Dean&Francis
ISSN 2959-6130

Impact of COVID-19 Containment Measures on Labor Force Participation

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Abstract:

The COVID-19 pandemic led governments to implement containment measures that reshaped labor market conditions worldwide. In this paper, I examine how the severity of these containment policies affected labor force participation, which captures both employment and job-search activity and therefore reflects broader labor market engagement than unemployment alone. Using 152 country-quarter observations from 2020, drawn from the Oxford COVID-19 Government Response Tracker and the World Bank, this study applies a simplified difference-in-differences model with macroeconomic controls and finds that higher containment stringency is associated with lower labor force participation, with an estimated coefficient of around −0.10 ($p < 0.01$). Inflation is negatively associated with labor force participation, while GDP growth shows a small positive relationship, and these estimates remain stable after adding the additional covariates. Taken together, the results indicate that stricter containment policies contributed to labor market withdrawal during 2020, underscoring the importance of using participation-based measures when assessing the broader economic effects of pandemic response policies.

Keywords: COVID-19; Labor Force Participation; Stringency Index; Cross-Country Analysis; Pandemic Policy

1. Introduction

The COVID-19 pandemic led to a global economic and social crisis that reshaped labor markets on an unprecedented scale. To control the spread of the virus, governments worldwide implemented a series of interventions, such as lockdowns, mobility restrictions, and business closures, whose consequences extended far beyond public health. These measures, while effectively reducing infection rates, imposed substantial economic costs and created widespread labor market disruptions. According to the International Labour Organization (2021), global working hours declined by an estimated 8.8 percent in 2020, equivalent to 255 million full-time jobs, underscoring the scale of the shock to labor participation and employment.

Previous studies are mainly focused on unemploy-

ISSN 2959-6130

ment as the primary indicator of pandemic-related labor market distress. For example, Morris, Correa, and Leiva (2023) demonstrated that a higher stringency index significantly increased unemployment rates across countries using a difference-in-differences framework. However, unemployment alone does not fully explain the dynamics of labor market disengagement. Many individuals left the labor force during the pandemic, either due to health risks, caregiving responsibilities, or discouragement over job prospects, resulting in a reduction in labor force participation that unemployment statistics do not fully capture.

The labor force participation rate (LFPR) provides a broader and more sensitive indicator of economic activity, since it includes both individuals who are employed and those actively seeking jobs. Therefore, a decline in LFPR reflects not only job losses, but also a withdrawal of individuals from the labor market due to reduced willingness to work or ability to remain economically active. Thus, examining how containment measures affected participation offers important insight into both people's behavioral responses and structural shifts in labor market engagement during the pandemic.

This study uses quarterly data from 152 country-quarter observations in 2020, combining information from the Oxford COVID-19 Government Response Tracker, the World Bank, the International Monetary Fund, and Our World in Data. Applied a simplified difference-in-differences (DID) model to estimate the relationship between the severity of containment policies and labor force participation, controlling for key macroeconomic variables such as GDP growth, inflation, exports, and pandemic severity. The empirical results show that stricter containment measures are significantly associated with lower labor force participation, with an estimated coefficient of approximately -0.10 ($p < 0.01$). Inflation shows a negative effect on participation, while GDP growth has a small positive association. These findings suggest that pandemic-related restrictions contributed to temporary labor market withdrawal across countries during 2020.

Building on the framework of Morris, Correa, and Leiva (2023), which examined how containment measures influenced unemployment using a multi-country difference-in-differences model, this paper extends the analysis to labor force participation, which is a broader indicator that captures both employment and job-seeking activity. While Morris, Correa, and Leiva (2023) concentrate on unemployment responses, Coibion, Gorodnichenko, and Weber (2020) demonstrate that a significant portion of the early labor market decline in the United States caused by the pandemic are resulted from workers leaving the labor force rather than registering as unemployment, suggesting that participation may more accurately represent covert forms of labor market distress. Similarly, Bauer, Broady, and Edelberg (2020) emphasize that pandemic-related job losses and lapses in healthcare disproportionately affected vulnerable groups, underscoring the importance of understanding labor force disengagement beyond unemployment statistics. By combining these insights, this study contributes to the literature by providing cross-national empirical evidence on how the stringency of COVID-19 containment policies affected overall labor market participation. Using quarterly data from 152 country-quarters in 2020, the analysis provides a global perspective on how policy-induced restrictions lead to labor force withdrawal and complements existing single-country and unemployment-focused studies.

The remainder of the paper is structured as follows. Section 2 presents the data sources, variable construction, and model specification. Section 3 shows the descriptive statistics and examines the main regression results. Section 4 conducts robustness and subset analyses to test the consistency of the findings. Section 5 discusses the broader policy implications and outlines the limitations of the study. Finally, Section 6 concludes with key takeaways and directions for future research.

2. Methodology

2.1 Data Source

This study uses quarterly country-level data for 2020 from multiple publicly available international databases. The government containment measure is captured by the Stringency Index from the Oxford COVID-19 Government Response Tracker (OxCGRT) (2020). COVID-19 cases per million population are obtained from the Our World in Data repository (Our World in Data, 2020). Labor force participation rates, GDP levels (PPP, current international dollars), and export shares of GDP come from the World Bank's World Development Indicators (World Bank, 2021a, 2021b, 2021c). Pre-pandemic GDP growth and consumer inflation rates are drawn from the International Monetary Fund's World Economic Outlook database (International Monetary Fund, 2020a, 2020b). Country development classifications follow the United Nations Conference on Trade and Development (UNCTAD, 2021) standard grouping framework. All datasets were matched using ISO country identifiers and aggregated to the quarterly level to ensure consistency across sources.

2.2 Sampling Method

The sample includes all countries for which complete information was available across the variables of interest during 2020. Observations with missing or inconsistent data were excluded to ensure comparability. Each country contributes up to four quarterly observations, producing a balanced panel with moderate cross-sectional and tempo-

ral variation. The focus on 2020 allows analysis of the immediate labor market responses to containment measures during the pandemic's initial shock. Because data availability was limited, the analysis relies on cross-sectional quarterly averages rather than full longitudinal modeling.
Taken together, these sampling choices will establish a consistent dataset from which the empirical model can be applied. The following subsection describes the regression framework used to estimate the relationship between containment policies and labor force participation.

2.3 Model Specification

The empirical strategy is based on a simplified difference-in-differences (DID) design, estimated through ordinary least squares (OLS) regression. The model examines how the Stringency Index, which represents containment intensity, affects the Labor Force Participation Rate (LFPR) while controlling for country-specific macroeconomic conditions.
The baseline regression equation is expressed as:

$$LFPR_{it} = \alpha + \beta \text{Stringency}_{it} + \gamma \bar{X}_{it} + \epsilon_{it}$$

Where $LFPR_{it}$ is the labor force participation rate of country i at quarter t; $Stringency_{it}$ measures the stringency of containment policies; X_{it} is a vector of control variables; and ϵ_{it} represents the random error term.

From Equation (1), the analysis focuses on the relationship between containment stringency and labor force participation, controlling for other relevant variables. The key parameter of interest captures how changes in containment policies are associated with variations in participation levels across countries during 2020.
The study also captures the parallel trends of the labor force participation in high and low stringency groups. Verifying parallel trends helps confirm that countries with different levels of containment measures would have shown similar labor market patterns if there were no policy interventions. This step is important because it helps ensure that any differences we observe in participation are caused by policy stringency rather than by pre-existing economic conditions.
Finally, examining sub-samples offers another way to check the reliability of the model. Since the pandemic and policy measures affected countries in various ways, looking at separate groups such as developed and developing economies or those with varying levels of COVID-19 severity helps show whether the main relationship is consistent across contexts. This step helps confirm that the results are not driven by a single group of countries but reflect broader patterns in global labor market changes.

2.4 Model Parameters

2.4.1 Outcome

The dependent variable is the Labor Force Participation Rate (LFPR), defined as the proportion of the working-age population either employed or actively seeking employment. LFPR reflects both employment and engagement in the job search process, which makes it a more comprehensive indicator of labor market activity.

2.4.2 Intervention

The intervention examined in this study corresponds to the widespread implementation of COVID-19 containment policies beginning in the second quarter of 2020. Following the World Health Organization's declaration of a global pandemic in March 2020, governments around the world adopted varying degrees of public health restrictions, including limits on mobility, business operations, and social interaction. These policy responses are measured using the Stringency Index, which combines different containment measures into a standardized 0~100 scale. Within this framework, 2020-Q1 serves as the pre-intervention period, during which labor market conditions predominantly reflected typical economic environments, while 2020-Q2 to 2020-Q4 represent the post-intervention period, which was characterized by the active implementation of pandemic control policies. Variation in stringency levels across countries and over time reflects differences in the timing and intensity of governmental responses and forms the primary source of treatment variation in the empirical analysis.

2.4.3 Additional Covariates

The model includes several additional covariates to account for underlying economic conditions. GDP growth in 2019 is used to capture pre-pandemic economic movement, where stronger growth indicates higher labor force engagement. The inflation rate in 2019 reflects the price environment, which can decrease real incomes and discourage labor force participation when inflationary pressures increase. The level of GDP in 2019 controls for differences in economic size and institutional capacity, since larger economies could sustain employment during external shocks. Exports as a share of GDP show exposure to global trade conditions; however, the expected effect on participation is uncertain given the pandemic-related disruptions to supply chains and demand. Finally, COVID-19 cases per million reflect the severity of the health crisis, where higher infection rates are expected to reduce labor force participation through illness, caregiving burdens, or precautionary withdrawal from work environments.

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3. Results

3.1 Descriptive Statistics

Table 1 summarizes the descriptive statistics for high and low stringency country groups, classified using the overall mean of the Stringency Index in 2020. Before the pandemic response period (2020-Q1), labor force participation levels were similar across groups (74.95% in low stringency countries and 73.91% in high stringency countries). After containment policies were introduced (2020-Q2 to Q4), participation declined more quickly in the high stringency group, averaging 70.74%, compared to 76.01% in the low stringency group. Containment intensity also increased for both groups after the pandemic declaration, averaging 70.85 on the Stringency Index for high stringency countries and 47.62 for low stringency ones. Moreover, the high stringency group recorded significantly higher COVID-19 case rates (829,215 per million) than the low stringency group (206,590 per million), suggesting that countries facing more severe outbreaks tended to impose stricter containment measures, which were associated with larger declines in labor force participation.

Table 1. Descriptive Statistics Comparison of Treatment (High Stringency) and Control (Low Stringency) Countries:

Variable	Low Stringency		High Stringency	
	Mean	SD	Mean	SD
LFPR(Pre-Pandemic)	74.953	6.268	73.911	5.683
LFPR(Post-Pandemic)	76.012	5.855	70.735	7.457
Containment Stringency (Pre-Pandemic)	15.347	2.874	21.709	4.414
Containment Stringency (Post-Pandemic)	47.616	8.943	70.85	6.522
GDP Growth	2.281	1.451	2.34	1.353
Inflation Rate	1.89	1.017	1.835	1.053
Export (% of GDP)	53.412	34.361	50.938	35.277
GDP (PPP, millions of current international $)	1,092,460	2,801,540	1,610,050	4,016,847
Covid-19 Cases (Per 1,000 population)	206.6	394.5	829.2	926

Notes: GDP values are expressed in millions of current international dollars (PPP). COVID-19 case numbers are reported per thousand population.

3.2 Parallel Trends

Figure 1 shows the changing path of labor force participation over time for the high and low stringency groups. Both groups follow a similar path before the start of the pandemic response period. Following the pandemic declaration in March 2020, a divergence appears, in which the high stringency group has a sharper decline. While the low stringency group shows partial recovery by 2020-Q4, the high stringency group remains below its pre-pandemic level. This visual comparison supports the legitimacy of using the pre-pandemic quarter as the reference period in the empirical analysis.

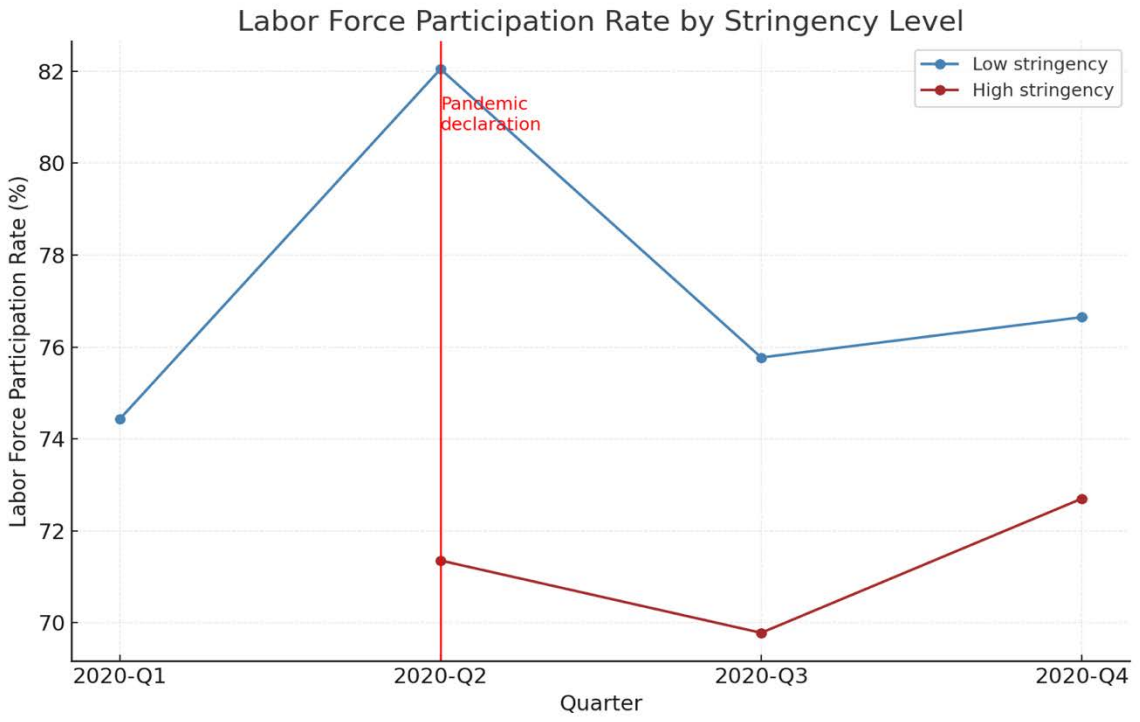

Figure 1. Quarterly trends in labor force participation for high-stringency and low-stringency countries. The figure shows a visibly sharper decline among high-stringency countries after 2020-Q1.

3.3 Regression Analysis

Table 2 shows the results of the regression estimates. Across all model specifications, containment stringency is associated with a lower labor force participation rate. In the model without covariates, an increase of one point Stringency Index will lead to a 0.102 percentage-point decrease in LFPR ($p < 0.01$). The results are consistent after adding macroeconomic controls, where the estimated effect remains −0.101 ($p < 0.01$). In other words, when holding the baseline economic conditions constant, stricter containment measures are associated with lower labor market participation during 2020. A 10-point increase in stringency corresponds to roughly a one-percentage-point decline in participation, which is meaningful given that the average LFPR in the sample is about 73–75 percent; scaled to the global labor force, this means a reduction equivalent to tens of millions of workers temporarily leaving economic activity.

GDP growth in 2019 is positively correlated with LFPR (0.08105, $p < 0.10$) among the covariates, meaning that countries with more economic momentum at the start of the pandemic had lower labor force withdrawal. However, there is a negative correlation between inflation and LFPR (−2.137, $p < 0.01$), which is consistent with higher pricing pressures lowering real economic capacity. The coefficients for GDP level, exports as a share of GDP, and COVID-19 cases per million are small and statistically negligible in the adjusted model, meaning that these factors do not independently explain variation in participation once stringency and macroeconomic conditions are accounted for.

The model has modest explanatory power across parameters, meaning that although the strictness of containment measures significantly influences labor force decline, broader crisis conditions also played an important role in labor market changes.

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Table 2. Regression result:

Variable	Without Covariates	With Covariates
Stringency Index	−0.102***(0.019)	-0.101 ***(0.020)
GDP Growth	N/A	0.08105*(0.423)
Inflation Rate	N/A	-2.137***(0.621)
GDP	N/A	0.000
Export (% of GDP)	N/A	0.007(0.013)
Covid-19 Cases Per Million	N/A	0.000
R^2	0.104	0.210
N	152	152

Notes: Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

3.4 Subset Regression Results

Table 3 shows the subset regression estimates. Using the median value of COVID-19 cases per million, the study first divides the sample based on the pandemic's severity. In both groups, containment stringency remains negatively correlated with labor force participation, although the impact is much stronger in nations with higher case incidence. In the high-incidence group, a one-point increase in the Stringency Index is associated with a 0.228 percentage decrease in labor force participation rate in the unadjusted model and 0.163 in the adjusted model. In contrast, in the low-incidence group, the corresponding estimates are −0.062 and −0.079. This suggests that in places where pandemic pressure was more severe, containment efforts had more noticeable consequences on the job market.

Then the study examines whether the relationship differs by degrees of economic development. The negative association between stringency and LFPR in both developing and developed country subsamples. Among developing countries, the estimated coefficients are −0.125 without covariates and −0.070 with covariates, indicating a larger reduction in participation relative to developed economies, where the estimates are −0.085 and −0.086. These results show that countries with more limited economic resilience will face greater labor force decline in response to containment measures.

Table 3. Subset Regression Result

Variable	Without Covariates	With Covariates
COVID-19 Cases Subset		
Below Confirmed Cases - Containment Stringency	-0.062**	-0.079**
Above Confirmed Cases - Containment Stringency	-0.228***	-0.163**
Developed vs Developing Countires Subset		
Developed Countries - Containment stringency	-0.085***	-0.086***
Developing Countries - Containment stringency	-0.125***	-0.070**

4. Discussion

4.1 Policy Implications

The results of the study show that stricter COVID-19 containment measures are associated with a decline in the labor force participation rate during 2020. The impact is different according to context; countries with severe pandemics and those with weaker economic resilience clearly have a greater decline in participation rates. These patterns underscore the role of both public-health pressure and underlying economic capacity in shaping labor market responses to crisis.

This finding has several implications for the design of pandemic containment strategies. First, while restrictions on mobility and social interaction are effective tools for slowing disease transmission, they should be paired with policies that maintain workers' connections to the labor force. For example, wage-subsidy programs, employment-retention credits, expanded childcare provision, and support for remote-work transitions can help prevent temporary labor-market disruptions from turning into longer-term withdrawal from work. Countries with limited fiscal capacity may require external funding to implement such measures effectively.

Second, the significance of adaptive containment frame-

works that incorporate both labor-market variables and epidemiological data is shown by the variety in estimated impacts. Real-time participation rate monitoring can act as an early warning sign of labor force disengagement, and it can allow policy intensity modifications before decreases become irreversible. This is especially important in high-incidence situations, in which strict control seems to have a greater financial cost.

Third, cross-national cooperation remains crucial. Because developing economies experienced larger declines in labor force participation under the same containment conditions, international support systems, such as including multilateral financial assistance, targeted employment retention programs, and digital skills training initiatives, may help mitigate longer-term labor market shortages in lower-income settings.

Finally, the findings highlight the importance of incorporating labor force participation, instead of relying on unemployment rates alone, when assessing the socioeconomic costs of pandemic response. Declines in participation not only reflect in job loss but also withdrawal of individuals from economic activity altogether, which may have long-term effects on productivity, accumulation of human capital, gender, and family labor dynamics. Therefore, future crisis response policy should include participation-based metrics to better understand the full view of labor market change.

4.2 Limitations of the Study

While the results are statistically robust and align with theoretical expectations, there are still several limitations in the study. First, the explanatory power of the model is limited. The estimated R^2 is approximately 0.10, meaning that containment stringency accounts for only a limited share of the cross-country variation in labor force participation during 2020. It means that, although stringency plays an important role, a substantial portion of participation dynamics is driven by other economic and social factors that are not captured in the present framework.

There are two primary considerations that contribute to this outcome:

The first concern is sample size. The dataset is restricted to 152 country-quarter observations, covering only a single year. This lowers the accuracy of the estimations and restricts the amount of temporal variation. In contrast, prior work such as Morris, Correa, and Leiva (2023) benefits from multi-year, higher-frequency data that allows for more detailed modeling of dynamic adjustment processes.

The second concern is the scope of included variables. Labor force participation is influenced by a wider set of structural and behavioral factors such as home care obligations, educational attainment, demographic makeup, and the presence of informal sector work; all of these have an impact on labor force participation than unemployment. Because these factors are not incorporated in the current study, the estimated effect may miss important channels through which containment measures shape participation. Furthermore, because of the cross-sectional design and lack of fixed effects, coefficient magnitudes may be influenced by unobserved country-specific features like institutional strength or cultural norms surrounding work.

Finally, data limitations prevent examination of distributional differences in labor force responses, such as gender, age, or sector-specific participation patterns. These dimensions may reveal different effects that are not visible in aggregate indicators. A further limitation is potential endogeneity. Government stringency may itself respond to labor-market conditions—for example, countries experiencing sharper labor market declines might adopt stricter policies—introducing reverse causality into the estimates. Future research could address this concern by using fixed-effects models, instrumental variables, or multi-year panel designs to better isolate causal effects.

Despite these limitations, the data offer reliable proof that reduced participation in 2020 was consistently linked to stricter containment measures. The stability of the estimated effect across specifications strengthens confidence in the directional validity of the findings. To more accurately identify the processes between containment policies and labor force engagement, future studies should expand the temporal scope, include more institutional and demographic variables, and use fixed-effects or individual-level designs.

5. Conclusion

This study contributes to the growing body of research examining the socioeconomic impacts of the COVID-19 pandemic by focusing on labor force participation rather than unemployment.

Using quarterly cross-country data from 2020 and a simplified difference-in-differences (DID) framework, the analysis finds that stricter containment measures significantly reduced labor force participation, even after accounting for key macroeconomic variables such as GDP growth, inflation, exports, and pandemic severity. The results indicate that a 10-point increase in the Stringency Index corresponds to approximately a one percentage decrease in participation, underscoring the labor supply consequences of strict health policies.

This study expands on the findings of Morris, Correa, and Leiva (2023) and provides a more comprehensive view of labor-market disengagement during global crises by focusing on participation rather than unemployment. The evidence suggests that containment policies discouraged people from continuing to be economically active in addition to limiting work chances; The regression results show that stricter containment measures are significantly

ISSN 2959-6130

associated with lower labor force participation, with an estimated coefficient of about −0.10 ($p < 0.01$). Subsample analyses further indicate that this negative effect is larger in developing countries and in those facing higher COVID-19 infection rates. This effect was probably caused by limited mobility, caring obligations, and uncertainty about their future career prospects. This behavioral dimension is important for understanding how long-term restrictions change workforce dynamics beyond immediate employment losses.

The policy implications are clear: governments must balance public-health objectives with measures that sustain workforce engagement. Targeted support, such as wage subsidies, remote work infrastructure, and gender sensitive care policies, all of these could help mitigate the decline in participation during future crises. International coordination and fiscal assistance are also important to protect vulnerable populations and prevent long-term shortages in global labor markets.

Despite the limitations, including a relatively low explanatory power and a limited sample size, the study provides enough evidence on the macro-level effects of containment policies on labor participation. Future research should expand the temporal scope beyond 2020, incorporate additional structural and demographic variables, and explore heterogeneity across gender, sector, and region to deepen understanding of participation dynamics in times of crisis.

In conclusion, the findings underscore that economic resilience during a global pandemic depends not only on protecting jobs but also on keeping people connected to the labor market. As governments design recovery policies for post-pandemic economies, policies that promote continued labor force engagement will be essential to fostering inclusive and sustainable growth.

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