

تقييم أثر جائحة COVID-19 على الاقتصاد الجزائري: أهمية الاقتصاد غير الرسمي

ASSESSMENT OF THE IMPACT OF COVID-19 PANDEMIC ON THE ALGERIAN ECONOMY: THE IMPORTANCE OF THE INFORMAL ECONOMY

ملخص



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الهدف الرئيسي من المقال هو دراسة التفاعل بين جائحة COVID-19 والاقتصاد غير الرسمي وأثره على الاقتصاد الجزائري باستخدام النموذج الوبائي SIR. يوسع المقال النموذج الوبائي SIR ليأخذ بعين الاعتبار القرارات الاقتصادية التي يتخذها الأفراد بالإضافة إلى توفر العلاج. أظهرت النتائج أن حساب حجم الاقتصاد غير الرسمي أمر بالغ الأهمية عند تحليل تأثير جائحة COVID-19 على الاقتصاد الجزائري. يلاحظ أن سياسة الاحتواء المثالية زادت من حدة الركود الاقتصادي ليرتفع من 2.15٪ إلى 7.87٪. ومع ذلك، فإنها أنقذت حياة 8300 شخص في الجزائر. بناءً على أفضل سياسة احتواء، تقترح الدراسة أن البدء في تقليل سياسة الاحتواء في 14 \ 06 \ 2020 مبكر جداً لأنه في هذه الفترة سياسة الاحتواء المثلى لم تبلغ ذروتها، ونتيجة لهذا القرار بدأ عدد الأفراد المصابين في الزيادة مرة أخرى.

Summary

The main objective of the article is to study the interaction between COVID-19 pandemic and the informal economy and its impact on the Algerian economy using SIR epidemiologic model. The article expands SIR model to count for economic decision made by individuals and the availability of treatment.

The results show that counting for the size of informal economy is critical when analyzing the impact of COVID-19 pandemic on the Algerian economy. It is noted that the policy of optimal containment augmented the severity of the recession from 2.15% to 7.87%. Nevertheless, it saves the lives of 8300 people.

Based on the best containment policy, the study suggests that starting reducing containment policy on 14\06\2020 is too early because in this period the optimal containment policy was not optimal, and as result of this decision the number of infected individuals started to increase again.

Key words: Informal economy; COVID-19; SIR model; economic recession; Estimation.

Classification: E26; O1.

1. INTRODUCTION

On 11 March 2020, the World Health Organization declared COVID-19 as a pandemic (Munthali & Xuelian, 2020). This pandemic originated in Wuhan, the capital of China's Hubei province, in December 2019 (Perone, 2020). COVID-19 or Coronavirus is a novel strain of coronavirus from the Severe Acute Respiratory Syndrome (SARS) species (Ozili & Arun, 2020) caused by the SARS-CoV-2 virus, with symptoms of fever, coughing, shortness of breath (McKibbin & Fernando, 2020). As the COVID-19 pandemic started to spread around the world, the government of many countries started to take containment policies to reduce infection and mortality caused by this pandemic. This procedure took the form of shutting down stores, restaurants, canceling in and out flights, and maintenance of good hygiene... etc. with social distancing as the sole option. However, it's not an option for workers in the informal economy with most activities are face-to-face. This raises the question about the interaction between Coronavirus and informal economy.

In literature the latter is often referred to as shadow, hidden informal, irregular, unobserved, unrecorded, subterranean, parallel. These are just a handful of the terms that have been used to describe economic activity (Bennihi & Bouriche, 2019). (De Colin & Schneider, 2016) counted 44 adjectives and 10 nouns to describe this phenomenon which, for whatever reason, is not directly measured by any of the usual economic and fiscal indicators. According to (Schneider & Williams, 2013) the informal economy insofar as it contains all market-based production of legal goods/services that are intentionally hidden from public authorities for many reasons such as to avoid payment of income, value added or other taxes and to avoid payment of social security contributions.

This part of the economy is often ignored when it comes to supportive policies particularly in times of crises. Although it contains 2 billion workers (ILO, 2020) worldwide, and the with no alternative source of income stop working is not an option for those working in the informal economy.

This paper shines the light on the interaction between COVID-19 and the informal economy in the case of Algeria. Especially that it has an important size of informal sector (Adair & Bellache, 2008; Adair P. 2014; Adair & Souag, 2018; Schneider & Buehn, 2018) and aims to answer the following question.

Does the interaction between COVID-19 and the informal economy worsen the economic situation in Algeria?

To answer this question, the paper adopts a modified SIR model that counts for economic decision and the availability of treatment for coronavirus and unlike the previous studies, this article takes in consideration the size of informal economy.

2. METHODOLOGY

To investigate the equilibrium interaction between economic decisions, and the spread of the COVID-19 pandemic in Algeria. SIR Epidemiologic models suggested by (Kermack & McKendrick, 1927) is used. Following the literature, the SIR model is modified assuming the availability of treatment and that buying consumption goods/services along with working brings people in contact. Thus increasing the likelihood that the infection spreads.

These economic activities can't be done only in the formal economy, but also in the informal economy. Which can add more contact that is not considered in the studies that only focused on the formal economy and the resulting contact, the paper argues that these overlooked activities can attribute to the spread of COVID-19.

For this purpose, the theoretical economy before the outbreak of infection is presented. After that, the basic SIR model is introduced along with the modified two SIR models named SIR-formal models which counts for the economic decisions made only in the formal sector, and SIR-all model which computes for economic decisions made by individuals in both formal and informal economy. After that, the paper discusses the optimal containment policy and the implication of it on the economy.

The model parameters are chosen based on the COVID-19 situation in Algeria, official national statistics data and the work of (Eichenbaum, Rebelo, & Trabandt, 2020).

The initial population is normalized to one. The initial infection parameter is set to 0.023 per million given a population of 43 million. The average mortality rate is set to 2,5%. However, we provide a robustness check with a mortality rate of 5% and 7%.

For the calibration of the infection parameters, the paper follows (Ferguson, et al., 2006) the paper assumes that these values are the same in the two sectors. Time spent on general community activities related to consumption activities is 48%. Based on the later it is calculated that transmissions related to consumption is 16%. The transmissions related to work is 10.51%. Turning to the transmission percentage while working in the informal is equal to 17.25%.

3. RESULTS

Empirical results for the three SIR models implied to study the impact of informal economy on COVID-19 dynamics are presented. At first, results of the basic SIR model is provided in addition to the modified SIR-formal model and the SIR-all model which is the general model that counts for both formal and informal economic decisions. Second robustness check is done by using different parameters values. Third, the results of optimal confinement policy associated with SIR-all model is provided.

basic SIR model

the infection is more severe in the basic SIR model than in the SIR-formal model. However, the economic impact is less severe in basic SIR model.

SIR-formal model

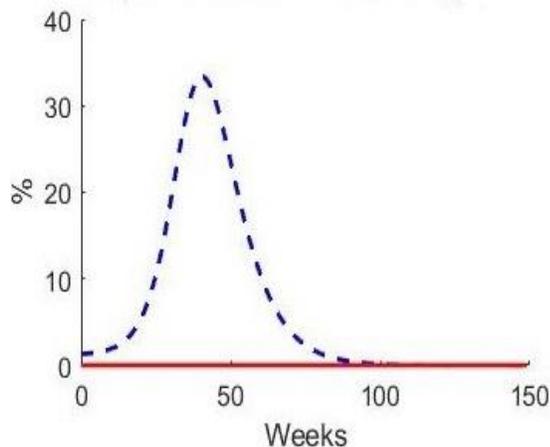
Unlike the basic SIR model the modified SIR-formal model catches the impact of individual's economic decision on the dynamics of the pandemic.

SIR-all

When the SIR model takes in consideration the size of the informal economy. The share of the initial population that is infected peaks at higher percentage than the previous models.

The optimal containment rate increases from 1.5% at the start of the period to reach maximum of 33% in week 37. This increase reduces the infection rates to reach a maximum of 4.7% after it was 6.85% and reduces the mortality rate of 0.13%; this containment roughly saves the life of 8300 persons. However, a much severe recession is associated with containment policy.

Figure 1 best optimal containment policy



Source : Authors own construction

4. DISCUSSION

This paper provides a comparison between basic SIR model and modified model named SIR-formal; This decision shrinks the severity of the pandemic in terms of infected individuals and death numbers. This is a direct result of susceptible individuals lowering the likelihood of getting infected; These same decisions sever the size of recession caused by the pandemic measured by the fall in aggregate consumption and aggregate hours worked. This decrease reflects two major factors:

- the COVID-19 virus causes infected individuals to be less productive at work. The associated negative income effect pulls down the consumption of infected people;
- the death toll caused by the pandemic permanently reduces the size of the workforce.

Furthermore, to demonstrate the interaction of informal economy and COVID-19 pandemic. SIR-all model is constructed. It combines economic decision and actions made by individuals in both formal and informal economy. In comparison between SIR-formal and SIR-all empirical results showed less infection peak in SIR-all. This can be explained by the individuals to cut back their interaction in informal economy to reduce the probability of getting infected. However, the degree of recession in the SIR-all is more severe.

This results highlights the importance of counting for the size of informal economy when analyzing the interaction of COVID-19 pandemic and economy. This raises the importance of paying attention to the size of informal economy. Especially workers in the informal economy are more vulnerable to this shock because they don't have an alternative source of income this point was highlighted (ILO, 2020b).

The previous results are validated by choosing different parameters values validate this result, a higher mortality rates push individuals to lower their consumption and working hours. More cut back by individuals more severe economic recession. The same outcomes are associated with productivity rates and long-run mortality rates.

The intensity of containment is strongly correlated with the behavior of infected individuals (Correia, Luck, & Verner, 2020) Hence, the rise of the infected individuals stimulate government to tighten up the rules of containment. However, the intensify containment measures make consumption much costly, so individuals lower their consumption and work. Causing severe recession (Eichenbaum, Rebelo, & Trabandt, 2020).

To reduce the impact of COVID-19 the Algerian government applied many actions starting by closing schools and universities (12/03/2020), releasing half of the government workers (17/03/2020) not much later the government declared total confinement. This Procedure was followed by social transfers to workers, unemployed and retired people. However, this financial support was only given to the registered workers in the official statistics excluding the workers in the informal economy that suffered the same or more damage from the containment measures.

5.CONCLUSION

The main objective of the article is to study the interaction between COVID-19 pandemic and the informal economy and its impact on the Algerian economy using SIR epidemiologic model. The article expands SIR model to count for economic decision made by individuals and the availability of treatment. Unlike the previous literature, this article takes in consideration the size of informal economy.

The results show that counting for the size of informal economy is critical when analyzing the impact of COVID-19 pandemic in the Algerian economy. the optimal containment policy increases the severity of the recession from 1.83% to 7.87% in the first year of the pandemic. However, it saves 8300 lives in Algeria.

Based on the best containment policy, the study suggests that starting reducing containment policy on 14\06\2020 is too early because in this period the optimal containment policy was not optimal, and as result of this decision the number of infected individuals started to increase again. If the increase in cases keep increasing it is inevitable for the Algerian government to return to total containment.

6.RECOMMANDATION

Countries with an important size of the informal economy need to take into account its size when formulating economic policies.

For our recommendations:

- The Algerian government must take into account the size of the informal economy when formulating economic policies to combat/ reduce the negative impact of the COVID-19 pandemic.
- Shutting down the known informal markets in the whole country for at least 14 days, in the mane time carry out an awareness campaign about the dangers of participation in the informal activities. Because keeping these markets open will help the spread of the virus.

- To help to reduce the impact of these policies the government should the available economic tools to increase the Purchasing power by decreasing the inflation rate. If the government succeeds in doing so it will reduce the impact for all the individuals.

REFERENCE

Pour plus de détails, veuillez consulter l'article: **ASSESSMENT OF THE IMPACT OF COVID-19 PANDEMIC ON THE ALGERIAN ECONOMY: THE IMPORTANCE OF THE INFORMAL ECONOMY**

. *Les Cahiers du*

CREAD, Volume 36, Numéro 3, Pages 349-371

Disponible sur :

<https://www.asjp.cerist.dz/en/article/120919>



Juillet 2020

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