

INFLUENCE OF COVID-19 ON THE INNOVATION ACTIVITY OF THE BIO-SECTOR IN BULGARIA

Valentina Nikolova-Alexieva

University of Food Technology - Plovdiv, Bulgaria, valentina_nikolova@abv.bg

Katina Valeva

University of Food Technology - Plovdiv, Bulgaria, tomika_888@yahoo.com

Abstract: The coronavirus pandemic, which engulfed humanity in early 2020, is developing extremely dynamically, spreading horizontally and affecting a number of sectors besides health - economic, financial, social, environmental. Its effect on modern economies is perceived as unprecedented. It is causing a health and socio-economic crisis of an unprecedented nature, of unclear and unpredictable duration. The state's anti-crisis measures, including physical distance, vaccination, testing, availability of green certificates, etc. have a strong macroeconomic and microeconomic effect. It affects different sectors to varying degrees and strengths. The bio-sector has not been spared the problems caused by the pandemic. He was forced to make innovative changes in his practices in order to survive.

The purpose of this report is to present the results of a survey of biosector enterprises on their innovation performance in the context of the COVID-19 emergency and to summarize the changes in their business practices that will have a lasting effect on their activities, as well as to present the factors that influenced this process.

Keywords: bio-sector, bio-enterprises, innovations, innovation activity

1. INTRODUCTION

The organic sector is one of the fastest growing sectors in recent years in Bulgaria. It includes producers, processors, importers and exporters who operate organic products¹⁰. The dynamic development is due to the favorable soil and climatic conditions and ecologically preserved geographical areas in the country. The market of organic products in Bulgaria is relatively new and still relatively small, but at the same time rapidly developing, and demand is growing dynamically. The number of retail chains that include organic food in their distribution is also constantly growing.

After 2008, there has been a significant increase in supply in terms of both the number of producers and the areas engaged in organic crops. (Fig.1) As of the beginning of 2020, the total number of certified bio-operators in the country is 6,822, which is an increase of over 25 times compared to 2008. The certified areas on which the methods for organic production of organic crops are applied have increased more than 6 times, reaching 162,332 ha compared to 26,622 ha in 2011 or 2.7% of the total utilized agricultural area in the country. (Fig.2)

Fig.1 Biosegment in Bulgaria

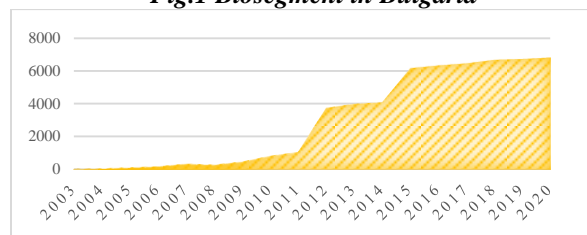
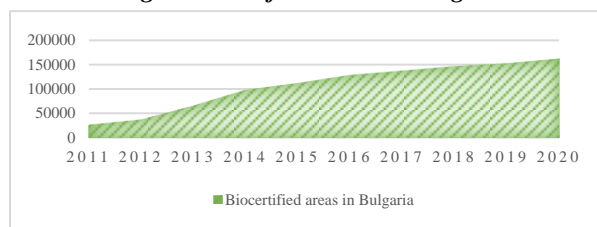


Fig.2 Biocertified areas in Bulgaria



Source: Ministry of Agriculture and Food, Bulgaria <https://bioreg.mzh.government.bg/Home/DataBaseList#sectionTableNonEffective>

In recent years, Bulgaria has registered the highest growth rate of the share of occupied areas with organic production among EU member states. However, the country lags behind the EU average of about 7%. The data show that there is a significant potential for the development of organic production in the country, which has not yet been fully utilized¹¹. The development of organic farming would allow both sustainable use of available resources and stabilization of farmers' incomes¹².

¹⁰ Alexander W, (2020) How Are Small Businesses Adjusting to COVID-19? Early Evidence from a Survey, Ministry of Agriculture and Food, Bulgaria,

¹¹ Ministry of Agriculture and Food, Bulgaria, <https://bioreg.mzh.government.bg/Home/DataBaseList#sectionTableNonEffective>

¹² ITRE committee, (2021) Impacts of the COVID-19 pandemic on EU industries

The crisis as a result of the state of emergency caused by the COVID-19 virus has posed a number of challenges and challenges to the Bulgarian economy and in particular to the bio-sector, which is developing within its borders. After the financial crisis of 2007-2008, this is the second serious crisis that the sector has to overcome. Strict measures as a result of the health crisis have affected the socio-economic life of the country. Indicative of this is the decline in the general business climate of the country. (Fig. 3) The adverse economic effects of a pandemic vary in cause, significance, and timing. Some businesses (entertainment, tourism, catering, etc.) had to cease operations altogether due to limitations in social life. In others, sales revenues decreased.

Fig. 3. General indicator of the business climate.

Source: www.nsi.bg

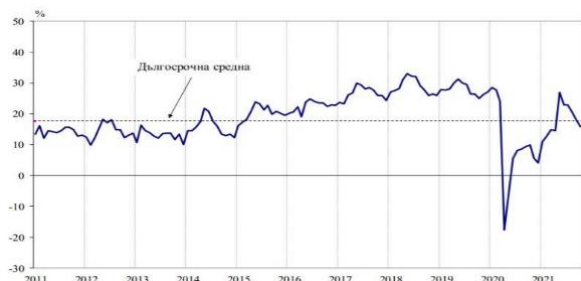
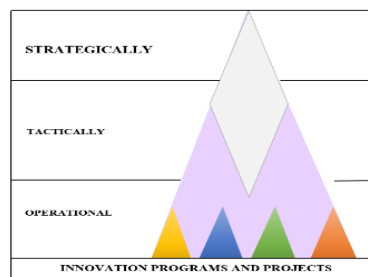


Fig. 4. Structure of innovation programs and projects in the bio-sector



The bio-enterprises integrated into the global economy had to deal with delayed or failed deliveries of raw materials or parts and refused or delayed orders¹³. The general contraction of economic activity has led to lower aggregate demand at the macro level, due to lower consumption and postponement or rethinking of investments.

Crises in enterprises are common in the market economy¹⁴. They are an integral part of the company's emergence, economic development and liquidation. Every business organization faces a crisis at some point in its development, but crisis phenomena, for the overcoming of which no strategic measures are taken, can lead to serious economic and social problems of the organization, or to its bankruptcy.

A crisis in an enterprise is a condition caused by factors that have the potential to cause urgent problems in its economic, social and financial development, requiring immediate intervention to solve them¹⁵.

Effective crisis management requires an active corporate innovation policy. It is implemented through innovation strategies including the development of innovation programs and projects¹⁶. Innovation programs and projects have a strategic, tactical and operational nature. They are interconnected and are shown in Fig.4.

Operational innovation programs and projects provide innovations at the moment and guarantee innovation security and independence today, creating conditions for income generation and the realization of competitive advantages.

Tactical innovation programs and projects provide innovation in the near future, and strategic in the long run. They are confidential and set aside for the company's future. The moment of their launch depends both on the company's readiness for market realization and on the market strength and level of competitors¹⁷.

Effective management of the creation and implementation and marketing of innovative programs and projects is the basis of their existence, development, survival and prosperity¹⁸.

A number of bio-sector enterprises saw different opportunities for innovation in the year of COVID-19¹⁹. The crisis forced them to optimize their production processes, to apply new business models, to provide a safe working

¹³ Prady, Delphine & Herve Tourpe & Sonja Davidovic & Soheib Nunhuck (2020), "Beyond the COVID-19 Crisis: A Framework for Sustainable Government-To-Person Mobile Money Transfers", IMF Working PaperNo. 20/198, Washington, DC.

¹⁴ Sangmin Aum & Sang Yoon (Tim) Lee & Yongseok Shin, (2020), "Inequality of Fear and Self-Quarantine: There a Trade-off between GDP and Public Health?," NBER Working Papers 27100, National Bureau of Economic Research, Inc.

¹⁵ Serikbayeva, Balzhan & Abdulla, Kanat & Oskembayev, Yessengali, (2020), "State capacity in responding to COVID-19," MPRA Paper 101511, University Library of Munich, Germany.

¹⁶ Summers, Larry, (2021). "Opinion: The Biden stimulus is admirably ambitious. But it brings some big risks, too," Washington Post.

¹⁷ Levy Yeyati, Eduardo & Samuel Pienknagura (2014), Wage compression and the decline in inequality in Latin America: Good or bad?, VoxEU, June 10, 2014.

¹⁸ Maloney, William F. & Taskin, Temel, (2020), "Determinants of Social Distancing and Economic Activity during COVID-19:A Global View," Policy Research Working Paper Series 9242, The World Bank.

environment, to improve their product portfolio by creating new product offerings in response to changes in demand, to launch innovations in the workplace²⁰.

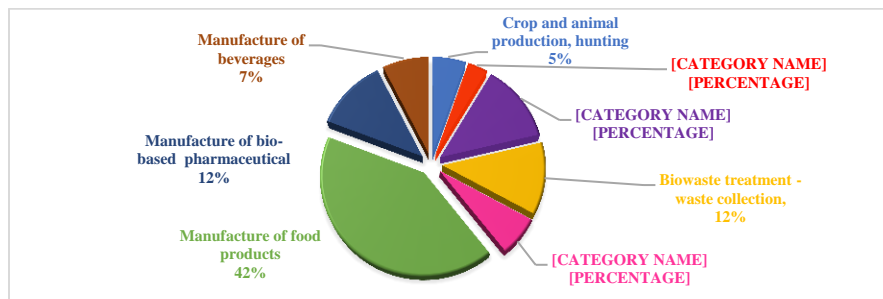
2. METHODOLOGY

This study used descriptive research design and employed mixed approach that means the study was conducted through both qualitative and quantitative research approach. The target population of the study were bio business firms operating in Bulgaria during the corona virus pandemic starting from March 2021- up to October 2021 period. The data analysis technique used under the study was descriptive analysis method, because the researcher used secondary data analysis relating to the challenges of these businesses during covid-19 crisis.

3. EXPLORATION: Research of innovation activity in the bio-industry as a result of COVID-19

The survey of was conducted between March of 2021 and October of 2021 among companies of various food' industry subsectors and sizes. The survey is based on open and closed questionnaire distributed by email. A questionnaire was used to collect data from a sample of 198 enterprises which were selected through stratified random sampling method from all subsectors of Bulgarian bio-industry. Respondents are representatives of all major subsectors of the bio industry in Bulgaria and their relative shares are shown in Fig. 5.

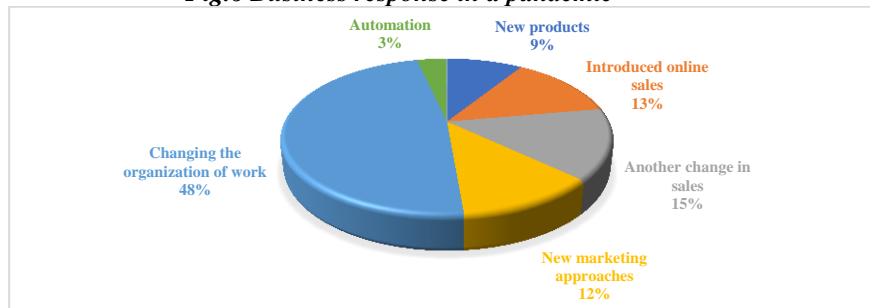
Fig.5 Share of respondents from bio-sector in Bulgaria



Source: Autors own calculations

The results of the study related to the reaction of enterprises to the crisis of Kovid - 19 is presented in fig. 6. The data show that almost half of the respondents - 48% have made changes related to changes in the organization of work. 13% have introduced online sales in their practice. Other changes in sales were stated by 15% of respondents. 9% have introduced new products in their portfolio. The smallest is the share of companies that have managed to automate part of their business processes - 4%.

Fig.6 Business response in a pandemic



Source: Autors own calculations

¹⁹ Guerrieri, Veronica & Guido Lorenzoni & Ludwig Straub & Iván Werning, 2020. "Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages?," NBER Working Papers 26918, National Bureau of Economic Research, Inc.

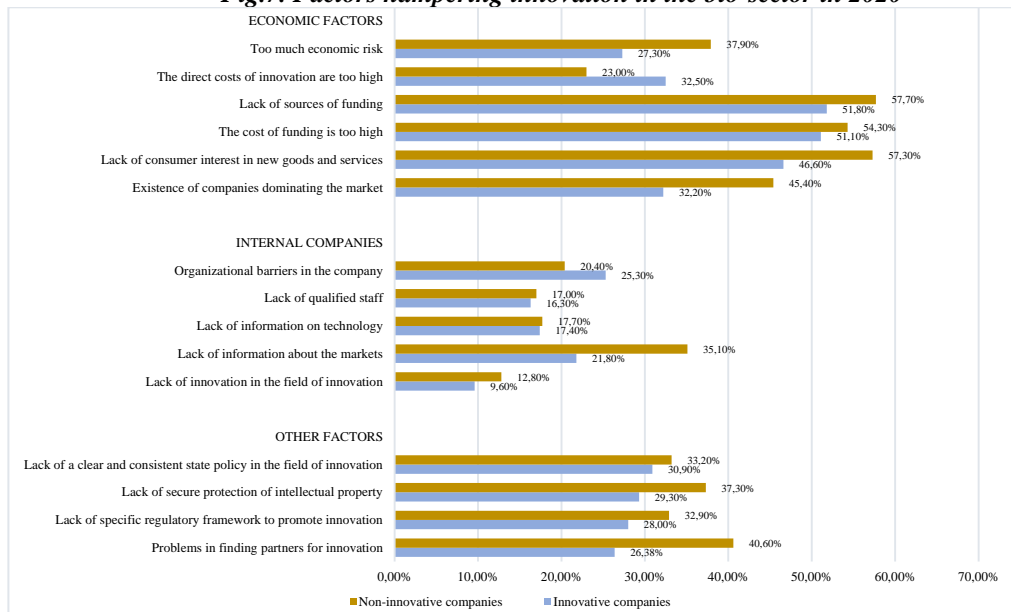
²⁰ Demirguc-Kunt, Asli & Lokshin, Michael M. & Torre, Ivan, (2020). "The Sooner, the Better: The Early Economic Impact of Non-Pharmaceutical Interventions during the COVID-19 Pandemic," Policy Research Paper, The World Bank.

The factors that have hindered the innovation activity of the enterprises from the bio-sector in 2021 are summarized in fig. 7.

Covid 19 has led to lasting changes in some business models and business processes (digitalization and automation of business processes, online commerce, etc.)

- Corporate tax revenues decreased by 18.7% in June 2020 compared to the same month of 2019. A significant decrease is also reported in revenues from customs duties (-9.2%) and excises (-10.6%), as well as and VAT (-6.2%). Only revenues from personal income taxes (4.5%) and from social security contributions (4%), as well as from taxes on insurance premiums (8.6%) increased. Revenues from aid also increased by 36.4%, mainly due to European anti-crisis programs.

Fig.7. Factors hampering innovation in the bio-sector in 2020



Source: Autors own research

- The budget balance is deteriorating sharply, mainly due to the reduced budget surplus (-65%), with a parallel threefold increase in the surplus under European programs (340%).
- In the second quarter of 2020 compared to the first quarter of the year GDP decreased by 9.8%, and compared to the same quarter of the previous year - by 8.2%.
- Compared to the first quarter of this year, consumer prices decreased by 1.4%, but compared to the same period of 2019 there is an increase of 1.6%.
- Producer prices also decreased (-4.6%), with a larger decrease for the foreign market (-6.2%) and less for the domestic market (-3.5%).
- The industrial production decreased by 13% compared to the same period of the previous year.
- The negative trade balance increased by 9.7% compared to the same period of the previous year, as imports increased by a higher percentage (-11.9%), while exports decreased by 7.5%.
- Direct investments remain at one of the lowest levels for the last 20 years and amount to only BGN 263 million in the second quarter of 2020.
- Restrictive measures related to COVID-19 contributed to the decrease in employment in the second quarter of the year (by 3.3% on an annual basis). Employment decreased the most in some economic activities of services (tourism, trade and transport), as well as in mining and processing industry.
- "In the second half of the year we expect the adverse impact of COVID-19 on the innovation activity of enterprises to continue, which in turn will have a negative impact on the dynamics of the labor market. The unemployment rate in the third quarter of 2020 is likely to be close and slightly below that registered in the second quarter of 2020, and will continue to rise in the fourth quarter. Thus, the average annual value of the unemployment rate (according to the LFS) is expected to be 5.6%, which is 0.6 percentage points. lower than the value in the spring forecast ", reads the report of the Ministry of Finance.

- At the same time, the average annual decline in employment is expected to be around 2.6%, which is 0.5 percentage points higher than the spring forecast. As a result, the economic activity of the population decreased compared to previous years, as the average annual coefficient of economic activity for 2020 shrank to 72.7% (for the population between 15 and 64 years).
- The expectations for the period 2021–2023 are that employment will gradually begin to recover, increasing by 0.9% in 2021, and in 2022 to accelerate to 1.5% together with the acceleration of economic growth in the country. However, reaching the number of employees observed in the pre-crisis 2019 is expected to occur only in the first months of 2023, when annual employment growth is projected to be around 0.4%.
- In 2023, the dynamics of employment in the country will again be influenced by the unfavorable demographic development, which is a major constraint on the extensive increase of the labor force in high demand.
- The dynamics of labor income and labor productivity in the first half of 2020 was affected in a downward direction, as a result of the restrictive measures introduced against the pandemic in mid-March. The layoffs and the significant contraction in hours worked led to a sharp slowdown in the growth of compensation per employee in the second quarter of the year.
- More detailed monthly data from the Short-Term Statistics of Employees and Labor Expenditures showed an upward development of the average wage after the reported bottom in April. By the end of 2020, the nominal pace of the indicator will continue to gradually accelerate, along with expectations to limit the decline in employment, but will remain relatively lower than a year ago.
- The growth of compensation per employee for the whole of 2020 is estimated at about 5%. Assuming the retention of a large part of employment as a result of the application of measure 60/40 will also have a limiting effect on labor productivity. In 2020, the dynamics of real productivity will move to negative territory (-0.4%), which is about 3.5 percentage points. lower than the reported growth rate in 2019.
- At the same time, the average annual decline in employment is expected to be around 2.6%, which is 0.5 percentage points higher than the spring forecast. As a result, the economic activity of the population decreased compared to previous years, as the average annual coefficient of economic activity for 2020 shrank to 72.7% (for the population between 15 and 64 years).
- The expectations for the period 2021–2023 are that employment will gradually begin to recover, increasing by 0.9% in 2021, and in 2022 to accelerate to 1.5% together with the acceleration of economic growth in the country. However, reaching the number of employees observed in the pre-crisis 2019 is expected to occur only in the first months of 2023, when annual employment growth is projected to be around 0.4%.
- In 2023, the dynamics of employment in the country will again be influenced by the unfavorable demographic development, which is a major constraint on the extensive increase of the labor force in high demand.
- The dynamics of labor income and labor productivity in the first half of 2020 was affected in a downward direction, as a result of the restrictive measures introduced against the pandemic in mid-March. The layoffs and the significant contraction in hours worked led to a sharp slowdown in the growth of compensation per employee in the second quarter of the year.
- More detailed monthly data from the Short-Term Statistics of Employees and Labor Expenditures showed an upward development of the average wage after the reported bottom in April. By the end of 2020, the nominal pace of the indicator will continue to gradually accelerate, along with expectations to limit the decline in employment, but will remain relatively lower than a year ago.
- The growth of compensation per employee for the whole of 2020 is estimated at about 5%. Assuming the retention of a large part of employment as a result of the application of measure 60/40 will also have a limiting effect on labor productivity. In 2020, the dynamics of real productivity will move to negative territory (-0.4%), which is about 3.5 percentage points. lower than the reported growth rate in 2019.
- In 2021, compensation per employee will be characterized by an accelerated growth rate, which is expected to reach about 6%. The latter will reflect the acceleration of the indicator both in the private sector and the effects of the further increase in incomes in the education sector, the planned new increase in staff costs in the public administration, in the structures in charge of pandemic management activities and its consequences, the minimum wage, etc. The upward development of the considered indicator will continue in 2022–2023, and at the end of the forecast period it is expected to grow at a rate of about 7%.
- In the conditions of maintaining the increase of the compensation per employee for the whole forecast period, the nominal labor costs per unit of production (NRTEP) will continue to increase. The highest rate is expected in 2020, as the optimization of labor costs in the economy will be carried out primarily through a reduction in employment, while the dynamics of compensation per employee was reported only slowdown. With the recovery of the positive dynamics of productivity in 2021-2023, the growth rate of nominal costs per unit of output will begin to slow down. The growth of NRTEP is estimated at 5.5% in 2020 and 4.4% for the forecast

period 2021-2023. In 2021, compensation per employee will be characterized by an accelerated growth rate, which is expected to reach about 6%. The latter will reflect the acceleration of the indicator both in the private sector and the effects of the further increase in incomes in the education sector, the planned new increase in staff costs in the public administration, in the structures in charge of pandemic management activities and its consequences, the minimum wage, etc. The upward development of the considered indicator will continue in 2022–2023, and at the end of the forecast period it is expected to grow at a rate of about 7%.

- In the conditions of maintaining the increase of the compensation per employee for the whole forecast period, the nominal labor costs per unit of production (NRTEP) will continue to increase. The highest rate is expected in 2020, as the optimization of labor costs in the economy will be carried out primarily through a reduction in employment, while the dynamics of compensation per employee was reported only slowdown. With the recovery of the positive dynamics of productivity in 2021-2023, the growth rate of nominal costs per unit of output will begin to slow down. The growth of NRTEP is estimated at 5.5% in 2020 and 4.4% for the forecast period 2021-2023

Recommendations: This research's findings recommend that the government of the country should make risk analysis and business steadiness planning in all critical federal and regional institutions, explore opportunities for cross-border digital trade and cooperate with domestic small business firms, support medium- and long-term business investments that lead to resilient supply chains for critical goods and services under the market, accelerate development of e-commerce/e-marketing systems including digital marketing, digital banking, digital payments mechanisms, e-financial services (e.g. microcredit and micro insurance), a national ID system, and robust digital communications systems within government and other socio activities overall the country. COVID-19 outbreak widely impacts SMEs in the country and most studies shows that there is a lack of flexible work strategies, formal documentation mechanisms and comprehensive crisis management and aftershock strategies for new micro enterprises with little previous crisis experience. We recommend that small businesses owners of small business should consider long-term and adoptive crisis management strategies, not only focusing on financial factors but also fully taking non-financial factors into account, owners, top management, as well as different levels of personnel, should be involved in developing crisis management mechanisms according to their needs. All should work in exploring new markets and incorporating technology into their future growth, produce different sanitary materials up to end of the pandemic and make their marketing flexible based on situations, which is another sign of active learning and improvement from the crisis. In the long run, the urge to grow and expand market share may be a strong driving force for small business to strengthen their resilience and innovation strategies.

4. CONCLUSION

This paper demonstrates bio-business and their challenges during corona virus pandemic in Balkan countries, specifically in Bulgaria using different empirical reviews, various and other organizations reports/assessments, magazines, small business experiences and other related secondary data analyses, the researcher tried to interpret analyze and make reasonable conclusions about each small business challenges in the current crisis time. This study finds that doing business in this COVID-19 pandemic time is very challenging and has dangerous impact on small businesses, workers life as well as the country's overall economy. This study has some limitations including it used only secondary data because it is difficult to get empirical/primary evidence directly from firms in this pandemic time; so it was better to include primary data. Also because of COVID-19 is the recent pandemic it was difficult to get more related literatures for review. While this research generates diversified important insights, future studies can conduct extensive surveys in line with the findings of the article to have a comprehensive understanding on different problems/challenges biobusiness-owners in patriarchal developing nations with the widespread coronavirus and other pandemics. Besides, as the secondary data analysis the study was conducted within five months of the identification of corona case in Bulgaria, future researchers can concentrate on gendered experiences at the later phase of the pandemic to investigate certain changes of bio businesses experiences.

This report is funded from the Science Fund of the University of Food Technology – Plovdiv, contract No 15 /21-H "Innovation as a strategic factor for entrepreneurial activity in the green economy"

REFERENCES

- Alexander, W. (2020). How Are Small Businesses Adjusting to COVID-19? Early Evidence from a Survey, Ministry of Agriculture and Food, Bulgaria, <https://bioreg.mzh.government.bg/Home/DataBaseList#sectionTableNonEffective>
- Blanchard, O. (2019). "Public Debt and Low Interest Rates," American Economic Review, American Economic Association, vol. 109(4), pages 1197-1229, April.

- Busso, M., & Messina, J. (2020). "The Inequality Crisis: Latin America and the Caribbean at the Crossroads." Inter-American Development Bank. <https://publications.iadb.org/publications/english/document/The-Inequality-Crisis.pdf>.
- Caballero, R.J., & Simsek, A. (2020). "Asset Prices and Aggregate Demand in a "Covid-19" Shock: A Model of Endogenous Risk Intolerance and LSAPs," NBER Working Papers 27044, National Bureau of Economic Research, Inc.
- Carvalho, V. M., Hansen, S., Ortiz, Á., Ramón García, J., Rodrigo, T., & Rodriguez, M. S., & Ruiz, J. (2020). "Tracking the COVID-19 Crisis with High-Resolution Transaction Data," CEPR Discussion Papers 14642, C.E.P.R. Discussion Papers.
- Caselli, F., Grigoli, F., Weicheng, L., & Sandri, D. (2020). "Protecting Lives and Livelihoods with Early and Tight Lockdowns," IMF Working Paper 2020/234.
- Chetty, R., Friedman, J. N., Hendren, N., Stepner, M., & The Opportunity Insights Team, (2020). "The Economic Impacts of COVID-19: Evidence from a New Public Database Built Using Private Sector Data," NBER Working Papers 27431, National Bureau of Economic Research, Inc.
- Coibion, O., Gorodnichenko, Y., & Weber, M. (2020). "Labor Markets During the COVID-19 Crisis: A Preliminary View," NB International Monetary Fund (IMF). 2020c. "Global Financial Stability Report, October 2020: Bridge to Recovery", Washington, DC
- Demirguc-Kunt, A., Lokshin, M.M. & Torre, I. (2020). "The Sooner, the Better: The Early Economic Impact of Non-Pharmaceutical Interventions during the COVID-19 Pandemic," Policy Research Paper, The World Bank.
- Guerrieri, V., Lorenzoni, G., Straub, L., & Werning, I. (2020). "Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages?," NBER Working Papers 26918, National Bureau of Economic Research, Inc.
- ITRE committee, (2021) Impacts of the COVID-19 pandemic on EU industries
- International Monetary Fund (IMF) (2020) "Outlook for Latin America and the Caribbean, October 2020: Pandemic Persistence Clouds the Recovery", Annex 1, Washington, DC.
- International Monetary Fund (IMF) (2020) "Special Series on Fiscal Policies to Respond to COVID-19, Reaching Households in Emerging and Developing Economies: Citizen ID, Socioeconomic Data, and Digital Delivery", Washington, DC.
- International Monetary Fund (IMF) (2020) "Fiscal Monitor, October 2020: Policies for the Recovery". Washington, DC: International Monetary Fund.
- International Monetary Fund (IMF), (2021) "World Economic Outlook, October 2021: After-Effects of the COVID-19 Pandemic: Prospects for Medium-Term Economic Damage", Chapter 2. Washington, DC:
- International Monetary Fund. ER Working Papers 27017, National Bureau of Economic Research, Inc. The World Bank. 2021. Global Economic Prospects, January 2021: Subdued Global Economic Recovery. January. Washington, DC.
- Levy, Y., Pienknagura, E., & Pienknagura, S. (2014). Wage compression and the decline in inequality in Latin America: Good or bad?, VoxEU, June 10, 2014.
- Maloney, W.F. & Taskin, T. (2020). "Determinants of Social Distancing and Economic Activity during COVID-19: A Global View," Policy Research Working Paper Series 9242, The World Bank.
- Prady, D., & Herve, T., Davidovic, S., & Nunhuck, S. (2020). "Beyond the COVID-19 Crisis: A Framework for Sustainable Government-To-Person Mobile Money Transfers", IMF Working Paper No. 20/198, Washington, DC.
- Sangmin, A., Sang Yoon, L., & Yongseok S. (2020). "Inequality of Fear and Self-Quarantine: Is There a Trade-off between GDP and Public Health?," NBER Working Papers 27100, National Bureau of Economic Research, Inc.
- Serikbayeva, B., Abdulla, K., & Oskembayev, Y. (2020). "State capacity in responding to COVID-19," MPRA Paper 101511, University Library of Munich, Germany.
- Summers, L. (2021). "Opinion: The Biden stimulus is admirably ambitious. But it brings some big risks, too," Washington Post.
- The World Bank. (2020) South Asia Economic Focus, October 2020: "Beaten or Broken? Informality and COVID-19," Washington, DC.