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Currency Devaluation Impacts on SEMs in Shanghai Cooperation Organization (SCO) Countries

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ABSTRACT

This study examines the impact of currency devaluation on small and medium-sized firms in Shanghai Cooperation Organization (SCO) countries, focusing on industrial growth measured as the annual percentage growth in value-added. A panel dataset is utilized to analyze key macroeconomic indicators, including percentage change in exchange rate, GDP per person employed, inflation rate, exports (current US$), imports (current US$), and foreign direct investment (FDI). The analysis applies Ordinary Least Squares (OLS), Random Effects, Fixed Effects, and Hausman tests to ensure robust estimation and model validation. The findings reveal that the exchange rate has a negative but statistically insignificant effect on industrial growth, suggesting that currency devaluation may not directly impact small and medium-sized firms in the industrial sector. GDP per person employed significantly and positively affects industrial growth, emphasizing the importance of labor productivity. Inflation exhibits a negative but insignificant relationship with industrial growth, indicating minimal impact. Conversely, exports, imports, and FDI demonstrate positive and significant effects, highlighting their critical role in fostering industrial performance. These results underscore the interconnectedness of trade, investment, and productivity in driving industrial growth, providing valuable insights for policymakers in SCO countries to develop strategies that support small and medium-sized firms in a dynamic macroeconomic environment.

Keywords: Currency devaluations, SEMS, GDP

INTRODUCTION

Currency devaluation stands out as a used economic policy tool to tackle trade imbalances and boost economic growth. It involves a deliberate reduction in a country's currency value compared to others (Smith 2020). This practice has an impact on Shanghai Cooperation Organization (SCO) member nations, which include emerging markets like Kazakhstan and Uzbekistan as well as major economies such as China, Russia, and India. On one side, it can make SMEs more competitive in exports by making their products and services cheaper for overseas buyers. On the flip side, it drives up the prices of imports, including technology, machinery, and raw materials that SMEs often need to run their businesses (Smith 2020).

Currency devaluation has a significant effect on small and medium enterprises (SMEs) in Shanghai Cooperation Organisation (SCO) countries. This is crucial as these nations depend on each other and work together . SMEs drive economic growth, invocation, and job creation, but arevulnerable to economic fluctuations (Zhang & Li, 2021). Currency devaluation is one of the main things that changes how they work (Ahmed 2020). When currency loses value, it can help SMEs that sell things to other countries. In places like China and Russia where SMEs make a lot of stuff and grow food, this can help them grow by selling to more people. SMEs that sell to other countries can do better because more people want to buy their products when they cost less. This can lead to making more money and producing more for less. This follows something called the "J-curve effect," where at first things get worse when currency loses value, but then trade gets better over time (Johnson, 2019).

But not all SMEs benefit from devaluation. SMEs that depend on imports face significant challenges. In SCO countries like Kyrgyzstan and Tajikistan local businesses need foreign machines and materials. When the currency loses value, it makes these inputs more expensive. This cuts into profits and makes it harder for these companies to compete at home and abroad. The way devaluation affects different SMEs shows how diverse these businesses are in SCO economies (Chen & Zhang, 2021).

Also when a currency loses value, it often causes prices to go up. This can start a chain reaction that hits SMEs hard. As costs for things like wages, utilities, and transport rise small businesses with little financial cushion feel the pinch the most. For SMEs in developing SCO countries where it's tough to get loans, dealing with these higher costs is tough. Because of this many small businesses might have to shut down or let people go (Ahmed et al. 2022).

Another major impact of currency devaluation is on the financial stability of SMEs. Foreign currency-denominated loans are widely used to finance SMEs in SCO countries. When converted to local currency during devaluation, this escalates the burden of these loans with debt servicing (Ali, et al., 2023). This is especially true for countries such as Kazakhstan and Uzbekistan, where SMEs have very few options available for domestic financing and are more vulnerable to exchange rate risk. Such consequent financial stress deters investment in growth and innovation, aggravating long-term sustainability of these enterprises (Lee et al., 2020). Beyond tangible economic effects, currency devaluation also affects the environment in which SMEs do business. It tends to create market volatility and lower investor confidence and reduces the levels of entrepreneur activity. In the context of SCO countries, particularly those with nascent SME ecosystems (Uzbekistan, Kyrgyzstan), this can halt advancement towards economic diversification and job creation.Additionally, SMEs find it difficult to plan for the future and invest, which is mostly due to regular devaluation episodes that bring about uncertainties (Kumar & Patel, 2021). However, currency devaluation can be an opportunity for, as well as a stumbling stone for SMEs. Although this can cause a reduction in the competitiveness of imports and an increase in exports, it can also mean an increase in the cost of goods and materials, which creates a complex environment for SMEs to operate in. The duality of this situation is particularly notable in SCO countries, where economic structures and small business characteristics exist on opposite poles.

These dynamics must be understood to promote and enhance sustainable growth and stability in the region. The Objectives of this study is to Explore the Different Mechanisms of effects of Currency devaluation on SMEs of SCO Countries; the sectors most Vulnerable, outcome determinants, sectoral and cross-cutting policy interventions used in SCO countries. By analyzing the specific factors that contribute to these positive and negative outcomes, the study aims to offer recommendations that inform smart decision-making in contexts where devaluation occurs.

Problem Statement

SMEs are critical players in the economic growth, innovation, and employment of SCO countries. However, they are extensively affected by macroeconomic fluctuations, particularly foreign currency devaluation (Zaiqiang et.al, 2014). Currency devaluation, although one of the all time used as a monetary policy device at the macroeconomic level as a way to improve the export competitiveness, have a dangerous exciting for generating SME via raising the cost of imported uncooked substances, equipment and systems. This double impact leads to asymmetries, where export-oriented SMEs can be winners while import-sensitive SMEs face losses. Moreover, devaluation usually induces inflation, increasing operational expenses and diminishing customer purchasing power, which has a more significant effect on smaller businesses with limited financial buffers (Wang et. Al, 2021). Notwithstanding the significance of this, there is no thorough analysis of the way currency devaluation impacts SMEs across various economic and institutional contexts of SCO international locations in the current literature. In addition, u.s.a.-precise dynamics including differing degrees of export orientation, import dependency and coverage support endure under-explored, leaving policymakers ill-prepared to mitigate the unfavourable consequences or maximise capability benefits for SMEs this work fills this hole through exploring the nuanced impacts of currency devaluation on SMEs in SCO international locations and underscores the interrelated roles of exchange, productivity and investment in shaping outcomes.

Significance of the Study

The importance of this research stems from the fact that it examines a crucial aspect of small and medium enterprises (SME) importance for the economic structure of various countries within the Shanghai Cooperation Organization (SCO) and their exposure to currency devaluation. They are major employers, innovative forces, and contributors to GDP, but they usually do not have the resources to withstand tremors from exchange rate dynamics (Rehan, et al., 2024). This research reveals the vulnerabilities and opportunities these micro-sacred spaces are confronted with by exploring currency depreciation and the implications of depreciating exchange rates on SMEs' cost structures, competitiveness, and survival. Additionally, the findings will guide policymakers on effective measures to reduce negative impact and to also utilize devaluation to boost exports.

The study's emphasis on regional cooperation among SCO countries highlights its potential to foster economic stability and resilience. Ultimately, the research aims to enhance the sustainability and growth of SMEs, which are pivotal for the region's economic progress.

Objective Of Study

- To review and assess the impact of currency devaluation on SMEs in the member states of the Shanghai Cooperation Organization countries starting with some analysis on the mechanisms that make it effect.
- To analyze the sector's specific weaknesses of SMEs that are caused by currency devaluation.
- To examine how the governments of the SCO countries assist in overcoming the challenges that devaluation of the currency poses towards the small and medium enterprises of these countries.
- To offer policy proposals which could enable the SMEs to effectively manage the problems of currency devaluation.

LITERATURE REVIEW

The currency devaluation aspect highlights the more subtle effects it has on small and medium sized enterprises (SME) across the Shanghai Cooperation Organisation (SCO). This chapter focuses on the combination of user funds and research conducted on the effects of currency devaluation on SME performance in terms of trade volume, level of inflation, foreign direct investment as well as productivity (Shah, et al., 2025; Imran, et al., 2023). The review is able to address some of the theoretical gaps by combining the findings of empirical studies and explaining some of the key trends, challenges and opportunities that are available for the SMEs in the aforementioned economies.

Gallagher & Andrew (2003) complemented their arguments using International Fisher Effect (IFE) and Interest rate parity theory (IRP). The interest rate parity, or IRP theory, talks about how interest rates and foreign exchange rate movements are connected. Hence in this respect the theory states that interest rate differentials leads to depreciation or appreciation of the currency which is offset by trade and capital flows between currency areas. The panel data issues SEM is constitute by the four countries China, Sri Lanka, Pakistan, Malwa, and India, the currency devaluation considered as the key exogenous variables in the fixed effects Model design procedures analysis by the analysts concluded that the economic productive areas of the currency devaluation stated the strongest exotic expensive difference on the low hangs integration on the to set on economic productive area like the men contain the last China, Sri Lanka syndrome in the guidance process. According to the Azhar, Iqbal and Imran (2025) the most common effect of asymmetric monopoly on factors, is that devaluation hails exports while it also increases import costs in the second interface, and thus it affects both the mar. Moreover, IFE factors argue that inflation impairing buying power and the balance of trade heightens the salience of productivity as a response to these harmful effects (Shpilin et al., 2017).

These two frameworks provide a justification to explain the dimensions that the devaluation takes in impacting performance of the SME. According to Felix (2022) exchange rates are called the 'international' value of a currency and in addition, reflect how much of one national currency can be exchanged for another and are typically classified into three types; The second type of exchange rate is pegged exchange rate where a nation keeps the rate to the currency of a super power. The negative effect of a high exchange rate on SEMs used OLS to verify the existence of an industry-exchange rate relationship. At mass level there is a semi free floating rate determining according to need and provide. One way is currency depreciation, which helps in balancing external trade by declining the import volume (Kayani et al., 2021; Ahmad, et al., 2016). It for an entire lot adjustment the composition of the imports basket.

Certainly, Xu et al., (2021) focused on export-led SMEs in SCO countries such as China, India and Kazakhstan transpiring in boosting product demand. The relative price of domestic goods can be lowered through Currency devaluation, thus, increasing exports, therefore, price for this distortion should always be fixed on devaluation.

Using Random Effects Model on the panel data suggests that exports of higher amounts play a major role in growth of the industrial sector, which is one of the main pillars of the stable export oriented economic structure of China. But the gains are not spread evenly. Take, for example, the import-dependent SMEs of Pakistan and Tajikistan for whom the cost of raw materials and machinery becomes increasingly expensive, eating into profit margins and stalling growth. This divergence further highlights the need for local supply chains to avoid import vulnerabilities.

According to Rahman & Ismail (2022), devaluation is also a cause of inflation, since the cost of purchasing capital goods from other countries is higher and this will affect the operation of SMEs negatively. Indeed, the increasing costs of operations, such as employee wages, utilities and materials, put many small and medium enterprises which have no more cash buffer (Pramono et al., 2022) under heavy pressure); However, since the SME sector mainly depends on price-sensitive consumer markets in many SCO countries like Kyrgyzstan and Uzbekistan, the inflation poses another layer of challenge by way of decreasing purchasing power. In contrast, India and China remain resilient with productivity increases and economies of scale to offset inflation.

Friction through random effects run showed that FDI is one of the most important variables for industrial economy in order to keep SME from the major lack of expansion due to currency devaluation (Cambell, 2008). The depreciation of the local currency translates nearly directly into lower asset prices, which in turn attracts foreign investors who bring key capital and technology into local enterprises (Shah, et al., 2024; Rasheed & Kiani, 2024). Haq, Bilal, and Qureshi (2020) FDI has been found to positively affect industrial development in most studies, and this was particularly true in the cases of Kazakhstan and Uzbekistan (12). But geopolitical dynamics and regulatory circumstances frequently moderate its impact on FDI, which in turn underscores a policy environment conducive to stable investment flows.

Gallagher & Andrew (2003), Productivity gains (the coup de PPD) (or the increase of GDP by reference to people (or hours of work) employed) are shown to provide the main avenue (but not the only one) to devaluation resistance (where in any case, there is a group of SMEs that resist perfectly the temptation economy policy). Industrial production is given its proper trajectory by efficient labour resource utilization which offsets the downside of rising input costs and inflation. By using panal data and fixed effects model we checked the impact of currency devaluations on Gdp which result for countries, these finding that through human capital development, especially in countries like China and India, strategic investments in workforce development have bolstered SME productivity, enabling them to remain competitive in volatile currency environments.

In the context of China and Kazakhstan, Chen & Zhao (2018) examined the influence of currency devaluations on small and medium-sized enterprises (SMEs) export performance (Mir, Rana, & Waqas, 2021; Ali, et al., 2020). Although the devaluation enhanced export competitiveness of SMEs in labor-intensive sectors, it equally increased the price of raw materials purchased from foreign sources, which restricted profit margins, their study found (Imran, et al., 2023). This pronounced impact of the dual effects was stronger among SMEs with non-diversified supply chains.

Lal et al. Mobile Server Pages (2023), A historical analysis of the growth of SMEs (2018) Arsha Kostroju-DiMaceo s.c, Impact of exchange rate fluctuation on the SMEs growth: Evidence from India and792–806 Uzbekistan. Employing a panel data strategy, they showed that, although a currency devaluation initiated short-run sales development for small and midsized enterprises (SMEs) concentrating on export, further, having to rely on imported products, development hindered the balance sheets of SMEs. Discovered that financial hedging mechanisms are important for SMEs to cope the exchange rate risk (Hanif, Abdin & Mirza, 2019; Hanif, Naveed & Rehman, 2017).

Rasulov (2021), studied the small and medium-sized enterprises (SMEs) in Tajikistan, highlighting the AG sector. Using a time-series econometric model, the study indicated that currency devaluation boosted the price competitiveness of exports of agricultural goods. Alternative loans were denominated in foreign currencies and this eroded the overall financial stability of SMEs because their debt servicing costs increased extremely.

Gao & Wang (2023), examined SME resilience under currency fluctuations in Kyrgyzstan and China. They took a mixed-method approach, using both survey data and econometric modeling outputs. They concluded that SMEs that were supported by government subsidies and extended incentives for export were able to capitalize on the benefits of devaluation while those that were left out of such support had difficulty coping with the increase in cost of business operation.

Mhlanga (2012), studied SMEs in Uzbekistan and Russia and reported the role of digitalization in overcoming the negative effects of currency devaluation. They found SMEs that used digital tools to manage their finances and access markets were more resilient. Despite rising costs of inputs, devaluation offered these firms an opportunity to enter new markets.

Literature Gap

Although the previous studies offer an understanding of the effect of currency devaluations on the SMEs in SCO countries, there are a number of gaps. First, a majority of works concentrate on separate countries or the example of bilateral trade between the countries (for example China-Kazakhstan or Russia-Uzbekistan) instead of the whole picture of SMEs experience in the SCO. This limits generalizability of findings and ignores interdependence across regions. Further, various non-traditional factors have not been previously studied for their potential impact on SME resilience to devaluation such as implementing digital transformation and innovation capacity facets. Despite the emphasize of digitalization (SCO,2022), research on the heterogeneity of technology adoption among industries and countries as well as the SCO is scant. Third, previous research on SMEs tends to prioritize the concerns of those exporting to global markets while discounting the experience and challenges of those operating principally serving domestic markets. Because these firms face unique challenges due to devaluation and its accompanying effects (e.g., higher inflation and input costs), they require specific policy responses. Lastly, there is little longitudinal evidence of the long-term consequences of devaluations for SME growth, survival and competitiveness. The main regurgitation of SME adaptation is focused on what the progressive SME can do or has done to adapt but few studies conducted from long-term perspectives have been undertaken to identify whether the adaptation strategies were effective in the long run and if not; how can SMEs adapt? Filling these gaps can guide more integrated and regionally coordinated policy actions.

Theoretical Framework

The present study investigates the linkage between currency devaluation and Small and Medium Enterprises (SMEs) in SCO countries, taking industrial growth as its dependent variable. Here the framework is based on Interest Rate Parity (IRP) Theory, which is an important factor to know how exchange rates work and how they affect trade and movement as a whole. The Interest Rate Parity (IRP) Theory is one of the greatest theories that describes the relationship between interest rates and exchange rates, essential for evaluating the impact of currency devaluation on SMEs. A devaluation of currency changes the relative price of exports and imports which has implications for trade flows, investment and inflation (Gallagher & Andrew, 2003). Interest rate differentials between countries also drive exchange- rate adjustments, and exchange-rates directly affect one-for-the other international trade and capital flows– an area of high interest to SMEs involved in trade and investment relations across borders. That is to say, the IRP theory guarantees that the return on a hedged foreign investment equals the domestic interest rate on investment of similar risk, and, thus, prevents the arbitrage opportunity of earning pure profit merely by trading the currency in the domestic and relevant foreign markets (Shapiro, 1996). Following the Zero-sum Game Theory, if one participator loses money, the other participator gains the equivalent amount. Hence, under these circumstances, (assuming that there will not be such ones in market), investors will long in spot market and short in forward market, or vice versa. This will cause the market to somewhat fluctuate and balance over time (Shapiro 1996). The first concept, International Fisher Effect (IFE) — named after the great American Mathematical Economists Irving Fisher — was introduced using the domestic market. Domestic Fisher Effect or in general Fisher Effect says that nominal interest rate (r) consist of real rate (a) and expected inflation rate (i). See formula 1. appendix (Shapiro & Wilcox, 1996)

$1+ r = (1+ a)(1+i)$ ………………….. (I)

r = Nominal Interest Rate , a = Real Interest Rate , i = Inflation Rate

However, when used in the context of international finance, Fisher effect also states that the net change in nominal rates between two countries will be offset by equal but opposite changes in the currency exchange rate. So according to this theory, currencies with low from interest rate would appreciate against currencies with low interest rate (Gallagher & Andrew 2003) Formula 2 be (Shapiro 1996,228)

$\frac{(1+r_h)}{(1+r_f)} = \frac{e_t}{e_o}$ ……………………… (II)

r_h= The Periodic home currency interest rate, r_f = The Periodic foreign currency interest rate. e_t= The expected home currency value of foreign currency at time t, e_o= The home currency value of foreign currency at time 0

Exports become less expensive and imports become more expensive due to devaluation. In the context of SMEs, the IRP claims that exchange rate regulation proceeds according the interest rate differential, affecting both the competitiveness and profit of SMEs. g) and reduces negative effects of devaluation through increase in productivity and consequently industrial growth, reflected in GDP per person employed. al, 2017). Devaluation does, as the costs of imports react to the rise. Inflation directly affects purchasing power and diminishes the growth of the industrial sector as per theories supporting IRP and if enterprises do not realize productivity gains to counterbalance inflation, they will suffer. Devaluating helps exports by making them cheaper; however, it can also exacerbate imports and endanger SMEs developing on foreign input. IRP places importance on the capacity of the exchange rate to equilibrate trade movements. Devaluation makes assets cheaper and thus attracts FDI. According to IRP, such inflow can stabilise exchange rate and also provides capital and technology for SMEs (Cambell, 2008). Based on Implicit Research Paradigm (IRP) theory and firm-Led, this framework embeds IRP than firm-level dynamics to demonstrate how currency devaluation affects SME growth in SCO ways. The research links macroeconomic variables to industrial growth, which implies practical measures to boost the SME resilience in a turbulent economy.

METHODOLOGY

This study aims to identify and analyze the relationship between dependent variable industry, independent variables currency depreciation and intervening variables EX, IM, PF, FDI and GDP. Therefore, for the purpose of this research, quantitative approach was used by analysing the industry effects of Shangai countries due to currency devaluation; it give an opportunity to measure the relationship between those variable and since the effects were numerical since it affects the economic growth, so the quantitative method enables the compare with different measures of numerically growth. To show causation, we need to vary the variable that is presumed to be the cause of the change of the other variable, and then measure the change in the other variable. Methodology. The study has employed WDI secondary data/last 20 years country time series data. In this research, we examine impact of devaluation on small and medium-sized enterprises (SME), and analyze the selected MNCs in Pakistan. In this study, we have used industrial growth as a dependent variable and exports, imports, exchange rate, GDP, inflation rate and Foreign direct investment (FDI) as independent variables to explore the respective impact.

Data Collection

The study utilizes secondary data from reliable source such as the World Development Indicators (WDI), The dataset spans a specified period 20 years and consists of annual data for all independent and dependent variable related to shanghai countries.

Model Specification

The study employs the following panel data regression model:

$$\boldsymbol{Ind_{it} = \beta_0 + \beta_1\, GDP_{it} + \beta_2 Ex_{it} + \beta_3 Imp_{it} + \beta_4 FDI_{it} + \beta_5 E.R_{it} + \beta_6 Inf_{it} + \mu_{it}}$$

Variable Descriptions

Industry (value added annual % of Growth) is d**ependent variable and independent variable is** Exchange rate (% Change), GDP (per person employed), Inflation rate, Export (Current US $), Import (current Us $), Foreign Direct Investment (FDI). The analysis is conducted using statistical software such as **EViews** to ensure precision and replicability of results.

Estimation Techniques

Ordinary Least Squares (OLS) to estimate baseline relationships. **Random Effects Model (REM) t**o account for unobserved heterogeneity across firms. **Fixed Effects Model (FEM) t**o control for time-invariant firm-specific effects. **Hausman Test t**o determine whether Random Effects Mode (REM) or Fixed Effects Model (FEM) is more appropriate.

RESULTS & DISCUSSION

Table 1 **Method: Panel Least Squares**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.36474	1.360356	8.354242	0.0000
IMPORT	8.37E-11	2.56E-11	3.265201	0.0013
EX_RATE	0.001009	0.000579	1.743147	0.0833
EXPORTS	4.44E-11	2.03E-11	2.183439	0.0305
FDI	2.73E-10	5.62E-11	4.861321	0.0000
GDP	0.000148	2.78E-05	5.312087	0.0000
INF_RATE	-0.028065	0.008060	-3.481927	0.0006

Root MSE	7.326626	R-squared	0.726813
Mean dependent var	10.11606	Adjusted R-squared	0.716100
S.D. dependent var	14.06163	S.E. of regression	7.492354
Akaike info criterion	6.908407	Sum squared resid	8588.712
Schwarz criterion	7.042946	Log likelihood	-545.6726
Hannan-Quinn criter.	6.963039	F-statistic	67.84271
Durbin-Watson stat	1.583237	Prob(F-statistic)	0.000000

`The t-stat of 3.26 is significantly higher then the critical t-value for typical significance levels (1.96 for 5% significance) This suggests that the coefficient is significantly different from zero at least 95% of the time. That is a very low p-value (0.0013), indicating extremely strong evidence against the null hypothesis. Which means that imports have a statistically significant impact on industry. For a 1 unit increase in imports, the dependent variable industry increases on average by 8.37E-11 (P extremely powerful evidence to reject the null hones so here too GDP has a statistically significant effect on the industrial sector. The coefficient is negative and statistically significant which shows that inflation is bad for industrial output. So the amount related to the coefficient –0.028065 states that the industrial output decreases by around 0.028065 unit for each 1 percentage point increase in the inflation rate, all else being equal. This negative sign illustrates the inverse relationship between inflation and industrial output. We argue that higher inflation rates are linked with lower industrial output per sale. The t-statistic of -3.48 being much lower than the critical value of around 1.96 at 5% significance level is non-significant. It confirms the fact that the coefficient is statistically insignificant. Based on the output, the P-value is 0.006 which backings the null hypothesis with a strong evidence which ensures that inflation statically insignificantly affect the industrial sector. LM Test : To find random effect in a panel data model. It is useful to decide on the need for entity-specific effects (random intercepts) to capture unobserved heterogeneity between entities (persons, firms, countries etc). The null hypothesis of the LM test is the absence of random effects, in which case a pooled OLS model is preferred to one with random effect (the latter assumes the absence of individual specific heterogeneity). Research hypothesis is the random effects model is appropriate i.e the pooled OLS model is not appropriate. The alternative hypothesis : random effects model is suitable that is there is enough heterogeneity across the individual units (entities).

Table 2
Lagrange Multiplier Tests for Random Effects

	Test Hypothesis		
	Cross-section	**Time**	**Both**
Breusch-Pagan	44.35952 (0.0000)	0.368077 (0.5441)	44.72759 (0.0000)
Honda	6.660294 (0.0000)	0.606693 (0.2720)	5.138536 (0.0000)
King-Wu	6.660294 (0.0000)	0.606693 (0.2720)	5.636947 (0.0000)
Standardized Honda	11.72240 (0.0000)	0.756071 (0.2248)	2.812777 (0.0025)
Standardized King-Wu	11.72240 (0.0000)	0.756071 (0.2248)	3.816584 (0.0001)
Gourieroux, et al.	--	--	44.72759 (0.0000)

LM Statistic 44.35952 p-value: 0.00000 Our panel data could contain random effects among the individual entities (countries, firms or individuals) in our sample. For instance, a p-value of 0.0000 implies a very strong rejection of the null hypothesis (that there are no random effects). This indicates that there is a great deal of evidence of random effects between the cross-sectional units, and therefore random effects model are well suited to the explanation of the variation in the dependent variable across the cross-sectional units. Indicating that, if both cross-sectional and time variation concluded together; there are existing random effects and the random effects model should be used to mitigate the panel data.

Table 3 Individuals Cross sectional Effects

COUNTRY	Effect
Pakistan	-5.301352
India	5.208027
China	3.663558
Belarus	0.658330
Sri Lanka	-3.430759
Tajikistan	-4.901091
Kazakhstan	7.318076
Ky	-0.108441
Russia	-4.780596
Uzbekistan	1.674248

Kazakhs (7.318076) 6. A strong export sector that becomes that much more competitive on a global stage. Reduced reliance on imports for SME activities. Ready to the supportive environment for businesses in currency fluctuations. India (5.208027) has demonstrated a huge degree of resilience, probably because of huge domestic market, saving a lot of the SME from the vagaries of the external global market. Export-driven sectors gaining from improved international competitive position subject to devaluation China (3.663558), The positive sign for China indicates that at least in this case the response of export-oriented SMEs and importing firms is above average which makes SMEs relatively robust and also that SMEs may even benefit from the devaluation. Shanghai SMEs could benefit from a weaker currency as exports rise, as well as supply chains holding up well. Professor Phillips added: "The highly industrialized economy likely counteracts the adverse impacts through economies of scale. Uzbekistan (1.674248) – Mid range resilience of Uzbekistan's SMEs, likely aided spread of some export industries and capacity to produce some goods domestically) Belarus (0.6583300) a country that has slightly positive impact means its resilient however compared other countries it weaker This could mean either limited growth in exports or a healthy dependence on imports. Pakistan (-5.301352) most affected: especially SMEs, indicating: High dependence on imported raw materials, which become more expensive. Failure to diversify exports to exploit the depreciating currency. Domestic purchasing power hampered by inflationary pressures. SMEs are extremely vulnerable in Tajikistan (-4.901091), perhaps due to, Weak export performance Over dependence on external goods or services. Low financial or institutional support to SMEs. Russia (-4.780596), Russia shows negative impacts which are likely to be caused by the Geopolitical constraints in terms of export markets. Increased inflationary pressure cost of imports. Sri Lanka (-3.430759)Sri Lankan SMEs are in the medium impact (likely due to, Import dependency). SMEs lack the scale to export more quickly after devaluation Kyrgyzstan (–0.108441): Kyrgyzstan has a small negative effect signifying a near neutrality of resilience with perhaps some vulnerability to devaluation compared to others.

Table 4 **Panel EGLS (Cross-section random effects)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.30580	2.870249	3.590558	0.0004
IMPORT	1.15E-10	4.11E-11	2.784223	0.0060
EX_RATE	- 0.000531	0.000665	- 0.798991	0.4255
EXPORTS	5.89E-11	3.44E-11	1.711841	0.0090
FDI	9.05E-11	8.16E-11	1.109746	0.0488
GDP	0.000164	6.68E-05	2.451299	0.0154
INF_RATE	-0.020211	0.008175	-2.472404	0.0145

Effects Specification

	S.D.	Rho
Cross-section random	5.124992	0.3909
Idiosyncratic random	6.397080	0.6091

Weighted Statistics

Root MSE	6.276985	R-squared	0.265776
Mean dependent var	3.013437	Adjusted R-squared	0.236983
S.D. dependent var	7.348492	S.E. of regression	6.418971
Sum squared resid	6304.087	F-statistic	9.230538
Durbin-Watson stat	2.061215	Prob(F-statistic)	0.000000

Unweighted Statistics

R-squared	0.696667	Mean dependent var	10.11606
Sum squared resid	9536.468	Durbin-Watson stat	1.362568

The 5.12499 cross-sectional random standard deviation essentially represents the deviance of the random effects among the individual cross-sectional units — shanghai countries — we have in our panel. It shows the variability of the individual specific (random) part of the model between the entities. The larger value indicates the average variability of random effects between entities. For instance, 5.12499 mean the between-person random effect SD (intercepts variance of unique intercepts for each entity) are large. Here this value represents the importance of between-country differences in explaining between-country variation in the dependent variable; random effects capture unobserved heterogeneity across cross-sectional units. The Rho of 0.3909 indicates that approximately 39percent of the total variation in the dependent variable (industry)is accounted for by between entity differences. This suggests that random effects are somewhat substantial in accounting for the variation in industrial production. The result provides evidence that there are meaningful differences across entities (e.g. industries or countries in the panel data) that influence the dependent variable. Nonetheless, much of the variance explained remains to be accounted for in other dimensions, either intra-entity, or not modeled. The low mean of idiosyncratic random standard deviation (6.397080) also shows that the variation in the dependent variable (industry) is low within-entity and consistent over time. This implies that the unit Shanghai countries have considerably large variance over time or across observations that random effects at the aggregate (cross sectional) level cannot account for. With a Rho value of 0.6091, it indicates that around 60.91 percent of the total variance of the dependent variable (industry) is attributed to the within-entity difference. This suggests that idiosyncratic or within-unit dynamics are more explanatory for the variation of the industry than the cross-sectional or entity-specific effects, which can only explain 39.09% of the variance. This implies by your model, the nature of variables that changed within each unit (foo sub-units share industry springs, or local policy statement changes or time impact) became determinant on Fuchs. Industry Imports are very strongly and positively associated with industrial output—higher imports = more industrial output^3. A value of 1.15E-10 suggests that there is a positive relationship between imports and industrial output, which is recorded in the positive coefficient. That is, a 1-unit increase in imports results in a 1.15E-10 unit increase in industrial output, other things equal. Because t-statistic (2.78) and p-value (0.006) respectively indicate that this relation is statistically significant, so imports have a positive effect on industry in this model. A negative sign indicates that the exchange rate and industrial output are related in the opposite direction. In general, a rise in exchange rate (a depreciation of the local currency) would reduce industrial activity, especially for exchange-rate-sensitive industries. For the exchange rate, the coefficient is -0.000531, meaning if the exchange rate increases by 1 unit, all else being equal, the industry (the dependent

variable, in other words) is expected to decrease by 0.000531 units. With respect to the negative coefficient (-0.000531) of variable EXR, it suggests that, the exchange rate has a negative impact on industrial output; an increase of the rate (devaluation of the currency) is conventionally linked with a small decrease in industrial output. Nonetheless, the observed effect is not statistically significant as evidenced by the t-statistic (-0.799) and p-value (0.4255). The absence of significance does not imply the Median in your model is not that great, but there is not strong evidence of the exchange rate being material to the industry. Exports (6.16E-11) One of the constituents of industrial output (value added) — Additive Factors impositive coefficients 5.89E-11: Positive → Exports That is, for every unit of increase of the independent variable (i.e., exports) there will be a 5.89E-11 unit increase of dependent variable (i.e., industrial output), holding all other variables constant. The corresponding t-statistic (1.71) and p-value (0.0090) indicate that this effect is statistically significant at the 5% level; it shows that exports are an important explanatory variable for variations in the industrial output. Because the coefficient is positive, this indicates the conventional view that increases in exports will increase industrial production, indeed the view of an economy that benefits from external demand. Dependent variable also affected with FDI and GDP it has positive and significance relationship with GDP and FDI but the impact of inflation is negative then with dependent variable if the inflation rate increase industry sector decline with just point unit.

Hausman Test This test is used for deciding on Random Effects model or Fixed Effects model for your data. The test depends on if the individual effects (like for instance for countries, industries or firms) are correlated with the independent variables. The test provides a p-value and a low p-value would accept the alternative hypothesis which is that a correlation exists and hence the Fixed Effects model fits the data well.

Table 5 Correlated Random Effects - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.048935	6	0.3163

The prob value of Hausman test is 0.3163 show that the less in 0.05 mean that reject the Ho and accept the alternative test so results is Random Effects Model is not enough for our panel data we must go for fixed effects model for final results.

Table 6 **Panel Least Squares Fixed Effects**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.299286	5.337895	1.180107	0.2399
EX_RATE	-0.000305	0.000705	-0.432342	0.6661
EXPORTS	6.33E-11	4.36E-11	1.451817	0.0487
IMPORT	1.13E-10	5.09E-11	2.214637	0.0284
GDP	2.50E-05	0.000166	0.149964	0.0810
INF_RATE	-0.026207	0.010474	-2.502064	0.0135
FDI	1.08E-12	1.12E-10	0.009675	0.0123

Effects Specification

Cross-section fixed (dummy variables)

Root MSE	6.068803	R-squared	0.812562
Mean dependent var	10.11606	Adjusted R-squared	0.793037
S.D. dependent var	14.06163	S.E. of regression	6.397080
Akaike info criterion	6.644200	Sum squared resid	5892.859
Schwarz criterion	6.951717	Log likelihood	-515.5360
Hannan-Quinn criter.	6.769072	F-statistic	41.61692
Durbin-Watson stat	2.189596	Prob(F-statistic)	0.000000

When looking closely at the industry and the coefficient of the exchange rate, the coefficient of -0.0003 implies that the exchange rate could harm the industry as the exchange rate increase (probably depreciation) leads to a lower industrial output or performance. The effect size, however, is very small, suggesting that if the relationship is real it is unlikely to be anything but trivial. This relation has a statistically insignificance (5% level) as we correspond a t-statistic of -0.432342 and p-value of 0.6661. Said a different way, given these results, we do not have enough evidence to say that the exchange rate is an important determinant of the industry. In this model, the exchange rate has a negative but statistically insignificant impact on the industry. Given the large p-value, we can say that the exchange rate does not appear to have a statistically significant effect on industrial output or industrial performance in this instance. Four of the others are control variables, namely, FDI. There is a significance and positive correlation between the independent variable export, import, and GDP and the dependent or industry variable if there is an increase of one unit of export how industry increases in the shanghai countries by 6.33E-11, just as the increase of one unit of FDI increases by 1.08E-12, and if the GDP increases by one unit of industry increases in shanghai countries and there is 2.50E-05 and the negative correlation with the dependent variable is the one of other independent variable inflation shows that if inflations increase by one unit of industry declines in the shanghai countries by 0.026207 in shanghai countries

Table 7 Individual Cross Sectional Effects

COUNTRY	Effect
Pakistan	-3.442115
India	9.175895
China	15.76111
Belarus	-4.092367
Sri Lanka	-2.242829
Tajikistan	-11.87166
Kazakhstan	1.720182
Ky	2.422457
Russia	-11.94348
Uzbekistan	4.512807

SMEs in India likely remain resilient or are even benefactors of currency devaluation. This may be attributed to competitive export sectors, favourable cost effects, or strong domestic demand which insulates SMEs from the negative effects of devaluation. The most positive impact is for China (an effect of 2.09), suggesting that SMEs in China might benefit the most from devaluation of the currency. This could be due to its enormous, export-driven economy where devaluation adds to global competitiveness, something key in Shanghai, which is particularly a global trade hub. The favourable impact on SMEs of Uzbekistan indicates that moderate positive effects are likely to be enjoyed by the SMEs sector due to new export industries or reduced import dependency (Vichare, 2006). A small, positive effect for these countries would suggest some degree of resilience. In these instances, SMEs might receive a boost in exports or a devaluation of the local currency reducing competitive pressure from imports. Pakistan (-3.442115) SMEs in Pakistan negative affected, mainly because of either inflationary pressures, weak export competitiveness or very high percentage of import-based raw materials. Belarus (-4.092367) Belarus's SMEs look most fragile, possibly reflecting both a heavy reliance on imports and so few export markets able to absorb the disruption by the devaluation. This question can also be used to ascertain the total score of SMEs in a country, SME score, which is a negative value ((0 to -3), where a lower number suggest a relatively more negative view on economy of SMEs that country. The allocated scores are as below, SMEs in Sri Lanka are negatively impacted but less severely than Pakistan and Belarus. Import dependency and inflationary pressures could create vulnerability. Tajikistan (-11.87166) Tajikistan has one of the highest negative impacts which may prove that SMEs in the country are particularly vulnerable. Possibly due to low quality exports, dependence on imports, weakness of economic foundation etc. Rank [11]Russia(-11.94348) Russia is deeply damaging to SMEs. These could be due to sanctions, lack of export diversification, and devaluation-induced inflation.

CONCLUSION

Findings from the analysis of the impact of currency devaluations on SMEs in Shanghai Cooperation Organization (SCO) countries provide valuable insights into the interplay of economic variables that drive industrial performance. The results show that, gross domestic prestige (GDP), foreign direct investment (FDI) and exports have a positive and significant association with industrial performance, illustrating that economic growth, capital inflows and export competitiveness play critical roles in assisting SME development. On the other hand, the impact of imports shows a negative significant relationship, which is justified by the higher costs of imported goods making it more difficult for SMEs to operate after a devaluation of the currency. Industrial performance suffers from macroeconomic instability (negative sign on inflation and exchange rates) but macro variables are statistically insignificant in this study as well. Which means they might have direct implication on SMEs but the impact is not huge, nonetheless they do create indirect impacts on costs and general market stability. The use of the random effects model emphasizes further cross-sectional (variance among SCO member states) and idiosyncratic random effects (variance among SMEs within SCO member states), highlighting fundamental differences between such enterprises. This indicates that under the context of SCO countries inflation and exchange rate volatility may not directly affect the results of the SMEs but can indirectly affect their operational costs and financial stability. This suggests that there is cross-sectional dependence in the data shown by the random effects model with random effects S.D. = 5.12, rho = 0.3909 Furthermore, the unique random effects (with an S.D. of 6.397 and Rho 0.6091) indicate the presence of significant within-unit heterogeneity, suggesting that there is considerable variation between SMEs in different SCO countries. Using the International Relative Prices (IRP) theory, this paper highlights the double-edged effect of currency devaluation. Devaluations enhance the competitiveness of exports by altering prices relative to other countries; however, they also raise import prices, making this a particularly complicated economic environment for SMEs. Overcoming these challenges through appropriate policy interventions and regional cooperation can enable sustainable growth of SME in SCO member states.

Policy Implications

1. Fostering Export Growth

Export-oriented policies seem to be required given the beneficial link between performance of industry and exports. Governments should work to improve trade facilitation, overcome logistical bottlenecks, and create export promotion schemes targeted to the requirements of SMEs. Tariff reductions on inputs used in exports, and fiscal support for market development can also make SMEs more competitive globally.

2. Reducing Import Dependency

Due to the adverse effect of imports on the performance of industries, it becomes imperative to minimize the dependence on foreign factors. Local production of raw materials and intermediate goods can overcome the negative influence of devaluation on the balance of payments by invoking policies of import and foreign investment related to production. This effort should also include setting up public-private partnerships to create local supply chains.

3. Encouraging FDI

The positive impact of FDI emphasizes the need to build an investment-friendly environment. Attracting foreign capital can be done through streamlining regulations, providing tax incentives, and developing industrial zones based on SMEs. The second is using FDI to displace the old technologies and practices — a process which we may further describe to increase productivity and resilience in SMEs.

4. Inflation management & exchange rate volatility

Although we found that inflation and the exchange rates themselves have immaterial direct impacts, their indirect impacts through costs and demand require firms to take pre-emptive actions. Policymakers must target exchange rate stabilization tools e.g. sufficient foreign reserves, synchronized monetary policies. Sectors with higher exposure to inflation can be supported through targeted subsidies to help SMEs weather rising costs.

5. Building an Insurance Policy for SMEs via Diversification

We should encourage small and medium-sized enterprises (SMEs) to diversify their market/products/revenue streams, reducing their exposure to exchange risk. By investing in innovation, digital transformation, and capacity-building efforts, SMEs can react faster to the rapidly switching market environment. Qinghai Province of China, in SCO Secretary General 2022-10-25 at Global Economic Transformation For instance, all SCO countries face common challenges related to exchange rate management, and stronger regional cooperation on SME support frameworks and common knowledge-sharing platforms are therefore highly necessary. Optimized systems approach can ease economic differences and enhance a coherent defence.

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