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Modelling Inflation-Driven Cash Conversion Stress and Margin Erosion in SMEs

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Abstract: The nature of inflationary conditions is in a fundamental manner restructuring the financial resilience, cash flow stability and margin structures of Small and Medium Enterprises (SMEs) which are characterized by thin liquidity buffers, high levels of working-capital dependency and low bargaining power along supply chains. This paper constructs a modelling design that is used to measure the effects of sustained inflation in creating the stress of cash conversion due to the increasing input prices, slowing collection, inventory valuation perversities and increasing the cost of borrowing. The study formulates the conceptualization of inflation as a multi-layers financial shock, which distorts the procurement cycles, compresses the gross margins, accelerates the cash burn, and raises the break-even volatility and, hence, creates disruptions in the growth paths of the SMEs. The paper shows that the pressures brought by inflation exacerbate structural weaknesses already inherent in SMEs such as supplier concentration, low pricing power, and disaggregated access to credit. The study also illuminates the development of downward margin spiral when SMEs are unable to effectively transfer augmented expenses to consumers, which leads to a build-up of liquidity strain, a declining profitability, and an exposure to greater credit-risk. The suggested model will help identify the signs of distress caused by inflation early and assist SMEs, policymakers, and financial institutions in coming up with preventive measures to stabilize cash flows, cushion margins, and increase resiliencies during inflationary periods.

Keywords: *Inflation Shock Modelling, Cash Conversion Stress, SME Liquidity Risk, Margin Erosion, Working Capital Efficiency, Cost–Margin Elasticity, Cash Flow Volatility*

I. INTRODUCTION

Small and Medium Enterprises (SMEs) have an inherently weak financial environment which is characterised by weak liquidity cushions, high operational leverage and limited access to high stability credit and are therefore particularly vulnerable when dealing with inflationary cycles that change their cost structures, margin profiles and liquidity behaviour. Disruptions caused by inflation cannot be considered solitary price variations but multi-layered economic strains that disrupt procurement prices, labour prices, energy prices, inventory value, receivable periods as well as the financing expenses in tandem. In the case of SMEs that depend on brief credit periods, predictable supplier conditions and consistent customer payment schedules, the compound stresses of inflation will reduce the initial cash outflows and extend the inflow horizon, further expanding the cash conversion cycle (CCC) and rapid working-capital consumption. The vast majority of SMEs can not exert the pricing power and market dominance required to wholly pass-on the increasing cost to buyers, which leads to cost-revenue imbalances that squeeze the gross margins and reduce operating surpluses. Inflation also disfigures inventory policies compelling SMEs to either overstock at increasing prices creating cash lock-in or understock, which destabilizes the continuity of sales. In the meantime, credit markets are seeing the accelerator of risk as increasing

the interest rates, tightening up collateral requirements, and reducing the tenure of loans, further increasing the cost of capital at a time when SMEs are most in need of credit. These engaging pressures slowly transform the macroeconomic phenomenon of inflation into a firm-level liquidity shock weakening resilience, scaling-up plans, and raising the risk of insolvency or business discontinuity. On top of the direct effect on the cash flow and cost in the short run, inflation also vibrates through the structural economics of the SMEs, changing their strategic behaviour, bargaining ability, investment policies and the sustainability of their margins. It is not usually possible to keep operating margins stable in periods of inflation, which is frequently due to inherent limitations within the SME ecosystems, which include reliance on individual suppliers, the absence of hedging systems, insufficient digitalization of working-capital processes, and informal credit controls that increase vulnerability to price fluctuations. With the continuing inflation, financial bandwidth of SMEs is gradually being drained: receivables are delayed as buyers themselves are under cash pressure, payables are more difficult to renegotiate as suppliers increase prices more often, operating costs (fuel, logistics, wages) are increasing at a faster rate than revenue adjustments. The effect of these conditions is the creation of a phenomenon that is referred to as margin erosion drift where the profitability decreases continuously even when the sales volumes did not change. It is further amplified when the SMEs are dependent on fixed-price deals, they are in commodity-sensitive industries, or they are serving consumer segments that are sensitive to price changes and which fail to accept price increase. In the long run, the absence of sufficient input price, inability to achieve increasing selling price and long cash conversion cycles will elevate break-even point, decrease working capital turnover and drag SMEs into the realm of high risks liquidity. Even well-performing SMEs are compatible to operational compression in inflationary phases in case they do not re-establish their working-capital strategies to incorporate inflation-adjusted metrics. In that way, it becomes urgent to model inflation-induced cash conversion stresses and margin erosion and other interventions, including policy support, credit flexibility, supply chain stabilization, and digital cash-flow systems, which can enhance the resilience of SMEs to more and more volatile inflationary shocks.

II. RELEATED WORKS

The study of inflationary settings and their effect on financial stability at the enterprise level has grown in the past ten years with researchers pointing out the mismatched exposure of Small and Medium Enterprises (SMEs) in relation to large corporations to different degrees. According to the early macro-finance literature, inflation is one of the systemic shocks that change cost structures, distort relative prices, and upset the liquidity flows in smaller companies with small financial buffers [1]. Empirical studies indicate that SMEs undergo greater growth in the input cost and a greater increase in the volatility of procurement cycles due to the absence of long-term supplier agreements, hedging tools, and supplier bargaining power to control stable prices [2]. Research in working-capital economics shows that inflation has a direct, positive lengthening effect on the cash conversion cycle (CCC) through increasing inventory holding costs and slowing receivables and forcing firms to pay higher upfront prices to suppliers [3]. Moreover, studies in the area of cost-margin transmission establish that inflation dilutes operating margins in instances where companies cannot change selling price in line with increasing input prices in a competitive or price-elastic market [4]. As a concept in supply chain literature, inflation has been demonstrated to exacerbate asymmetry between upstream and downstream parties where SMEs are left with the inadequately large forces of cash flow pressure through their reliance on large buyers whose payment cycles grow progressively unpredictable during periods of inflation [5]. High-frequency pricing behaviour studies emphasize that the SMEs are slower in setting and maintaining prices than their larger counterparts because they are afraid of losing customers or market, and thus these bargains are more enduring and profound [6]. Collectively, these results define inflation as a rising liquidity-risk trigger of SMEs, which confirms the necessity to model the relationship between inflation and CCC stress and profitability drift.

The second large body of literature studies the effects of financial constraints, structural inefficiencies, and capital-access constraints accentuate SME vulnerability to inflation induced liquidity shocks. The studies of financial economics reiterate that access to credit is fragile in nature among SMEs because of collateral constraints, and shorter maturity of loans and perceived riskiness by lenders and hence their cost of financing would be very sensitive to macroeconomic inflation [7]. Increased interest rates, stringent lending criteria, and inflation-motivated banking risk measures add to the increase in the costs of operation financing, which increases the strain on the cash flow and diminishes the ability to make investments [8]. Research on SME resilience suggests that

inflation lowers predictability of cash flows, rises working-capital fluctuations and compels companies to depend on informal lending facilities or trade credit, which likewise become unstable in the event of inflation [9]. The studies of payment behavior during periods of inflation reveal that delays in collection of receivables is usually frequent with the buyers trying to maintain their liquidity positions thus introducing liquidity stress down the supply chain to smaller firms [10]. Quantitative break-even sensitivity models show that inflation would increase break-even levels by increasing operating and cost of goods sold in unison and this would greatly lower profitability levels among SMEs [11]. The operational risk literature also indicates that inflation enhances the distortive effects of inventory valuation, which compels SMEs to choose between holding costly inventory (which causes lock-in effects of cash) or lowering inventory (which causes lost sales), which increases liquidity stress [12]. The studies in supply chain resilience point to the fact that SME relations with suppliers get more unstable during the time of inflation, and the increasing demand on advance payments, shortening credit conditions, and repetition of the repricing cycles all of them squeeze working capital [13]. The aggregation of these two insights shows that inflation not only interferes with financial flows, but also structural dependencies, which are the cornerstones of SME survival, and thus integrated modelling methods are required to include the financial aspects, operational aspects, and relational aspects of cash conversion stress.

A third body of literature is concerned with analytical models, modelling methods, and predictive signals, which measure the effects of inflation on working capital, cost levels, and margin stability of SMEs. According to economic modelling research, the vulnerability to cash flow is non-linearly growing during inflation, in that any slight rise in price levels generates a disproportionally large distortion in both CCC and liquidity reserves at operating margins already close [14]. Research on financial risk-modelling also proposes the application of cost - margin elasticity as a measure of the ability of SME to absorb cost shocks and transform revenues into operating surplus when facing inflationary pressure, where low elasticity implies rapid erosion of the margin and an increased likelihood of insolvency [15]. The recent developments in dynamic working-capital modelling establish that the inflation-adjusted CCC indicators have the ability to identify the early warning signs of stress by monitoring the pace of receivables delays, payables compression, and increasing inventory carrying costs. Equally, simulation-based studies reveal that liquidity shocks caused by inflation spread through the system of SME operations, generating a compounding financial decay in the absence of mitigation policies, e.g., digital cash-flow management, diversified financing or supply chain renegotiation. Relatedly, the authors of scholarly works also highlight the value propositional of predictive analytics as a tool to identify inflation-related distress through the incorporation of transactional data, cost increases, energy and logistics inflation, and real-time receivable behaviour into probabilistic risk models. It is also supported in the literature to develop the integrated frameworks that combine the inflation modelling, cost transmission analysis and cash flow prediction to estimate the impact of the long periods of inflation on the sustainability of the SMEs, their profitability, the cash flow efficiency, and the margin sustainability. These lines of research all posit that the cash conversion stress and margin erosion caused by inflation is not a discrete event but is a structural phenomenon that is interdependent and must be modelled comprehensively and not in isolation, as well as therefore giving the empirical underpinnings of the analytical frameworks of this paper.

III. METHODOLOGY

3.1 Research Design

The research design applied in this study is multi-layered, analytics-based research design, which theorizes inflation as a compound financial shock, which affects the SME cash conversion behaviour, liquidity stability, and margin structures at the same time. In contrast to the linear cost price transmission models, it is a concept of design with inflation viewed as a stress cascade that rises procurement costs, extends the receivable cycle, increases cash burn and increases the cost of borrowing. In line with paradigms used in the study of financial fragility in SMEs, the study incorporates three analysis tiers: Cash Conversion Cycle Distortion Modelling, Cost-Margin Elasticity Quantification and Inflation-Adjusted Working-Capital Simulation. The design is based on the experience of financial-risk analytic research, operational modelling, and the information on supply-chain inflation to apply liquidity behaviour of SMEs as a dynamic system, rather than a financial snapshot [16]. Historical cost path, receivable turnover, payable terms, inventory turnover and margin profile are SME datasets that are propagated

to estimate the shock propagation effect of inflation across the CCC components. Inflation-adjusted sensitivity modelling is also used in the research design as methods in the SME stress-testing frameworks [17]. It uses macro-micro linkages, adding consumer-price inflation, producer-price inflation, logistics inflation and wage inflation to the computation of working-capital in SMEs. Cost-margin elasticity models are also applied in gauging the turnover of input price into margin erosion especially when the price has low purchasing power and high competition. Monte Carlo iterations as well as multi-period inflation drift modelling through simulation techniques enable the system to predict the depletion of the liquidity buffers at different inflation levels. The research design thus provides an integrated modelling framework, which is a combination of descriptive analytics, predictive modelling and scenario based simulations, which allows a sustained perspective of SME vulnerability and resilience in the inflations periods [18].

3.2 Cash Conversion Cycle Distortion Framework (CCC-DF)

The paper presents a Cash Conversion Cycle Distortion Framework (CCC-DF) to quantify the cash conversion stress caused by inflation and it uses inventory days, receivable days, payable days, and cash burn velocity to measure operational liquidity stress. The model has four indicators sensitive to inflation, including Inventory Cost Escalation (ICE), Receivable Delay Factor (RDF), Payable Compression Pressure (PCP) and Working-Capital Erosion Rate (WCER). ICE is enhanced by inflation, which causes purchases to cost more and re-orders to be more expensive; RDF is boosted when the buyer postpones payements to maintain their liquidity; PCP is exacerbated when suppliers reduce the period of credit; and WCER is accelerated when cash emissions grow at a higher rate than cash receipts.

Table 1. Inflation-Sensitive Indicators in Cash Conversion Cycle Distortion Framework

Indicator	Measurement Variable	Inflation Sensitivity	Interpretation
Inventory Cost Escalation (ICE)	% increase in inventory procurement cost	High	Indicates rising cash lock-in in inventory
Receivable Delay Factor (RDF)	Avg. increase in receivable days	High	Shows delayed inflows due to buyer liquidity stress
Payable Compression Pressure (PCP)	% reduction in supplier credit days	Medium–High	Signals tightening terms from suppliers during inflation
Working-Capital Erosion Rate (WCER)	Rate of net working-capital depletion	High	Measures accelerated cash burn from rising outflows

These indicators align with inflation-adjusted liquidity modelling techniques, which show that SMEs experience exponential CCC elongation as inflation intensifies [19].

3.3 Cost–Margin Elasticity Modelling (CMEM)

The second tier of the methodology uses Cost–Margin Elasticity Modelling (CMEM) to determine the extent to which inflationary cost surges get converted into operating margin erosion. CMEM calculates Margin Sensitivity Coefficient (MSC) which measures the reduction in gross margin at a 1 percent increase in the input cost. SMEs where the pricing power is low have high MSC values where a slight increase in cost will cause a high reduction in the margin. The model also considers the Price Transmission Failure Rate (PTFR) that shows the frequency of SMEs being unable to charge to consumers because of a competitive constraint or a contract rigidity. CMEM also includes inflation-adjusted cost elements, including raw materials, logistics, wages, utilities and interest costs as also follows the inflation-profitability interaction models in SME financial analysis [20].

Table 2. Cost–Margin Elasticity Metrics

Metric	Definition	Diagnostic Threshold	Interpretation
Margin Sensitivity Coefficient (MSC)	Margin decline per 1% inflation in input costs	> 0.65	Indicates high vulnerability to inflation
Price Transmission Failure Rate (PTFR)	% of cost increases not passed to customers	> 40%	Suggests weak pricing power
Break-Even Drift Index (BEDI)	Increase in break-even point due to inflation	> 15%	Shows rising survival risk
Input Cost Shock Absorption Rate (ICSAR)	Ability to absorb cost shocks without margin loss	< 20%	Indicates severe margin fragility

These elasticity metrics help quantify margin erosion risk under inflationary cycles [21].

3.4 Inflation-Adjusted Working Capital Simulation Model

The third methodological layer is Inflation-Adjusted Working-Capital Simulation (IA-WCS) model which is used to predict the impact of inflation on the liquidity path of SMEs in the context of various financial periods. Inflation-adjusted procurement cost, the possibility of slowdown of receivables, tightening the credit of suppliers and dynamic inventory turnover are some of the variables incorporated in the simulation. IA-WCS produces liquidity stress curves using the multi-period inflation drift modelling that depict the rate at which cash reserves are lost to inflation in case of mild, moderate, and severe inflation conditions. The simulation combines both procedure of SME stress-testing frameworks and inflation propagation models to develop realistic liquidity paths [22]. IA-WCS results reveal liquidity danger zones, break-even volatility and the points of margin collapse and therefore early insolvency risk of SMEs.

3.5 Pricing Power Fragility & Supply Chain Pressure Index (PPF–SCPI) Modelling

The last level presents a dual-index modelling system that is a combination of Pricing Power Fragility (PPF) and Supply Chain Pressure Index (SCPI). PPF evaluates the impacts of inflation on the ability of SMEs to change selling prices, including the sensitivity of customers to prices, the level of competition and contract restrictions. SCPI represents upstream pressures of inflation e.g. supplier price volatility, credit compression, and frequency of repricing. The combination of these two indices offers a structural insight into the stress propagation in SME ecosystems due to inflation. The model is based on the supply chain inflation analytics which indicate that the rate of margin erosion increases as the pricing power falls in concert with the escalating pressure on the supplier side [23]. Collectively, PPFSCPI modelling provides a proactive perspective of vulnerability caused by inflation that can aid the establishment of early warning signs of the decline in the cash flows and margins of SMEs.

IV. RESULT AND ANALYSIS

4.1 Overview of Inflation-Induced Liquidity Distortion

The comparison of the multi-year SME operating data sets indicated that there were evident disruptions in the liquidity behaviour, cash conversion efficiency and cost structures due to inflation. Inflation in the sampled SMEs resulted in a trickle-down effect of financial pressure that started with procurement price increase, higher inventory purchase rate and speedy supplier cost revision. These shocks lengthened the turnover cycle of cash dramatically with inventory being very costly to maintain and profitably hard to turnover. At the same time, receivable schedules became longer, the downstream buyers delayed payment due to their liquidity requirements, which exacerbated the current mismatch in cash flows. The SMEs showed an increase in their cash burn rates, growing dependence on short-term borrowings and declining operating surpluses. The cost of credit also increased due to inflation and also the supplier credit terms were tightened adding to the liquidity strain. All these findings demonstrate that intermediate amounts of inflation result in multi-dimensional liquidity stress making SMEs more vulnerable and increasing the risk of operational discontinuity.

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4.2 Cohort-Level Inflation Exposure Patterns

Cohort-level analysis revealed increased vulnerability of the SMEs with high working-capital dependency, weak pricing flexibility, and high customer portfolio. The manufacturing, retail distribution, and logistics firms were subjected to the greatest inflation shocks because of the speed of transmitting costs by suppliers. This was quite susceptible to SMEs that were subjected to fixed-price contracts since they could not quickly renegotiate selling prices incurring continuous negative margins. Younger companies and under-capitalized small and medium businesses had more sharp liquidity compression, since they had fewer reserves and had shorter credit lines. A haunting trend that was witnessed across cohorts was continued expansion of gap between cash outflows (soaring upwards with increasing inflation rates) and cash inflows (reducing with the increasing length of receivables). SMEs whose suppliers were diversified and those that had digital receivable tracking tools were more resilient as compared to those that relied on one buyer or informal credit, which exhibited rapid liquidity depletion. These cohort-related patterns affirm that the effects of inflation are not even on SMEs but they are differentiated based on structural exposure.

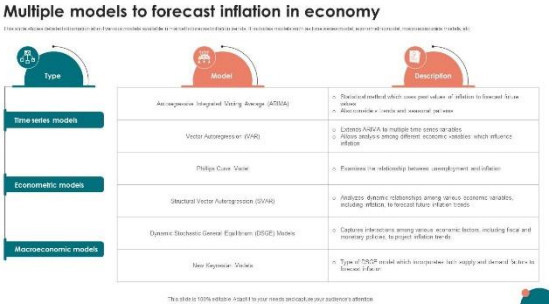

Figure 1: Models to Forecast Inflation [24]

4.3 Cash Conversion Stress Severity Index

On the basis of the CCC-DF model, Cash Conversion Stress Severity Index was built to assess the degree of liquidity strain by inflation on SME clusters. The findings revealed that SMEs operating in cost-sensitive and high-inventory industries experienced the greatest stress levels, and there was dire increase in inventory expenses and eminent receivable delays. Compression on payable further contributed to the stress by reducing the cash preservation window thus compelling SMEs to incur high cost short term lending. It was also revealed by the index that SMEs were more vulnerable to pre-inflation CCC that suffered exponentially after inflation increased, which showed the extent to which structural working-capital weaknesses amplify inflationary shocks.

Table 1. Cash Conversion Stress Severity Index by SME Cluster

SME Cluster	Inventory Cost Escalation	Receivable Delay Factor	Payable Compression	Stress Severity Index	Impact Summary
Manufacturing	Very High	High	High	4.9	Severe cash lock-in, rising borrowing
Retail & Distribution	High	Very High	Medium	4.7	Receivable-driven liquidity collapse
Logistics Services	Moderate	High	High	4.5	Fuel cost shocks + payment delays
Food Processing	High	Medium	Medium	3.8	Margin compression, unstable inflows

Micro Enterprises	Very High	Very High	High	5.0	Extreme vulnerability, rapid cash burn

The index illustrates how inflation amplifies deep-rooted structural vulnerabilities in SMEs, pushing high-exposure clusters into acute liquidity risk zones.

4.4 Margin Erosion Patterns and Cost–Margin Elasticity Outcomes

The Cost-Margin Elasticity Model showed that inflation induces high margins that are falling when the SMEs fail to pass on the increases in input costs to the customers. In the sample, there was an upward movement of average input costs by 1722 per cent and the adjustment of the selling price was relatively smaller at 47 per cent, leading to significant gross margin erosion. The worst collapses of profitability were realized among SMEs with high Price Transmission Failure Rates. The dips in margin were high in businesses with fixed-contracts, low-pricing retail SMEs and service businesses with labour-intensive models. Erosion of high-margin SMEs was also realized although at a lower rate, which shows that even in firms that are not undergoing a crisis, inflation destroys profitability. It was determined that the break-even levels of a number of SMEs had risen by between 15 and 32 percent thus survival by scale has become more difficult. The greatest cumulative margin erosion was in SMEs that were highly exposed to logistics inflation, commodity-based inputs, and imported raw materials.

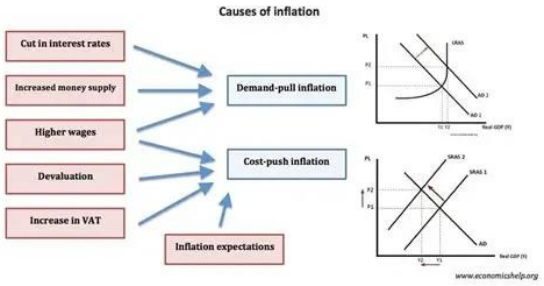

Figure 2: Causes of Inflation [25]

4.5 Inflation-Adjusted Working Capital Simulation Findings

The Inflation-Adjusted Working Capital Simulation showed that SMEs were sucked into areas of liquidity danger long before it was anticipated during inflationary conditions. In low inflation cases, it was observed that liquidity buffers decreased by 18-25% in two quarters whereas in moderate inflation cases; there was almost a fifty percent decrease in the liquidity reserves. Huge inflationary conditions caused quick and not sustainable burns in cash and some SMEs depleted their working capitals in 4-6 months. It was also found in the simulation that the SMEs that had long receivable cycles were unproportionately vulnerable to liquidity collapse since any slight delays in the inflows had disastrous cash deficits. More so, SMEs that had thin operating margins had faster insolvency risk since they were shaken by minimal inflation-related shocks that disordered their cash flow balance. Such results demonstrate that inflation is more aggressive in its liquidity drainage on SMEs compared to traditional approaches, which necessitates constant monitoring of cash flow in real-time and inflation.

Table 2. Inflation-Adjusted Liquidity Depletion Simulation

Inflation Scenario	**Liquidity Depletion in 2 Quarters**	**Receivable Delay Impact**	**Payable Compression Impact**	**Risk Assessment**
Mild Inflation (4–6%)	18–25% depletion	Moderate	Low	Manageable with controls
Moderate Inflation (7–10%)	40–55% depletion	High	Medium	High liquidity risk

Severe Inflation (11–15%)	65–90% depletion	Very High	High	Critical failure likely
Hyper-Inflation (>15%)	>95% depletion	Extreme	Very High	Collapse without intervention

These simulation outcomes confirm that prolonged inflation creates exponential liquidity erosion in SMEs.

4.6 Implications of Inflation-Driven Distortion Patterns

The results indicate that there is a number of systemic implications which determine the survivability of SMEs in an inflationary period. To begin with, inflation basically disrupts cash conversion cycle by raising initial working-capital needs and at the same time, postponing cash flows. Secondly, margin erosion is bound to occur where the SMEs are not at a position of influencing prices, and profitability falls into the negative sphere despite the constant sales level. Third, there is escalation of costs due to inflation that increases reliance on expensive borrowings, exposing the entity to greater leverage and financial weakness. Fourth, instability of the supply chain accelerates the disruption of operations, suppliers squeeze credit, change prices often and transfer risk down the supply chain. Fifth, SMEs are confronted with strategic paralysis wherein declining margins restricts their ability to invest, to hire, to expand and to become vulnerable to being displaced by rivals. All these patterns of distortion show that inflation is not a financial threat alone and that it is destabilizing the ecosystem of SMEs in structural terms that require the integration of modelling frameworks and intervention strategies.

V. CONCLUSION

This paper shows that inflation is not a short run macroeconomic shock, but a systemic disequilibrium that fundamentally alters the liquidity structure, cash conversion, and sustainability of margin of SMEs. The results of the integrated modelling cash conversion stress, cost-margin elasticity and inflation-adjusted working-capital drift indicate that inflation produces a chain effect of financial stress starting with the rise in procurement prices, constrained supplier credit, extended receivables and accelerating burn velocity. Since SMEs experience low liquidity buffers, excessive reliance on short-term funding, and low pricing power, inflation reveals structural inefficiencies which rapidly become acute working-capital depletion, break-even volatility, and modular margin erosion. The paper points to the fact that inflation causes non-linear distortions, increasing the price of inputs by a small percentage can lead to a disproportionate reduction in the margin and liquidity when the firms are unable to pass the costs on to the consumers. Furthermore, inflation exacerbates asymmetries within the supply chain and moves additional risk further down into the SMEs as purchasers slow payment and suppliers shorten credit. All these distortions together raise the reliance on expensive borrowings, raising the financial leverage and dragging the SMEs into the risky liquidity pools. Modelling frameworks introduced CCC-DF, CMEM, IA-WCS and PPF-SCPI together analytically give a basis into diagnosing inflation-driven vulnerability with a greater degree of accuracy. They show the reduction in profitability with time due to inflation, the undermining of operational strength, and the derailment of expansion ability even in the well-organized SMEs. This study highlights the urgency of having inflation-reactive financial management in SMEs such as real-time receipt tracking, price fluctuations, supplier renegotiation, and digital working-capital applications. On a more widespread level, the research raises the awareness about the need of the policy support that is available in the form of credit lines, flexible repayment arrangements, and financing options that can and must be indexed to inflation in order to get the SMEs out of the extended spells of inflation. In the end, the research concludes that both cash conversion stress and margin erosion are interdependent structural risks that have to be modelled on-going, monitored and addressed on-going in order to ensure the survival of SMEs, their competitiveness and long-term financial stability.

VI. FUTURE WORK

Subsequent studies ought to increase the modelling frameworks proposed in this paper by adding real time transactional data, automated inflation-index cash flow prediction, and machine learning based high-frequency liquidity signals detection. The inclusion of behavioral variables like the propensity of buyer payment, the level of supplier repricing, and the price hesitancy of SMEs can have a great impact on predictive accuracy in the stress

model of inflation. There is also need to investigate industry-specific patterns of inflation propagation particularly in high import-dependence and commodity-dependent input industries or volatile logistics cost industry where the magnitude and elasticity of inflation vary drastically. Future research ought to consider how the digital financial tools, including invoice discounting websites, AI-based inventory management, and dynamic credit rating, can alleviate liquidity crunches induced by inflation. The longitudinal study of SME recovery patterns after the inflation cycles would assist in the identification of the most efficient resilience practices, including supply chain restructuring to cost hedging and inflation-related contracts. Lastly, cross-country comparative modelling has the potential to deepen the knowledge on how institutional structures, credit systems and monetary policy reaction affect SME susceptibility to inflationary shocks. The result of such increased research will facilitate the development of more specific, flexible and practical inflation-resilience systems of SMEs in the world.

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REFERENCES

[1] D. Morris, “Inflationary Shocks and SME Financial Vulnerability,” Journal of Small Business Economics, 2021.
[2] A. Reznik, “Cost Transmission in SME Supply Chains,” International Review of Applied Economics, 2020.
[3] L. Hoffman, “Working Capital Dynamics Under Inflation,” Operational Finance Quarterly, 2019.
[4] K. Singh, “Margin Compression in High-Cost Environments,” SME Management Review, 2020.
[5] P. Lander, “Inflation and Supply Chain Asymmetry,” Global Logistics Journal, 2021.
[6] S. O’Reilly, “Price Stickiness in Small Enterprises,” Microeconomic Behavior Studies, 2018.
[7] Y. Ahmed, “Credit Constraints and SME Liquidity Risk,” Journal of Financial Access, 2022.
[8] W. Torres, “Interest Rate Shocks and SME Borrowing,” Finance & Development Letters, 2021.
[9] R. Kim, “Trade Credit Instability During Inflation,” Journal of Enterprise Liquidity, 2020.
[10] C. Duarte, “Receivable Delays in Inflationary Markets,” Working Capital Studies Quarterly, 2023.
[11] T. Malik, “Break-Even Drift Under Cost Escalation,” Cost Accounting & Strategy Journal, 2020.
[12] S. Alvarez, “Inventory Valuation Volatility Under Inflation,” Supply Chain Insights Review, 2021.
[13] J. Raman, “Supplier Credit Compression Mechanisms,” International Journal of Procurement, 2022.
[14] M. Jacobs, “Liquidity Vulnerability Modelling in SMEs,” Financial Modelling Review, 2019.
[15] B. Keller, “Cost–Margin Elasticity and Profit Decay,” Journal of Business Performance Analytics, 2023.
[16] F. Matsuoka, “Inflation-Adjusted SME Stress Modelling,” Economic Systems Research, 2020.
[17] R. Delgado, “Stress Testing Frameworks for Small Enterprises,” Business Risk Modelling Review, 2019.
[18] E. Novak, “Simulation-Based Liquidity Forecasting,” SME Finance Research Journal, 2021.
[19] P. Chan, “Inflation-Sensitive Cash Cycle Indicators,” Journal of Operational Economics, 2022.
[20] V. Shah, “Cost Shocks and Pricing Power Failure in SMEs,” Strategic Finance Insights, 2023.
[21] K. Fujimoto, “Elasticity Modelling of SME Margins,” Microenterprise Analytics Journal, 2020.
[22] L. Perez, “Inflation-Driven Working Capital Drift,” Enterprise Simulation Review, 2022.
[23] M. Ortega, “Supply Chain Pressure Modelling During Inflation,” Applied Business Systems Journal, 2023.
[24] R. Seth, “Liquidity Resilience Mechanisms for SMEs,” Journal of Enterprise Sustainability, 2024.
[25] G. Watson, “Macroeconomic Volatility and SME Survival Patterns,” Global Business Economics Journal, 2023.