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Is Education Reform an Enabler of Firm Financial Performance? A Sharp Regression Discontinuity Design in Vietnam

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KEYWORDS

CEO education, education reform, firm performance, regression discontinuity design (RDD), Vietnam.

ABSTRACT

This study investigates whether national education reform can enhance firm performance by shaping the human capital of corporate leaders. Exploiting Vietnam's 1986 Đổi Mới reform as a quasi-natural experiment, we implement a sharp regression discontinuity design (RDD) using CEO birth year as the assignment variable. Our findings show that firms led by CEOs exposed to post-reform education achieve significantly higher financial performance, with a 1.44% increase in return on assets (ROA) and a 3.63% increase in return on equity (ROE) relative to sample averages. These effects are particularly pronounced among female CEOs, those with postgraduate degrees, and CEOs with equity ownership, indicating that reform-era education interacts with both agency incentives and demographic traits. By anchoring CEO characteristics in institutional origins, this study extends the upper echelons and human capital theories, and provides novel causal evidence on how macro-level policy reforms can generate micro-level organizational returns in emerging market contexts.

1. Introduction

The quality of corporate leadership plays a central role in shaping firms' strategic choices, risk-taking behavior, and performance. A large body of research documents that CEO attributes—such as demographics, education, and prior experiences—significantly influence corporate outcomes (Bertrand & Schoar, 2003; Graham et al., 2013). Rooted in upper echelons theory (Hambrick & Mason, 1984), this literature emphasizes that observable and acquired CEO characteristics serve as key inputs into managerial decision-making. However, most existing studies focus on individual-level determinants and give limited attention to the institutional environments that shape executive human capital, particularly the formative role of national education systems. As a result, causal evidence on whether systemic education reform improves firm performance through enhanced leadership quality remains scarce, especially in emerging markets undergoing rapid institutional change.

Vietnam offers a compelling context to address this gap. Following the introduction of the Đổi Mới reform in 1986, the country implemented sweeping changes to its education system, transitioning from a centralized, resource-constrained model to one that is more decentralized, market-oriented, and performance-driven (Hanh & Vinh, 2021). These reforms expanded access to education at all levels, increased investment in human capital, modernized curricula, and encouraged private sector participation. Importantly, they also marked a shift away from rote learning toward competency-based education, improving the alignment

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between educational outcomes and labor market needs. As a result, cohorts educated after 1986 were exposed to substantially different institutional conditions than those educated earlier.

Against this backdrop, this paper examines whether exposure to post-reform education causally enhances firm performance through the channel of CEO educational attainment. We employ a sharp regression discontinuity design that exploits the 1986 reform as a cutoff to identify CEOs who were of schooling age during or after the reform. We then compare the financial performance of firms led by these "post-reform" CEOs with those led by "pre-reform" CEOs, using return on assets (ROA) and return on equity (ROE) as key outcome measures.

Our empirical strategy proceeds in two stages. First, we show that CEOs born after 1986 are significantly more likely to attain higher levels of formal education, particularly postgraduate degrees, consistent with the expansion and improvement of Vietnam's education system following Đổi Mới. Second, leveraging the discontinuity around the reform cutoff, we find that firms led by post-reform CEOs exhibit significantly higher ROA and ROE. These effects are more pronounced among female CEOs, CEOs with equity ownership, and those with postgraduate education, suggesting that education reform interacts with leadership characteristics and incentive structures to shape firm outcomes.

This study contributes to the literature in several ways. First, by focusing on a systemic policy reform rather than individual CEO traits alone, we link macro-level institutional change to micro-level corporate performance. Second, we provide novel causal evidence from an emerging market context, complementing prior studies that largely examine elite education and managerial outcomes in developed economies. Third, our findings extend upper echelons theory by incorporating the role of structural conditions under which executive human capital is formed, highlighting education reform as an upstream source of variation in leadership quality.

The results also carry important policy implications. For governments in developing and transition economies, education reform should be viewed not only as a social investment but also as a long-term economic strategy. By demonstrating that reforms such as Đổi Mới generate durable firm-level performance gains through enhanced executive human capital, this study underscores the value of sustained investments in education quality, access, and skills development. In Vietnam, these insights align with ongoing national strategies aimed at building a highly skilled, adaptable leadership pipeline to support productivity, competitiveness, and long-term economic growth.

The remainder of the paper is organized as follows. Section 2 reviews the related literature and identifies research gaps. Section 3 describes the research design and estimation strategy. Section 4 presents the empirical results, and Section 5 concludes with implications and directions for future research.

2. Theoretical literature review framework

2.1. Upper echelons theory

Upper echelons theory (Hambrick & Mason, 1984) posits that firms reflect the cognitive bases, experiences, and values of their top executives rather than acting as purely rational entities. Strategic decisions, including investment, governance, innovation, and risk-taking, are shaped by both observable executive traits (e.g., age, gender, education) and less visible attributes such as ideology, personality, and values.

With recent advancements in data analytics and the growing availability of biographical data, researchers have begun to explore more nuanced CEO attributes such as overconfidence, narcissism (Cragun et al., 2020), dual roles (Krause et al., 2014), and CEO–TMT interactions (Georgakakis et al., 2022). This evolution in the literature reflects a broader recognition that executives are not homogeneous decision agents. Rather, they are embedded within historical, institutional, and psychological contexts. However, much of the research following upper echelons theory has treated CEO traits as static and individualistic, focusing on who the CEO is, without exploring how those traits are formed. Our study extends this theory by examining how one of the most fundamental CEO traits, education, is not only a personal achievement but a product of institutional conditions, particularly national education policy and reform.

2.2. Human capital theory

While upper echelons theory explains why executive characteristics matter, it does not delve deeply into the mechanisms through which these traits affect firm outcomes. To fill this gap, we turn to human capital theory (Becjer, 1964), which asserts that education and experience enhance an individual's productivity and decision-making capacity. Education is a key form of human capital that improves analytical thinking, information processing, and leadership capability. In the context of top executives, this theoretical lens suggests that CEOs with more advanced educational attainment, especially those with graduate or postgraduate degrees, are better equipped to manage complexity, uncertainty, and risk. Studies have shown that CEOs with MBA degrees are more likely to pursue aggressive growth strategies and M&A deals (King et al., 2016), while those with legal training demonstrate more conservative behavior in financial disclosures due to greater awareness of litigation

risks (Bamber et al., 2010). In addition, one possible explanation for this assertive behavior is that MBA-trained executives possess stronger strategic decision-making capabilities, enabling them to more effectively identify and leverage opportunities that enhance firm value (Geletkanycz & Black, 2001).

Moreover, education can enhance not only cognitive ability but also social capital through professional networks, alumni connections, and exposure to diverse managerial paradigms (Wang & Yin, 2018). Therefore, CEO education is not merely an indicator of capability but also a vehicle for accessing resources, building legitimacy, and developing leadership identity. By applying human capital theory, we argue that the effects of CEO education on firm performance are not incidental, but causal, particularly when the education itself is shaped by systemic reform that improves quality and relevance. In such contexts, the value of education as human capital is significantly elevated, making it a strategic lever for firms operating in dynamic and transitional economies.

2.3. Institutional and educational reform perspective

While upper echelons theory and human capital theory emphasize individual traits and capabilities, they often understate the institutional forces that shape these attributes. In emerging and transitional economies, where national institutions such as education systems undergo rapid reform, structural context plays a decisive role. Vietnam offers a compelling setting to examine this issue. The 1986 Đổi Mới education reform represented a fundamental transformation rather than a marginal policy adjustment, shifting the system from a centralized, ideology-driven model to one that was decentralized, skill-oriented, and internationally aligned. The reform expanded access to education, diversified school types, modernized curricula, and introduced competency-based assessment (Hanh & Vinh, 2021).

Consequently, CEOs educated after 1986 were likely exposed to more practical and market-oriented learning environments. These "post-reform CEOs" experienced not only higher educational attainment but also a qualitatively different educational paradigm. This allows education reform to be conceptualized as an institutional shock that generates cohort-based variation in executive human capital. Importantly, this variation is largely exogenous to individual ability, facilitating clearer causal identification. Such an institutional perspective is particularly valuable in emerging markets, where large-scale reforms create distinct pre- and post-policy environments. Incorporating this macro-level lens enhances our understanding of how executive characteristics evolve across policy regimes and how institutional change translates into firm-level strategic behavior.

2.4. Literature gaps and causal identification framework

Despite growing research on CEO characteristics and their influence on firm outcomes (Bertrand & Schoar, 2003a; Custódio & Metzger, 2014), the literature remains fragmented in several ways. First, much of the evidence focuses on elite or Western education, particularly in developed economies. For example, studies have examined how MBA degrees affect strategic behavior (King et al., 2016), or how legal training correlates with disclosure conservatism (Bamber et al., 2010). However, few studies have explored how large-scale education reforms, particularly in emerging markets, affect executive formation and firm performance.

Second, prior work tends to treat education as an individual trait rather than a product of institutional context. While human capital theory explains why education matters, it rarely addresses how structural reforms in education systems translate into measurable differences in managerial capacity. This is a critical oversight, especially in transition economies where education policies have undergone rapid changes.

Third, existing empirical strategies are often correlational in nature, lacking causal identification. To our knowledge, no study has leveraged a national education reform as a quasi-natural experiment to assess its impact on firm performance through executive human capital. By combining a sharp RDD with CEO-level data from Vietnam's post-Đổi Mới generation, our study addresses this gap and contributes to a more nuanced understanding of how institutional reform shapes the upper echelons of corporate leadership.

3. Research design and estimation strategy

3.1. Sample selection and data sources

This study uses panel data of firms listed on the HOSE and HNX from 2014 to 2023. Financial information is collected from audited annual reports and FiinPro-X, while CEO demographics (including birth year, gender, education level, and tenure) are manually verified through annual disclosures, corporate websites, and public filings. To implement the regression discontinuity design, we focus on CEOs born between 1970 and 2000. CEO-level information, including birth year, gender, education level, and tenure, was manually collected and cross-verified from multiple public sources, such as audited annual reports, company disclosures on the HOSE and HNX websites, and official corporate websites. We ensured data consistency across sources and excluded firms with incomplete or conflicting CEO information.

3.2. Model specification and estimation strategy

This study employs a sharp RDD to examine the causal impact of education reform exposure on firm performance through CEO education. RDD is a quasi-experimental method that estimates treatment effects by exploiting discontinuities in treatment assignment based on a known cutoff, in this case, the year 1986, marking the launch of Vietnam's Đổi Mới reform. The key idea is that CEOs born just before and after the cutoff are assumed to be similar in unobserved characteristics, but differ sharply in their likelihood of being educated under the reformed system. This allows for causal inference by comparing outcomes across the threshold. The basic RDD model is formulated as:

$$Y_{i,t}=\beta_0+\beta_1 Reform_i+\beta_2 BirthYear_i+\beta_3 (Reform_i \times BirthYear_i)+\varepsilon_i$$

In our basic specification, Y_(i,t) denote firm performance of firm i at time t, measured by ROA and ROE. $Reform_i$ is an indicator equal to 1 if the CEO was born in 1986 or later and 0 otherwise; and the running variable is $BirthYear_i$, the CEO's year of birth. The interaction term $Reform_i \times BirthYear_i$ captures the change in slope at the cutoff, while ε_i is error term. Incorporating control variables enhances the robustness of the RDD analysis. The modified RDD model with control variables is:

$$Y_{i,t}=\beta_0+\beta_1 Reform_i+\beta_2 BirthYear_i+\beta_3(Reform_i \times BirthYear_i)+\sum\beta_k Controls_{i,t}+\varepsilon_{i,t}$$

Here, β_k is the vector of coefficients for control variables, $Controls_i$ is a vector of control variables, $Controls_{i,t}$ denote relevant control variables including firm size, CEO tenure, CEO age.

Building on the specification above, we map each construct to standard measures used in corporate finance. Firm performance is proxied by ROA and ROE, the treatment indicator equals one for CEOs born in or after 1986, and the running variable is the CEO's birth year (centered at 1986 in estimation). Precise definitions and source references for every variable are reported in Table 1.

Table 1. Variable definitions, measurement, and sources

Variables	Definitions	Sources (examples)
Dependent Variables		
ROA (Return on Assets)	Net income divided by total assets.	Bertrand and Schoar (2003); King et al. (2016)
ROE (Return on Equity)	Net income divided by shareholders' equity.	Bertrand and Schoar (2003); King et al. (2016)
Main Independent Variable		
Reform_CEO	Binary indicator equal to 1 if the CEO was born in 1986 or later (more likely educated under the post-reform system), 0 otherwise.	Authors' construction based on Vietnam's 1986 education reform (Hanh & Vinh, 2021).
Control Variables		
Firm Size	Natural logarithm of total assets.	Rajan and Zingales (1995); Frank and Goyal (2009)
CEO Tenure	Number of years the CEO has held the position.	Graham et al. (2013); Custódio and Metzger (2014); Henderson et al. (2006).
CEO Age	Age of the CEO in each year (years).	Graham et al. (2013); Serfling (2014).

Notes: Variables are constructed at the firm-year level. Data for accounting variables come from audited annual reports and FiinPro; CEO demographics are hand-collected from HOSE/HNX disclosures and company reports.

3.3. Discontinuity design justification

The 1986 Đổi Mới reform represents a substantial shift in Vietnam's education policy. This systemic change resulted in significant differences in the curriculum, accessibility, and structure of education. We argue that CEOs born after 1986 were more likely to complete their primary and secondary education within the reformed system.

By using CEO birth year as a running variable and 1986 as the cutoff, we implement a sharp RDD in which assignment to treatment is based entirely on whether a CEO was born before or after the reform. Birth year, being non-manipulable and exogenous, makes it a credible forcing variable. The assumption is that firms led by CEOs born just before and after 1986 are otherwise similar, and thus differences in performance can be causally attributed to education system exposure. To operationalize the discontinuity, we define that Reform is equal to 1 if BirthYear is equal or greater than 1986, and 0 otherwise. The running variable is centered around 1986 and used both linearly and in interaction with the treatment to allow for local slope adjustments.

3.4. Robustness and subsample analysis

To ensure the reliability of our estimates and reinforce the internal validity of the identification strategy, we conduct a series of robustness checks and subsample analyses. First, we exclude observations of CEOs born before 1960, 1970, and 1980 in separate regressions. This step helps verify that the results are not driven by older cohorts who may differ in unobservable ways unrelated to the education reform. Next, we restrict the sample to CEOs born between 1980 and 1990, a narrower window around the reform

threshold, to enhance comparability and focus on individuals most plausibly affected by the policy shift.

In addition, we perform subsample analyses to examine whether the estimated effects of education reform exposure vary across key CEO attributes. Specifically, we estimate separate regressions for male and female CEOs, for CEOs with undergraduate versus postgraduate qualifications, and for CEOs who do and do not hold equity ownership in their firms. These subsample tests are conducted independently rather than through interaction terms to allow clearer interpretation of effects within more homogeneous groups. Collectively, these exercises strengthen the credibility of our empirical design and support the conclusion that the Đổi Mới education reform had a meaningful, long-term influence on firm performance through the human capital of post-reform CEOs.

4. Empirical results

4.1. Descriptive statistics

Table 2 provides summary statistics for the key variables used in the empirical analysis. Panel A illustrates the time trend of CEO exposure to the Đổi Mới education reform from 2014 to 2023. The number of CEOs born after 1986, referred to as "Reform CEOs" — gradually increases over time. In 2014, only 3 CEOs in the sample were born after the reform, but by 2023 this number had increased to 46, reflecting generational turnover in leadership. Despite this growth, the majority of CEOs in the sample remain from the pre-reform cohort throughout the study period.

Panel B presents descriptive statistics for firm performance and CEO characteristics. The average return on assets (ROA) is approximately 5.89%, with a standard deviation of 7.68%, while the average return on equity (ROE) is 5.94%, although ROE displays greater variation (SD = 57.55%) and a wider range, reflecting volatility in shareholder returns. The binary variable for reform exposure (Reform) has a mean of 0.0299, indicating that approximately 3% of CEOs in the sample were born after 1986. This low proportion is consistent with the generational structure observed in Panel A.

In terms of control variables, the average firm size (measured by the log of total assets) is 25.54, with values ranging from 2.62 to 35.29. CEOs in the sample have an average tenure of 3.40 years, and an average age of 48.54 years, with a standard deviation of 7.83. The youngest CEO is 24, while the oldest is 72. These descriptive statistics suggest considerable variation in firm size, CEO characteristics, and financial outcomes, thereby providing a rich empirical setting to explore the effect of education reform on firm performance through the channel of CEO human capital.

Table 2. Summary statistics

Panel A: Time trends of CEO exposure to education reform

Fiscal year	CEOs born before Doi Moi 1986	CEOs born after Doi Moi 1986	Total
2014	497	3	500
2015	538	3	541
2016	584	6	590
2017	610	7	617
2018	626	9	635
2019	634	10	644
2020	628	25	653
2021	624	34	658
2022	622	41	663
2023	611	46	657

Panel B: Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
ROA	6068	0.0589	0.0768	-0.9960	0.7837
ROE	6068	0.0594	0.5755	-40.8206	1.5868
Reform	6158	0.0299	0.1703	0	1.0000
Firmsize	6068	25.5440	6.5781	2.6187	35.2905
CEO_Tenure	6158	3.4013	2.3279	1	10
CEO_Age	6158	48.5374	7.8295	24	72

4.2. Preliminary analysis

Before presenting the main regression results, we perform a set of visual diagnostics to assess the validity of the regression discontinuity design and the plausibility of a discontinuity in outcomes around the cutoff year. This approach follows best practices in the RDD literature, which recommends graphical evidence as a critical first step to assess the underlying design assumptions (Imbens & Lemieux, 2008; Lee & Lemieux, 2010).

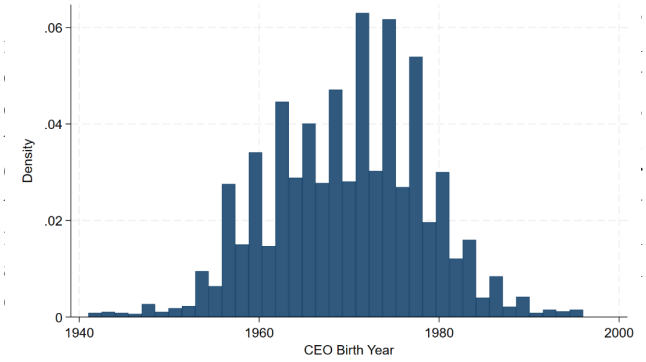

Figure 1. Histogram of CEO Birth Year

Figure 2 illustrates the local polynomial regressions (RD plots) of ROA and ROE against CEO birth year. Both outcome variables display a visible change in

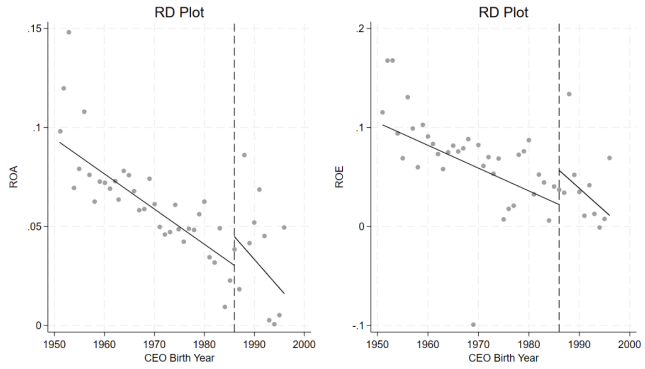

Figure 2. Regression discontinu

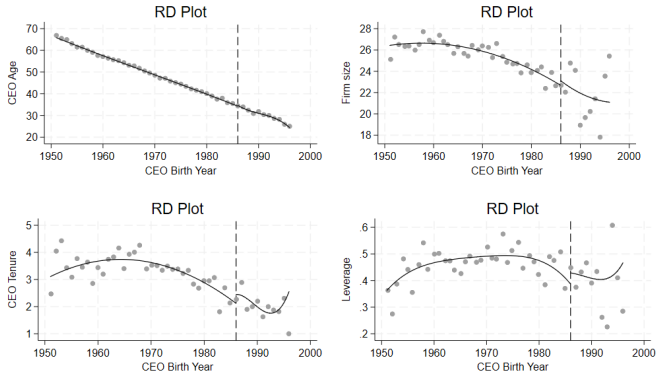

Figure 3. Covariates around the cut-off 1986

level at the cutoff. Specifically, we observe a downward trend in firm performance prior to 1986, followed by a discrete upward jump after the cutoff, suggesting that CEOs exposed to the post-reform education system lead more profitable firms. These graphical patterns provide preliminary evidence of a treatment effect and align with prior work that employs visual inspection to support causal identification (Lee & Lemieux, 2010; Oreopoulos, 2006).

This paper also examines the continuity of predetermined covariates around the 1986 cutoff. Specifically, we plot and estimate local polynomial regressions for CEO age, firm size, CEO tenure, and leverage, using CEO birth year as the running variable. As shown in Figure 3, none of these covariates exhibit a statistically significant jump at the cutoff, and the fitted lines appear smooth on both sides. These findings indicate that observable firm and CEO characteristics are balanced around the threshold, thereby supporting the assumption that any discontinuity in the outcome variables can be attributed to the treatment effect rather than systematic differences in baseline characteristics. Overall, these visual diagnostics lend strong support to the application of a sharp RDD and justify proceeding with formal estimation of treatment effects.

4.3. Baseline regression

Table 3 reports the estimation results from the sharp regression discontinuity design (RDD), assessing the causal impact of post-reform education exposure on firm financial performance, measured by ROA and ROE. Two specifications are reported: a linear model (Panel A) and a linear interaction model that allows for slope differences across the cutoff (Panel B). As shown in Figure 2, the regression lines before and after the cutoff year (1986) are not parallel, indicating differing slopes. This pattern suggests that a model allowing for slope heterogeneity is more appropriate. Therefore, the linear interaction model (Panel B) is used as the main specification, while the linear model (Panel A) serves as a reference.

In Columns (1) and (3), the regressions are estimated without control variables. Columns (2) and (4) include firm-level and CEO-level controls such as firm size, CEO tenure, CEO age, and year fixed effects.

Table 3. Result of Sharp Regression Discontinuity Design (RDD)

Variable	ROA		ROE	
	(1)	(2)	(3)	(4)
Panel A: Linear model				
Reform	0.0116**	0.0095*	0.0279**	0.0273**
	(0.0059)	(0.0057)	(0.0126)	(0.0130)
Panel B: Linear interaction model				
Reform	0.0147**	0.0144**	0.0356**	0.0363**
	(0.0071)	(0.0072)	(0.0143)	(0.0147)
Control variables	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes
Number of observation	6068	6068	6068	6068
Number of firms	687	687	687	687

Notes: This table reports sharp regression discontinuity (RDD) estimates of the effect of post-reform CEO education on firm performance. The running variable is the CEO's birth year, centered at 1986. Panel A presents a local linear model that constrains pre- and post-cutoff slopes to be equal; Panel B relaxes this with a slope-interaction term. Columns (1)–(2) use ROA as the outcome and columns (3)–(4) use ROE; columns (2) and (4) additionally include the set of firm- and CEO-level controls defined in Table 1, while all specifications include year fixed effects. The coefficient on Reform is the estimated discontinuity (local average treatment effect) at the 1986 cutoff. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

The RDD results, showing a 1.44% increase in ROA and a 3.63% increase in ROE for firms led by post-reform CEOs, align with the mechanisms outlined in the human capital and education reform frameworks. Specifically, the Đổi Mới reform equipped CEOs with advanced management skills, such as strategic financial planning and risk assessment, enabling them to optimize asset and equity utilization. Additionally, professional networks built through expanded higher education access provided CEOs with critical resources and market insights, enhancing strategic decision-making. Furthermore, the reform's emphasis on creative and adaptive cognitive frameworks likely enabled these CEOs to navigate market complexities more effectively, leading to innovative business decisions that drove the observed improvements in ROA and ROE.

Moreover, these findings are consistent with the study's theoretical framework: they support the notion that institutional reforms can enhance managerial human capital, which in turn improves firm-level decision-making and strategic outcomes. The results align with prior research that highlights the role of CEO education in shaping corporate outcomes (Bertrand & Schoar, 2003b; Custódio & Metzger, 2014), and add novel evidence from an emerging market context where education policy reforms have long-term implications for organizational performance. This reinforces the importance of viewing education not only as an individual trait but also as an institutional product with macroeconomic consequences.

4.4. Heterogeneity analysis

Table 4 presents separate regression results for male and female CEOs. For male CEOs, the reform has no significant effect on ROA, and only a modest effect on ROE (around 3.09%, significant at the 10% level). In contrast, for female CEOs, the reform is associated with a significant increase in both ROA (4.14%) and ROE (7.91%), both statistically significant at the 1% level. These results suggest that the positive impact of education reform on firm performance is stronger in firms led by female CEOs. One possible explanation is that post-reform education helped reduce gender barriers and provided greater opportunities for capable women to excel in executive roles.

Table 4. Result of Sharp SRDD: Male CEO vs Female CEO

Variable	ROA		ROE	
	(1)	(2)	(3)	(4)
Panel A: Male CEO				
Reform	0.0083	0.0086	0.0295*	0.0309*
	(0.0082)	(0.0085)	(0.0167)	(0.0172)
Number of observations	5469	5469	5469	5469
Number of firms	658	658	658	658
Panel B: Female CEO				
Reform	0.0425***	0.0414***	0.0812***	0.0791***
	(0.0119)	(0.0121)	(0.0231)	(0.0226)
Number of observations	599	599	599	599
Number of firms	149	149	149	149
Control variables	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes

Notes: This table reports sharp regression discontinuity (SRDD) estimates run separately for firms led by male (Panel A) and female (Panel B) CEOs. The running variable is the CEO's birth year centered at 1986; Reform equals 1 if the CEO was born in or after 1986. Columns (1)–(2) use ROA and columns (3)–(4) use ROE as outcomes; columns (2) and (4) add the control set defined in Table 1 (e.g., firm size, CEO tenure, CEO age), while all specifications include year fixed effects. The coefficient on Reform is the local average treatment effect at the 1986 cutoff within each gender subsample. The number of observations and firms pertains to each subsample. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Building on the gender-based heterogeneity, we next investigate whether the reform's effects vary by

CEO educational attainment. Table 5 reveals a clear divergence: for CEOs with only undergraduate degrees, the education reform has no statistically significant impact on either ROA or ROE. However, for CEOs with postgraduate qualifications (e.g., Master's or PhD), the reform leads to a 5.81% increase in ROA and a 7.61% increase in ROE, both statistically significant.

These findings suggest that the benefits of reform-era education are not uniform across all executives, but rather are amplified among those who pursue higher academic achievement. One plausible explanation is that postgraduate CEOs may have better internalized the reform's emphasis on analytical rigor, strategic thinking, and meritocratic advancement, key elements of Vietnam's post-1986 education transformation. As a result, their enhanced cognitive and leadership capabilities may translate more effectively into firm-level outcomes. This result reinforces the view that education reform enhances executive quality, but its payoff is greatest when combined with further investment in advanced human capital.

Table 5. Result of Sharp SRDD: Role of Education level

Variable	ROA		ROE	
	(1)	(2)	(3)	(4)
Panel A: Undergradute				
Reform	-0.0008	-0.0008	0.0175	0.0175
	(0.0065)	(0.0067	(0.0169)	(0.0170)
Number of observations	3897	3897	3897	3897
Number of firms	570	570	570	570
Panel B: Post-graduate				
Reform	0.0563***	0.0581***	0.0631**	0.0761**
	(0.0190)	(0.0194)	(0.0284)	(0.0337)
Number of observations	397	397	397	397
Number of firms	2109	2109	2109	2109
Control variables	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes

Notes: This table reports sharp regression discontinuity (SRDD) estimates run separately for firms led by undergraduate (Panel A) and post-graduate (Panel B) CEOs. The running variable is the CEO's birth year centered at 1986; Reform equals 1 if the CEO was born in or after 1986. Columns (1)–(2) use ROA and columns (3)–(4) use ROE as outcomes; columns (2) and (4) add the control set defined in Table 1 (e.g., firm size, CEO tenure, CEO age), while all specifications include year fixed effects. The coefficient on Reform is the local average treatment effect at the 1986 cutoff within each gender subsample. The number of observations and firms pertains to each subsample. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Finally, we explore whether the effect of education reform is moderated by CEO ownership. Table 6 presents the results by CEO stock-holding status. The reform has a significant and positive effect on both ROA and ROE for firms where the CEO holds equity. Specifically, post-reform CEOs who are equity-holders lead firms with a 1.60 - 1.77% increase in ROA and a 4.55 - 4.63% increase in ROE, with significance at the 5 - 10% level. However, the reform has no statistically significant effect on firms led by CEOs without stock ownership. These results suggest that the benefits of post-reform education are more effectively realized when CEOs have stronger alignment with shareholder interests, potentially due to greater motivation, autonomy, or influence over firm strategy. In other words, education-driven human capital gains are most potent when coupled with ownership-based incentives.

Table 6. Result of Sharp SRDD: Role of CEO stock holding

Variable	ROA		ROE	
	(1)	(2)	(3)	(4)
Panel A: Holding stock				
Reform	0.0177*	0.0160	0.0463**	0.0455**
	(0.0104)	(0.0108)	(0.0199)	(0.0201)
Number of observations	4277	4277	4277	4277
Number of firms	625	625	625	625
Panel B: Not holding stock				
Reform	0.0034	0.0068	0.0023	0.0126
	(0.0089)	(0.0089)	(0.0193)	(0.0191)
Number of observations	1706	1706	1706	1706
Number of firms	390	390	390	390
Control variables	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes

Notes: This table reports sharp regression discontinuity (SRDD) estimates run separately for firms led by CEO stock holding (Panel A) and CEO non-stock holding (Panel B). The running variable is the CEO's birth year centered at 1986; Reform equals 1 if the CEO was born in or after 1986. Columns (1)–(2) use ROA and columns (3)–(4) use ROE as outcomes; columns (2) and (4) add the control set defined in Table 1 (e.g., firm size, CEO tenure, CEO age), while all specifications include year fixed effects. The coefficient on Reform is the local average treatment effect at the 1986 cutoff within each gender subsample. The number of observations and firms pertains to each subsample. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

4.5. Robustness check of sharp RDD

To test the robustness of the sharp regression discontinuity design (RDD), we perform several

alternative specifications by trimming the sample based on CEO birth cohorts in Table 7. Specifically, we sequentially exclude CEOs born in the 1950s (Panel A), the 1950s and 1960s (Panel B), and the 1950s, 60s, and 70s (Panel C), to ensure that results are not driven by older generations whose exposure to the reform is ambiguous. Across all specifications, the estimated effects of education reform on both ROA and ROE remain statistically significant and economically meaningful.

Additionally, in Panel D, we restrict the sample to a narrower bandwidth, CEOs born between 1980 and 1990, to closely examine those likely to have been directly exposed to the reform in their formative education years. The results continue to hold, with reform exposure associated with a 3.3 - 3.49% increase in ROA and a 4.96 - 5.22% increase in ROE. These consistent patterns across multiple robustness checks confirm that the positive effects of education reform are not sensitive to cohort composition and provide further support for the credibility of the causal interpretation under the sharp RDD framework.

Table 7. Robustness check of Sharp SRDD

Variable	ROA		ROE	
	(1)	(2)	(3)	(4)
Panel A: Excluding CEOs born in 50s				
Reform	0.0133*	0.0134*	0.0288**	0.0294**
	(0.0072)	(0.0074)	(0.0141)	(0.0141)
Number of observations	5370	5370	5370	5370
Number of firms	662	662	662	662
Panel B: Excluding CEOs born in 50s and 60s				
Reform	0.0115	0.0132*	0.0278*	0.0285**
	(0.0078)	(0.0079)	(0.0143)	(0.0142)
Number of observations	3324	3324	3324	3324
Number of firms	530	530	530	530
Panel C: Excluding CEOs born in 50s, 60s, and 70s				
Reform	0.0465***	0.0448***	0.0654***	0.0625
	(0.0122)	(0.0120)	(0.0231)	(0.0229)
Number of observation	734	734	734	734
Number of firms	203	203	203	203
Panel D: Only CEOs born in the period 1980-1990				
Reform	0.0349***	0.0332***	0.0522**	0.0496**
	(0.0124)	(0.0123)	(0.0237)	(0.0236)
Number of observations	687	687	734	734
Number of firms	188	188	188	188
Control variables	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes

Notes: This table presents robustness checks for the sharp RDD by progressively tightening the birth-cohort window around the 1986 cutoff. The running variable is the CEO's birth year centered at 1986, and Reform equals 1 if the CEO was born in or after 1986. Panel A excludes CEOs born in the 1950s; Panel B excludes those born in the 1950s–1960s; Panel C excludes the 1950s–1970s (retaining cohorts closer to the cutoff); and Panel D restricts the sample to CEOs born during 1980–1990. Columns (1)–(2) use ROA and columns (3)–(4) use ROE; columns (2) and (4) add the full control set from Table 1, while all specifications include year fixed effects. Estimates are obtained from a local linear RDD with a triangular kernel and CCT optimal bandwidth; robust bias-corrected standard errors clustered at the firm level are reported in parentheses. The reported coefficient on Reform is the local average treatment effect at the cutoff for each cohort restriction. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

This section provides strong empirical evidence that Vietnam's 1986 education reform has had a lasting impact on firm financial performance through the human capital of corporate leaders. Using a sharp RDD based on CEO birth year, we find that firms led by post-reform CEOs exhibit significantly higher ROA and ROE. These effects are robust across different model specifications and subsample restrictions. The heterogeneity analyses further reveal that the reform's impact is stronger among female CEOs, those with postgraduate degrees, and CEOs who hold equity stakes, highlighting how reform-era education interacts with individual characteristics and incentive structures to shape strategic outcomes. Finally, extensive robustness checks confirm the stability of the results, reinforcing the credibility of the identification strategy. Collectively, these findings underscore the long-term organizational benefits of systemic education reform and the importance of investing in human capital development at the executive level.

5. Conclusion

This study exploits Vietnam's 1986 Đổi Mới education reform as a quasi-natural experiment to examine how systemic changes in educational institutions shape firm outcomes through executive leadership. Using a sharp regression discontinuity design, we show that firms led by post-reform CEOs, those more likely to have been exposed to competency-based and decentralized education, exhibit significantly higher profitability. These effects are stronger among female CEOs, postgraduate-educated CEOs, and CEOs with equity ownership, indicating that institutional reforms interact meaningfully with individual attributes and incentive structures.

Our findings contribute to several strands of literature. First, they extend upper echelons theory (Hambrick & Mason, 1984) by highlighting the role of structural context, particularly national education systems, in shaping executive traits and capabilities. While prior research documents that CEO characteristics

influence firm outcomes (Bertrand & Schoar, 2003a), this study shows that such characteristics are partly formed through institutional interventions rather than solely through individual background. Second, the results contribute to the literature on education policy and economic development (Oreopoulos, 2006) by demonstrating that broad-based education reform can generate long-term organizational returns through improved executive human capital. By linking education reform to firm-level performance via leadership channels, our study bridges macro-level institutional change and micro-level corporate outcomes.

The policy implications are substantial. For governments in emerging and transitional economies, education reform should be viewed not only as a social investment but also as a long-term economic strategy. Our results suggest that leadership quality within firms is partly shaped by policy decisions made decades earlier, and that inclusive, skill-oriented, and merit-based education systems can yield durable productivity gains across the private sector. In the Vietnamese context, our findings provide empirical support for ongoing human resource development initiatives, such as the 2021–2025 socio-economic development plan, which emphasizes high-quality education and vocational training to meet industrial demands. They also align with regional labor and employment strategies that prioritize talent development and skill matching to enhance competitiveness. More broadly, the superior performance of post-reform CEOs highlights the potential long-run returns to recent investments in educational technology, teacher training, and leadership development aimed at producing adaptable, market-oriented executives.

This study has limitations that point to avenues for future research. Our analysis relies on listed firms on the HOSE and HNX, which may not fully represent the diversity of Vietnamese businesses, particularly small and medium enterprises (SMEs) or unlisted firms. Listed firms are typically larger, more resource-rich, and subject to stronger governance and market discipline, conditions under which the benefits of post-reform CEO education, such as advanced skills, professional networks, and adaptive cognitive frameworks, may be more pronounced. In contrast, SMEs and unlisted firms, often operating under resource constraints and less formal governance structures, may experience weaker or different effects of education reform on financial performance. Future studies could extend the analysis to unlisted firms using alternative data sources such as surveys, private firm registries, or industry associations to assess the generalizability of our findings.

Further research could also explore outcome dimensions beyond financial performance, including innovation, sustainability practices, or organizational resilience during economic shocks. Comparative studies across other emerging economies that have implemented major education reforms would help determine whether the effects documented here are context-specific or generalizable. Finally, qualitative or experimental approaches could provide deeper insights into how reform-era education shapes CEOs' decision-making styles, values, and strategic priorities, thereby enriching our understanding of the mechanisms linking institutional reforms to firm outcomes.

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