

SME'S IN THE AGE OF COVID-19 : ALGERIA CASE STUDY

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ABSTRACT:

This study investigates the impact of the covid-19 pandemic on small and medium-sized enterprises SMEs in Algeria by comparing two key periods: before and after the outbreak. Utilizing a stock-flow model calibrated with empirical data from 2012 to 2023, the analysis quantifies how entry, exist, and cumulative government financial support influenced the SME population dynamics during these phases. The finding reveal that government interventions significantly mitigate SME closures amid the crisis, although new business entries experienced a slowdown. Pre-covid periods demonstrated stable SME growth while POST-COVID periods showed increased volatility, elevated exists, and reduced entries despite increased financial support. These results highlight vulnerability of SMEs to economic shocks and underscore the critical role of timely and sustained government support foster recovery and resilience in this vital sector.

Keywords: SME, stock flow model , government support, covid-19.

RESUME :

Cette étude examine l'impact de la pandémie de COVID-19 sur les petites et moyennes entreprises (PME) en Algérie, en comparant deux périodes clés : avant et après l'apparition de la pandémie. En utilisant un modèle stock-flux calibré avec des données empiriques allant de 2012 à 2023, l'analyse quantifie comment les entrées, les sorties et le soutien financier cumulé de l'État ont influencé la dynamique de la population des PME au cours de ces phases. Les résultats révèlent que les interventions gouvernementales ont considérablement atténué les fermetures de PME pendant la crise, bien que les créations de nouvelles entreprises aient ralenti. Les périodes précédant la pandémie ont montré une croissance stable des PME, tandis que les périodes post-COVID ont affiché une volatilité accrue, une augmentation des fermetures et une baisse des créations, malgré un soutien financier accru. Ces résultats

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mettent en évidence la vulnérabilité des PME face aux chocs économiques et soulignent le rôle crucial d'un soutien gouvernemental rapide et soutenu pour favoriser la reprise et renforcer la résilience de ce secteur vital.

Mots Clés: PME, stock-flux model, soutien gouvernemental, covid-19.

I. INTRODUCTION

During a crisis, businesses in general and smes in particular, face various vulnerability factors that can lead them to situations of failure. Economically, it is an external shock for all the players, particularly for SMEs and entrepreneurs. SMEs were more heavily impacted than large companies. Covid-19 crisis represents an unprecedented shock to both the Algerian and global economies. The sudden drop in consumption and investment, the necessary lockdown followed by gradual reopening, represent both demand constraints (demand shock) and production constraints (supply shock). For this reason, efforts must be redoubled, and top priority should be given to SMEs in all development programs, notably: encouraging the entrepreneurial spirit by adopting more flexible financing and taxation measures, facilitating market access, and also supporting and disrupted the operations of SMEs worldwide, impacting their management of human resources, cash flow and business operations. Despite efforts to sustain their operations, many businesses have struggled to maintain profitability and competitiveness during this global health crisis. Algeria like all other countries around the world, has taken measures to provide immediate assistance to businesses in order to overcome the crisis, so in response, government rolled out a package of emergency measures deferred tax payments, subsidized loans, social security relief and direct grants to shore up SMEs working capital and prevent mass layoffs. While these interventions provided a critical sustainability and differential impacts across sectors and firm sizes. This study introduces a dynamic stock-flow framework to assess how government support schemes influenced SME entry, exist, and net growth during COVID-19 crisis. Thus, we will analyze the evolution of Algerian SMEs throughout the panademic and highlight the emergency measures rolled out by the government to sustain them while the central issue of this research revolves around the following question:

➤ How did COVID-19 impact Algerian SMEs? And how did the government support their recovery and resilience?

Hypothesis

The COVID-19 pandemic severely affected Algerian SMEs, however, the government's support measures played a crucial role in alleviating the most critical impacts and ensuring the short-term survival of many enterprises.

II. LITERATURE REVIEW

II.1. ALGERIAN SMES: DEFINITION AND ECONOMIC SIGNIFICANCE

Small and medium sized enterprises (SMEs), which are major contributors to most industries and economies, rely heavily on their ability to meet client expectations while sustaining a competitive edge in their respective markets. Since the 1990s, Algeria has been undergoing a radical transformation of its economic environment. SMEs are defined as a company that produces goods and services. In June 2000, Algeria adopted the Bologna charter on SMEs, which defines the different types of businesses based on the following criteria: workforce, turnover, annual balance sheet, and the independence of the company, thus:

Company	Staff	Turnover (DA)	Total Balance Sheet (DA)
Very Small	1-9	< 20 million	< 10 million
Small	10-49	< 200 million	< 100 million
Medium	50-250	200 million - 1 billion	100 million - 2 billion

The table No. 1 allows us to the following observation:

- Very small enterprises or micro-enterprise: a business employing between 1 and 9 people, with an annual turnover of less than 20 million DA, or total balance sheet not exceeding 10 million DA.
- Small enterprise: a business employing between 10 and 49 people, with an annual turnover not exceeding 200 million DA, or a total balance sheet not exceeding 100 million DA.
- Small enterprise: a business employing between 50 and 250 people, with an annual turnover not exceeding 200 million DA and 2 billion DA, or a total balance sheet not exceeding 100 million DA and 500 million DA .

Therefore, the SME is seen as a small-scale economic entity with low costs, and it has a flexibility that allows it to adapt to local or temporary specificities. As a socio-economic unit, SMEs are a fundamental pillar various interests and align, playing a major role in driving economic growth through this synergy. Since 1980s, SMEs have shown notable dynamism in terms of job creation and play a crucial role in the national economy. SMEs and micro-enterprises represent nearly 90% of Algeria's business sector. They contribute about 90% of the non-hydrocarbon GDP and play a crucial role in reducing unemployment in the areas where they operate, having created nearly 2 million jobs during the period from 2004 to 2015 (saoud et gasmi, 2016). According to L'ANDI, they represent 99% of the total value-added excluding hydrocarbons (ANDi,2020). The creation of small and medium-sized enterprises (SMEs) occupies a leading position in the algerian development process, so no one can deny their role and importance in all economies, as they enable and contribute to economic growth and development by: job creation, creation of added value, contribution to income

distribution. Firstly, in the area related to the quality of their processes, private sector companies, particularly SMEs, suffer from a lack of skilled labor and a widespread shortage of marketing and strategy (Rachid Boudjema, 2019). OCED reports show that SMEs play a key role in economic growth: they are the largest job creators, and more than 95% of businesses in the OCED area are SMEs, which account for 60 to 70% of employment in most countries (Sebeg Meriem, Bousbia Laiche Rabia, 2024). Algerian enterprises suffer from various obstacles, generally linked, the complexity of administrative procedures, bureaucracy, lack of commercial services, and the informal sector (Loukil Leila).

II.2. COVID 19 IMPACT ON ALGERIAN SMES

The covid 19 crisis was marked by a decline in global supply due to the global economic recession, the main cause of which was the shutdown of many activities (SID-ALI ouennoughi, 2023). The lockdown and the measures taken by the Algerian authorities led to a decrease in demand for specialized shops by the population (BEKHETI ALI, BOUAOUINA SALIMA, 2021). The covepe Algeria survey (summer 2020) revealed that covid 19 severely impacted Algerian businesses. About 32% were partially or fully closed especially in construction, heavy industry, and foreign-owned firms. Around 79% saw a drop in sales (average decline of 56%). Companies faced reduced demand, staff shortages, supply issues and limited financial services (leberte-algerie.com). The vulnerability of SMEs to shocks is particularly linked to access to financing. It is also to highlight that most of affected workers are those in precarious or already earning low wages, with limited access to social protection (United Nations Algeria, 2020). The effects on SMEs are dramatic. Seven out of ten companies have reduced their production capacity due to a decrease in number of employees and working hours (ILO, 2020), the pandemic caused a shift in consumer and producer behavior, with the Algerian food market recording a 40% increase in demand for essential goods (Ministry of Commerce, 2020). To confront the crisis, the Algerian authorities implemented significant reductions in imports, amounting to approximately 18% or 34.4 \$ billion compared to 42 billion \$ in 2019. Additionally, substantial budget cuts were made, with the government initially reducing the state budget by 30% in March 2020, later increasing it to 50% in May 2020 (Radia Ait Si Said, 2021).

II.3. GOVERNMENT SUPPORT

Since the 2000s, Algeria has given a great importance to SMEs, so government, like many others, faced significant challenges during the covid-19 crisis. In response to economic shock caused by the pandemic, the government introduced a series of support measures aimed at protecting business, particularly small and medium-sized enterprises SMEs. These measures included financial assistance, deferred tax payments, and credit guarantees to help businesses manage cash flow and survive the economic disruptions. Algerian experts stressed the urgent need for the government to step in strongly to protect small and medium-sized businesses by putting in place financial and banking measures (Bekhiti Ali, Bouaouina

salima, 2021). The executive decree No. 20-239, published in official gazette No. 59 on September 8, 2022, it is hereby decreed as follows:

Article 1: This decree aims to define the procedures for the continued support by the public treasury, in an exceptional manner, by reducing the interest rates on: Investment loans, Operating loans, and Housing loans granted by banks and financial institutions, which have been rescheduled or had their repayment deadlines extended for the benefit enterprises and individuals who are facing financial difficulties due to the COVID-19 pandemic.

Article 2: The public treasury will continue to cover the reduced interest rates on the loans mentioned above (granted by banks and financial institutions), when their repayment schedules are rescheduled or deferred, for the benefit of enterprises and individuals experiencing hardship because of the COVID-19 outbreak.

This decree allows the government to help businesses hurt by covid-19 by lowering the interest on certain loans. If someone's loan was delayed or rescheduled, the government will help pay part of the interest, so its less of a burden on them. Furthermore, the general directorate of taxes includes the cancellation of fines, surcharges and penalties for the late submission od declarations and late payment of duties, taxesn and levies (DGI,2020). The aim of these measures is to delay tax payments for businesses in addition, the DGI gave taxpayers the option to request a payment schedule for their tax debts in case of cash flow difficulties. According to the same source, the tax authorities also decied to suspend the taxation on undistributed profits, for which the withholding tax rate on distributed income is 15%. At the trade level, measures were put in place by Algerian customs authorities to support the economy and ensure the continuity of the supply process for businesses. Customs were instructed to facilitate and speed up the importation of widely consumed goods and medical equipment used for the prevention and fight against the effect of covid-19 (Yasser hassaine, abdelmadjid badri,2021). Essential food products and medical devices were banned from export to ensure their availability in the Algerian market and to encourage Algerian companies to increase the production of these goods ansd equipement to meet national needs (DGD,202). Besides financial support, and to mitigate the effects of the covid-19 panademic on SMEs, the Algerian authorities decided to grant financial aid of 30,000 DZD for a period of three months to businesses affected by the economic situation caused by the pandemic, due to a decline in activity and loss of income during the lockdown period (official gazette, 2020). As part of civil society's contribution, the Algerian youth center submitted proposals to the ministry of industry aimed at supporting and assisting businesses facing difficulties during the lockdown in order to ensure a wage that preserves workers dignity, and after the lockdown, to enable these businesses to resume their activities(APS,202), these measures focus on granting allowances financed by the national unemployment insurance fund or a special covid-19 fund, maintaining beneficiaries enrollment in social security and their access to healthcare cards (chifa card) until June 2020, and postponing loan installment payments until September 1st for loans granted to workers (bkhiti ali, bouaouina salima,2021). This orientation toward economic recovery was further reinforced by the government's

organization of a national conference on "the recovery plan for a new economy", which brought together 11 thematic workshops (sabeg meriem, bousbia laiche rabia, 2024). These focused on key sectors such as agriculture, industry, mining, energy resources, development financing, and the promotion of micro-enterprises and start-ups among others.

III. METHODOLOGY

This study describes a simple dynamic model analyses the evolution of SMEs during the covid-19 period. The model is based on the stock-flow modeling, where the number of SMEs at each period depends on the previous stock: entries(new SMEs) and exits (SMEs that cease their activity), additionally, the model incorporates the effect of government support, which is assumed to reduce exits and stimulate entries.

III.1. MAIN VARIABLE:

- Stock of SMEs (t): number of active SMEs at time t
- Entries (entry): number of newly established SMEs
- Exits (exit): number of SMEs that cease operations
- Government support: number of funded support projects.

Table 02: Comparative model fit indicators for SMEs dynamics before and after COVID-19 under different parameter assumptions

Scenario	RMSE	MAE	MAPE (%)	R ²	Theil's U
Pre-COVID(S2 2012 – S2 2019)	15,924	13,408	1.63	0.9896	0.00844
Post-COVID using Pre-COVID α, β	12,991	10,880	0.885	0.9460	0.00514
Post-COVID using Post-COVID α, β	11,973	10,021	0.810	0.9542	0.00473

Source: By the writer, RStudio out-put

III.2. BASIC EQUATION:

$$SME_t=SME_{t-1}+ ENTRY_t-EXIT_t$$

This equation reflects the evolution of the SME stock over time as the difference between new entries and exits.

To account for the role of public intervention, we the effect of government support on both SMEs entries and exist. Specifically , government support is assumed to reduce

the number of firm exits and stimulate the creation of new firms. This influences is effectiveness parameters:

α : alpha represents the impact of support on reducing business failures.

β : beta reflects the capacity of support to encourage new business creation

the adjusted equations are as follows:

$$EXIT_{effective,t} = EXIT_t - \alpha \cdot support_t$$

$$ENTRY_{effective,t} = ENTRY_t + \beta \cdot SUPPORT_t$$

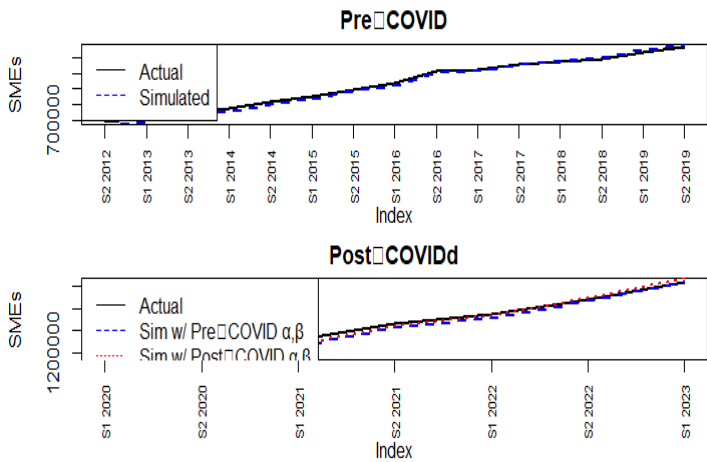
$$SME_t = SME_{t-1} + ENTRY_{effective,t} - EXIT_{effective,t}$$

this formulation highlight the dynamic contribution of government interventions to the net evolution of the SME sector during the observed period. And to assess the impact of covid-19 on the SME sector, the analysis was conducted using two scenarios: one based on pre-covid parameter estimates (α, β), and another based on post-covid re-estimated parameters. This dual scenario approach allows for comparison of SME dynamics under different assumptions about the effectiveness of government support

III.3. SOME ARTIMITICAL RESULTS

- Pre-covid (S2 2012- S2 21019): Estimated $\alpha=0,00892$; $\beta=0$. This mean that each unit of support offset 0,00892 units of firm exits (reducing closures), with essentially no effect on new entries. The model fit was very strong ($R^2=0,9896$, Theil's u= 0,0084; MAPE= 1,63%) indicating it captured SME stock changes almost perfectly using historical entries, exist, and support.
- Post-covid (S1 2020- S1 2023) with old parameters: applying the pre-covid α, β yields $R^2=0,9460$ (MAPE=0,88%). The slight drop in fit suggests the crisis altered SME dynamics. All error metrics (RMSE, MAE,MAPE) remain low, showing the model still tracks trends well.
- Post covid re-estimated: Re-estimating on S1 2020-S1 2023 data gives $\alpha= 0.01247$, $\beta=0$. The higher α means support had a strong effect on preventing exits during the panademic. Model perfmance improve ($R^2=0,9542$, Theil's u= 0,0047; MAPE= 0,81%), and that confirm the better fit with the update α .

Figure 01: Government support scenarios



Source: By the writer, RStudio out-put

$\alpha(0,00892 \text{ to } 0,01247)$: government aid became more effective at saving firms after COVID. In paractical terms, each dinar of support prevented more SME closures in the crisis period. This likely reflects the intensified support packages (loans, grants, tax deferrals) put in during the pandemic. And increased SME vulnerability, so aid had greater marginal impact> the result is consistng with observations that “ government support protected SMEs from economic impact” of covid-19.

$B=0$ in both period : the support programs showed no measurable effect on new firms entry. In other words aid was targeted at existing businesses survival, not at stimulating SME. This aligns with Algeria’s policy focus (e.g emergency loans and wage subsidies) on preserving incumbents. Incentives (beyond crisis support) may needed.

III.4. DISCUSSION

SMEs were among the hardest hit by the crisis, suffering revenue losses of up to 60% laying off at least half of their worforce. Most faced sever liquidity constraints, difficulties in paying salaries, and burdensome fixed costs. During the crisis, the parameter α (from 0.00892 to 0.01247) indicated that government aid became more effective at preserving existing firms, each dinar of support had a greater marginal impact, likely due to more compregensive support measures and the increased vulnerability of SMEs. However with $\beta=0$ in both periods, this aid had no meusurbale effect on new firms entry , support was focus on survival of incumbents rather than stimulating entrepreneurship. Although the government did promote startups in parallel through training, seed funding, and the reduction of entry barriers, these efforts were foster a stronger recovery and long term growth, further targeted measures may be needed to support new business creation alongside firm survival.

IV. CONCLUSIONS

The health crisis was marked by a widespread slowdown across all sectors of the global economy starting in early 2020, and Algeria was no exception. Managing a crisis as unpredictable and devastating as the coronavirus pandemic was certainly no easy. Like many other countries the Algerian government reacted swiftly to mitigate the severe consequences of this unprecedented situation. Small and medium sized enterprises (SMEs), which represent a reliable and essential component of the Algerian economic fabric, were particularly affected, facing revenue losses, liquidity constraints, and job cuts-making government intervention crucial to support this vital sector. This study examined the dynamics of small and medium-sized enterprises in Algeria across two critical periods: before and after the covid-19 outbreak. Using a stock flow model calibrated through empirical data from 2012 to 2023, we evaluated how entry, exit and cumulative government financial support influenced the SME population over time. The optimized model highlighted that government support had a measurable mitigating effect on SME exits during the covid-19 period. Specifically, the estimated parameters for the stock-flow model suggest that support mechanisms reduced the effective number of business closures while slightly discouraging new entries due to delayed or redirected investment. Two scenarios pre-covid and post-covid show contrasting trajectories. Pre-covid semesters showed consistent SME growth, driven by stronger net entry flows. In contrast, post-covid periods were marked by volatility, increased exits, and slower entry rates, despite rising support levels. This divergence underscores the targeted policy responses. The stock-flow approach proved effective in simulating SME population dynamics and in quantifying policy impacts. For policymakers, this suggests that support programs need to be both immediate and sustained, with complementary measures aimed at encouraging entrepreneurial entry in recovery phases. As management expert peter drucker said:” focus on opportunities, not problems”. Focusing on opportunities rather than problem is essential, this principle can guide policymakers and entrepreneurs alike to adopt a forward-looking perspective full of potential, especially during economic recovery periods following crises.

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