Creative Business and Sustainability Journal (CBSJ)
Vol.46 No.1 January – June 2024, pp.37-65

Selling, General, and Administrative Cost Asymmetry in Hypergrowth Private Fintech Firms

Chawanakorn Thienboonlertrat*
Thanyaluk Vichitsarawong**

Abstract

This research investigates the cost asymmetry between hypergrowth and non-hypergrowth firms by using private fintech firms in the United Kingdom (U.K.) as a sample. Examining cost growth elasticity and cost multiplier elasticity, the findings indicate that hypergrowth firms' cost growth elasticity and cost multiplier elasticity are significantly lower than those of non-hypergrowth firms. The results show that, in private fintech firms, cost asymmetry can occur between non-hypergrowth and hypergrowth stages, which is different from prior asymmetry findings that focused only on the revenue-increasing and revenue-decreasing stages. Our study further provides empirical evidence of the static internal economies of scale from which hypergrowth firms benefit, serving as one of the explanations for cost asymmetry in the hypergrowth stage. Overall, our findings suggest that U.K. private fintech companies gain a cost advantage during the hypergrowth stage by balancing the finding of new opportunities with successfully reaping high-quality revenues while effectively dealing with managerial inefficiency.

Keywords: Cost Asymmetry; Fintech, Hypergrowth; Scale-up; Financial Services

Received: February 27, 2024 | **Revised:** April 26, 2024 | **Accepted:** May 20, 2024

* Ph.D Candidate, Department of Accountancy, Chulalongkorn Business School, Chulalongkorn University.
** Associate Professor, Department of Accountancy, Chulalongkorn Business School, Chulalongkorn University.

Introduction

In recent years, there has been a rapid expansion of fintech companies in the financial services industry. Fintech firms promote competition and offer services that were previously provided by traditional financial institutions (Pozzolo, 2017). There are different areas within the fintech sector: lending tech, payments/billing tech, personal finance/wealth management, money transfer/remittance, blockchain/bitcoin, institutional/capital markets tech, equity crowdfunding, and insurtech (KPMG & CBINSIGHTS, 2016).

Equity investment in fintech has expanded rapidly over the past decade, amounting to over $1 trillion in more than 35,000 deals since 2010. There is greater geographical diversification of deals, even though the United States (U.S.), the European Union (E.U.), the United Kingdom (U.K.), and China remain the main locations (Cornelli et al., 2021). When equity investors forecast the profitability of target firms, selling, general, and administrative (SG&A) costs are considered as they form a high share of revenue (Lazere, 1996). In our fintech samples, SG&A costs account for 65 percent of total costs on average. However, cost behavior seems to be asymmetric. Anderson et al. (2003) find that costs decrease less when an activity level decreases than they increase for an equivalent activity increase. Recently, many early-stage firms, including fintech start-ups, have experienced sizable growth at a hypergrowth rate (World Economic Forum, 2016). The fast scaling and digital process to facilitate growth of these firms could have implications for returns to scale (Giustiziero et al., 2023) and, hence, the relationship between firm revenue growth and cost growth. Therefore, another point of cost asymmetry in the hypergrowth stage can occur, which is different from the asymmetric behavior of listed or mature firms previously documented in prior research (Anderson et al., 2003; Balakrishnan et al., 2014).

This study examines whether SG&A cost asymmetry exists in private fintech firms during a hypergrowth phase. To achieve this aim, the study investigates private fintech firms in the U.K. during the period 2011- 2021. First, we examine the relationship between cost growth and revenue growth in private fintech firms, both in percentage change and logarithm forms (Anderson et al., 2003; Balakrishnan et al., 2014) between the hypergrowth and non-hypergrowth phases. Second, we examine the extent to which private fintech firms apply a cost efficiency strategy to achieve economies of scale during the hypergrowth phase compared to the non-hypergrowth phase.

The findings illustrate that hypergrowth companies' cost growth elasticity and cost multiplier elasticity are significantly lower than those of non-hypergrowth firms. The results further demonstrate that hypergrowth firms have less cost elasticity and, hence, higher economies of scale compared to non-hypergrowth firms. Overall, the findings suggest that cost asymmetry exists in private fintech firms during the hypergrowth phase, and these hypergrowth firms apply the cost efficiency strategy to achieve economies of scale.

The findings of this research reflect managers' resource-related decisions that prioritize speed and efficiency under hypergrowth circumstances. The cost decision will impact profitability, which will be of interest to debt and equity investors. The findings contribute to the cost asymmetry literature (Anderson et al., 2003; Balakrishnan et al., 2014) by indicating that, apart from the prior findings on asymmetry between revenue-decreasing and revenue-increasing stages, cost asymmetry can occur between hypergrowth and non-hypergrowth stages. To our knowledge, this study is one of the first attempts to examine cost asymmetry during the hypergrowth phase of private fintech firms. Moreover, this study contributes to the economies of scale literature (Chandler & Hikino, 2009; De Loecker & Syverson, 2021; Junius, 1997) by providing empirical evidence that, despite being in the same industry, the static internal economies of scale of firms can vary between different growth stages. Finally, this study presents the existence of cost asymmetry and economies of scale in the fintech industry and how they evolve between different stages, contributing to the financial services industry's literature on cost asymmetry (Subramaniam & Watson, 2016) and economies of scale (Benston, 1972; Goldberg et al., 1991; Latzko, 1999).

The remainder of this paper is organized as follows: First, we discuss the literature review and hypothesis development. Second, we describe the research methodology, sample, and empirical models. Third, we present empirical findings, additional analysis, and robustness tests. Fourth, we discuss theoretical contributions and managerial implications. Finally, we summarize key findings and discuss the limitations and directions of future research.

Literature Review and Hypothesis Development

Fintech and Firm Life Cycle

Fintech development is mainly led by start-ups. Their environment is characterized by high growth and strong dynamics (Dorfleitner et al., 2017). This sector is also highly attractive to investors, despite its high risk (D'Avino et al., 2015). Firm losses are often incurred at the initial stage as expenses exceed revenues. Thus, start-ups usually rely on venture capitalists, their own capital, or short-term debt (Berger & Udell, 1998; Gregory et al., 2005). Despite scant resource availability, high flexibility and a rapid growth rate are necessary to remain in the market.

The growth/scale-up stage is when firms grow rapidly to a competitive size. Many scaling firms exhibit hypergrowth rates exceeding 40% annually (World Economic Forum, 2016). It is particularly evident among digital firms where entry barriers are low (Banalieva & Dhanaraj, 2019). Firms turn product-market fit into profit-market fit by ensuring that each new customer brings in additional revenues and incurs only marginal costs (Rayport et al., 2023).

Hoffman and Yeh (2018) mention two types of rapid growth that are relevant to an uncertain start-up environment. On one hand, **Classic start-up growth** prioritizes efficiency over speed. It establishes certainty around product/market fit, ensuring that a product satisfies a strong market demand. On the other hand, **Blitzscaling** prioritizes speed over efficiency without assuring any certainty about the payoff or efficiency, as the benefit of winning the market is attractive and the competition is intense. Fintech products can be suitable for blitzscaling as they can be launched quickly and updated with relative ease.

Based on the firm life cycle theory, there are four stages of the firm life cycle, as illustrated in Figure 1. Fintech firms start with an introduction stage. After they discover a product that fits with market demand, they progress to the growth stage, experiencing sales at a hypergrowth rate. Management decisions on cost growth will be based on balancing speed and efficiency. Subsequently, if there is no innovation, sales growth usually slows down, and firms become stable in a mature stage or face revenue decline in a stagnant stage (Anthony & Ramesh, 1992).

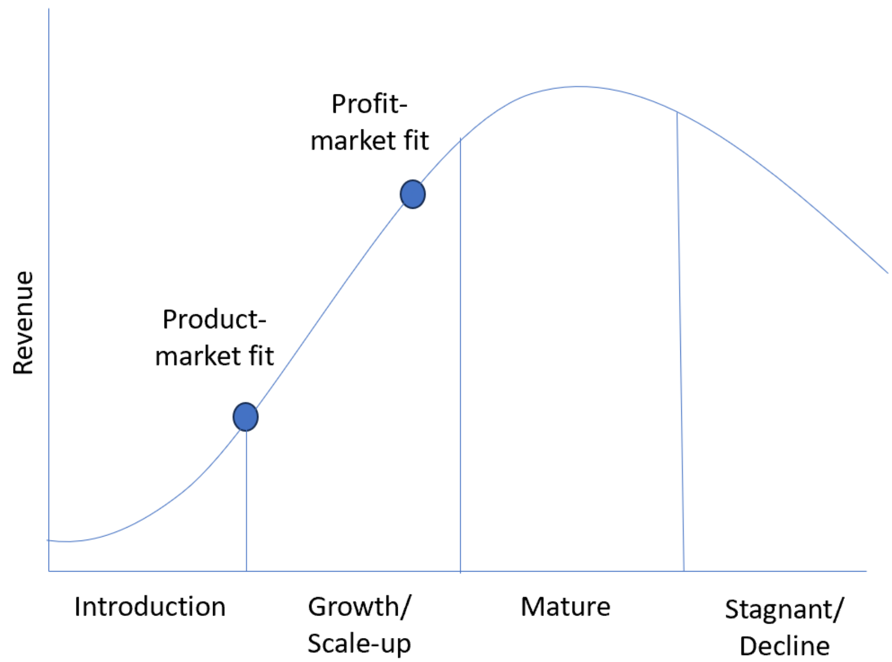

Figure 1: Firm Life Cycle

Cost Asymmetry

Certain costs rise more with an increase in activity levels than they decrease with a proportionate decrease in activity levels (Cooper & Kaplan, 1998; Noreen, 1991). This phenomenon is termed asymmetric cost behavior or cost stickiness, which arises from management's deliberate adjustment of resources (Anderson et al., 2003).

Cost stickiness varies across industries. Subramaniam and Watson (2016) find that costs in the manufacturing industry are the "stickiest." However, they do not find SG&A cost stickiness in the financial services industry or the software and technology services industry. The possible explanation is that their financial services samples are public financial institutions that are subject to earnings pressure from a public market (Hall, 2016). Moreover, both public and private banks in prior studies have incentives to reduce costs to manage the required regulatory capital. The asymmetry is also different between public and private firms. Private firms are found to have less SG&A cost stickiness or even anti-sticky cost behavior due to less access to capital and fewer agency problems (Chen & Ma, 2021; Cheng et al., 2018; Sheen, 2020). Prior research regarding the cost asymmetry in private firms mainly covers process industries. According to Arthur (1996), such industries face diminishing returns, in which firm size becomes a constraint on further increases in scale.

Firms with high investment in organizational capital exhibit SG&A cost stickiness, as firm-specific intangible resources and capabilities can deteriorate if the level of investment is not maintained in the downturn (Loy & Hartlieb, 2018; Venieris et al., 2015). Based on a resource-based view of strategy (Martín-de-Castro et al., 2011), intangible assets are a company's unique internal competencies that boost its profitability and provide it with a significant competitive edge (Lev et al., 2009), making innovation crucial to firm growth (Coad & Rao, 2008; Geroski & Machin, 1992). This substantiates the findings that growth firms have sticky cost behavior (Balakrishnan et al., 2014; C. X. Chen et al., 2012). However, digital transformation, which has recently become prevalent in knowledge-based industries, can significantly inhibit cost stickiness by reducing adjustment costs (Verhoef et al., 2021) and management's overly optimistic expectations as businesses can use the digital technology platform to create a sales forecast model that is more accurate (Chen & Xu, 2023; Hui et al., 2024). Knowledge-based industries can also experience increasing returns to scale. Mithani (2023) compares the scaling capability between digital and non-digital financial adviser firms and finds faster scaling of digital firms relative to non-digital firms due to cost-free replication of digital products. Thus, a digital business model has implications for costs as inputs and possibly causes the cost asymmetry of private fintech firms to be different from that of traditional private firms.

Although prior research examines cost asymmetry across various industries and different stages of a firm's life cycle (Ibrahim et al., 2022; Silge & Wöhrmann, 2021; Zisis & Naoum, 2023), it still focuses on the asymmetry between revenue-increasing and revenue-decreasing stages (cost stickiness) and mainly investigates mature or listed firms that are not in a hypergrowth stage. Recently, many companies have experienced exceptional growth by expanding at a hypergrowth rate (World Economic Forum, 2016). The fast scaling of these firms to capture market share with digital business models could have implications on returns to scale (Giustiziero et al., 2023) and, hence, the relationship between firm revenue growth and cost growth, generating another point of cost asymmetry in the hypergrowth stage. Private fintech firms are representative of companies experiencing this exceptional growth and having SG&A costs as crucial factors in revenue generation. Different from other industries, the SG&A costs of financial services firms are pivotal to future revenues as they relate to domain knowledge development, technology advancement, customer acquisition, and regulatory compliance, including data security, privacy, anti-money laundering, consumer protection regulations, etc. Therefore, a sample of private fintech firms in the U.K. is employed in this study to examine the SG&A cost asymmetry between firms in the hypergrowth and non-hypergrowth stages.

Cost Asymmetry and Hypergrowth Private Fintech Firms

Private fintech firms are not subject to earnings pressure like public firms, and they are not subject to a regulatory capital ratio requirement if they do not register for bank licenses. Moreover, they are different from traditional financial institutions as they combine the characteristics of financial services and technology firms. They are also different from typical private firms as they need to have high growth and a path to profitability to access capital from venture capitalists (Gnanasambandam et al., 2017). Hypergrowth firms typically scale to attain revenue growth with higher margins. Consequently, the scaling strategies that prioritize speed and efficiency (Bohan et al., 2024; Hoffman & Yeh, 2018; Rayport et al., 2023) will have implications for their decisions relating to costs, possibly causing cost asymmetry between the hypergrowth phase and the non-hypergrowth phase.

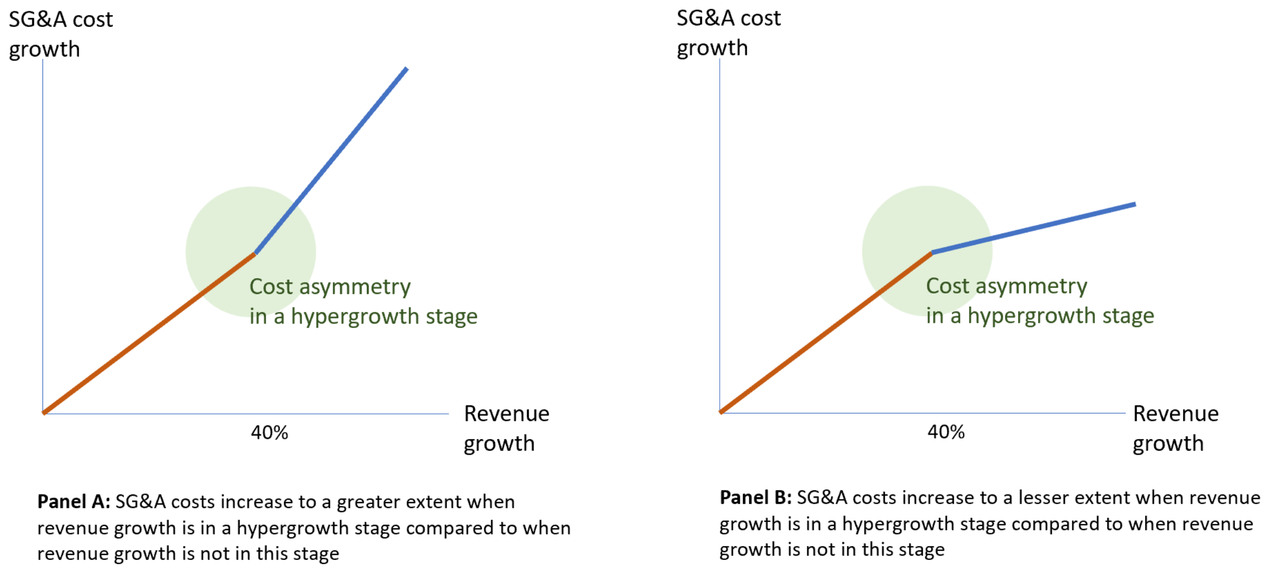

Figure 2: Relationship between SG&A Cost Growth and Revenue Growth

Cost asymmetry could occur when SG&A cost growth increases to **a greater extent** when revenue growth is in a hypergrowth stage compared to a non-hypergrowth stage, as illustrated in Figure 2 Panel A. Hypergrowth firms' scaling objective is to achieve market dominance quickly to benefit from demand-side economies of scale and economies of replication (Jansen et al., 2023; Penrose, 2009). Consequently, they tend to adopt **Blitzscaling** with speed prioritization in an uncertain environment. Their operation is still neither well-developed nor cost-optimized (DeSantola & Gulati, 2017), and an organization's learning is limited under time pressure (Dierickx & Cool, 1989), resulting in managerial inefficiencies (Kuratko et al., 2020) and increased costs.

Conversely, cost asymmetry could occur when SG&A cost growth increases to **a lesser extent** when revenue growth is in a hypergrowth stage compared to a non-hypergrowth stage, as illustrated in Figure 2 Panel B. When the prioritized objective of hypergrowth firms is to lower costs to benefit from supply-side economies of scale, economies of learning, and economies of scope (Bingham & Davis, 2012; Chandler & Hikino, 2009), they could focus on efficiency over speed in an uncertain environment **(Classic start-up growth).** Due to fintech firms' digital business models, they can accommodate a rapidly increasing volume of customers with lower adjustment costs (Piaskowska et al., 2021).

Drawing upon prior studies (Nambisan et al., 2019; Penrose, 2009; Piaskowska et al., 2021), we hypothesize that SG&A cost growth increases to **a lesser extent** when revenue growth is in a hypergrowth stage compared to a non-hypergrowth stage because the scalability of digital products allows fintech firms to enhance sales at a marginal cost, and supply-side economies of scale usually govern scaling direction. Therefore, the first hypothesis is stated as follows:

H1: For private fintech firms, SG&A cost growth increases to a lesser extent when revenue growth is in a hypergrowth stage than otherwise.

Economies of scale are important factors that relate to the cost asymmetry. Scaling can be sustainable and enhances competitive advantage by attaining increasing returns to scale, which is a consistent, positive, nonlinear relationship between inputs and outputs. Economies of scale are part of the internal drivers for increasing returns to scale (Bohan et al., 2024). They relate to lower costs per unit as production volume increases during firm expansion (Chandler & Hikino, 2009), potentially arising from purchasing power and production efficiency.

Private fintech firms in a hypergrowth stage typically grow immensely through the scaling process. During this stage, there is potential for substantial output growth as firms have not reached minimum efficient scale (Chandler & Hikino, 2009), in which economies of scale have been exhausted and constant returns have begun. While higher volume diminishes only per unit fixed cost in non-digital firms (Silberston, 1972; Stigler, 1958), it reduces both per unit fixed and variable cost in digital firms. Despite digital firms' higher setup costs, cost-free replication allows them to scale up with negligible marginal costs (Loebbecke & Picot, 2015). Therefore, it is expected that hypergrowth firms will exhibit higher economies of scale than non-hypergrowth firms, which consist mainly of mature and declining firms. Hence, the second hypothesis is stated as follows:

H2: For private fintech firms, hypergrowth firms have higher economies of scale than non-hypergrowth firms.

Research Methodology

Sample

The sample includes private fintech firms based in the U.K. from the Crunchbase database for the period 2011–2021. The financial data of the firms in the sample is hand-collected from financial statements filed with the U.K. government. This study uses U.K. samples due to the following reasons: First, U.K. firms are obliged to disclose their financial data to the company house. The Companies Act of 1967 required all companies, both private and public, to file their financial statements annually with the Company House (Ball & Shivakumar, 2005). Second, there have been significant private equity investments in U.K. fintech in recent years, as financial technology is the most attractive technology subsector for venture capital investors in the U.K. Total investment in fintech is $4.57 billion in 2020 ($6 billion in 2019). There is government support to foster the growth of fintech firms, such as R&D tax incentives (HM Revenue & Customs, 2007) and the Financial Conduct Authority's Regulatory Sandbox (Financial Conduct Authority, 2015). Finally, U.K. firms adopt International Financial Reporting Standards (IFRS) or United Kingdom Generally Accepted Accounting Practice (UK GAAP). Therefore, they are obliged to capitalize intangible assets, reducing measurement errors when total assets are used to calculate asset intensity as a control factor.

The initial sample starts with 1,906 firms. Both active and inactive firms are included in the sample. Small and micro firms, totaling 806, are excluded from the sample because they are not required to submit profit and loss statements and are exempt from auditing. Regarding the business models of the sample firms, we exclude challenger banks, insurtech firms, and firms whose business models are not fintech (venture capital, private equity, recruitment agencies, etc.), totaling 210 firms, because they have different capital structures and regulatory requirements compared to other fintech companies. According to the company life cycle framework, firms in the introduction stage that have not yet earned any revenue are excluded from this study as the sample requires revenue growth (i.e., there must be the presence of revenues for two consecutive years). In addition, firms with unavailable data, totaling 743, are excluded. Consequently, there are 808 firm-year observations from 147 fintech firms for the final sample.

Some prior studies (C. X. Chen et al., 2012; Sallehu et al., 2023; Venieris et al., 2015) adopt Anderson et al. (2003) and Anderson and Lanen (2007)'s sample selection criteria (i.e., discarding observations for which current SG&A costs exceed current revenue, lagged SG&A costs exceed lagged revenue, or costs move in opposite directions to sales). Banker and Byzalov (2014) illustrate that discarding observations for which sales and costs move in opposite directions is unjustifiable and causes biased coefficients. Balakrishnan et al. (2014) show that sample criteria and truncation rules can affect reported findings significantly, resulting in unstable results of cost asymmetry. As imposing such rules induces sample selection bias, our sample selection does not adopt these restrictions.

Following Adams et al. (2019)'s approach, the outlier test, which Dehon et al. (2012) develop based on Hausman (1978)'s logic, is conducted to compare estimates between outlier robust estimators and ordinary least square (OLS) estimates.[1] The results suggest that OLS results differ significantly from the outlier robust results. Therefore, the S-estimator or MM-estimator with the highest possible efficiency is used to downweigh the influence of the extreme values.[2] Alternatively, we use the S-estimator to identify outliers and then exclude them prior to implementing OLS (Adams et al., 2019).[3] As a result, the identified multivariate outliers, whose revenue growth or SG&A growth exceeds the 5^{th} or 95^{th} percentiles, are excluded (73 firm-year observations). Subsequently, firms left with only 1 observation after outlier exclusion (singleton) are removed (8 firm-year observations), as robust clustered standard errors will be singular in the presence of singleton clusters (Cameron & Miller, 2015). Then, the panel data regression (OLS with firm and time fixed effect)[4] is run with cluster firm-adjusted standard errors (Petersen, 2009) to reduce the effect of serial correlation in observations from the same firm. The year fixed effect is included to control for the effect specific to a certain year. The results from both approaches are presented in the Research Findings section. After excluding outliers, the reduced sample consists of 727 firm-year observations from 136 fintech firms.

[1] Regarding typical methods used to exclude outliers, trimming and dropping can cause sample selection problems and biased coefficient estimates when outliers occur in a nonrandom fashion (Heckman, 1979). Neither winsorizing nor trimming reduces the impact of the multivariate outliers, specifically when outlier frequencies exceed the threshold. (Adams et al., 2019).

[2] Adams et al. (2019) recommend using MM robust regression or S-estimation to alleviate outlier influence as they balance robustness and efficiency. The efficiency of MM robust estimators can be greater than that of S-estimators when outlier bias is less severe. Prior financial research (Adams et al., 2022; Cho et al., 2021) employs this approach.

[3] The use of the S-estimator to identify outliers has the advantages of using a more efficient OLS and reducing the outlier impact. Some financial studies (Adams et al., 2022; Yan & Qi, 2021) adopt this approach.

[4] We perform the overidentifying restriction test, which is applicable to a model with cluster firm-adjusted standard errors, to choose between a fixed effect and a random effect model (Cameron & Miller, 2015; Schaffer & Stillman, 2006).

Empirical Models

Existence of Cost Asymmetry in the Hypergrowth Stage

To test H1 for the existence of cost asymmetry in the hypergrowth stage, we use the elasticity of cost growth, which measures the percentage change in cost growth with respect to revenue growth. Balakrishnan et al. (2014) suggest that this model is the first-order Taylor expansion from the logarithmic specification proposed by Anderson et al. (2003). The Model (1) measures the elasticity of cost growth as follows:

$$\left[\frac{SG\&A_{i,t}-SG\&A_{i,t-1}}{SG\&A_{i,t-1}}\right] = \gamma_0 + \gamma_1 \left[\frac{Revenue_{i,t}-Revenue_{i,t-1}}{Revenue_{i,t-1}}\right] + \gamma_2 H_{i,t} + \gamma_3 H_{i,t} \left[\frac{Revenue_{i,t}-Revenue_{i,t-1}}{Revenue_{i,t-1}}\right] + \sum Control_{i,t} + \varepsilon_{i,t}$$

$$SG\&A\ growth_{i,t} = \gamma_0 + \gamma_1 Revenue\ growth_{i,t} + \gamma_2 H_{i,t} + \gamma_3 H_{i,t} Revenue\ growth_{i,t} + \sum Control_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $Revenue_{i,t}$ is revenue of firm *i* in year *t*. *Revenue growth*$_{i,t}$ is $\left[\frac{Revenue_{i,t}-Revenue_{i,t-1}}{Revenue_{i,t-1}}\right]$, while *SG&A growth*$_{i,t}$ is $\left[\frac{SG\&A_{i,t}-SG\&A_{i,t-1}}{SG\&A_{i,t-1}}\right]$.

The elasticity of cost growth with respect to revenue growth equals the percentage change in cost growth divided by the percentage change in revenue growth. $SG\&A_{i,t}$ is SG&A costs of firm *i* in year *t*, which is calculated from the addition of selling, general, and administrative costs and costs of services or costs of goods sold (if any) reported on financial statements.[5] SG&A costs exclude depreciation and amortization because they are not directly based on management's decisions. $H_{i,t}$ is a dummy variable that equals one when revenue is in a hypergrowth stage in period *t* and zero otherwise. The hypergrowth stage is when *Revenue growth* is higher than 40%. According to World Economic Forum (2016), hypergrowth is the startup phase, with an average annual growth rate of at least 40% for more than one year.

The following control variables are included in Model (1). First, we include **audit by Big 4** *(Big4*$_{i,t}$*)* and **audit opinion** *(Unqualified* $_{i,t}$*)* to control the reliability of financial reporting on costs. *Big 4* is a dummy variable that equals one when the financial statements are audited by PwC, EY, KPMG, or Deloitte, and zero otherwise. *Unqualified* is a dummy variable that equals one when the audit opinion is unqualified and zero otherwise. Second, we include **abnormal accruals** (*Abnormal accruals*$_{i,t}$) to control for accrual-based earnings manipulation. Due to prior findings on the negative association between two types of earnings management (Cohen & Zarowin, 2010; Zang, 2012), firms that perform accrual-based earnings management are less likely to do real earnings management, such as cutting SG&A costs. However, there are also findings that firms

[5] Some firms classify parts of SG&A costs as costs of services delivered (Lévesque et al., 2012). As our sample consists of only financial services companies, any costs of services or costs of goods sold should be classified as SG&A costs.

jointly use both accrual-based and real earnings management to report better earnings (C. L. Chen et al., 2012). *Abnormal accruals*$_{i,t}$ is a firm's actual total accruals in year *t* minus predicted total accruals in year *t* (Francis & Wang, 2008).

To control the impact of firm size and resources, we include **Asset intensity** and **Employee intensity**. *Asset intensity*$_{i,t}$ is the ratio of total assets at the beginning of year *t* to *Revenue* of year *t. Employee intensity*$_{i,t}$ is the ratio of the number of employees at the beginning of year *t* to *Revenue* of year *t.* As U.K. fintech samples recognize intangible assets on their balance sheet, they become suitable samples to test hypergrowth cost asymmetry while controlling the impact of intangible asset intensity.

In addition to Model (1), following Anderson et al. (2003), we propose a log model to test cost asymmetry based on two considerations. First, Davidson and MacKinnon (1981)'s test rejects the linear model in favor of the log-log model. Second, the log-log specification alleviates the heteroscedasticity of a linear model that is caused by firm size differences. The log-log model of Model (2) is as follows:

$$ln\left[\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right] = \gamma_0 + \gamma_1 \, ln\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right] + \gamma_2 \, H_{i,t} + \gamma_3 \, H_{i,t} \, ln\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right] + \sum Control_{i,t} + \varepsilon_{i,t}$$

$$ln \, SG\&A \, multiplier_{i,t} = \gamma_0 + \gamma_1 \; ln \, revenue \, multiplier_{i,t} + \gamma_2 \, H_{i,t} + \gamma_3 \, H_{i,t} \; ln \, revenue \, multiplier_{i,t} + \sum Control_{i,t} + \varepsilon_{i,t} \qquad (2)$$

where *ln SG&A multiplier*$_{i,t}$ is $ln\left[\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right]$, while *ln revenue multiplier*$_{i,t}$ is $ln\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right]$. Other variables are as previously defined. Elasticity of cost multiplier $\left[\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right]$ with respect to revenue multiplier $\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right]$ equals the percentage change in cost multiplier divided by the percentage change in revenue multiplier, which is calculated as follows:

Elasticity of cost multiplier with respect to revenue multiplier =

$$\frac{dln\left[\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right]}{dln\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right]} = \frac{d\left[\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right]/\left[\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right]}{d\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right]/\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right]} = \frac{\text{\%change in cost multiplier}}{\text{\%change in revenue multiplier}}$$

Similar to Model (1), we include a set of control variables: *Asset intensity*$_{i,t}$, *Employee intensity*$_{i,t}$, *Big4*$_{i,t}$, *Unqualified*$_{i,t}$, and *Abnormal accruals*$_{i,t}$. *Asset intensity* $_{i,t}$ and *Employee intensity* $_{i,t}$ are measured in the log form, *ln asset intensity*$_{i,t}$ and *ln employee intensity*$_{i,t}$, to be consistent with *ln SG&A multiplier*$_{i,t}$ and *ln revenue multiplier*$_{i,t}$. Following Anderson et al. (2003), dummy variables including *Big4*$_{i,t}$ and *Unqualified*$_{i,t}$ are not in the log form. *Abnormal accruals*$_{i,t}$ variable has both negative and positive values, so it is not measured in the log form.

To test for H1, we examine the hypergrowth firms' elasticity of cost growth with respect to revenue growth for Model (1) and their elasticity of cost multiplier with respect to revenue multiplier for Model (2). The elasticity of hypergrowth firms is equal to $\gamma_1 + \gamma_3$, while that of non-hypergrowth firms is γ_1. It is expected that $\gamma_3 < 0$ in both Model (1) and Model (2), indicating that *SG&A growth* increases to a lesser extent when *Revenue growth* is in a hypergrowth stage than otherwise. Hence, the findings will support the SG&A cost asymmetry in hypergrowth private fintech firms.

Existence of Economies of Scale in the Hypergrowth Stage

To test H2 for the existence of economies of scale in the hypergrowth stage, we use Model (3) to examine the elasticity of cost with respect to output. As fintech firms in our study earn revenues mainly from fee and subscription income, a total revenue figure is used to represent output. Revenues are probably one of the most accurately tracked economic values and are clearly correlated with output (De Loecker & Syverson, 2021). Model (3) is presented as follows:

$$ln\,SG\&A_{i,t} = \gamma_0 + \gamma_1\, ln\,Revenue_{i,t} + \gamma_2\, H_{i,t} + \gamma_3\, H_{i,t}\, ln\,Revenue_{i,t} + \sum Control_{i,t} + \varepsilon_{i,t} \quad (3)$$

Elasticity of cost with respect to output (revenue) =

$$\frac{d\,ln\,SG\&A_{i,t}}{d\,ln\,Revenue_{i,t}} = \frac{d\,SG\&A_{i,t}/SG\&A_{i,t}}{d\,Revenue_{i,t}/\,Revenue_{i,t}} = \frac{\%change\ in\ SG\&A}{\%change\ in\ revenue}$$

The elasticity of cost with respect to revenue equals the percentage change in SG&A cost divided by the percentage change in revenue. The interaction term between log of revenue $(ln\,Revenue_{i,t})$ and hypergrowth ($H_{i,t}$) variable is added to investigate whether being in the hypergrowth stage increases the economies of scale (decreases cost elasticity) relative to non-hypergrowth firms. Hypergrowth firms' elasticity of cost with respect to revenue equals $\gamma_1 + \gamma_3$, while that of non-hypergrowth firms is γ_1.

To test H2 whether fintech firms achieve additional economies of scale during the hypergrowth phase, it is expected that $\gamma_3 < 0$. Additionally, if there are economies of scale, the cost elasticity is expected to be less than one. On the contrary, the diseconomies to scale would cause the cost elasticity to be greater than one.

Research Findings

Descriptive statistics are reported in Table 1. The mean of *SG&A growth* is 0.396, while the mean of *Revenue growth* is 0.766. Meanwhile, the mean of *ln SG&A multiplier* is 0.158, and that of *ln revenue multiplier* is 0.209. The standard deviation of *Revenue growth* is higher than that of *SG&A growth*, suggesting higher variation on the revenue side. Similarly, *ln revenue multiplier* also has higher variation than *ln SG&A multiplier*. The mean of hypergrowth (*H*) is 0.276, indicating that 27.6% of samples have a revenue growth rate higher than 40%. The full sample is used in the outlier-robust regression with an MM or S-estimator. The reduced sample that excludes outliers whose *Revenue growth* or *SG&A growth* is less than the 5th percentile or more than the 95th percentile is used in the OLS panel data regression. The scatter plot, Figure 3, illustrates the underlying trend after excluding outliers. Hypergrowth firms (represented by red dots and the red line) tend to have a flatter slope as revenue growth increases, compared to non-hypergrowth firms.

Table 2 presents the Pearson correlation coefficients of variables. Variables of interest such as *Revenue growth*, hypergrowth (*H*), and *H x Revenue growth* are highly correlated with a dependent variable, *SG&A growth*. By design, an interaction term, *H x Revenue growth*, has a high correlation with the variables it is composed of, including *Revenue growth* and hypergrowth (*H*). The multicollinearity of independent variables is examined. The VIF values of all variables are less than 10, and the highest condition index is lower than 30, indicating no multicollinearity concern (Belsley et al., 2005; Kalnins, 2018). Correlations of variables in Model (2) (untabulated results) also exhibit a similar trend.

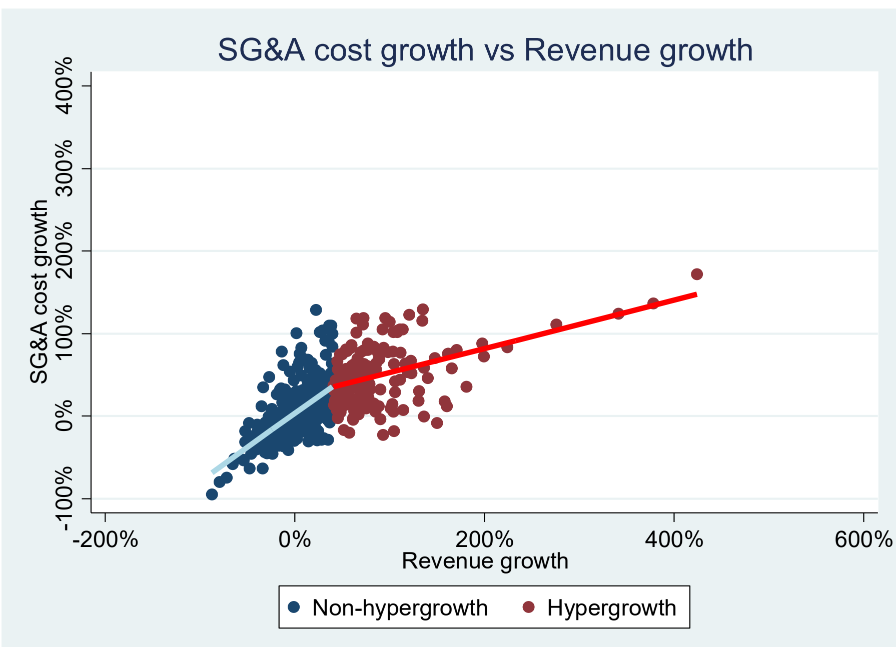

Figure 3: Scatter Plot After Excluding Outliers Beyond the 5th or 95th Percentile

Creative Business and Sustainability Journal (CBSJ)
Vol.46 No.1 January – June 2024, pp.37-65

Table 1: Descriptive Statistics (N=808)

Variable	Mean	Std. Dev.	Min	p5	p95	Max
SG&A growth	0.396	2.517	-0.948	-0.338	1.289	60.412
Revenue growth	0.766	6.390	-0.875	-0.385	1.814	150.000
ln SG&A multiplier	0.158	0.459	-2.964	-0.413	0.828	4.118
ln revenue multiplier	0.209	0.562	-2.079	-0.486	1.035	5.017
ln SG&A	9.228	1.478	2.773	6.837	11.508	14.423
ln revenue	9.046	1.766	1.386	5.817	11.640	14.373
H	0.276	0.447	0.000	0.000	1.000	1.000
Big4	0.389	0.488	0.000	0.000	1.000	1.000
Unqualified	0.965	0.183	0.000	1.000	1.000	1.000
Abnormal accruals	-0.209	4.557	-123.981	-1.204	1.218	11.122
Asset intensity	3.594	9.079	0.038	0.213	14.250	163.500
Employee intensity	0.017	0.114	0.000	0.000	0.035	3.000

Note: All variables are defined in Appendix Table III.

Table 2: Pearson Correlations

	SG&A Growth	Revenue Growth	H	Hx Revenue Growth	Big4	Unqualified	Abnormal Accruals	Asset Intensity	Employee Intensity
SG&A growth	1.000								
Revenue growth	0.456*	1.000							
H	0.204*	0.188*	1.000						
H x Revenue growth	0.455*	1.000*	0.189*	1.000					
Big4	-0.047	0.013	0.002	0.007	1.000				
Unqualified	0.005	0.009	-0.034	0.006	0.151*	1.000			
Abnormal accruals	0.034	-0.770*	-0.075*	-0.771*	-0.047	-0.009	1.000		
Asset intensity	-0.036	0.054	-0.055	0.062	-0.008	-0.027	-0.093*	1.000	
Employee intensity	-0.020	-0.004	-0.033	0.003	-0.061	-0.060	-0.007	0.706*	1.000

Note: All variables are defined in Appendix Table III. * represents Pearson correlation coefficients that are statistically significant at the 0.05 level.

Table 3: Cost Asymmetry in the Hypergrowth Stage

Panel A: Model (1)

Dependent Variable	(1) OLS			(2) Robust Regression		
SG&A Growth	**Coef.**	**t-value**		**Coef.**	**t-value**	
Revenue growth	0.8128	13.61	***	0.7250	9.76	***
H	0.1799	3.36	***	0.0136	0.42	
H x Revenue growth	-0.4891	-6.81	***	-0.1399	-1.89	*
Big4	-0.0687	-1.79	*	-0.0483	-2.49	**
Unqualified	-0.0587	-0.60		0.0700	0.97	
Abnormal accruals	-0.0268	-1.84	*	-0.0285	-2.30	**
Asset intensity	0.0047	1.27		0.0035	1.66	
Employee intensity	-0.4595	-3.00	***	-5.2790	-9.65	***
Constant	0.1123	1.06		-0.0019	-0.03	
Year FE	*yes*			*yes*		
Firm FE	*yes*			*yes*		
Observations	727			808		
R-squared (OLS)/ Pseudo R-squared (Robust reg)	52.92%			39.33%		

Panel B: Model (2)

Dependent Variable	(1) OLS			(2) Robust Regression		
ln SG&A Multiplier	**Coef.**	**t-value**		**Coef.**	**t-value**	
ln revenue multiplier	0.8734	9.85	***	0.7939	12.64	***
H	0.0740	1.42		0.0558	1.17	
H x ln revenue multiplier	-0.4091	-3.61	***	-0.1474	-1.95	*
Big4	-0.0892	-2.42	**	-0.0653	-1.85	*
Unqualified	-0.0490	-0.45		-0.0069	-0.12	
Abnormal accruals	-0.0236	-2.02	**	0.0191	13.15	***
ln asset intensity	0.0243	1.51		-0.0123	-0.86	
ln employee intensity	-0.0357	-2.22	**	-0.0198	-1.15	
Constant	-0.0869	-0.59		-0.0185	-0.15	
Year FE	*yes*			*yes*		
Firm FE	*yes*			*yes*		
Observations	727			808		
R-squared (OLS)/ Pseudo R-squared (Robust reg)	61.03%			40.75%		

Notes: P-values are based on robust clustered standard errors. *, **, and *** indicate significance at 10%, 5%, and 1% levels (two-sided p-values), respectively. All variables are defined in Appendix Table III.

Table 3 shows the results of the existence of cost asymmetry in the hypergrowth stage. Panels A and B present the results for the elasticity of cost growth with respect to revenue growth (Model 1) and the elasticity of cost multiplier with respect to revenue multiplier (Model 2), respectively. We estimate Models (1) and (2) with OLS and robust regression. In Panel A, coefficients from estimating Model (1) with OLS are shown in Column (1). The coefficient of Hypergrowth (*H*) is 0.1799 (p-value < 1 percent), indicating that hypergrowth firms have a higher level of *SG&A growth* on average compared to non-hypergrowth firms. The coefficient of *H x Revenue growth* is -0.4891 (p-value < 1 percent). The significance of the interaction term demonstrates that there is a significant difference in the elasticity of cost growth with respect to revenue growth between hypergrowth and non-hypergrowth firms. The cost growth elasticity of non-hypergrowth firms is represented by 0.8128 (p-value < 1 percent), suggesting that *SG&A growth* increases by 81.28% on average when *Revenue growth* increases by 100%. With the significant coefficient of *H x Revenue growth*, the cost growth elasticity of hypergrowth firms is calculated as 0.8128-0.4891 = 0.3237. This suggests that when *Revenue growth* increases by 100%, the *SG&A growth* of hypergrowth firms will increase by only 32.37%. In Column (2), Panel A, the results from the robust regression of Model (1) exhibit similar findings for *Revenue growth* and the interaction term (*H x Revenue growth*).

Table 3, Panel B presents the results for the elasticity of cost multiplier with respect to revenue multiplier (Model 2). The coefficients of Model (2) estimated with OLS are shown in Column (1) of Panel B. The estimate of *H x ln revenue multiplier* is -0.4091 (p-value < 1 percent), indicating the significant difference in the elasticity of cost multiplier with respect to revenue multiplier between hypergrowth and non-hypergrowth firms. The elasticity of cost multiplier of non-hypergrowth firms is represented by 0.8734 (p-value < 1 percent), suggesting that the cost multiplier $\left[\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right]$ increases by 87.34% on average when the revenue multiplier $\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right]$ increases by 100%. With the significance of the coefficient of *H x ln revenue multiplier*, the elasticity of cost multiplier of hypergrowth firms is calculated as 0.8734-0.4091= 0.4643. The implication is that when the revenue multiplier increases by 100%, the cost multiplier of hypergrowth firms will increase by only 46.43%. In Column (2), Panel B, results from robust regression exhibit similar signs and significance of *ln revenue multiplier* and the interaction term (*H x ln revenue multiplier*).

Regarding control variables, *Big4* is negatively significant in both Model (1) and Model (2). Most fintech firms are at an early stage and have negative earnings. Big bath (under-report earnings by incurring significant expenses or taking large write-offs) is likely to incur in the current period of bad news so that companies can report higher earnings in the future (Kirschenheiter & Melumad, 2002). The negative association suggests that Big4 audit firms are possibly able to reduce this big bath incidence.

Abnormal accruals is significant, with a negative sign in almost all models. The relation reflects that firms with higher accruals, possibly due to an intention to beat the zero earnings benchmark, are more likely to do real earnings management by cutting SG&A costs. This is consistent with prior research findings that firms jointly use both accrual and real earnings management to report better earnings (C. L. Chen et al., 2012).

Employee intensity (ln employee intensity) is negatively significant in both Model (1) and Model (2). It is consistent with the notion that if the number of staff at the beginning of the year is too small compared to revenue, cost growth can increase due to the required additional hiring. Additionally, once the number of employees becomes high relative to revenue, companies will choose to limit cost growth to aim for profitability.

In summary, hypergrowth firms possess a lower elasticity of cost growth with respect to revenue growth and a lower elasticity of cost multiplier with respect to revenue multiplier. Therefore, the findings support H1 that, in private fintech firms, SG&A cost growth increases to a lesser extent when revenue growth is in a hypergrowth stage than otherwise.

Existence of Economies of Scale in the Hypergrowth Stage

Table 4 presents the results of the existence of economies of scale in the hypergrowth stage of private fintech firms. The coefficients from estimating Model (3) with OLS are shown in Column (1) of Table 4. The coefficient estimate of hypergrowth (*H*) is 0.5070 (p-value < 5 percent), indicating that hypergrowth firms have a higher level of *ln SG&A* on average compared to non-hypergrowth firms. The estimate of *H x ln revenue* is -0.0511 (p-value < 5 percent). This result indicates a significant difference in cost elasticity with respect to revenue (output) between hypergrowth and non-hypergrowth firms. The cost elasticity of non-hypergrowth firms is represented by 0.8659 (p-value < 1 percent), suggesting that cost increases by 86.59% on average when revenue increases by 100%. With the significant coefficient of *H x ln revenue*, the cost elasticity of hypergrowth firms is calculated as 0.8659-0.0511=0.8148. The figure suggests that when revenue increases by 100%, the cost of hypergrowth firms will increase by only 81.48%. In Column (2), the coefficients from robust regression exhibit similar signs and significance of *ln revenue*, hypergrowth (*H*), and the interaction term (*H x ln revenue*). Consequently, it can be concluded that both hypergrowth and non-hypergrowth firms benefit from economies of scale as their cost elasticities are less than 100%. However, hypergrowth firms have higher economies of scale, as suggested by their lower cost elasticity. Consequently, H2 is supported.

The control variable, *Unqualified,* is positively significant at the 10% level in OLS and at the 1% level in robust regression. It indicates that firms with an unqualified opinion tend to report significant expenses more completely, resulting in a higher cost level. *Abnormal accruals* is significant, with a negative sign at the 1% level. The negative association reflects that firms with an intention to beat the zero earnings benchmark tend to do both accrual and real earnings management. Moreover, *ln asset intensity* is positive and significant at the 1% level in the OLS model, suggesting that a larger firm's size relates to higher operation costs. Finally, *ln employee intensity* is positively significant at the 1% level in the robust regression model. As the number of employees relative to sales grows, staff costs increase inevitably.

In conclusion, the lower cost growth and cost multiplier elasticity of hypergrowth private fintech firms, as portrayed in Table 3, could potentially be explained by the incidence that these firms place importance on cost efficiency to achieve profitability. Scale-up firms successfully balance finding new opportunities with reaping high-quality revenues (those with lower marginal costs) and can effectively deal with internal chaos and management inefficiencies. As a result, the fast scalability enables hypergrowth firms to achieve higher cost efficiency compared to non-hypergrowth firms. The economies of scale test in Table 4 substantiates this proposition and demonstrates that hypergrowth firms benefit from economies of scale as firms grow substantially by having lower cost elasticity with respect to output (revenue) compared to non-hypergrowth firms. Although speed is one of hypergrowth firms' priorities to attain market dominance, they still consider marginal costs that arise from additional revenues. The findings imply that U.K. private fintech firms in a hypergrowth phase are likely to adopt classic start-up growth rather than Blizscaling, which is managerially inefficient and burns cash quickly (Sullivan, 2016).

Table 4: Economies of Scale in the Hypergrowth Stage

Dependent Variable	**(1) OLS**			**(2) Robust Regression**		
ln SG&A	**Coef.**	**t-value**		**Coef.**	**t-value**	
ln revenue	0.8659	14.45	***	0.8949	45.88	***
H	0.5070	2.28	**	0.2722	3.03	***
H x ln revenue	-0.0511	-2.23	**	-0.0274	-2.89	***
Big4	0.0099	0.14		0.0079	0.30	
Unqualified	0.3762	1.85	*	0.6242	32.01	***
Abnormal accruals	-0.0123	-13.08	***	-0.0130	-38.84	***
ln asset intensity	0.0745	2.64	***	0.0145	0.56	
ln employee intensity	0.0683	1.50		0.0723	3.63	***
Constant	1.2882	2.42	**	0.7484	3.67	***
Year FE	yes			yes		
Firm FE	yes			yes		
Observations	779			808		
R-squared (OLS)/ Pseudo R-squared (Robust reg)	89.92%			57.44%		

Notes: P-values are based on robust clustered standard errors. *, **, and *** indicate significance at 10%, 5%, and 1% levels (two-sided p-values), respectively. All variables are defined in Appendix Table III.

Robustness Tests

Additional tests are conducted to alter some specifications of the models and are reported in Appendix Table I. First, *Ageyear*, representing the firm age of a certain firm-year observation, is added to the models as a control variable. Coad et al. (2013) find that older firms have higher productivity and profitability and are better able to convert sales growth into subsequent profits and productivity. Therefore, firm age could impact firms' decisions about cost adjustment during the hypergrowth phase. The results from the inclusion of *Ageyear* in the random effect model[6] exhibit signs and significance similar to the results presented above. However, *Ageyear* has significant pairwise correlations with all other independent variables except *Abnormal accruals* and *(ln) asset intensity*. Therefore, it is not included in the main model specification. Second, *SG&A* in our study is calculated by adding the reported selling, general, and administrative

[6] Including *Ageyear* in the fixed effect model results in extremely high multicollinearity with firm fixed effect dummies. Therefore, the random effect model is used instead.

expenses to the costs of services or costs of goods sold (if any), as some firms classify parts of their SG&A costs as costs of services delivered (Lévesque et al., 2012). Our conclusion is still valid when we exclude the costs of services and costs of goods sold from SG&A expenses and run tests only on SG&A costs that firms intentionally report as their selling, general, and administrative expenses. Finally, the results remain robust when the hypergrowth threshold is adjusted from 40% to either a 50% or 60% cutoff point. Even if the cutoff is adjusted to the mean or median of *Revenue growth*, the conclusion remains valid (untabulated results).

To compare with the cost stickiness (the asymmetry between revenue-increasing and revenue-decreasing stages) of prior studies, we add $D_{i,t}$ (the dummy variable equal to one when *Revenue growth* is negative and zero otherwise) and $D_{i,t}xRevenue\ growth_{i,t}$ in Model (1). The coefficient of $D_{i,t}xRevenue\ growth_{i,t}$ represents the difference in cost growth elasticity between a stage with negative *Revenue growth* and a stage with *Revenue growth* from 0 to 40% (equivalent to the asymmetry between revenue increase and revenue decrease in prior studies (Anderson et al., 2003; Balakrishnan et al., 2014)). Meanwhile, the coefficient of $H_{i,t}xRevenue\ growth_{i,t}$ captures the asymmetry between a phase with *Revenue growth* from 0 to 40% and a phase with *Revenue growth* greater than 40%. The analysis employs only Model (1), as the curvature of a log model in Model (2) can bias elasticity coefficients to increase with sales growth magnitude (Balakrishnan et al., 2014), making the elasticity coefficients of a revenue-increasing stage larger than those of a revenue-decreasing stage.

The results in Appendix Table II show that $D_{i,t}xRevenue\ growth_{i,t}$ is not significant while $H_{i,t}xRevenue\ growth_{i,t}$ is still negatively significant in both Columns (1) and (2). This indicates that the cost stickiness documented in prior research does not exist in fintech firms. The possible explanation is that although fintech firms have high intangible assets, which can lead to a high degree of cost stickiness (Sallehu et al., 2023; Venieris et al., 2015), their digital transformation and digital capabilities are able to reduce cost stickiness (Chen & Xu, 2023), resulting in an insignificant asymmetry between revenue-increasing and revenue-decreasing stages.

Discussion

Theoretical Contributions

This study, first, contributes to the literature on cost asymmetry. While prior studies (Anderson et al., 2003; Balakrishnan et al., 2014) focus only on cost asymmetry between revenue-increasing and revenue-decreasing stages (known as cost stickiness), this study portrays that in private fintech firms, asymmetry can also occur between non-hypergrowth and hypergrowth stages, which can be explained by a cost advantage from additional economies of scale. This suggests that scale-up firms effectively balance the finding of new opportunities with successfully reaping high-quality revenues while handling internal inefficiency. Second, this research contributes to the economies of scale literature (Chandler & Hikino, 2009; De Loecker & Syverson, 2021; Junius, 1997). It shows that, despite being in the same industry, static internal economies of scale of firms can vary between different growth stages due to cost efficiency during the hypergrowth stage, supporting the proposition of a cost advantage before reaching minimum efficient scale. Finally, with the unique data set from U.K. fintech financial statements, this study contributes to the financial services industry's literature on cost asymmetry (Subramaniam & Watson, 2016) and economies of scale (Benston, 1972; Goldberg et al., 1991; Latzko, 1999) by providing firm-level evidence of cost asymmetry and economies of scale in the fintech industry previously unavailable due to a lack of private firms' data.

Managerial Implications

Regarding the managerial contribution of this research, understanding cost asymmetry behavior could help debt and equity investors more accurately predict profitability from revenue and SG&A growth trends. These factors should be considered by investors in profitability assessment and business plan evaluation, which are part of the screening process (Shepherd et al., 2000). The findings also have implications for the evaluation of the financial performance of private fintech firms compared to peer firms. Founders could consider the asymmetry in their cost spending and seek to achieve additional economies of scale once their firms enter the hypergrowth phase to attain a competitive advantage through scaling. Managers can aim to achieve market dominance and prevent cash depletion by leveraging business digital capabilities to enhance economies of scale. Finally, central banks recognize the potential of fintech to enhance financial services, drive efficiency, and stimulate economic growth. They can guide fintech firms to scale up successfully by focusing on efficient cost management to achieve economies of scale. This helps prevent start-up failure, ensuring the stability of the financial system.

Conclusion

Brief Summary

This research seeks to investigate the cost asymmetry between hypergrowth firms and non-hypergrowth firms by using the private fintech sample. It illustrates the existence of cost asymmetry, which is different from the typical cost asymmetry found between revenue-increasing and revenue-decreasing stages in public financial institutions. Examining cost growth elasticity and cost multiplier elasticity, the findings indicate that hypergrowth firms' cost growth elasticity and cost multiplier elasticity are significantly lower than those of non-hypergrowth firms. This research demonstrates that hypergrowth firms consider cost efficiency and benefit from additional economies of scale throughout the growth process.

Limitations and Directions of Future Research

The limitation of this research is that the sample excludes small and micro firms in the U.K., as they are not required to disclose profit and loss statements and are exempt from auditing. Also, challenger banks and insurtech firms are not included in the sample. Future analysis could investigate the existence of economies of scope and economies of learning of hypergrowth firms compared to non-hypergrowth firms, as hypergrowth firms possibly reap cost advantages from economies of scope when they make a complementary range of products while focusing on their core competencies. There are cost savings that hypergrowth firms can also gain from refining their operating practices, regarded as economies of learning.

References

Adams, J., Hayunga, D., & Mansi, S. (2022). Index fund trading costs are inversely related to fund and family size. *Journal of Banking and Finance, 140*, 106527. https://doi.org/10.1016/j.jbankfin.2022.106527

Adams, J., Hayunga, D., Mansi, S., Reeb, D., & Verardi, V. (2019). Identifying and treating outliers in finance. *Financial Management, 48*(2), 345-384.

Anderson, M. C., Banker, R. D., & Janakiraman, S. N. (2003). Are selling, general, and administrative costs “sticky”?. *Journal of Accounting Research, 41*(1), 47-63.

Anderson, S. W., & Lanen, W. N. (2007). Understanding cost management: what can we learn from the evidence on 'sticky costs'?. *Available at SSRN, 975135*.

Anthony, J. H., & Ramesh, K. (1992). Association between accounting performance measures and stock prices. A test of the life cycle hypothesis. *Journal of Accounting and Economics, 15*(2-3), 203-227. https://doi.org/10.1016/0165-4101(92)90018-W

Arthur, W. B. (1996). Increasing returns and the new world of business. *Harvard Business Review, 74*(4), 100-109.

Balakrishnan, R., Labro, E., & Soderstrom, N. S. (2014). Cost structure and sticky costs. *Journal of Management Accounting Research, 26*(2), 91-116.

Ball, R., & Shivakumar, L. (2005). Earnings quality in UK private firms: Comparative loss recognition timeliness. *Journal of Accounting and Economics, 39*(1), 83-128.

Banalieva, E. R., & Dhanaraj, C. (2019). Internalization theory for the digital economy. *Journal of International Business Studies, 50*, 1372-1387.

Banker, R. D., & Byzalov, D. (2014). Asymmetric cost behavior. *Journal of Management Accounting Research, 26*(2), 43-79.

Belsley, D. A., Kuh, E., & Welsch, R. E. (2005). *Regression diagnostics: Identifying influential data and sources of collinearity*. John Wiley & Sons.

Benston, G. J. (1972). Economies of scale of financial institutions. *Journal of Money, Credit and Banking, 4*(2), 312-341.

Berger, A. N., & Udell, G. F. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking & Finance, 22*(6-8), 613-673.

Bingham, C. B., & Davis, J. P. (2012). Learning sequences: Their existence, effect, and evolution. *Academy of Management Journal, 55*(3), 611-641.

Bohan, S., Tippmann, E., Levie, J., Igoe, J., & Bowers, B. (2024). What is scaling?. *Journal of Business Venturing, 39*(1), 106355.

Cameron, A. C., & Miller, D. L. (2015). A practitioner’s guide to cluster-robust inference. *Journal of Human Resources, 50*(2), 317-372.

Chandler, A. D., & Hikino, T. (2009). *Scale and scope: The dynamics of industrial capitalism*. Harvard University Press.

Chen, C. L., Huang, S. H., & Fan, H. S. (2012). Complementary association between real activities and accruals-based manipulation in earnings reporting. *Journal of Economic Policy Reform, 15*(2), 93-108.

Chen, C. X., Lu, H., & Sougiannis, T. (2012). The agency problem, corporate governance, and the asymmetrical behavior of selling, general, and administrative costs. *Contemporary Accounting Research, 29*(1), 252-282.

Chen, Y., & Ma, Y. (2021). Financing constraints, internal control quality and cost stickiness. *Journal of Business Economics and Management, 22*(5), 1231-1251.

Chen, Y., & Xu, J. (2023). Digital transformation and firm cost stickiness: Evidence from China. *Finance Research Letters, 52*, 103510.

Cheng, S., Jiang, W., & Zeng, Y. (2018). Does access to capital affect cost stickiness? Evidence from China. *Asia-Pacific Journal of Accounting & Economics, 25*(1-2), 177-198.

Cho, Y. J., Tsui, D., & Yang, H. I. (2021). The role of convex equity incentives in managers' forecasting decisions. *Journal of Financial Reporting, 6*(2), 19-44.

Coad, A., & Rao, R. (2008). Innovation and firm growth in high-tech sectors: A quantile regression approach. *Research Policy, 37*(4), 633-648.

Coad, A., Segarra, A., & Teruel, M. (2013). Like milk or wine: Does firm performance improve with age?. *Structural Change and Economic Dynamics, 24*, 173-189.

Cohen, D. A., & Zarowin, P. (2010). Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics, 50*(1), 2-19.

Cooper, R., & Kaplan, R. S. (1998). The promise-and peril-of integrated cost systems. *Harvard Business Review, 76*(4), 109-120.

Cornelli, G., Doerr, S., Franco, L., & Frost, J. (2021). Funding for fintechs: Patterns and drivers. *BIS Quarterly Review,* (20).

D'Avino, M., De Simone, V., Iannucci, M., & Schiraldi, M. M. (2015). Guidelines for e-startup promotion strategy. *Journal of Technology Management & Innovation, 10*(1), 1-16.

Davidson, R., & MacKinnon, J. G. (1981). Several tests for model specification in the presence of alternative hypotheses. *Econometrica: Journal of the Econometric Society*, 781-793.

De Loecker, J., & Syverson, C. (2021). An industrial organization perspective on productivity. In K. Ho, A. Hortaçsu, & A. Lizzeri (Eds.), *Handbook of industrial organization* (Vol. 4, pp. 141-223). Elsevier.

Dehon, C., Gassner, M., & Verardi, V. (2012). Extending the Hausman test to check for the presence of outliers. In B. H. Baltagi, R. Carter Hill, W. K. Newey, & H. L. White (Eds.), *Essays in Honor of Jerry Hausman* (pp. 435-453). Emerald Group Publishing Limited.

DeSantola, A., & Gulati, R. (2017). Scaling: Organizing and growth in entrepreneurial ventures. *Academy of Management Annals, 11*(2), 640-668.

Dierickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science, 35*(12), 1504-1511.

Dorfleitner, G., Hornuf, L., Schmitt, M., & Weber, M. (2017). The fintech market in Germany. In G. Dorfleitner, L. Hornuf, M. Schmitt, & M. Weber (Eds.), *FinTech in Germany* (pp. 13-46). Springer.

Financial Conduct Authority. (2015). Regulatory sandbox. *Financial Conduct Authority, 11*, 30.

Francis, J. R., & Wang, D. (2008). The joint effect of investor protection and Big 4 audits on earnings quality around the world. *Contemporary Accounting Research, 25*(1), 157-191.

Geroski, P., & Machin, S. (1992). Do Innovating Firms Outperform Non-Innovators?. *Business Strategy Review, 3*(2), 79-90. https://doi.org/https://doi.org/10.1111/j.1467-8616.1992.tb00030.x

Giustiziero, G., Kretschmer, T., Somaya, D., & Wu, B. (2023). Hyperspecialization and hyperscaling: A resource-based theory of the digital firm. *Strategic Management Journal, 44*(6), 1391-1424.

Gnanasambandam, C., Miller, A., & Sprague, K. (2017). *Grow fast or die slow: The role of profitability in sustainable growth*. Mckinsey&Company. https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/grow-fast-or-die-slow-the-role-of-profitability-in-sustainable-growth#/

Goldberg, L. G., Hanweck, G. A., Keenan, M., & Young, A. (1991). Economies of scale and scope in the securities industry. *Journal of Banking & Finance, 15*(1), 91-107.

Gregory, B. T., Rutherford, M. W., Oswald, S., & Gardiner, L. (2005). An empirical investigation of the growth cycle theory of small firm financing. *Journal of Small Business Management, 43*(4), 382-392.

Hall, C. M. (2016). Does ownership structure affect labor decisions?. *The Accounting Review, 91*(6), 1671-1696.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 1251-1271.

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society*, 153-161.

HM Revenue & Customs. (2007). *Claiming Research and Development (R&D) tax reliefs*. https://www.gov.uk/guidance/corporation-tax-research-and-development-rd-relief

Hoffman, R., & Yeh, C. (2018). *Blitzscaling: The lightning-fast path to building massively valuable companies*. Currency.

Hui, L., Xie, H., & Chen, X. (2024). Digital technology, the industrial internet, and cost stickiness. *China Journal of Accounting Research*, 100339.

Ibrahim, A. E. A., Ali, H., & Aboelkheir, H. (2022). Cost stickiness: A systematic literature review of 27 years of research and a future research agenda. *Journal of International Accounting, Auditing and Taxation, 46*, 100439.

Jansen, J. J., Heavey, C., Mom, T. J., Simsek, Z., & Zahra, S. A. (2023). Scaling-up: Building, leading and sustaining rapid growth over time. *Journal of Management Studies, 60*(3), 581-604.

Junius, K. (1997). *Economies of scale: A survey of the empirical literature, Kiel Working Paper, No. 813*. Kiel Institute of World Economics (IfW).

Kalnins, A. (2018). Multicollinearity: How common factors cause Type 1 errors in multivariate regression. *Strategic Management Journal, 39*(8), 2362-2385.

Kirschenheiter, M., & Melumad, N. D. (2002). Can "big bath" and earnings smoothing co-exist as equilibrium financial reporting strategies?. *Journal of Accounting Research, 40*(3), 761-796.

KPMG, & CBINSIGHTS. (2016). *The Pulse of Fintech Q2 2016*. https://assets.kpmg/content/dam/kpmg/xx/pdf/2016/08/the-pulse-of-fintech-q2-report.pdf

Kuratko, D. F., Holt, H. L., & Neubert, E. (2020). Blitzscaling: The good, the bad, and the ugly. *Business Horizons, 63*(1), 109-119. https://doi.org/https://doi.org/10.1016/j.bushor.2019.10.002

Latzko, D. A. (1999). Economies of scale in mutual fund administration. *Journal of Financial Research, 22*(3), 331-339.

Lazere, C. (1996). Holding the line on SG&A. *CFO, 12*, 28-37.

Lev, B., Radhakrishnan, S., & Zhang, W. (2009). Organization capital. *Abacus, 45*(3), 275-298.

Lévesque, M., Joglekar, N., & Davies, J. (2012). A comparison of revenue growth at recent-IPO and established firms: The influence of SG&A, R&D and COGS. *Journal of Business Venturing, 27*(1), 47-61.

Loebbecke, C., & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems, 24*(3), 149-157.

Loy, T. R., & Hartlieb, S. (2018). Have estimates of cost stickiness changed across listing cohorts?. *Journal of Management Control, 29*, 161-181.

Martín-de-Castro, G., Delgado-Verde, M., López-Sáez, P., & Navas-López, J. E. (2011). Towards 'an intellectual capital-based view of the firm': Origins and nature. *Journal of Business Ethics, 98*(4), 649-662. https://doi.org/10.1007/s10551-010-0644-5

Mithani, M. A. (2023). Scaling digital and non-digital business models in foreign markets: The case of financial advice industry in the United States. *Journal of World Business, 58*(4), 101457.

Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy, 48*(8). https://doi.org/10.1016/j.respol.2019.03.018

Noreen, E. (1991). Conditions under which activity-based cost systems provide relevant costs. *Journal of Management Accounting Research, 3*(4), 159-168.

Penrose, E. T. (2009). *The theory of the growth of the firm*. Oxford University Press.

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies, 22*(1), 435-480.

Piaskowska, D., Tippmann, E., & Monaghan, S. (2021). Scale-up modes: Profiling activity configurations in scaling strategies. *Long Range Planning, 54*(6), 102101.

Pozzolo, A. F. (2017). Fintech and banking. Friends or foes. *European Economy Banks, Regulation, and the Real Sector, 3*, 9-12.

Rayport, J. F., Sola, D., & Kupp, M. (2023). The overlooked key to a successful scale-up. *Harvard Business Review, 101*(1), 56-65.

Sallehu, M. M., Chiou, I., & Liu, Y. (2023). The effect of intangible resources on selling, general, and administrative cost behavior of young and established firms. *The North American Accounting Studies, 6*(1), 1-25.

Schaffer, M., & Stillman, S. (2006). XTOVERID: Stata module to calculate tests of overidentifying restrictions after xtreg, xtivreg, xtivreg2, xthtaylor. *Statistical Software Components*. https://ideas.repec.org/c/boc/bocode/s456779.html

Sheen, A. (2020). Do public and private firms behave differently? An examination of investment in the chemical industry. *Journal of Financial and Quantitative Analysis, 55*(8), 2530-2554.

Shepherd, D. A., Ettenson, R., & Crouch, A. (2000). New venture strategy and profitability: A venture capitalist's assessment. *Journal of Business Venturing, 15*(5-6), 449-467.

Silberston, A. (1972). Economies of scale in theory and practice. *The Economic Journal, 82*(325s), 369-391.

Silge, L., & Wöhrmann, A. (2021). Market reaction to asymmetric cost behavior: The impact of long-term growth expectations. *Review of Managerial Science, 15*(2), 309-347.

Stigler, G. J. (1958). The economies of scale. *The Journal of Law and Economics, 1*, 54-71.

Subramaniam, C., & Watson, M. W. (2016). Additional evidence on the sticky behavior of costs. In M. J. Epstein & M. A. Malina (Eds.), *Advances in Management Accounting* (Vol. 26, pp. 275-305). Emerald Group Publishing Limited.

Sullivan, T. (2016). Blitzscaling. *Harvard Business Review, 94*(4), 44-50.

Venieris, G., Naoum, V. C., & Vlismas, O. (2015). Organisation capital and sticky behaviour of selling, general and administrative expenses. *Management Accounting Research, 26*, 54-82.

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research, 122*, 889-901.

World Economic Forum. (2016). *Mastering hypergrowth*. https://www.weforum.org/reports/mastering-hypergrowth/

Yan, Y., & Qi, S. (2021). Childhood matters: Family education and financial inclusion. *Pacific-Basin Finance Journal, 65*. https://doi.org/10.1016/j.pacfin.2020.101489

Zang, A. Y. (2012). Evidence on the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review, 87*(2), 675-703.

Zisis, V., & Naoum, V.-C. (2023). Sticky cost theory and firm's evolution. *Applied Economics Letters, 30*(3), 379-383.

Creative Business and Sustainability Journal (CBSJ)
Vol.46 No.1 January – June 2024, pp.37-65

Appendix

Table I: Robustness Tests

Panel A: Model (1)

	(1) with Ageyear			**(2) without Costs of Services**			**(3) Cutoff 50%**			**(4) Cutoff 60%**		
Dependent Variable ***SG&A growth***	**Coef.**	**z-value**		**Coef.**	**t-value**		**Coef.**	**t-value**		**Coef.**	**t-value**	
Revenue growth	0.8036	16.83	***	0.5048	4.46	***	0.7599	13.35	***	0.7336	12.76	***
H	0.1883	4.45	***	0.1011	1.43		0.2608	5.11	***	0.4401	6.96	***
H x Revenue growth	-0.4974	-8.59	***	-0.3179	-2.44	**	-0.4938	-7.67	***	-0.6437	-9.26	***
Big4	-0.0016	-0.08		-0.0617	-1.06		-0.0661	-1.76	*	-0.0604	-1.67	*
Unqualified	0.0757	1.71	*	-0.0208	-0.15		-0.0579	-0.59		-0.0721	-0.68	
Abnormal accruals	-0.0257	-2.04	**	-0.0393	-1.98	**	-0.0249	-1.75	*	-0.0310	-2.13	**
Asset intensity	0.0029	1.80	*	0.0026	0.51		0.0049	1.28		0.0056	1.41	
Employee intensity	-0.3043	-3.01	***	-0.4789	-2.31	**	-0.4791	-3.09	***	-0.5109	-3.16	***
Ageyear	-0.0004	-0.49		*NA*			*NA*			*NA*		
Constant	-0.0627	-1.07		0.1432	0.99		0.1011	0.96		0.1060	0.94	
Year FE	*yes*			*yes*			*yes*			*yes*		
Firm FE	*no*			*yes*			*yes*			*yes*		
Observations	727			727			726			730		
R-squared (OLS)	54.61%			16.34%			52.49%			50.42%		

Table I: Robustness Tests (Cont.)

Panel B: Model (2)

	(1) with Ageyear			**(2) without Costs of Services**			**(3) Cutoff 50%**			**(4) Cutoff 60%**		
Dependent Variable ***ln SG&A multiplier***	**Coef.**	**z-value**		**Coef.**	**t-value**		**Coef.**	**t-value**		**Coef.**	**t-value**	
ln revenue multiplier	0.8638	12.97	***	0.6100	4.29	***	0.8425	9.78	***	0.8305	10.19	***
H	0.0949	2.34	**	-0.0119	-0.17		0.1336	2.27	**	0.2910	4.58	***
H x ln revenue multiplier	-0.4361	-4.72	***	-0.2614	-1.52		-0.4378	-3.79	***	-0.6433	-5.67	***
Big4	-0.0117	-0.66		-0.0593	-1.13		-0.0879	-2.46	**	-0.0839	-2.43	**
Unqualified	0.0559	1.27		0.0322	0.16		-0.0485	-0.45		-0.0609	-0.51	
Abnormal accruals	-0.0229	-2.38	**	-0.0363	-2.12	**	-0.0222	-1.98	*	-0.0351	-2.12	**
ln asset intensity	0.0002	0.03		-0.0079	-0.24		0.0259	1.61		0.0334	1.93	*
ln employee intensity	-0.0232	-2.69	***	-0.0492	-1.58		-0.0321	-2.06	**	-0.0322	-2.04	**
Ageyear	0.0000	0.07		*NA*			*NA*			*NA*		
Constant	-0.1740	-2.58	**	-0.1801	-0.73		-0.0792	-0.55		-0.0819	-0.52	
Year FE	*yes*			*yes*			*yes*			*yes*		
Firm FE	*no*			*yes*			*yes*			*yes*		
Observations	727			726			726			730		
R-squared (OLS)	63.20%			28.64%			60.60%			59.13%		

Notes: P-values are based on robust clustered standard errors. *, **, and *** indicate significance at 10%, 5%, and 1% levels (two-sided p-values), respectively. All variables are defined in Appendix Table III.

Table II: Existence of Cost Stickiness

Dependent Variable	(1) OLS			(2) Robust Regression		
SG&A growth	**Coef.**	**t-value**		**Coef.**	**t-value**	
Revenue growth	0.7308	4.72	***	0.6911	6.61	***
H	0.1635	2.55	**	0.0946	2.19	**
H x Revenue growth	-0.4059	-2.48	**	-0.2684	-2.55	**
D	0.0287	0.95		-0.0019	-0.09	
D x Revenue growth	0.2564	1.30		-0.0070	-0.05	
Big4	-0.0676	-1.81	*	-0.0477	-2.83	***
Unqualified	-0.0596	-0.60		0.1042	1.25	
Abnormal accruals	-0.0270	-1.86	*	-0.0435	-7.55	***
Asset intensity	0.0049	1.28		0.0122	9.06	***
Employee intensity	-0.4312	-2.79	***	-5.4560	-9.79	***
Constant	0.1207	1.12		-0.0685	-0.92	
Year FE	*yes*			*yes*		
Firm FE	*yes*			*yes*		
Observations	727			808		
R-squared (OLS)/ Pseudo R-squared (Robust reg)	52.70%			38.98%		

Notes: P-values are based on robust clustered standard errors. *, **, and *** indicate significance at 10%, 5%, and 1% levels (two-sided p-values), respectively. All variables are defined in Appendix Table III.

Creative Business and Sustainability Journal (CBSJ)
Vol.46 No.1 January – June 2024, pp.37-65

Table III: Variable Definitions

Variable	Definition
$SG\&A_{i,t}$	SG&A costs of firm *i* in year *t*. SG&A is calculated from the addition of selling, general, and administrative costs and costs of services or costs of goods sold (if any) reported on financial statements. SG&A costs exclude depreciation and amortization.
$Revenue_{i,t}$	Revenue of firm *i* in year *t*
SG&A $growth_{i,t}$	Percentage change of *SG&A* from year *t-1* to year $t = \left[\frac{SG\&A_{i,t} - SG\&A_{i,t-1}}{SG\&A_{i,t-1}}\right]$
Revenue $growth_{i,t}$	Percentage change of *Revenue* from year *t-1* to year $t = \left[\frac{Revenue_{i,t} - Revenue_{i,t-1}}{Revenue_{i,t-1}}\right]$
ln SG&A $multiplier_{i,t}$	Natural logarithm change of *SG&A* from year *t-1* to year $t = ln\left[\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right]$
ln revenue $multiplier_{i,t}$	Natural logarithm change of *Revenue* from year *t-1* to year $t = ln\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right]$
ln $SG\&A_{i,t}$	Natural logarithm value of *SG&A*
ln $revenue_{i,t}$	Natural logarithm value of *Revenue*
$H_{i,t}$	H is a dummy variable equal to one when *Revenue growth* is in a hypergrowth stage in period *t* and zero otherwise. The hypergrowth stage is when *Revenue growth* is higher than 40%.
$D_{i,t}$	D is a dummy variable equal to one when *Revenue growth* is negative in period *t* and zero otherwise.
$Big4_{i,t}$	Big 4 is a dummy variable equal to one when the financial statements are audited by PwC, EY, KPMG, or Deloitte and zero otherwise.
$Unqualified_{i,t}$	Unqualified is a dummy variable equal to one when the audit opinion is unqualified and zero otherwise.

Table III: Variable Definitions (Cont.)

Variable	Definition
Abnormal accruals$_{i,t}$	Abnormal accruals is the difference between *Actual total accruals* of year *t* and *Predicted total accruals* of year *t*. $Actual\ total\ accruals = \left[\frac{Earnings\ before\ extraordinary\ items_{i,t} - Operating\ cash\ flows_{i,t}}{Total\ assets_{i,t-1}}\right]$ $Predicted\ total\ accruals = \left[\frac{\left[Revenue_{i,t} x \left(\frac{Current\ accruals_{i,t-1}}{Revenue_{i,t-1}}\right)\right] - \left[GrossIntangibles_{i,t} x \left(\frac{Amortization_{i,t-1}}{GrossIntangibles_{i,t-1}}\right)\right]}{Total\ assets_{i,t-1}}\right]$ *Earnings before extraordinary items* =net income – extraordinary items *Operating cash flows* = Operating cash flows from cash flow statements *Current accruals* = change in non-cash working capital = Δ [total current assets – cash and short term investments] - Δ [total current liabilities – total amount of debt in current liabilities]
Asset intensity$_{i,t}$	Asset intensity is the ratio of total assets at the beginning of year *t* to *Revenue* of year *t.*
Employee intensity$_{i,t}$	Employee intensity is the ratio of the number of employees at the beginning of year *t* to *Revenue* of year *t.*
ln asset intensity$_{i,t}$	Natural logarithm value of *Asset intensity*
ln employee intensity$_{i,t}$	Natural logarithm value of *Employee intensity*