.

The DiD approach estimates the policy impact by comparing changes in the outcome variable between the treatment and control groups before and after the policy intervention. This approach allows time-invariant unobserved factors to be excluded from the estimation, as they are assumed to affect both groups similarly throughout the study period.

An important assumption of the DiD method is the parallel trends assumption, which states that, in the absence of the policy intervention, the outcomes of the treatment and control groups would have evolved similarly over time. When this assumption holds, the divergence in trends observed after policy implementation can be interpreted as the policy's causal effect (Bertrand et al., 2004; Abadie, 2005).

The combination of PSM and DiD enhances the reliability of the estimates. Specifically, PSM ensures comparability between the treatment and control groups

based on observable characteristics, while DiD eliminates the influence of time-invariant unobserved factors. As a result, the PSM-DiD framework provides a robust analytical framework for evaluating the impact of SMEDF-concessional credit policies on firm performance.

## 3. Research results

### *3.1. Comparative analysis before matching*

*Table 1* presents the descriptive statistics of firm characteristics for the two groups of enterprises in 2018: firms that received loans from the SMEDF and those that did not. The year 2018 is selected as the baseline for comparison because it represents the period prior to the official implementation of Decree No. 39/2019/ND-CP, thereby reflecting the initial characteristics of firms before they gained access to the policy support.

**Table 1. Descriptive statistics of firm characteristics by group (2018)**

| Variable | Self-financed/ Commercial loan group (n = 969) | SMEDF loan group (n = 231) | Total (n = 1,200) |
|---|---|---|---|
| | Mean (Std. Dev.) | Mean (Std. Dev.) | Mean (Std. Dev.) |
| **Asset size** | 9.771 (1.482) | 10.560 (1.415) | 9.923 (1.501) |
| **Number of employees** | 6.921 (0.769) | 7.324 (0.737) | 6.999 (0.779) |
| **Innovative start-up** | 0.114 (0.317) | 0.316 (0.466) | 0.152 (0.360) |
| **Value chain participation** | 0.176 (0.381) | 0.303 (0.461) | 0.201 (0.401) |
| **Log revenue** | 9.274 (1.150) | 9.903 (1.158) | 9.395 (1.177) |

*Source:* Authors' calculations based on the enterprise survey (2025).

The results presented in *Table 1* indicate notable differences between firms that received loans from the Small and Medium Enterprise Development Fund (SMEDF) and those that did not prior to the policy's implementation. Specifically, firms in the treatment group exhibit larger average asset size (10.560 vs. 9.771) and a higher average number of employees (7.324 vs. 6.921). This suggests that enterprises selected to receive financial support tend to be larger than the general population of SMEs.

In addition, the proportion of innovative start-up firms in the treated group reaches 31.6%, significantly higher than the 11.4% in the non-treated group. Similarly, the proportion of firms participating in value chains in the treated group (30.3%) is higher than in the control group (17.6%). These results reflect the SMEDF's policy orientation, which prioritizes supporting firms with high growth potential and strong capacity to participate in production value chains.

Moreover, the initial revenue level of the treated firms is higher, with the average logarithm of revenue at 9.903, compared to 9.274 for the non-treated group. These differences suggest that directly comparing the business performance of the two groups without controlling for initial disparities may lead to biased estimates of policy impacts. Therefore, applying the PSM method to construct a control group with comparable characteristics is necessary before conducting the policy impact analysis using the (DiD) model.

To examine the statistical significance of these differences, the study performs t-tests on two key variables.

**Table 2. T-test comparison of innovative start-up characteristics**

| Group | Observations | Mean | Std. Error | Std. Dev. | 95% Confidence Interval |
|---|---|---|---|---|---|
| **Self-financed/ Commercial loan** | 969 | 0.114 | 0.010 | 0.317 | [0.094; 0.134] |
| **SMEDF loan** | 223 | 0.316 | 0.031 | 0.466 | [0.256; 0.376] |
| **Difference** | | -0.202 | 0.026 | | [-0.253; -0.152] |

*Note: t = -7.47, p < 0.001*

*Source:* Authors' calculations based on the research dataset (2025).

The test results *(Table 2)* indicate that the difference in the proportion of innovative start-ups between the two groups is -0.202 and is statistically significant at the 1% level (t = -7.88, p < 0.001). This confirms that the group receiving loans from the SMEDF has a significantly higher proportion of innovative start-up firms than the non-treated group.

These findings suggest that the SMEDF tends to prioritize supporting enterprises with innovative start-up characteristics, which is consistent with the policy objectives stipulated in Decree No. 39/2019/ND-CP. However, the substantial differences observed between the two groups prior to the policy's implementation also suggest the potential for selection bias, as firms with more favorable characteristics are more likely to gain access to financial support. This further underscores the need to apply the Propensity Score Matching method to construct a control group with more comparable characteristics before estimating the policy impact.

The T-test results in *Table 3* indicate a significant difference in revenue between the two groups of enterprises prior to the policy's implementation. Specifically, the average logarithm of revenue for firms that received loans from the SMEDF is 9.903, higher than the 9.274 for firms that did not receive loans. The average difference between the two groups is 0.629, with a t-statistic of -7.47 and p < 0.001, indicating that this difference is statistically significant at the 1% level.

These findings suggest that even before accessing financial resources from the SMEDF,

**Table 3. T-test comparison of firm revenue**

| Group | Observations | Mean | Std. Error | Std. Dev. | 95% Confidence Interval |
|---|---|---|---|---|---|
| **Self-financed/ Commercial loan** | 969 | 9.274 | 0.037 | 1.150 | [9.201; 9.346] |
| **SMEDF loan** | 231 | 9.903 | 0.076 | 1.158 | [9.753; 10.053] |
| **Difference** | | -0.629 | 0.084 | | [-0.795; -0.464] |

*Note: t = - 7.47, p < 0.001.*

*Source:* Authors' calculations based on the research dataset (2025).

firms that later received loans already had higher revenue levels than those that did not. This result partly reflects the SMEDF's approval mechanism. According to Decree No. 39/2019/ND-CP, the Fund prioritizes supporting enterprises operating in innovative start-up sectors, participating in value chains, or with high growth potential. Consequently, firms selected for financial support often possess stronger operational foundations from the outset.

The initial difference in revenue between the two groups suggests that a simple comparison of business outcomes after the policy's implementation may yield biased estimates of its impact. Therefore, this study applies the PSM method to construct a control group with more comparable characteristics, then employs the DiD model to identify the causal impact of the credit support policy on firms' revenue.

*3.2. Propensity Score Matching results*

To address selection bias, the study uses propensity-score matching. *Table 4* presents the results of the logit model used to estimate the propensity scores.

*Table 4* reports the estimation results of the logit model used to identify factors influencing the probability that firms gain access to loans from the SMEDF. The results show that the model is statistically significant overall, with an LR chi² value of 141.05 ($p < 0.001$), indicating that the explanatory variables effectively predict the probability of firms receiving loans.

Among the explanatory variables, the innovative start-up variable has the strongest effect on the likelihood of receiving loans from the Fund, with an estimated coefficient of 1.415 and high statistical significance ($p < 0.001$). This result suggests that enterprises operating in innovative start-up sectors have a substantially higher probability of accessing concessional financing compared with other firms. The value chain participation variable is the second most influential factor, with a coefficient of 0.795 ($p < 0.001$), indicating that firms involved in supply chains or production value chains are also more likely to receive financial support from the Fund. In addition, the manufacturing sector variable has a positive and statistically significant effect (coefficient = 0.542; $p = 0.001$).

**Table 4. Results of the Logit model for propensity score estimation**

| Variable | Coefficient | Std. Error | z-value | p-value | 95% Confidence Interval |
|---|---|---|---|---|---|
| **Asset size** | 0.294 | 0.201 | 1.47 | 0.143 | [-0.099; 0.688] |
| **Number of employees** | 0.253 | 0.386 | 0.65 | 0.513 | [-0.504; 1.009] |
| **Innovative start-up** | 1.415 | 0.186 | 7.61 | 0.000 | [1.050; 1.780] |
| **Value chain participation** | 0.795 | 0.179 | 4.44 | 0.000 | [0.444; 1.146] |
| **Manufacturing sector** | 0.542 | 0.157 | 3.44 | 0.001 | [0.234; 0.851] |
| **Constant** | -6.942 | 0.994 | -6.98 | 0.000 | [-8.891; -4.993] |

*Note: N = 1,200; LR chi²(5) = 141.05; Prob > chi² = 0.000; Pseudo R² = 0.120*

*Source:* Authors' calculations based on the research dataset (2025).

In contrast, the variables asset size and number of employees are not statistically significant at the 5% level. This finding suggests that the SMEDF's loan approval process does not primarily depend on the absolute size of the enterprise but rather focuses on the nature of business activities and development potential, particularly for innovative start-ups or firms participating in value chains.

Based on the estimated propensity scores, the study proceeds to match firms using the Nearest Neighbor Matching method with a caliper of 0.03. The results show that four firms in the treatment group fall outside the region of common support and are therefore excluded from the analysis sample. After removing these observations, 227 firms in the treatment group were successfully matched with 227 firms in the control group, creating a more balanced dataset for conducting the DiD analysis in the subsequent section.

*Table 5* presents a comparison of average revenue levels between firms that received loans from the SMEDF (treatment group) and those that did not (control group) before and after Propensity Score Matching.

Before matching, the average logarithm of revenue for firms receiving loans is 9.903, higher than the 9.274 for the control group. The difference between the two groups is 0.629, with a t-statistic of 7.47, indicating it is highly statistically significant. This result reflects the fact that enterprises supported by the SMEDF typically possess stronger operational foundations from the outset.

After applying the Nearest Neighbor Matching method, the revenue difference between the two groups decreases to -0.024, with a t-statistic of -0.20, and is no longer statistically significant at conventional significance levels. This result indicates that the matching procedure substantially reduces the initial differences between the two groups of firms, thereby creating a control group with characteristics comparable to those of the treatment group.

**Table 5. Comparison of firm revenue before and after matching**

| | Mean (Treatment group) | Mean (Control group) | Difference | Std. Error | t-value |
|---|---|---|---|---|---|
| **Before matching** | 9.903 | 9.274 | 0.629 | 0.084 | 7.47 |
| **After matching (ATT)** | 9.878 | 9.901 | -0.024 | 0.117 | -0.20 |

*Source:* Authors' calculations based on the research dataset (2025).

These findings suggest that the PSM method successfully achieves balance between the treatment and control groups, thereby providing a suitable dataset for the subsequent DiD analysis aimed at evaluating the impact of the SMEDF's concessional credit policy on firms' revenue.

*3.3. Balance test after matching*

To assess the quality of the matching procedure, the study conducts balance tests for key firm characteristics.

The balance test results indicate that the matching procedure significantly improves comparability between firms that received loans from the SMEDF and those in the control group. Specifically, for the asset size variable, the bias decreases from 54.4% to 2.6%, corresponding to a reduction of approximately 95.2%. For the innovative start-up variable, the bias decreases from 50.8% to 3.3%, equivalent to a reduction of 93.5%. Meanwhile, the bias for the value chain participation variable declines from 29.9% to 10.4%, corresponding to a reduction of 65.2%.

**Table 6. Results of the balance test**

| Variable | | Mean (Treatment group) | Mean (Control group) | % Bias | % Bias reduction | t-value | p-value |
|---|---|---|---|---|---|---|---|
| **Asset size** | Before matching | 10.560 | 9.771 | 54.4 | | 7.33 | 0.000 |
| | After matching | 10.527 | 10.565 | −2.6 | 95.2 | −0.28 | 0.779 |
| **Innovative start-up** | Before matching | 0.316 | 0.114 | 50.8 | | 7.88 | 0.000 |
| | After matching | 0.304 | 0.291 | 3.3 | 93.5 | 0.31 | 0.759 |
| **Value chain participation** | Before matching | 0.303 | 0.176 | 29.9 | | 4.34 | 0.000 |
| | After matching | 0.291 | 0.247 | 10.4 | 65.2 | 1.06 | 0.291 |

*Source:* Authors' calculations based on the research dataset (2025).

Overall, the bias indicators for all explanatory variables decrease substantially after matching, indicating that the matching process significantly improves the balance of characteristics between the two groups of enterprises. Moreover, statistical tests conducted after matching indicate that there are no longer statistically significant differences between the two groups for the observed variables ($p > 0.05$). This result suggests that the matched dataset has achieved the necessary balance, providing a suitable basis for conducting the DiD analysis to evaluate the impact of the concessional credit policy in the subsequent sections of the study.

**Table 7. Summary indicators of matching quality**

| Sample | Ps $R^2$ | LR $chi^2$ | p-value | Mean Bias | Median Bias | B | R |
|---|---|---|---|---|---|---|---|
| **Before matching** | 0.110 | 129.09 | 0.000 | 45.0 | 50.8 | 84.6 | 1.35 |
| **After matching** | 0.002 | 1.28 | 0.734 | 5.4 | 3.3 | 10.6 | 1.09 |

*Source:* Authors' calculations based on the research dataset (2025).

The summary indicators also confirm that the matching process achieves a high level of quality. Specifically, the Pseudo $R^2$ value decreases from 0.110 to 0.002, indicating that firm characteristics can no longer meaningfully explain the differences between the two groups after matching. Similarly, the LR $chi^2$ value declines substantially from 129.09 to 1.28 and is no longer statistically significant ($p = 0.734$), suggesting that the observable differences between the two groups have been largely eliminated.

In addition, the mean bias decreases from 45.0% to 5.4%, which is well below the commonly accepted threshold of 25%. The B statistic also declines from 84.6 to 10.6, remaining below the 25 thresholds typically used in matching-based studies. These results indicate that the matching process significantly improves the balance between the two groups of firms, thereby creating a control group with characteristics comparable to those of the treatment group. This enhances the reliability of the policy impact estimates obtained in the subsequent analysis.

*3.4. PSM-DiD estimation results*

After ensuring the quality of the matching procedure, the study estimates the DiD model using the matched sample.

The estimation results of the DiD model show that the coefficient of the interaction variable between the treatment group and the post-policy period is 0.133 and statistically significant at the 1% level ($t = 4.15$, $p < 0.001$). This result indicates that, after controlling for other factors, the credit support policy provided by the SMEDF has a positive impact on the revenue of small and medium-sized enterprises. Since the dependent variable is measured as the logarithm of revenue, this coefficient can be approximately interpreted as an increase of about 13.3% in revenue for

**Table 8. Results of the PSM-DiD estimation model**

| Variable | Coefficient | Std. Error (Robust) | t-value | p-value | 95% Confidence Interval |
|---|---|---|---|---|---|
| **Treatment group (loan_39)** | -0.009 | 0.026 | -0.35 | 0.724 | [-0.060; 0.041] |
| **Post-policy period (post)** | 0.380 | 0.033 | 11.48 | 0.000 | [0.315; 0.445] |
| ***DiD effect (did)*** | ***0.133*** | ***0.032*** | ***4.15*** | ***0.000*** | ***[0.070; 0.196]*** |
| **Asset size** | 0.603 | 0.019 | 30.93 | 0.000 | [0.564; 0.641] |
| **Number of employees** | 0.279 | 0.037 | 7.55 | 0.000 | [0.206; 0.351] |
| **Innovative start-up** | 0.140 | 0.017 | 8.10 | 0.000 | [0.106; 0.174] |
| **Year 2018** | 0.085 | 0.026 | 3.31 | 0.001 | [0.035; 0.136] |
| **Year 2019** | -0.208 | 0.028 | -7.37 | 0.000 | [-0.263; -0.153] |
| **Year 2020** | -0.763 | 0.028 | -27.29 | 0.000 | [-0.818; -0.708] |
| **Year 2021** | -0.492 | 0.026 | -18.73 | 0.000 | [-0.544; -0.441] |
| **Constant** | 1.369 | 0.097 | 14.06 | 0.000 | [1.178; 1.560] |

*Note: N = 2,394; F(10, 2383) = 1779.99; Prob > F = 0.000; R-squared = 0.901; Root MSE = 0.359*

*Source:* Authors' calculations based on the research dataset (2025).

firms receiving loans compared with the control group.

Regarding other variables in the model, the coefficient of the treatment group variable (loan_39) is -0.009 and is not statistically significant (p = 0.724). This result indicates that, after controlling for observable characteristics through the matching process, there is no significant difference in revenue between the two groups prior to the policy implementation. This finding further confirms that the matching procedure successfully creates a comparable control group.

The coefficient for the post-policy period variable (post) is 0.380 and is statistically significant at a high level (p < 0.001), reflecting an overall upward trend in firm revenue for both groups during 2019-2022 compared with the earlier period.

All control variables in the model show positive, statistically significant effects on firm revenue. Among them, asset size has the strongest impact with a coefficient of 0.603 (p < 0.001), indicating that firms with larger asset bases tend to generate higher revenue. The number of employees is positively associated with a coefficient of 0.279 (p < 0.001), reflecting the role of labor scale in expanding business operations. The innovative start-up variable also has a positive effect with a coefficient of 0.140 (p < 0.001), suggesting that firms with innovative characteristics often achieve better business performance.

The year dummy variables capture revenue trends over time. The results show that revenue in 2018 is higher than that of the base year 2017 (coefficient = 0.085, p = 0.001). However, the years 2019, 2020, and 2021 exhibit lower revenue levels compared with the reference year 2022. Notably, the 2020 coefficient is -0.763 ($p < 0.001$), indicating a significant negative impact of the COVID-19 pandemic on business operations during that period.

Regarding model fit, the R-squared value of 0.901 indicates that the independent variables explain approximately 90.1% of the variation in firm revenue. The F-statistic of 1779.99, with $p < 0.001$, suggests that the model is statistically significant overall and appropriate for analyzing the policy's impact.

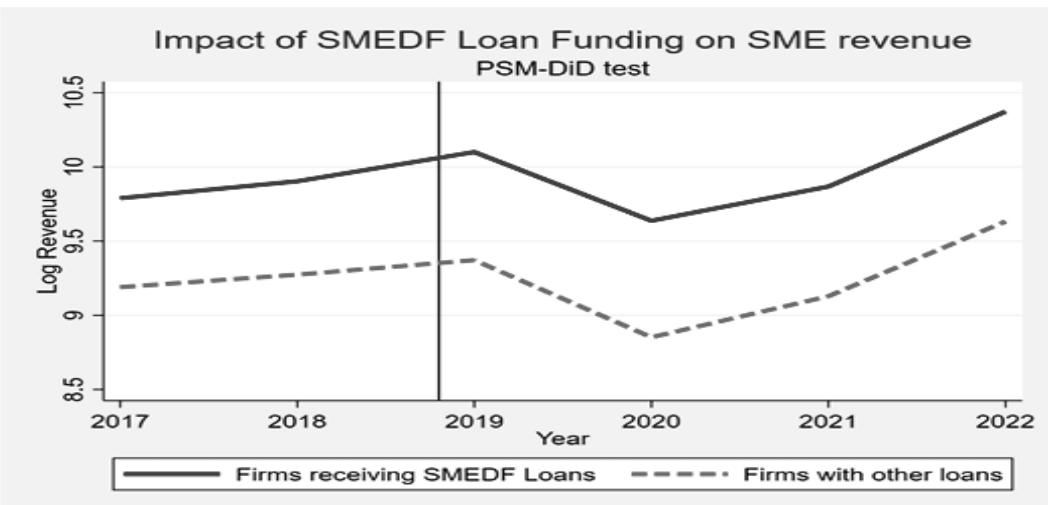
*3.5. Parallel trends test*

An important assumption of the DiD method is the parallel trends assumption, which states that, in the absence of policy intervention, the trends in the outcome variable between the treatment and control groups would evolve similarly over time. To test this assumption, the study plots the trends in average revenue for the two enterprise groups over the study period.

The results in *Figure 1* show that during the period prior to policy implementation (2017-2018), the revenue trends of the treatment and control groups are nearly parallel, indicating negligible differences in growth rates. This provides supporting evidence for the parallel trends assumption required for the DiD method.

After the policy was implemented in 2019, the gap between the two trend lines widened, indicating that the revenue of firms receiving loans from the SMEDF increased more rapidly than that of the control group. In Figure 1, a vertical line is placed at the point corresponding to 2018.8 to mark the time when Decree No. 39/2019/ND-CP came into effect. The noticeable change in revenue trends after this point provides additional visual evidence of the positive impact of the credit support policy on firms' business performance.

**Figure 1. Revenue trends of the two groups of enterprises over time**




*Source:* Authors' calculations and compilation from SMEDF data for the period 2017 - 2022 (2025).

The trend graph shows that during the period 2017-2018, the revenues of the two groups of enterprises move in relatively parallel directions, thereby providing further evidence in support of the parallel trends assumption of the DiD method. This implies that, prior to the policy's implementation, changes in revenue between the two groups followed a similar pattern.

After Decree No. 39/2019/ND-CP took effect in mid-2019, the gap between the two trend lines gradually widened. Specifically, the revenue of firms receiving loans from the SMEDF tends to increase more rapidly than that of the control group, indicating the positive impact of the credit support policy on firm performance.

In addition, *Figure 1* also reflects the influence of macroeconomic factors affecting both groups of enterprises. In 2020, the revenues of both groups declined significantly due to the Covid-19 pandemic. However, during the subsequent recovery period (2021-2022), firms receiving loans from the SMEDF exhibited faster revenue growth than the control group, thereby widening the revenue gap between the two groups in the post-policy period.

## 4. Discussion and robustness checks

### *4.1. Interpretation of results*

The study's results indicate that the credit support policy provided by the SMEDF under Decree No. 39/2019/ND-CP has a positive impact on the revenue growth of small and medium-sized enterprises in Hanoi. Specifically, after controlling for other factors, the revenue of firms receiving loans from the Fund increases, on average, by approximately 13.3% relative to the control group. This level of impact can be considered substantial in the context of SMEs, which often face significant constraints in accessing formal credit sources.

Several mechanisms may explain this positive effect. *First,* the Fund's concessional lending interest rate, ranging from approximately 6 - 8% per year, is about 3 - 5% lower than prevailing commercial lending rates during the same period. This helps reduce firms' financial costs, thereby facilitating business investment and expansion of production and business activities. *Second,* the relatively long loan maturity, typically ranging from three to seven years, provides firms with sufficient time to implement medium- and long-term investment projects without immediate repayment pressure. *Third,* access to financing from the SMEDF may also serve as a positive signal regarding a firm's capability and growth potential, thereby enabling firms to obtain additional financing from other financial institutions.

However, it should be noted that the estimated impact of approximately 13.3% reflects the average policy effect across the entire sample. In practice, the magnitude of the effect may vary across different groups of firms depending on their specific characteristics. For example, innovative start-up firms may benefit more from the policy because they typically require substantial initial investment capital while facing greater difficulties in accessing credit from commercial banks. Therefore, examining heterogeneous effects across different types of firms could be an important direction for future research to understand better the effectiveness of credit support policies for the SME sector.

### *4.2. Comparison with previous studies*

The findings of this study are consistent with previous research on the impact of financial support programs on SMEs. Many empirical studies have shown that improving access to credit can help firms increase

investment, expand operational scale, and improve business performance. In the Vietnamese context, several previous studies have also found that preferential credit programs have positive effects on SME performance. However, most of these studies primarily rely on traditional estimation methods, such as OLS regression or Fixed-Effects models, which may not adequately address endogeneity arising from initial differences across firms.

The distinguishing feature of this study lies in the application of a combined PSM-DiD approach to enhance the reliability of the estimation results. This approach allows the study to control for observable differences between firms receiving loans and those that do not, while also eliminating the influence of unobserved factors that remain constant over time. As a result, the estimated results are more likely to reflect the causal impact of the credit support policy.

The estimated magnitude of the policy effect in this study, with an average revenue increase of approximately 13.3%, is also comparable with findings reported in many international studies on the effectiveness of SME support programs. Nevertheless, direct comparisons across studies should be made cautiously due to differences in economic contexts, policy implementation mechanisms, and measurement approaches across countries.

*4.3. Robustness checks*

To assess the reliability of the estimation results, the study conducts several robustness checks using different approaches.

*First,* the study varies the caliper width in the matching procedure to examine the sensitivity of the results to the matching specification. When testing different caliper values (0.01, 0.03, and 0.05), the estimated DiD coefficient ranges from 0.12 to 0.14 and remains statistically significant. This indicates that the results are not sensitive to the specific choice of the caliper parameter.

*Second,* the study examines the influence of outliers by excluding the top and bottom 5% of observations in the revenue distribution. After implementing this adjustment, the DiD coefficient remains at 0.128 and remains statistically significant, suggesting that extreme observations do not drive the results.

*Third,* the study conducts subgroup analyses across firm types to examine whether the policy impact varies by firm characteristics. The results indicate that the policy effect is stronger for innovative start-up firms, with estimated impacts ranging from approximately 16% to 18%. In contrast, the estimated impact for traditional firms is lower, ranging from approximately 10% to 11%. This finding suggests that the SMEDF's credit support policy is more effective for firms with innovative characteristics, consistent with the policy's strategic orientation.

*4.4. Limitations of the study*

Although this study provides empirical evidence on the positive impact of the credit support policy implemented through the SMEDF, several limitations should be considered when interpreting the results.

*First,* although the combined PSM-DiD approach helps control for selection bias based on observable characteristics and unobserved factors that remain constant over time, it cannot eliminate the influence of unobserved factors that vary over time. For example, if firms receiving loans simultaneously experience improvements in managerial capability, business strategy, or technological innovation during the study period, and these factors are not captured in the dataset, the estimated results may still be subject to some degree of bias.

*Second,* the study focuses primarily on the policy's impact on firms' revenue and does not examine other important performance indicators, such as profitability, labor productivity, or firm survival. In practice, revenue growth does not necessarily imply improved business efficiency if production or financial costs increase proportionately.

*Third,* the post-policy observation period remains relatively short, spanning only 2019 to 2022. Within this timeframe, the year 2020 was significantly affected by the Covid-19 pandemic, which may have influenced firms' business performance. Therefore, the study cannot fully capture the long-term effects of the credit support policy on firm development.

*Fourth,* the dataset used in this study includes only small- and medium-sized enterprises located in Hanoi. Consequently, the findings may not fully reflect the policy's impact on SMEs in other regions of Vietnam, where economic conditions, market development, and access to financial resources may differ.

## 5. Conclusion and policy implications

### *5.1. Conclusion*

This study employs a combined PSM-DiD approach to evaluate the impact of the credit support policy provided by the SMEDF under Decree No. 39/2019/ND-CP on the revenue growth of small and medium-sized enterprises in Hanoi. The estimation results indicate that, after controlling for selection bias and unobserved time-invariant factors, the credit support policy implemented through the SMEDF has a positive and statistically significant impact on firms' revenue. Specifically, the revenue of firms receiving loans from the Fund increases on average by approximately 13.3% compared with firms that did not gain access to the Fund.

These findings are particularly meaningful in the context where the SME sector plays a central role in the Vietnamese economy but continues to face considerable constraints in accessing formal credit sources. The empirical evidence from this study suggests that well-designed, effectively implemented government financial support programs can improve firms' access to capital and promote the growth of the SME sector.

### *5.2. Policy implications*

Based on the research findings, several policy implications can be proposed to enhance the effectiveness of credit support programs for small and medium-sized enterprises.

*First,* it is necessary to maintain and gradually expand the scale of the SMEDF in order to support a larger number of enterprises. The empirical results indicate that credit support policies have a positive effect on firms' revenue growth. However, any expansion of the Fund should be accompanied by appropriate monitoring and risk management mechanisms to ensure the effective use of financial resources.

*Second,* the policy orientation that prioritizes support for innovative start-ups and firms participating in value chains appears appropriate and should continue to be maintained. The subgroup analysis indicates that the policy impact is stronger for innovative start-up firms than for traditional enterprises, suggesting that allocating resources to high-growth-potential firms may yield greater economic benefits.

*Third,* additional non-financial support measures should be strengthened, such as business management consulting, market linkage support, human resource training, and technology transfer programs. In many cases, concessional financing constitutes only a necessary condition for firm development, while managerial knowledge, technological

capabilities, and market access are critical factors for long-term sustainability.

*Fourth,* monitoring and evaluation mechanisms for the use of loan capital should be strengthened to ensure that financial resources are utilized effectively and for their intended purposes. Close monitoring of firms' performance after receiving financial support can also enable policymakers to identify emerging challenges and implement timely support measures.

*Fifth,* future studies should expand the scope of analysis to other localities and incorporate additional outcome indicators beyond revenue, such as profitability, labor productivity, job creation capacity, and firm survival rates. Such analyses would provide a more comprehensive understanding of the effectiveness of SME support programs and offer stronger evidence to inform future policy design.

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