Pakistan Journal of Economic Studies, Vol. 9(1) 2026, 16-27

Pakistan Journal of Economic Studies

ISSN (E) 2708-1486 (P) 2708-1478
Volume 9: Issue 1 January-March 2026
Journal homepage: https://journals.iub.edu.pk/index.php/pjes/index

Exploring the Effects of Volatility on Firm Growth: Do Export Matter?

[a] Rashid Rauf, [b] Abdul Rashid, [c] Muhammad Imran

[a] Lecturer, International Institute of Islamic Economics, International Islamic University Islamabad, Pakistan
Email: rashid.rauf@iiu.edu.pk

[b] Professor, International Institute of Islamic Economics, International Islamic University Islamabad, Pakistan
Email: abdulrashid@iiu.edu.pk

[c] Independent Researcher, Pakistan
Email: muhammademrran@gmail.com

ARTICLE DETAILS

History:
Accepted: 16-03-2026
Available Online: 26-03-2026

Keywords:

Firm growth

Macroeconomic Volatility

Firm Volatility

Market Volatility

Exports

JEL Codes:
D22
D80

ABSTRACT

Objective: The objective of the study is to explore the differential impact of micro and macro level volatilities by categorizing firms into exporting and non-exporting firms.

Research Gap: It is the first ever study conducted to explore the heterogeneous impact of volatilities by classifying Pakistan Stock Exchange (PSX) listed firms into exporting and non-exporting firms.

Design/Methodology/Approach: The differential impact of volatility on the basis of exports of Pakistan Stock Exchange listed firms is explored by using two step robust system generalized method of moments.

The Main Findings: We found the differential effects of volatility on firm growth. The impact of industrial and macroeconomic volatility on firm growth of exporting firms is positive. However, it is negative for non-exporting firms. Similarly, market and firm level volatility has a positive (negative) impact on growth of non-exporting (exporting) firms.

Theoretical / Practical Implications of the Findings: It is recommended that the decision makers and firms' managers should take into account the heterogeneity of firms (exporting status of the firms) while making decisions.

Originality/Value: The impact of firm, industrial, market and macroeconomic volatility on growth of 419 PSX listed manufacturing firms is examined by analyzing annual unbalanced panel data over the period 1999-2024.

Recommended Citation:

Rauf, R., Rashid, A. & Imran, M. (2026). Exploring Effects of Volatility on Firm Growth: Do Export Matter? *Pakistan Journal of Economic Studies*, *9*(1), 16-27. Available at: https://journals.iub.edu.pk/index.php/pjes/article/view/4484

Corresponding Author's email address: rashid.rauf@iiu.edu.pk

1. Introduction

Firm growth is an intensively explored topic (Saari, Kontkanen, Arslan, & Hurmelinna-Laukkanen, 2021). Firm growth is a complicated process, which depends on social, cultural, and economic factors. It is the sole responsibility of managers to manage all these above-mentioned factors efficiently so that the purpose of consistent firm growth can be achieved (Rauf, Rashid, Imran, & Abdullah, 2023a). Despite the abundance of the small firm growth literature still a little is known and its literature is highly fragmented (Hafiz, Latiff, Islam, Saif, & Wahab, 2022). In the economic literature, determinants of firm growth have also been explored by many researchers. Example of these determinants include export status (Grazzi & Moschella, 2018), size (Asmaranti & Sihombing, 2025), age (Ng, Lau, Soh, & Ab Razak, 2024), human capital (Borazon, Liu, & Okumus, 2024), R&D (Abed, 2025), access to finance (Cheratian & Goltabar, 2025), leverage (Ma, Wan, & Zhao, 2025),

profitability (Pham & Kalyebara, 2020), investment (Tingbani, Salia, Hartwell, & Yahaya, 2025) and cash holding (Islam, Najmudin, Jati, & Syadad, 2024).

The review of the empirical literature tells us that several empirical studies have investigated the determinants of firm growth for different countries. For instance, Innovation, number of owners, initial size of firm and limited competition is significantly positively linked with firm growth. Grazzi and Moschella (2018) have also studied determinants of the firm growth. They have used the data of Italian firms and found that the firms involved in exports tend to grow faster than non-exporting firms of similar age group and size. Further, the positive effect associated with growth, declines with age. Firm growth enhances both the aggregate demand as well as the increase in aggregate supply of the country (Morettini, Poti, & Gabriele, 2023). Rauf and Rashid (2019) define volatility as the exposure to danger or hazard. Volatility is cyclical (Shiravand, Zolfaghari, & Khosravinejad, 2025), it remains higher in the developing economies than the developed nations. In addition, it enters not only in life of an individual (Rauf, et al., 2023a) but also affects firm (Rauf, Rashid, & Imran, 2023b).

Chang and Li (2024) and Sheykhi, Taleblou, and Mohajeri (2025) analyzed the impact of volatility. The most common finding emerging form these studies is that volatility has a significant adverse influence on economic growth. Volatility is considered as a major fact of economic life of both individuals and firms. Because volatility makes firm major decision uncertain (Ito & Haneda, 2017). For example, which product to develop and produce, technology to use and employees to hire. Therefore, knowledge of volatility firm growth relationship is essential for the betterment of firms in particular and society in general.

Shih & Hung (2008) documented that the link between investment and volatility is ambiguous; however, most empirical studies support adverse effect of volatility on investment. Existing theoretical and empirical literature suggests that volatility both at firm and aggregate level are significantly negatively associated to GDP growth as well as investment (Ramey & Ramey, 1995). Ahmed and Hamid (2011) have examined the determinants of growth of the firm and reported that finance is a main hurdle to the growth of a firm in Pakistan. To the best of our knowledge, it would be an initial empirical study of the link between volatility and firm growth under heterogeneity in Pakistan.

Besides the direct impact of volatility on firm growth, there is possibility that volatility may affect the growth of firm differently for exporting and non-exporting firms. Indeed, some studies in literature have reported the indirect effects of volatility on exports of firms (Louati, Echaoui, & Mouatassim, 2022). There are some researchers who have explored the differential effect of volatility on firm growth as well. See, for instance, Rauf, et al. (2023b) have studied the role of the industrial, market, firm, and macroeconomic volatility on Pakistani firms' growth.

Another firm-specific characteristic which may considerably influence the impact of volatility on firm growth is its involvement in exporting activities. Several researchers are of the view that exports play significant role to enhance firm growth. Exporting firms are generally large ((Hassani, Bp, & S, 2025), highly productive (Younas, 2022), creates competition in the local market (Abegaz & Lahiri, 2021), well equipped (X. Li & Sun, 2017), sell their output to a large number of customers and thus generates higher sales (Rashid, Rauf, & Imran, 2022). Furthermore, exporting firms are considered diversified as they sell their output in domestic and international market. Finally, exporting firms are considered relatively productive (Biswas & Das, 2023) and efficient in terms of both cost as well as output. It is also generally believed exporting activities require more investment and R&D expenditures (Lin, Huang, & He, 2024). Given these characteristics we can predict that exporting firms have quite different capability to absorb internal and external shocks than their counterparts. Therefore, it would be worth exploring whether the effects of volatility on growth of firms differ for exporting than their counterparts. The firms are considered exporting firms if they export their output into international market in a given year. Similarly, the firms are considered non-exporting if they sell their entire output in the local market in a given year.

On theoretical grounds the influence of volatility on firm growth might differ for firms having different exporting status. Such as, firms that do exports might have developed capability to absorb internal as well as external shocks. Thus, their growth will be affected less by volatility, than non-exporting firms. However, we don't find any empirical support on the role of such firm characteristic in formulating the effect of volatility on firm growth. Nevertheless, for policy point of view, it is essential to identify how different characteristics of firms play a vital role in reducing the impact of volatility on firm growth.

Economic theory suggests that exports are not only beneficial for the country, but the exports are also beneficial for the exporting firms. The reason behind this logic is that exports result in economies of scale (Yang & Tsou, 2020). Hence, firms' cost of production would definitely decline. Large scale operation by exporting firms may enhance the productivity of the workers. Further, exporting firms are considered more innovative, productive, experienced and financially sound (Wu, 2017). Furthermore, exporting firms normally boosts economic development by creating competition in the local market (Abegaz & Lahiri, 2021). The benefits of global trade are also associated with the exporting firms (Galbreath, Chang, & Tisch, 2021). The exporting firms may grasp knowledge and expertise from the interaction in an international market. Therefore, it would be useful to know exporting firms play a vital role in establishing the association between volatility and firm growth.

Objective:

- To explore whether the impact of volatility differs for exporting and non-exporting firms. The growth of firms is important because it is beneficial for the economy as it enhances national income.
- To obtain the objective of the study, we draft the research question.
- Are exporting firms affected less by volatility then their non-exporting counterparts?

2. Literature Survey

Many studies are available on firm growth but it is related to the developed economies. But the research of firm growth for the underdeveloped markets is lacking. Further, the existing literature ignored the association among volatilities and firm growth. See, for instance, volatility and age effects were only explored by Khan, Khan, and Khan (2016). Most of the other researchers like Hashmi, Raza, and Shah (2020) have found the positive effect of financial intermediation services on firms' growth by analyzing 130 companies listed at PSX.

2.1 Classification of Volatility and Firm Growth Studies

The first segment of literature documents positive correlation between volatility and firm growth. Ranciere, Tornell, and Westermann (2003) have presented positive impact of volatility on firms' growth. Further, they have found that volatile economies have grown faster than relatively stable economies. Rauf, et al. (2023a) indicated a positive connection between volatility and firm growth. Campos, Karanasos, Koutroumpis, and Glebkina (2025) and Garfa and Argoubi (2025) has also confirmed the positive volatility growth relationship. In addition, the researchers have reported that even in presence of Asian financial crisis the said volatility growth relation holds.

The second strand of literature favors an adverse link between volatility and growth. Chong and Gradstein (2009) have reported an adverse impact of volatility on firms' growth. Antonakakis and Badinger (2016) have also reported negative effect of volatility on growth. Trypsteen (2017) has documented a negative association among volatility and growth. Abate (2016) has analyzed a panel of 78 countries to determine direct as well as indirect volatility effects on growth and found that the direct and indirect effect of volatility on growth is negative. Many of other researchers have also acknowledged a negative impact of volatility on growth. They use economic volatility as a proxy of volatility.

The final strand is of a mixed association between volatility and growth. Esen and Akin (2023) does not found any significant association between volatility and growth. Few researchers reported similar results see, for example, Garr, Okoampa-Larbi, and Awadzie (2022); KehindeOgunbadejo, AramaZubair, and Kanwanye (2023). Not a single study explains the comprehensive volatility firm growth phenomenon the reason behind it is the research on volatility firm growth relationship is conducted from a wide range of angles. Therefore, generalization and consensus of volatility firm growth relationship is missing. The review of the empirical literature raises a general question. Why the reported results of the empirical studies differ? To date it is still an unsettled question and it needs to be addressed.

In order to measure the volatility abundance of studies are there. For example, Rauf, et al. (2023b) have used the data of firm sales and estimated time varying firm-specific volatility by applying the methodology used by Rauf, et al. (2023a). An alternative estimation technique of measuring volatility is of based on Auto Regressive one AR(1) specification used by Rashid, et al. (2022). In order to measure firm level volatility, various researchers have used daily stock price data (see, for instance, Khan, et al., 2016; Herskovic, Kelly, Lustig, and Nieuwerburgh, 2020).

2.2 Impact of Exports on Firm Growth

Theoretically exporting firms are those that sell in both local and foreign markets (Cao, Xie, & Yu, 2023). Therefore, on average these exporting firms are less likely to fail and have more growth potential than the non-exporting counterparts (Gu, Malik, Pozzoli, & Rocha, 2022). In light of international trade theory and export-led growth hypothesis exports are positively related with firm growth (Winkler, Kruse, Luna, & Maliszewska, 2023) and performance (Keyifli & Ergun, 2025). In addition, these firm promotes economic growth. Rodriguez-Gulias, Fernandez-Lopez, Rodeiro-Pazos, and Nogueira-Moreiras (2021) have documented that exports are positively associated with firms' sales growth mainly because of the economies of scale. Falk and Hagsten (2018) have stated a positive effect of exports on firms' growth. Furthermore, the said impact is stronger for newly exporting firms than the old exporting firms.

Exports have a flourishing impact on growth of the firm (Sinha, Mishra, & Patel, 2019). Exports not only increases growth of the firm but also guarantee firm survival. Yang and Tsou (2020) have found that exports are positively associated with higher growth rates. Grazzi and Moschella (2018) have found a positive link between exports and firms' growth. Further, the positive effect of exports on firm growth diminishes with increase in firm age. Furthermore, the first entrant in the export market is found to be well equipped to handle negative effects of exchange-rate volatility. Numerous researches have also found a positive link among exports and firms' growth (see, for instance, (Krasniqi & Mustafa, 2016); (Fuertes-Callen & Cuellar-Fernandez, 2019)).

Cintio, Ghosh, and Grassi (2017) have found that the employment growth is independent of exports. Similarly, few other researchers have concluded that exports were never a driver of firm growth (see, for example Ahmed and Hamid, 2011). They have documented that higher export share makes firm growth less (more) likely in short-run (long-run). Therefore, in addition to the categorization of firms on the basis of exporting status; categorization of the firms on the basis of size is also required. Theoretical and empirical literature suggests that exporting firms can handle volatility than their counterparts because the market which they serve is relatively large. To examine the expected different impact of volatility on the non-exporting and exporting firms, we have to study the subsequent hypothesis.

Hypothesis: The impact of volatility is higher for non-exporting firms than exporting firms.

3. Econometric Model

To study the influence of volatility on firms' growth and to achieve the objective documented in introduction section, we have to select an appropriate model. The prevailing literature recognizes the following determinants of firms' growth. Age and size explored by (Haschka, Herwartz, Struthmann, Tran, & Walle, 2022), R&D (Abed, 2025), leverage (Ma, et al., 2025), investment (X. Li & Hou, 2019), profitability (Pham & Kalyebara, 2020). The empirical model of the study is based on Rashid, et al. (2022). We analyzed firm growth on the basis of firm, industrial, market and macroeconomic volatilities.

$$\begin{aligned} FG_{it} \;=\; & \alpha_0 + \gamma_0 FG_{it-1} + \gamma_1 Size_{it} + \gamma_2 Age_{it} + \gamma_3 R\&D_{it} + \gamma_4 Leverage_{it} \\ & + \gamma_5 Cash_{it} + \gamma_6 Investment_{it} + \gamma_7 Profitablity_{it} + \gamma_8 v_t^{Market} \\ & + \gamma_9 v_t^{Macro} + \gamma_{10} v_{it}^{Firm} + \gamma_{11} v_{jt}^{Industry} + f_i + Dum^{ind} + \mu_{it} \end{aligned} \qquad (1)$$

3.1 Exporting Status and Volatility Effects

Exports play a significant role to enhance not only the growth of a firm but also the growth and development of a country (Gebresilassie & Woldu, 2020). Exporting firms are generally large (Camino, Ordenana-Rodriguez, & Vera-Gilces, 2022), innovative (Turnbull & Richmond, 2013) and well equipped (C. Li, Cong, & Yin, 2021). Further exporting firms are considered diversified as they sell their output in international market in addition to the domestic market. Finally, exporting firms are considered relatively productive and efficient in terms of both cost and output (Pane & Patunru, 2021). It is also generally believed exporting activities require more investment and R&D expenditures (Jung, 2021).

Given these characteristics we can predict exporting and non-exporting firms have quite different capability to absorb internal and external shocks. Therefore, it would be worth exploring whether the effects of volatility on growth of firms differ for non-exporting as well as exporting firms. To answer this question in this study, we classify the firms into non-exporting and exporting firms based on their international sales. To examine the

differential effect of volatility on firm growth across exporting and non-exporting firms, we run the proposed model for both types of firms. Based on the above discussion and literature review we hypothesize that the growth of exporting firm might not be hampered by the domestic volatility while it is more likely to affect by global volatility, as compared to non-exporting firms.

3.2 Variable Description

In our study, we used the unbalanced panel data of all non-financial firms listed at PSX. For the firm volatility we use cash flow and sales volatility. For macroeconomic volatility we use ER, CPI) Industry level volatility is based on industrial sales. Market volatility is based on the KSE 100 index. The data of firm-specific variables is acquired from the "balance sheet analysis of non-financial firms". The data on macroeconomic variables is collected from International Financial Statistics and World Development Indicators. Further, entry and exit is allowed.

Table 1: Variable Description

Name	Abbreviation	Description
Firm Growth	FG	Firm growth is the sales growth
Firm Age	Age	Firm age is the age of the firm
Research and Development Expenditures	R&D	Research as well as development expenditures
Firm Size	Size	Firm size is the log of total assets
Leverage	Leverage	Leverage is to the extinct the firm is using debt financing
Investment	Fixed Assets	As a proxy for investment, we used change in firms fixed assets
Profitability	Profitability	Return on asset is the profitability
Cash	Cash	Cash is a ratio cash flow/total asset
Industrial Dummy	Dum	Dum is the industrial dummy
Firm Level Volatility	v^{firm}	v^{firm} is the firm volatility (on the basis of cash flow and sales)
Industrial Volatility	$v^{Industry}$	$v^{Industry}$ is the industrial volatility (based on industrial sales)
Market Volatility	v^{Market}	v^{Market} is the KSE 100 index-based market volatility
Macroeconomic Volatility	v^{Macro}	v^{Macro} is the macroeconomic volatility (based on CPI, and ER)

3.3 Measuring Macro-Level Volatility

For macroeconomic and market volatility we used GARCH models. Further, $\boldsymbol{v^{Macro}}$ is derived by using the principal component analysis.

$$\Delta IPI_t = \text{a} + \text{b (lag)}\ IPI_t + \text{d (lag)}\varepsilon_t + e_t$$

$$v_t^2 = \text{c} + \gamma\ \text{(l)}e_t^2$$

where the constant terms are (a) and (c), autoregressive and moving average parameters (b) and (d) and (lag) is a lag polynomial operator. The conditional variance, (v_t^2), is the one period ahead forecast variance based on the past information and error term is (e_t).

3.4 Measuring Firm-Specific Volatility

To measure time varying firm volatility, we used a technique used by Rauf and Rashid (2021).

$$S_{it} = f_i + f_t + \omega_{it}$$

where (S_{it}) represents firm sales, ($f_i\ and\ f_t$) are firm and year fixed-effects respectively, ω_{it} is the error term, "i" is ith firm and "t" denotes period.

4. Results and Discussion

In this fragment, initially summary statistics is discussed. Subsequently, the differential effects of micro and macro volatilities on firm growth of exporting and non-exporting firm. Table 2, documents the descriptive statistics of the macroeconomic variables.

Table 2: Summary Statistics of Macroeconomic Variables

Variable	ER	CPI
Max.	148.9	416.8
Mean	107.9	108.3
Std. Dev.	13.5	99.9
Min.	72.8	14.6
Obs.	453	453

CPI & ER are the consumer price index & real effective exchange rate respectively.

The above table shows that the descriptive statistics of the macroeconomic variables. Mean, maximum, maximum, standard deviation (SD) indicates that ER series is relative stable series than CPI.

Table 3: Unit Root Test

	ADF- Stat. (At level)		ADF- Stats (At 1st Difference).	
Variables	**t-stat.**	**Prob.**	**t-stat.**	**Prob.**
CPI	0.882	0.999	-3.664	0.026
ER	-2.522	0.111	-14.686	0.000

CPI & ER are the consumer price index and real effective exchange rate respectively.

At level both the macroeconomic series are non-stationary but these series are stationary at first difference. Q-stats have identified the presence of ARCH effect. So, following Rashid et al. (2022), GARCH[1] models to obtain the GARCH variance series is applied.

Table 4: GARCH Estimates for Macro level Risk

Regressor	ΔCPI	ΔER
MA(1)	-0.841***	0.441***
	(0.043)	(0.137)
AR(1)	0.979***	-0.122
	(0.033)	(0.147)
Constant	1.083	0.0004
	(2.194)	(0.101)
GARCH(1)	0.491*	0.861***
	(0.262)	(0.029)
ARCH(1)	0.041**	0.107***
	(0.018)	(0.027)
Cons.	3.056*	0.125**
	(1.628)	(0.052)
Log-likelihood	-942.247	-908.576
Q-stat	0.2171	1.368
P Value	0.641	0.242
Observations	453	453

*, ** and *** represents significant at 10%, 5%, and 1% level.

On the basis of Q-stats we measure GARCH variance series for the macroeconomic variables. The summary statistics of GARCH based volatility is depicted in the next table.

Table 5: Summary Statistics of Macroeconomic Volatilities

Variables	GCPI	GER
Mean	6.284	3.646
Minimum	3.071	1.340
Maximum	18.373	15.617
Std. Dev.	1.040	2.005
Observations	453	453

GCPI and GER are GARCH volatility series of CPI and ER.

In the above table, we report the summary statistics of the GARCH volatility series of the underlying macroeconomic variables. Table 5 highlights that the GER is relatively volatile series as compared to GCPI. The next Table 6 displays the summary statistics of the variables used in the study.

[1] Generalized autoregressive conditional heteroskedasticity

Table 6: Descriptive Statistics of Firm Level Variables

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
Firm Growth	6,688	0.3619	15.846	-0.999	1119
Firm Size	6,688	14.539	2.082	7.090	19.035
Firm Age	6,688	33.736	17.090	0	77
R&D Expenditures	6,688	1035	5637	0	44617
Leverage	6,688	0.652	0.503	0.070	4.143
Investment	6,688	8668	38988	0	232000
Profitability	6,688	0.226	0.542	-1.165	4.003
Cash	6,688	0.084	0.230	0.0001	1.609

Table 7 depicts the descriptive statistics of firm, industry, market and macroeconomic volatility. Macroeconomic and market level volatiles are relatively stable series than the firm and industry level volatility.

Table 7: Summary Statistics of Macro and Micro Volatilities

Variables	Obs.	Mean	Std. Dev.	Minimum	Maximum
Firm level volatility (v^{firm})	6,688	0.368	0.536	0.00002	13.545
Market level volatility (v^{Market})	6,688	0.205	0.077	1.678	5.457
Macro level volatility (v^{Macro})	6,688	4.852	1.291	3.765	9.094
Industry level volatility ($v^{Industry}$)	6,688	0.533	0.503	0.007	2.728

4.3 Exporting Status and Volatility Effects on Firm Growth

Exports play a significant role to enhance not only the firm growth but also the economic growth by the generation of new jobs and improvement in the balance of payments and balance of trade. Pakistan is facing a trade deficit that is why the importance of exports becomes many folds for the economy of Pakistan. Exporting firms generally consider large, innovative and well equipped. Further, exporting firms are considered diversified as they sell their output in international market in addition to the domestic market. Furthermore, exporting firms are rich in resources. Due to bigger market and resource abundance these exporting firms are expected to contribute more for not only their own growth but also for the development of a country. Foreigners' income is an additional factor, having direct impact on firm growth of exporting firms. However, foreigners' income has nothing to do with the non-exporting firms. With an increase in foreigners' income demand as well as sales of exporting firms increase. Therefore, we can expect that on average exporting firm will perform better than non-exporting firm. Finally, exporting firms are considered relatively more productive and efficient (Wu, 2017) in terms of both cost and output. It is also generally believed that the exporting activities require more investment and R&D expenditures. Therefore, exporting firms are expected to grow more and have a flourishing impact on GDP growth of a country.

Given these characteristics we can predict exporting and non-exporting firms have quite different capability to absorb internal and external shocks. Therefore, it would be worthwhile whether the effects of volatility on growth of firms differ for exporting as well as non-exporting firms. Following Coudounaris (2021), we classify firms into non-exporting and exporting firms based on their international sales. To examine, the differential effect, of volatility on firm growth across non-exporting and exporting firms, we run the proposed model for both types of firms. Based on the above discussion and relevant literature this study hypothesize that the growth of exporting firms is might be less influenced by the volatility than their counterparts.

We have reported the results of exporting and non-exporting firms in the next table presented below. Among the four volatility terms in explanatory variables, the macroeconomic, and industrial volatility enters negatively in the model for non-exporting firms. However, the influence of market as well as firm volatility on firm growth that are not involved in exports is positive and strong. However, for the firms involved in export, the influence of macroeconomic and industrial volatility is positive and the impact of firm and market volatility is negative. The coefficient of lagged dependent variable attained positive value for both types of firms. It indicates the persistence of firm sales growth. The coefficients of age, size, leverage investment and cash are negative. The

effect of research and development and profitability on the firm growth is positive. The reason behind this is that R&D enhances future growth prospects of the firms. Further profitable firms grow overtime.

Table 8: Two-Step Robust System-GMM Estimates for Differential Impact of Volatility on Firm Growth of Exporting and Non-Exporting Firms

	Growth of Exporting Firms	Growth of Non-Exporting Firms
Lagged Firm Growth	0.00163***	0.00163***
	(0.00001)	(0.00001)
Size	-0.38756***	-0.38756***
	(0.00604)	(0.00604)
Age	-0.01320***	-0.01320***
	(0.00068)	(0.00068)
R&D	0.00002***	0.00002***
	(0.00000)	(0.00000)
Leverage	-0.260145***	-0.260145***
	(0.00476)	(0.00476)
Investment	-0.21600***	-0.21600***
	(0.00393)	(0.00393)
Profitability	0.17998***	0.17998***
	(0.00748)	(0.00748)
Cash	-0.20441***	-0.20441***
	(0.00217)	(0.00217)
Macro volatility	0.79534***	-0.73185***
	(0.01874)	(0.00551)
Market volatility	-0.91100***	3.16000***
	(0.04300)	(0.01480)
Industrial volatility	0.93658***	-0.06251***
	(0.00801)	0.00262
Firm volatility	-0.40179***	0.96338***
	(0.01386)	(0.00263)
Constant	4.03883***	49.0265***
	(0.07106)	(15.9076)
Obs.	1498	1515
Firms	419	419
Instruments	378	378
Dummy for industry	YES	YES
Validity Tests		
AR(2)	1.31	1.31
	[0.189]	[0.189]
Sargan	1341.4	1341.4
	[0.000]	[0.000]
Hansen	386.49	386.49
	[0.171]	[0.171]

Standard errors and probabilities are in small and large brackets respectively. *** *p<0.01*

5. Conclusions and Policy Implications

In this paper, the effects of micro and macro volatilities on PSX listed firms' growth are addressed. This section covers the findings acquired from the reported empirical results of section 4. In addition, the important policy implications and future research directions in the field, is also highlighted in this section. The first finding of the study is that non-exporting firms are adversely affected by macroeconomic and industrial volatilities but not the exporting firms. The possible rationale of this adverse relationship is that these firms sell their output only in national markets.

Following key policy implication arise from our findings. First of all, the study reports the possible differences in results of exporting and non-exporting firms. The effect of research and development expenditures and profitability on firm growth is positive. Therefore, policy makers are requested to initiate such policies that may encourage R&D activities by the firms. Furthermore, the effect of leverage on firms' growth is negative. Therefore, managers need to be cautious in case of too much debt financing.

The study explores the impact of volatilities on firm growth at aggregate level. Rather than making a single pool of all the industries, in future researchers may analyze the same phenomenon by categorizing firms into a

number of distinguishing sectors. For example, on the basis of size textile sector is the largest sector. The response of textile sector to micro and macro level volatilities may differ from the other relatively small sectors. Further, such an analysis may provide ground to the policy makers to pay special importance to specific sectors. Similarly, power sector is also different from all the other manufacturing sectors. Unlike the other sectors it is free from any inventory, only the management of collections and payments is required. Therefore, sectoral level extension of the study may provide important policy implications to the management of power industry.

References

Abate, G. D. (2016). On the link between volatility and growth: A spatial econometrics approach. *Spatial Economic Analysis, 11*(1), 27-45.

Abed, A. (2025). The paradox of research and development productivity and firm growth: Empirical evidence from publicly listed firms in the United Kingdom. *European Management Review, 22*(2), 397-415.

Abegaz, M., & Lahiri, S. (2021). Efficiency Spillovers from Foreign Direct Investment and Domesticâ€ • exporting Firms: The Case of Ethiopian Manufacturing. *Journal of International Development, 33*(1), 151-170.

Ahmed, H., & Hamid, N. (2011). Financing constraints: Determinants and implications for firm growth in Pakistan. *The Lahore Journal of Economics, 16*(1), 317-346.

Antonakakis, N., & Badinger, H. (2016). Economic growth, volatility, and cross-country spillovers: New evidence for the G7 countries. *Economic Modelling, 52*, 352-365.

Asmaranti, R. D., & Sihombing, P. (2025). Corporate Social Responsibility as a Moderator of Financial Determinants of Firm Value. *International Journal of Entrepreneurship and Business Management, 4*(2), 97-108.

Biswas, P. R., & Das, S. (2023). Export Decision and Export Performance of Manufacturing Firms an Experience from Indian Organized Sector *Risks and Resilience of Emerging Economies: Essays in Honour of Professor Ajitava Raychaudhuri* (pp. 131-150). Singapore: Springer Nature Singapore.

Borazon, E., Liu, J. M., & Okumus, F. (2024). Human capital, growth, and competitiveness of Philippine MSMEs: the mediating role of social capital. *Asia Pacific Business Review, 30*(5), 894-923.

Camino, S., Ordenana-Rodriguez, X., & Vera-Gilces, P. (2022). Learning-by-exporting vs. self-selection in Ecuadorian manufacturing firms: Evidence from different industry classifications. *The Journal of International Trade & Economic Development, 32*(2), 281-312.

Campos, N., Karanasos, M., Koutroumpis, P., & Glebkina, E. (2025). The finance-growth nexus and public-private ownership of banks in Brazil since 1870. *Annals of Operations Research, 352*(3), 835-858.

Cao, J., Xie, E., & Yu, M. (2023). Monopsony Power and Export Product Quality.

Chang, M., & Li, Y. (2024). Impact of capital market volatility on economic growth-An analysis based on stochastic volatility model. *Heliyon, 10*(3).

Cheratian, I., & Goltabar, S. (2025). Decoding the nexus: Finance availability and firm growth in the wake of COVID-19. *Development Policy Review, 43*(4), 70016.

Chong, A., & Gradstein, M. (2009). Volatility and firm growth. *Journal of Economic Growth, 14*(1), 1-25.

Cintio, M., Ghosh, S., & Grassi, E. (2017). Firm growth, R&D expenditures and exports: An empirical analysis of Italian SMEs. *Research Policy, 46*(4), 836-852.

Coudounaris, D. N. (2021). The internationalisation process of UK SMEs: exporting and non-exporting behaviours based on a four forces behavioural model. *Review of International Business and Strategy, 31*(2), 217-256.

Esen, O., & Akin, A. (2023). Asymmetric effects of inflation and inflation uncertainty on output growth: Evidence from Turkey based on threshold autoregressive (TAR) model. *Symmetry: Culture and Science, 34*(1), 27-44.

Falk, M., & Hagsten, E. (2018). An exploration of growth in computer software micro firms. *Journal of Small Business & Entrepreneurship, 30*(3), 233-252.

Fuertes-Callen, Y., & Cuellar-Fernandez, B. (2019). Inter-relationship between firm growth and profitability in a context of economic crisis. *Journal of Business Economics and Management, 20*(1), 86-106.

Galbreath, J., Chang, C. Y., & Tisch, D. (2021). Are exporting firms linked to cleaner production? A study of eco-innovation in Taiwan. *Journal of Cleaner Production, 303*(1), 1-12.

Garfa, K., & Argoubi, M. (2025). Challenging Volatility Myths: Structural and Temporal Dynamics in MENA's Growth-Openness Nexus. *Journal of Cultural Analysis and Social Change, 10*(4), 4105-4122.

Garr, D. K., Okoampa-Larbi, R., & Awadzie, D. M. (2022). The impact of exchange rate volatility on the performance of Ghana's economy. *Indian Journal of Economics and Business, 21*(3), 145-159.

Gebresilassie, Y. H., & Woldu, G. T. (2020). Determinants of Ethiopia's Livestock Exports: Analysis of Gravity Model of Trade. *Abyssinia Journal of Business and Social Sciences, 5*(1), 1-9.

Grazzi, M., & Moschella, D. (2018). Small, young, and exporters: New evidence on the determinants of firm growth. *Journal of Evolutionary Economics, 28*(1), 125-152.

Gu, G., Malik, S., Pozzoli, D., & Rocha, V. (2022). Chinese import competition, offshoring and servitization. *Economic Inquiry, 60*(2), 901-928.

Hafiz, N., Latiff, A. S. A., Islam, M. A., Saif, A. N. M., & Wahab, S. A. (2022). Towards the underlying theories of small firm growth: A literature review. *FIIB Business Review, 11*(1), 36-51.

Haschka, R. E., Herwartz, H., Struthmann, P., Tran, V. T., & Walle, Y. M. (2022). The joint effects of financial development and the business environment on firm growth: Evidence from Vietnam. *Journal of Comparative Economics, 50*(2), 486-506.

Hashmi, A. M., Raza, H., & Shah, S. A. (2020). Integration of Financially Intermediated Services for Firm Growth A Micro Level Analysis form Pakistan. *NICE Research Journal, 13*(4), 95-107.

Hassani, H., Bp, C., & S (2025). Firm Heterogeneity and Indias Manufacturing Exports: Lessons on Protection and Trade Theory. *The International Trade Journal, 39*(4), 396-420.

Herskovic, B., Kelly, B., Lustig, H., & Nieuwerburgh, S. (2020). Firm volatility in granular networks. *Journal of Political Economy, 128*(11), 4097-4162.

Islam, M. N. Z., Najmudin, N., Jati, D. P., & Syadad, H. C. P. o. M. I. C. (2024). *Financial Constraints, Investment, Cash Holdings, Good Corporate Governance, And Firm Growth*.

Ito, K., & Haneda, S. (2017). Exchange Rate Uncertainty and R & D Investment: Evidence from Japanese Firms. *The Developing Economies, 55*(2), 56-74.

Jung, J. (2021). International Trade and Human Capital Investment with Heterogeneous Firms and Workers: Modeling and Analysis. *Mathematics, 9*(10), 1106.

KehindeOgunbadejo, H., AramaZubair, A., & Kanwanye, H. T. (2023). Exchange and Interest Rate Volatility Effect on Economic Growth in Nigeria under various ARCH Model families: ARDL Approach: Exchange and Interest Rate Volatility Effect on Economic Growth in Nigeria under various ARCH Model families: ARDL Approach. *International Journal of Economics and Development Policy, 6*(1), 43-56.

Keyifli, A., & Ergun, B. (2025). The Effect of Firm Level Export on Financial Performance. *Turkish Studies-Economics, Finance, Politics, 20*(4).

Khan, F., Khan, S. U. R., & Khan, H. (2016). Pricing of risk, various volatility dynamics and macroeconomic exposure of firm returns: New evidence on age effect. *International Journal of Economics and Financial Issues, 6*(2), 551-561.

Krasniqi, B. A., & Mustafa, M. (2016). Small firm growth in a post-conflict environment: The role of human capital, institutional quality, and managerial capacities. *International Entrepreneurship and Management Journal, 12*(4), 1165-1207.

Li, C., Cong, J., & Yin, L. (2021). Extreme heat and exports: Evidence from Chinese exporters. *China Economic Review, 66*(4), 1-18.

Li, X., & Hou, K. (2019). R&D based knowledge capital and future firm growth: Evidence from China's Growth Enterprise Market firms. *Economic Modelling, 83*(1), 287-298.

Li, X., & Sun, L. (2017). How do sub-national institutional constraints impact foreign firm performance? *International Business Review, 26*(3), 555-565.

Lin, X., Huang, G., & He, L. Y. (2024). How does trade policy uncertainty affect firms' pollution emissions? Theory and evidence from China. *Macroeconomic Dynamics, 28*(8), 1776-1808.

Louati, A., Echaoui, A., & Mouatassim, A. (2022). The exchange rate volatility and Moroccan exports: An empirical investigation. *International Journal of Business, Economics and Management, 9*(4), 109-120.

Ma, Y., Wan, Y., & Zhao, Y. (2025). Financial leverage and stock price crash risk: The role of growth in Chinese firms. *Accounting & Finance, 66*(1), 392-408.

Morettini, L., Poti, B., & Gabriele, R. (2023). Process and strategies of growth in medium-sized fast-growing firms. *Journal of Industrial and Business Economics, 50*(3), 605-626.

Ng, Y. L., Lau, W. T., Soh, W. N., & Ab Razak, N. H. (2024). Financial constraints on firm growth: the role of firm age in the ASEAN-6. *Comparative Economic Research. Central and Eastern Europe, 27*(1), 93-111.

Pane, D. D., & Patunru, A. A. (2021). Does Export Experience Improve Firms' Productivity? Evidence from Indonesia. *The Journal of Development Studies, 57*(12), 2156-2176.

Pham, H., & Kalyebara, B. (2020). Investments in subsidiaries, joint ventures, affiliates and firm growth: Evidence from Vietnam. *Accounting, 6*(5), 879-892.

Ramey, G., & Ramey, V. A. (1995). Cross-country evidence on the link between volatility and growth. *The American Economic Review, 85*(5), 1138-1151.

Ranciere, R., Tornell, A., & Westermann, F. (2003). *Crises and growth: A re-evaluation*: National Bureau of Economic Research.

Rashid, A., Rauf, R., & Imran, M. (2022). Do macroeconomic volatilities affect stock price volatility in Pakistan? An empirical assessment using firm-level data. *Pakistan Journal of Applied Economics, 32*(2), 145-168.

Rauf, R., & Rashid, A. (2019). Interlinkages among Exchange Rate, Interest Rate, Consumer Price Index, and Output Volatilities. *Forman Journal of Economic Studies, 15*(1), 115-136.

Rauf, R., & Rashid, A. (2021). Impact of Volatility on Firm Sales Growth Some Insights from Pakistan. *Business & Economic Review, 13*(4), 47-76.

Rauf, R., Rashid, A., & Imran, M. (2023b). Exploring Effects of Firm, Industrial, Market and Macroeconomic Volatility on Firm Sales Growth under Heterogeneity in Pakistan. *Business & Economic Review, 15*(01), 1-28.

Rauf, R., Rashid, A., Imran, M., & Abdullah, M. (2023a). Volatility and Firm Growth. Do Firm Size and Age Matter? *Journal of Applied Economics & Business Studies (JAEBS), 7*(3), 1-26.

Rodriguez-Gulias, M. J., Fernandez-Lopez, S., Rodeiro-Pazos, D., & Nogueira-Moreiras, M. A. (2021). Technological Innovation and Exports: Effects on Firm Growth *Technological Innovation and International Competitiveness for Business Growth* (pp. 17-39). Cham: Palgrave Macmillan.

Saari, M., Kontkanen, M., Arslan, A., & Hurmelinna-Laukkanen, P. (2021). International Growth and Social Media Competitiveness of Small Software Firms *Technological Innovation and International Competitiveness for Business Growth* (pp. 63-93). Cham: Palgrave Macmillan.

Sheykhi, A., Taleblou, R., & Mohajeri, P. (2025). The impact of exchange rate volatility on economic growth: A meta-analysis approach. *Journal of Economic Studies, 53*(3), 566-588.

Shih, P. T., & Hung, W. (2008). The overall effect of volatility on investment. *Economics Letters, 99*(2), 324-327.

Shiravand, M., Zolfaghari, M., & Khosravinejad, N. (2025). How Do Global Economic Uncertainty and the Oil Market Affect Each Other? A Hybrid Approach Using Machine Learning and Econometrics for Improved Forecasting. *A Hybrid Approach Using Machine Learning and Econometrics for Improved Forecasting Resources policy, 90*, 104733.

Sinha, A. K., Mishra, A. K., & Patel, Y. (2019). Firm size, R&D expenditure, and international orientation: An empirical analysis of performance of Indian firms. *International Journal of Technological Learning, Innovation and Development, 11*(4), 311-336.

Tingbani, I., Salia, S., Hartwell, C. A., & Yahaya, A. (2025). Looking in the rearview mirror: Evidence from artificial intelligence investment, labour market conditions and firm growth. *International Journal of Finance & Economics, 30*(1), 961-982.

Trypsteen, S. (2017). The growth-volatility nexus: New evidence from an augmented GARCH-M model. *Economic Modelling, 63*(1), 15-25.

Turnbull, J., & Richmond, K. (2013). Scotland's business innovation performance 2008-10. *Fraser of Allander Economic Commentary, 37*(2), 65-75.

Winkler, D., Kruse, H., Luna, L. A., & Maliszewska, M. (2023). Linking Trade to Jobs, Incomes, and Activities. *World Bank Policy Research Working Paper, 10635*.

Wu, R. (2017). Export and gender difference in production contribution: A joint and non-linear analysis using panel and firm-level data. *The Journal of Developing Areas, 51*(4), 285-302.

Yang, C. H., & Tsou, M. W. (2020). Globalization and firm growth: Does ownership matter? *Small Business Economics, 55*(4), 1019-1037.

Younas, M. Z. (2022). A spatial agglomeration analysis of firm productivity: A case of the textile sector of Pakistan. *Lahore Journal of Economics (LJE), 27*(1), 21-69.

Acknowledgments

The author must acknowledge the support in conducting the research work.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Disclaimer

The views and opinions expressed in this paper are those of the author alone and do not necessarily reflect the views of any institution.