# The recovery of the labor force after the pandemic: An analysis of the heterogeneity between countries

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### Abstract

After the pandemic, the "great resignation" happened in some countries, but it was not a global phenomenon. Labor supply behaved significantly different between countries during 2020-2021. Understanding the reasons behind these differences is important because of its implications for the economic cycle and long-term economic growth. Using cross-section and panel regressions and information for more than 40 advanced and emerging economies up to the end of 2021, this paper attempts to understand the causes behind these differences. The main findings suggest that households' income support and job retention programs were key factors to understand the heterogeneity in the behavior of labor supply. The economic recovery played an important role too, although there are a lot of countries where the economic recovery was not accompanied with a similar recovery in the labor supply, partly due to the public policy responses. Factors such as the early retirement of elderly workers or associated directly with Covid-19, although they may have played a relevant role at the beginning of the pandemic or in specific countries, do not seem to be relevant to explain the heterogeneity of the recovery of the labor supply between economies almost two years after the pandemic started.

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## 1. Introduction

The economic crisis that started with the Covid-19 pandemic caused huge disruptions in the labor market. The mobility and economic restrictions in 2020 and 2021 prevented a worse sanitary outcome but put a high burden in the livelihoods around the globe. Labor markets where strongly affected causing massive lay-off or furlough of workers around the world, but with significant heterogeneity between countries.

After the pandemic, the "great resignation" – that we interpret as the economic trend in which employees voluntarily resigned from their jobs and did not come back to the labor force – was not a global phenomenon. At the beginning of 2020, some countries had small declines in the labor force participation rate, suggesting little impact on the supply of workers, while others saw a decline higher than in previous crisis, including the global financial crisis <sup>2</sup>/. The subsequent recovery was also uneven across economies. These differences remain when comparing within advanced or emerging economies. Among advanced economies, the United States stands out as one in which the labor supply recovered more slowly. At the same time, in Latin American countries, the impact of the pandemic on labor supply was greater than in other emerging economies.

Understanding the behavior of the labor supply after the Covid-19 pandemic is important because of its implications for the economic cycle and long-term economic growth. While there was a strong correlation between the recovery of employment and labor force participation across the globe, the relationship is not one-to-one, and economies in which labor force participation recovered more lagged due to permanent supply factors could suffer more persistent inflationary pressures. Evidence from labor dynamics in the United States and United Kingdom point to high labor demand with supply showing and underwhelming respond [[Pizzinelli & Shibata, 2022]] suggesting that some supply driven issues were still not completely solved. More generally, there is no clear correlation between the recovery in labor supply and the economic recovery among economies. Some of them showed an economic recovery synchronized with labor supply and others recovered economically but people did not return to the labor force. These differences could have relevant implications for inflationary dynamics.

Moreover, differences in the recoveries of labor supply could help to anticipate differences in the relevance of permanent scars and their effects on long-term economic growth. Past evidence suggests that labor supply can be stickier than what classical theories suggest [[Clark & Summers, 1982]]. In Europe, for example, there is evidence that the high level of unemployment in the late 70s and 80s caused some hysteresis effect in the labor market even with recovering demand [[Blanchard, 1986]]. Moreover, evidence from OECD countries point that a downturn in the economic cycle could have persistent effects on labor participation, especially in young and old population [[Duval et al, 2011]], which could affect potential growth.

 $<sup>^{2}</sup>$ / In this paper, labor participation rate will be used as a proxy of labor supply. For further discussion see section 3.

There are different reasons that could explain the heterogeneity in the behavior of the labor supply after the pandemic, highlighting factors that directly affect the supply of workers or do so via labor demand and the incentives to go out and look for work. (i) During the pandemic, higher level of mobility restrictions and a greater damage generated by Covid-19 probably affected the labor supply due to quarantine restrictions, home responsibilities, or because of fear of getting infected. (ii) Although direct fiscal transfers to households were necessary to cope with the crisis for countless families, they may have discouraged the return to work, especially when it meant a higher reserve income. (iii) Job retention policies, which made it possible to maintain labor relations when people were not working, prevented additional falls in labor supply. (iv) Elderly workers may have advanced their retirement due to higher exposure to the pandemic and the strong increase in their wealth. (v) Finally, countries with greater economic recovery and, therefore, a more vigorous labor demand, could have encouraged a faster return of workers to the labor supply.

Until now, most studies that analyze labor market reactions to the pandemic are single country analysis and/or have been done mostly for advanced economies. Examples of papers that analyze the evolution of the labor market in advanced economies, which results are discuss in section 2, include [[Ando et al, 2022]], [[Pizzinelli & Shibata, 2022]] [[Albanesi & Kim, 2021]], [[Barrero et al, 2020]], [[Coombs et al, 2021]], [[Fabrizio et al, 2021]], [[Faria E. Castro, 2021]], [[Gortz et al, 2021]], [[Holzer et al, 2021]], [[Lofton et al, 2021]], [[Shibata, 2021]] and [[Forster et al, 2021]]. In the case of emerging economies, to the best of our knowledge, only the following papers have been published after the Covid-19: [[Alfaro et al, 2020]], [[Khamis et al, 2021]] and [[ADB, 2021]]. There are a few cases of multiple country analysis, which include [[Ando et al, 2022]] and [[Khamis et al, 2021]].

In this paper, we analyze the relevance of the aforementioned factors through panel and cross section econometric estimations. Using quarterly data between the beginning of the pandemic and the end of 2021 for more than forty advanced and emerging economies and considering ILO database, we estimate the relevance of different factors that could potentially explain why some economies saw smaller declines and/or a faster recovery in the labor supply than others.

The main results of our estimations suggest that the different public policy responses played a relevant role to explain the heterogeneity of the behavior of labor supply across economies. Job retention programs prevented the breakdown of relations between employees and employers, making it easier for employees to return (or not leave) the labor supply. Moreover, a negative correlation is observed, once the rest of the factors are controlled, between the fiscal household income support implemented after the pandemic and the behavior of the labor supply. That is, ceteris paribus, countries with greater transfers of resources to households had a slower recovery in labor supply. The intensity of the economic recovery, via its impact on labor demand and the incentives to find a job, also play a relevant role to explain a greater recovery in the labor force. Factors directly associated with Covid-19 – such as the fear of being infected or the inability to go out to work due to restrictions or other responsibilities – and the early retirement of elderly workers do not seem to play a relevant

role. In any case, this does not mean that these factors were not relevant for some countries or at the beginning of the pandemic, as other studies suggest.

This paper is organized in the following way. In section two we present different stylized facts that emerge from comparing the behavior of labor supply across economies and review the factors that could explain the differences. In section three we detail the econometric strategy and describe the variables that were used. Section four presents the main results and the last section the main conclusions.

## 2. Stylized facts and possible explanations

This section reviews some stylized facts related to the behavior of labor supply after the pandemic that are derived from the comparison between economies. In addition, it lists the possible explanations that will be studied to understand the disparate behavior of the labor supply between economies.

Stylized fact #1: The "great resignation" was not a global phenomenon.

The great resignation, also known as the big quit and the great reshuffle, was an economic trend in which employees voluntarily resigned from their jobs. Although some of the possible explanations was the possibility of switching to a different job, in this paper we abused a bit of the nomenclature and used the great resignation as the phenomenon that describes people living the labor force and, consequently, the labor supply. Figure 2.1 suggests that not every country saw an important decline in the labor participation rate after the pandemic started. Moreover, some countries saw a faster and more intense recovery after the initial falls. These differences remain even when comparing within advanced or emerging economies.

<u>Stylized fact #2</u>: There was a strong but not perfect correlation between the recovery of employment and labor force participation.

The comparison between economies suggests that countries that had a greater recovery or saw their labor participation less affected after the pandemic tended to see a greater recovery in employment. This relationship, however, is not perfect. Countries above and to the left of the 45-degree line in Figure 2.2 had a larger labor force recovery than employment, suggesting a less tight labor market. In contrast, countries to the right and below the 45-degree line had a smaller recovery in labor supply than in employment, suggesting a tighter labor market and higher inflationary pressures. Therefore, understanding the behavior of the labor supply and, especially, of factors that affected the incentives to stay or return to it could have relevant conclusions in terms of the state of the cycle and the inflationary pressures of each economy.

Figure 2.1. Labor participation rates between 2019.q4 and 2021.q4.



Note: 44 countries, blue lines correspond to advanced economies, red lines to emerging economies. Differences with respect to 2019.q4. Seasonal adjusted data. Source: ILO.

Figure 2.2. Change in LPR and employment rates between 2019.q4 and 2021.q4.



Note: 44 countries. Seasonal adjusted data. Changes in employment rates in X axis, and in LPR in Y axis. Source: ILO.

<u>Stylized fact #3</u>: Some countries showed an economic recovery synchronized with labor participation and others recovered economically but people did not return to the labor force.

The comparison between economies throws that that there is no clear link between economic recovery, measured as the recovery of GDP, and the behavior of labor participation. In fact, Figure 2.3 shows that there is a large group of countries that had a significant economic recovery but in which labor participation remains well below pre-pandemic levels. At the same time, other countries had what we call a synchronized recovery, where the recovery in GDP was accompanied by a better performance of labor supply.



Figure 2.3. Change in labor participation rate and GDP between 2019.q4 and 2021.q4.

Note: 44 countries. Seasonal adjusted data. Changes in GDP in the axis, and in LPR in Y axis. Source: ILO and Bloomberg.

As was mentioned before, understanding the causes behind the behavior of labor supply is relevant due to the potential implications labor supply could have in the state of the cycle and inflation pressures, as well as the impact on long-term trend growth. Behind the possible causes, there are factors that directly affect the labor supply, and others that do so through the dynamics of labor demand, the probability of finding a job and, therefore, the incentives to look for one. Below we detail the possible causes, the reasons why they could have affected the labor supply and what other studies have found about their relevance.

(i) Causes directly related to the pandemic

More restrictions and greater intensity of the sanitary damage generated by the Covid-19 pandemic probably affected more the labor supply due to the impossibility or working due to the restrictions itself or other home responsibilities, or because of the fear of getting infected. Indeed, evidence from the United States suggests that workers with access to telework or to work in private were less likely to be affected by the pandemic than those that require physical interconnection [[Shibata, 2021]]. Moreover, considering the unequal impact of the pandemic between men and women, despite traditionally male tends to leave the employment more than female during economic crisis, during the pandemic it has been

the opposite for the United States [[Albanesi & Kim, 2021]] specially when there were young children present [[Fabrizio et al, 2021]], [[Lofton et al, 2021]]. Figure 2.4 suggests these differences where more important at the beginning of the pandemic but started to decrease over time.



Figure 2.4. Labor male and female participation rate

Note: 43 countries. Differences with respect to 2019.q4 Seasonal adjusted data. Lines corresponds to median between countries. Source: ILO.

(ii) Direct fiscal transfers to households and (iii) job retention programs

Although direct fiscal transfers to households were necessary to cope with the crisis for countless families, they may have discouraged the return to work, by generating a higher reserve income for individuals. Job retention policies, which made it possible to maintain labor relations despite people were not working, maintained labor relationships, and prevented additional falls in labor supply. Governments deployed large stimulus packages and special laws to avoid the worse outcome for families and workers [[Gortz et al, 2021]]. These packages included transfers or enhanced policies that protect the worker, like short time work schemes or more favorable unemployment benefits to reduce the economic burden to families [[Ando et al, 2022]].

# Figure 2.5. Change in labor participation rate between 2019q.4 and 2021.q4 and households' fiscal income support



Note: 44 countries. TPL is the differences with respect to 2019.q4 of the detrended series. The variable households' fiscal income support will be described in section 3. Source: ILO, IMF and own calculations.

(iv) Early retirement

The pandemic generated strong incentives for elderly workers to retire. Because of the risks of facing severe health consequences after getting infected were higher, elderly workers were at more risk than young workers. Moreover, given the strong increase in the prices of financial assets and houses that occurred between 2020 and 2021 and the greater relative savings of older people compared to young people, the incentive to withdraw from the labor force was greater for the elderly group. In fact, there is evidence that suggests that older groups in the United States are more likely to look forward for an earlier retirement if there is an important increase in asset valuation [[Faria E. Castro, 2021]]. This situation is shared with the United Kingdom, where earlier retirement was taken by older groups even at the present of flexible working technology like telework [[Coombs et al, 2021]]. Although this cause is directly related to the pandemic, since it has a more permanent implication on the evolution of the labor force and productivity, we will consider it separately from cause (i).

(v) The economic recovery

Countries with greater economic recovery and, therefore, a stronger labor demand, should have encouraged a faster return of workers to the labor supply. Greater increases in labor demand increase the probability of finding a job and, consequently, people's incentives to remain or enter to the labor force. However, as previously mentioned and as shown in Figure 2.3, the evidence on the relevance of this factor is heterogeneous since there are economies in which GDP recovered strongly but did not have a similar recovery in the labor force.





Note: 37 countries. Detrended series, differences with respect to 2019.q4 Seasonal adjusted data. Source: ILO and own calculations.

### 3. Methodology and dataset

### 3.1 Econometric framework

The study analyzes the process of the recovery of the labor supply in different countries through two alternative strategies, cross section, and panel data estimations.

First, the data is studied from a cross-sectional perspective in which the cumulative change in labor force participation from the start of the pandemic to the cut-off quarter is observed. For this, equation (1) was estimated with data for 41 countries at three points in time: the second, third and fourth quarters of 2021 <sup>3</sup>/. In addition, to prevent the estimate from being biased by the long-term trajectory of the labor force participation, we used the change in the gap between labor force and its trend as the endogenous variable. In other words, the dependent variable  $\Delta LFP_c$  corresponds to the difference between the gap during the cut-off quarter with respect to the gap observed in the fourth quarter of 2019. Finally,  $X_c$  is a vector of controls and variables of interest at the country level and  $\varepsilon_c$  is the error that we correct for heteroskedasticity.

<sup>&</sup>lt;sup>3</sup>/ List of countries included: Australia, Austria, Belgium, Bulgaria, Canada, Chile, Colombia, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, North Macedonia, Norway, Peru, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, United Kingdom and United States.

$$\Delta LFP_c = \alpha_0 + \gamma X_c + \varepsilon_c \ (1)$$

The second strategy studies the recovery of the labor supply using panel data. Different versions of equation (2) are estimated. Throughout the different regressions, the dependent variable corresponds to the level of the labor force participation or the difference between the level at each quarter with respect to the fourth quarter of 2019. This second measure is used with the objective of exclusively analyzing the fall and recovery of the labor force participation during the pandemic, which requires restricting the sample from 2020q1 to 2021q4. For the first measure, we control for fixed country effects to control for permanent differences in the labor force participation between countries.

The vector  $\delta Z_{ct}$  summarizes the explanatory variables of the model and  $\varphi_t$  corresponds to the time fixed effect, which controls for the shocks that affected all countries in each period. Meanwhile,  $\varphi_c$  is the country fixed effect, which controls for variables not observed and idiosyncratic to each country and, as mentioned before, allows correcting for the average differences between countries in terms of the level of labor force participation. In the specifications in which for all the countries the dependent variable is normalized to base zero at 2019q4, it is decided not to incorporate the fixed effect to gain degrees of freedom and to be able to add variables of interest that are fixed across time and varies between countries.

$$LFP_{ct} = \beta + \delta Z_{ct} + \varphi_t + \varphi_c + \varepsilon_{ct} (2)$$

The estimation method of equation (2) and its alternative versions had to be chosen with precision. Due to the bias that the GLS estimation presents when using short panels, an OLS estimation was chosen, controlling for dummy variables for time and country, a method also known as LSDV. Additionally, the Wooldridge (2002) autocorrelation test confirmed the presence of autocorrelation in the series, so it was decided to cluster the errors at the country level which make estimates unbiased and efficient.

### 3.2 Dataset

Changes or the level of the labor force participation rate is used as the dependent variable. While the denominator of the labor force corresponds to the number of people at a working age, the numerator corresponds to the number of people at a working age who are employed or, if not, are actively looking for and want to find a job. Thus, changes in the labor participation rate are usually interpreted as changes in the labor supply since it should summarize the number of people who are actively available and willing to work. The data on the labor force participation rate is extracted from the International Labor Organization (ILO), is seasonally adjusted and has quarterly frequency. The database starts in 2015.q1 and goes up to 2021.q4, although most regressions were run only for the pandemic period.

As mentioned before, for the cross-section regressions, the dependent variable is calculated as the change in the labor participation rate gap with respect to its trend to avoid bias in the estimation related to trend changes that are not explained by the variables of interest. To calculate this trend, we use data from 2014.q1 to 2019.q4 and estimate a linear trend. Given that there is a high uncertainty regarding the trend and that it was calculated using a short period of time, for the panel estimates, in which the estimated coefficients do not respond only to the accumulated changes but to quarter-to-quarter changes – less affected by trends –, in the baseline results we did not correct the labor participation rate for its trend in panel regressions, except for common trends around the globe (capture by the inclusion of time fixed effects). Nevertheless, in the Annex B we present the results while we control for changes in the labor participation trend, which do not differ from what we find in the baseline regressions.

Regarding the variables of interest, different measures were used to capture the heterogeneity in each of the possible causes described in section 2.

(i) We use different variables to capture the differences between restrictions, home responsibilities and the fear to get infected. To measure restrictions, we use the stringency index calculated and reported daily by Oxford University  $^{4}$ /. To approximate the fear of getting infected we use the death toll rate and the rate of vaccination. Finally, we use the proportion of women in the labor force in 2019 as a proxy of the relevance of home responsibilities since they probably affected differently women from men.

(ii) To capture direct fiscal transfers to households we use the spending announced by governments after Covid-19 collected by the IMF. These expenses include above the line measures. In addition, we add an estimation of pension withdrawals in countries in which this measure was passed by between 2020 and 2021. The amounts considered correspond to the amounts announced by the governments. All these amounts are expressed with respect to the GDP of each country in 2020. Additionally, social protection spending in 2019 as a percentage of GDP is considered, to consider not extraordinary (or due to Covid-19) government support.

(iii) To capture the relevance of job retention programs we use a proxy to capture the intensity of usage of these problems, this is the difference between the change in employment and the total of worked hours. Countries that implemented important job retention programs should have had more important drops in total hours worked relative to total employment, which would translate into a higher value for this variable. On the contrary, in countries that did not implement employment protection programs, the difference between the variation of total hours worked and employment should be smaller because employment was reduced as well as hours worked and the value of this variable, therefore, too.

(iv) To identify the relevance of the early retirement of elderly workers we use two variables. On the one hand, we use the percentage of the population over 55 years old in 2019. On the

<sup>&</sup>lt;sup>4</sup>/ The stringency index is a composite measure of nine response metrics to the pandemic: school closures; workplace closures; cancellation of public events; restrictions on public gatherings; closures of public transport; stay-at-home requirements; public information campaigns; restrictions on internal movements; and international travel controls.

other hand, we use the variation in the price of houses and the price of financial assets (stock market) to approximate the change in the wealth that individuals in each country faced.

(v) For the economic recovery, we use the change in GDP.

The way we specify each variable depends on its inclusion in the cross section or panel regressions. In the panel regressions, for the stringency index, the vaccination rate and death per million inhabitants (in log) we use the value of the variables during the current quarter. In the cross-section regressions, we use the average of the last four quarters prior to the cut-off quarter. For the retention programs, the variation in the prices of houses and financial assets and the growth of the GDP, we consider the annual variation of the previous quarter (in the case of the GDP, the moving average of the last four quarters). In the cross-section regressions, for the retention programs, the annual average between 2020q2 and 2021q1 is used (since this was the period of greatest relevance of the retention programs), the average variation of the last four quarters for asset prices, and the cumulative GDP growth during the pandemic period. In the panel regressions, the variables that do not vary over time (percentage of women, percentage of people over 55 years old, fiscal support and social spending) are considered equal to zero prior to the start of the pandemic and take the corresponding value for each country after 2020q2 and until the end of the sample.

The regressions include additional controls. In cross section and panel regressions (when we do not add fixed country effects), a dummy is added for advanced countries. In the panel regressions, the level of informality in 2016 is also considered. These variables are correlated with several of the factors mentioned above, so their inclusion is relevant to avoid possible biases in the estimates and interpretation of the results. Finally, the panel regressions include time fixed effects and country fixed effects in the regressions that do not standardize labor participation with respect to the changes prior to the start of the pandemic.

## 4. Main results

## 4.1 Analysis of the heterogeneity between countries

Table 4.1.1 shows the results of the cross section regressions for three different time periods. Columns 1 and 2 correspond to the accumulated changes from 2019q4 to 2021q2, 3 and 4 to 2021q3, and 5 and 6 to 2021q4. The reason why different time intervals are considered is to check the robustness of the results and to assess whether the relevance of some variables increased or decreased over time online to what the economic intuition would suggest.

The first thing to note is that the coefficients that accompanied the variables included to measure the direct impact of Covid-19 on the labor supply are, in general, not statistically significant. Although the vaccination rate and the percentage of women in the labor force in 2019 have the expected sign, they do not seem relevant in explaining the accumulated changes of the labor participation rate. This seems in line with what is observed in Figure

2.4, where although important differences arise after the beginning of the pandemic between men and women, the relevance of the difference diminished over time. The coefficient of the stringency index is almost always statistically insignificant and has the opposite sign than expected, since the economic intuition suggests that greater restrictions should have caused a greater drop or a smaller recovery in the labor force. One possible interpretation is that, although the restrictions may have been relevant in explaining the behavior of labor participation at the beginning of the pandemic, a year later and with most countries without restrictions, their relevance reduced.

Public policies seem to have played a relevant role. On the one hand, larger income support packages for households (via fiscal spending or withdrawal from pension funds) are associated with slower recoveries in the labor participation rate. This relationship is significant and stable throughout all regressions. In addition to the above, job retention programs seem to have had a positive effect on labor supply, by allowing individuals to maintain their labor relationships and, therefore, preventing them from leaving the labor force even in periods where they were not working. The coefficient that accompanies this variable, although maintains the expected sign, loses significance in the estimates that consider the change until the third and fourth quarters of 2021, which could be explained by the end of the retention programs and, therefore, the lower relevance of these in the dynamics of labor participation.

The variables associated with the early retirement of the elderly workers are not robust to the different regressions. Although a certain negative correlation is observed between the increase in the prices of financial assets and the recovery in labor participation – in line with was expected –, this correlation is not always significant. Furthermore, the percentage of the population over 55 years old in 2019 seems to explain little of the behavior of labor participation and, furthermore, it has the opposite sign that expected. Something similar happens with the variation in the price of houses.

Finally, a clear and significant positive correlation between economic recovery and labor participation is observed once we control for the rest of variables. In this case, we must be careful with the interpretation of the results since the causality between labor force and economic growth is more likely to be bidirectional than for the other variables. Still, the evidence is suggestive that, everything else constant, larger economic recoveries have been positively associated with larger recovery in labor supply.

	(1)	(2)	(3)	(4)	(5)	(6)	
	202	1.q2	202	21.q3	2021.q4		
Stringency index	0.0516	0.0674	0.0533	0.0832*	0.0598	0.0784	
	(1.33)	(1.69)	(1.15)	(1.71)	(1.25)	(1.51)	
Vaccination rate		-5.331		-3.387		-2.282	
		(-1.26)		(-0.93)		(-0.61)	
% of women		-0.0427		-0.186		-0.149	
		(-0.20)		(-0.74)		(-0.53)	
Fiscal income support	-0.132**	-0.139***	-0.148**	-0.182***	-0.142**	-0.173***	
	(-2.63)	(-3.74)	(-2.63)	(-4.08)	(-2.49)	(-3.55)	
Retention programs	0.239**	0.201*	0.154	0.123	0.153	0.129	
	(2.38)	(2.02)	(1.64)	(1.30)	(1.63)	(1.23)	
% of people > 55y		0.0775		0.147*		0.116	
		(1.43)		(2.01)		(1.48)	
House prices	0.128	0.0397	0.221*	0.105	0.155	0.0704	
	(1.39)	(0.48)	(1.82)	(1.21)	(1.42)	(0.88)	
Financial prices	-0.0392	-0.0714**	-0.0359	-0.0820**	-0.0188	-0.0568	
	(-1.25)	(-2.25)	(-0.98)	(-2.34)	(-0.50)	(-1.44)	
GDP	0.271**	0.278***	0.284**	0.397***	0.276**	0.384***	
	(2.62)	(2.86)	(2.26)	(3.81)	(2.13)	(3.52)	
Advanced economies		1.602*		2.017*		1.660	
		(1.84)		(1.84)		(1.38)	
Constant	-1.607	-3.184	-2.723	0.763	-3.114	-0.101	
	(-0.73)	(-0.28)	(-1.03)	(0.06)	(-1.18)	(-0.01)	
Number of observations	41	41	41	41	41	41	
R-sq	0.421	0.596	0.329	0.587	0.256	0.457	
adj. R-sq	0.319	0.462	0.210	0.449	0.125	0.276	

Table 4.1.1: Cross section regressions. Baseline results. Changes in the LFP gap with respect2019q4

Note: t statistic between parentheses Robust errors. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

Table 4.1.2 shows the results of different panel regressions. Column (1) considers the regression using a sample that goes from 2015.q1 to 2021.q4. This regression controls for country fixed effects, which captures everything that is fixed over time but differs between countries. Beyond the common global trend captured by the inclusion of time fixed effects, this regression could potentially suffer from problems associated with the idiosyncratic trends of labor force participation rates and the possible biases and econometric problems that this would generate in the results. This is why column (2) considers the same equation as column (1) but for a shorter period of time. Although this does not solve the problem it reduces it. Finally, columns (3) to (5) consider only the changes during the pandemic period, standardizing the participation rates with respect to what was observed at the end of 2019. These regressions include variables of interest and/or controls that are fixed through time, so

they exclude country fixed effects due to perfect multicollinearity. Although excluding country fixed effects could cause potential problems of omission of relevant variables, gaining degrees of freedom and the possibility of including additional variables is useful.

The variables most directly associated with Covid-19 have, in general, the expected sign, although their statistical significance is not robust to the different specifications. Annexes A and B show that these results are not specific to the variables considered here, and they maintain when considering other variables such as death per million inhabitants and the vaccination rate. In addition, next section presents an alternative approach that suggests similar conclusions.

Regarding fiscal support to households, the variable of interest has the expected sign, suggesting a negative effect of the aid on the incentives of workers to return to the labor force. In this case, this coefficient is not statistically significant in all the specifications, probably due to the high collinearity that this variable – which is positive and constant for all the quarters after 2020q2 – has with the country fixed effects. Once we do not control for country fixed effects, the variable gains statistically significance. These results are maintained in the different robustness specifications considered in Annex B. It is important to note that non-extraordinary aid, that is, aid associated with social programs that existed prior to the pandemic, do not seem to have a relevant role like the extraordinary aid implemented after Covid-19.

Job retention programs maintain their sign and gain significance with respect to the crosssection estimates, highlighting the relevance of this public policy to avoid further declines and promote a rapid recovery of the labor force. Likewise, the economic recovery maintains its sign and, although it loses some statistical significance, still suggests that the positive correlation between the economic recovery and the recovery of the labor force is maintained once controlling for the other variables. Finally, the evidence on the relevance of the early retirement of people reveals this factor does not seem important to explain the differences between countries.

Annex A and Annex B includes different estimations to check the robusticity of the results. In addition to the ones that were already described, we run regressions restricting the sample to countries with total population higher than one million people. In general, the results hold with respect to what was presented in this section.

	(1) 2015q1- 2021q4_	(2) 2019q4- 2021q4	(3) Change v 2	(4) with respect to 2020q1-202 <u>1q</u>	(5) o 2019q4. 4
Stringency index	-0.0290	-0.0265*	-0.00962	0.00440	-0.00329
	(0.0225)	(0.0139)	(0.00952)	(0.0152)	(0.0172)
% of women			-0.0252	-0.0811	-0.154
			(0.112)	(0.122)	(0.120)
Fiscal income support	-0.0946	-0.0959	-0.133***	-0.163***	-0.156**
	(0.0712)	(0.0642)	(0.0407)	(0.0520)	(0.0569)
Social protection				0.0181	0.0446
				(0.0458)	(0.0557)
Retention programs	0.0994***	0.0813***	0.101***	0.141***	
	(0.0240)	(0.0256)	(0.0287)	(0.0415)	
% of people $> 55y$			0.130***	0.179***	0.178**
			(0.0376)	(0.0628)	(0.0658)
House prices	0.0225	-0.00255	0.0376	0.0471	0.0689
	(0.0219)	(0.0283)	(0.0279)	(0.0318)	(0.0451)
Financial prices	-0.00945	-0.00898	-0.0186	-0.0113	-0.0150
	(0.00911)	(0.0110)	(0.0138)	(0.0193)	(0.0183)
GDP	0.130	0.191*	0.225***	0.152*	0.167*
	(0.104)	(0.110)	(0.0738)	(0.0832)	(0.0837)
Advanced economies	8.055***	10.57***	1.060*		
	(0.279)	(0.732)	(0.535)		
Informality				-0.0154	-0.0276
				(0.0144)	(0.0184)
Constant	56.67***	55.81***	-4.933	-3.261	0.898
	(0.224)	(0.294)	(5.735)	(5.546)	(5.490)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	No	No	No
Number of observations	1040	378	336	248	248
R-sq	0.955	0.938	0.468	0.546	0.463

#### Table 4.1.2: Panel data regressions. Baseline results

Note: standard errors between parentheses. Clustered errors at country level. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

# 4.2 Analysis of the heterogeneity among age groups and gender

An alternative way to analyze the relevance of the aforementioned factors is to study whether the variables of interest had a heterogeneous effect between population groups that, a priori, would be influenced differently by these factors. Because of the difference in home responsibilities between men and women, it is expected that, if Covid-19 factors matters, the relevance of these factors are different between men and women. In the same way, if differences in early retirement explain different behaviors in the labor force participation between countries, the variables that capture the change in people's wealth should have a greater impact on those over 55 years old than on the prime labor force (people between 25 and 54 years old). In this section we present the results obtained by analyzing these heterogeneities.

Table 4.2.1 presents the coefficients estimated by running the regression specified in column (3) from Table 4.1.2 for male and female labor force participation separately. These regressions consider a smaller number of countries (due to the availability of data that discriminate by gender). Despite having a different sample, the results for total labor force participation coincide with those found in the previous section. With respect to the heterogeneity between men and women, no relevant and statistically significant differences are observed in the coefficients found for male and female labor participation, which reaffirms the results found in the previous section on the relevance that the factors associated with Covid-19 had in explaining the differences in the behavior of labor supply between countries, at least once we consider all the data available until 2021q4. These results repeat in the alternative exercises carried out in Annex C, in which we estimate equation (2) of Table 4.1.2 for men and women, and we run an additional panel data regression, where we add an additional gender level to the panel regression and evaluate the statistical significance of the interaction between the gender dummy and the factors associated with Covid-19, which ends up not being significant.

	(1)	(2)	(3)
	Total	Male	Female
Stringency index	-0.0102	-0.0119	-0.00909
	(0.0137)	(0.0111)	(0.0161)
Fiscal income support	-0.130***	-0.109***	-0.137***
	(0.0413)	(0.0392)	(0.0480)
Retention programs	0.0817***	0.0693**	0.100***
	(0.0272)	(0.0280)	(0.0306)
House prices	0.0671*	0.0368	0.0846**
	(0.0342)	(0.0312)	(0.0353)
Financial prices	-0.0187	-0.0135	-0.0238
	(0.0176)	(0.0166)	(0.0197)
GDP	0.197**	0.195**	0.202**
	(0.0845)	(0.0853)	(0.0879)
Advanced economies	1.818***	1.684***	1.754**
	(0.599)	(0.499)	(0.693)
Constant	-2.126***	-1.771***	-2.213***
	(0.565)	(0.463)	(0.610)
Time fixed effects	Sí	Sí	Sí
Country fixed effects	No	No	No
Number of observations	336	336	336
R-sq	0.388	0.348	0.367

Table 4.2.1: Panel data regressions. Heterogeneity by gender

Note: standard errors between parentheses. Clustered

errors at country level. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

Table 4.2.2. presents the results that analyze the differentiated impacts between age groups, i.e. the prime group versus the group older than 55 years old. Once again, the results for the total labor force participation for this subgroup of countries (which is different from the previous one) are the same as the results mentioned in the previous section, although the statistical significance of the economic recovery falls in this case. Regarding the differentiated effect of financial variables between the prime group and those over 55 years old, the results go against what is suggested by economic intuition, suggesting a positive effect of financial wealth on labor participation for those over 55 years old. Therefore, these results confirm this factor does not seem to be important to explain the differences between countries. As was mentioned with the previous regressions, these results hold in the alternative regressions presented in Annex C.

	(1)	(2)	(3)
	Total	Prime	> 55 years old
Stringency index	-0.00720	-0.0185	-0.0328**
	(0.0194)	(0.0140)	(0.0145)
Fiscal income support	-0.129**	-0.111**	-0.169*
	(0.0577)	(0.0497)	(0.0969)
Retention programs	0.0793**	0.0476*	0.0622
	(0.0355)	(0.0269)	(0.0373)
House prices	0.0471	0.0224	0.0775
	(0.0279)	(0.0245)	(0.0477)
Financial prices	-0.0218	-0.0115	0.0234**
	(0.0245)	(0.0125)	(0.0100)
GDP	0.148	0.0825	0.00722
	(0.0994)	(0.0777)	(0.0719)
Advanced economies	1.207	0.928	1.077
	(0.889)	(0.822)	(1.850)
Constant	-1.528*	-1.037	-0.787
	(0.808)	(0.756)	(1.639)
Time fixed effects	Sí	Sí	Sí
Country fixed effects	No	No	No
Number of observations	248	248	248
R-sq	0.383	0.450	0.403

Table 4.2.2: Panel data regressions. Heterogeneity by age group

Note: standard errors between parentheses. Clustered errors at country level. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

### 5. Conclusions

The "great resignation" was not a global phenomenon after the Covid-19 pandemic. Indeed, labor supply behaved differently between countries during 2020-2021. Understanding the behavior of the labor supply after the Covid-19 pandemic is important because of its implications for the economic cycle and long-term economic growth. While there was a strong correlation between the recovery of employment and labor force participation across the globe, the relationship is not one-to-one, and economies in which labor force participation recovered more lagged due to supply factors could suffer more persistent inflationary pressures. Moreover, differences in the recoveries of labor supply could help to anticipate differences in the relevance of permanent scars and their effects on long-term economic growth.

Through cross-section and panel estimations this paper attempts to understand the causes behind these differences. Using quarterly data between the beginning of the pandemic and the end of 2021 for more than forty advanced and emerging economies, we estimate the relevance of different factors that could potentially explain why some economies saw smaller declines and/or a faster recovery in the labor supply than others.

The main findings suggest that households' income support and job retention programs were key factors to understand the heterogeneity in the behavior of labor supply between countries. The economic recovery played an important role, although there are a lot of countries where the economic recovery was not accompanied with a similar recovery in the labor supply, partly due to the public policy responses. Factors such as the early retirement of elderly workers or associated directly with Covid-19, although they may have played a relevant role at the beginning of the pandemic or in specific countries, do not seem to be relevant to explain the heterogeneity of the recovery of the labor supply between economies almost two years after the beginning of the pandemic.

### References

To be completed.

## Appendix

### A. Robustness checks on baseline results: cross section

	(1)	(2)	(3)	(4)	(5)	(6)	
	202	21q2	202	1q3	2021q4		
Stringency index	0.0205	0.00393	0.0161	-0.0324	0.0206	-0.0276	
	(0.68)	(0.11)	(0.46)	(-0.60)	(0.55)	(-0.53)	
Vaccination rate		-0.704		3.945		4.265	
		(-0.15)		(0.97)		(1.10)	
% of women		-0.309*		-0.403**		-0.379*	
		(-1.88)		(-2.16)		(-1.91)	
Fiscal income support	-0.121**	-0.141***	-0.124***	-0.140**	-0.117***	-0.133**	
	(-2.73)	(-3.82)	(-2.91)	(-2.59)	(-2.94)	(-2.42)	
Retention programs	0.219**	0.143	0.141	0.0786	0.151*	0.0953	
	(2.24)	(1.36)	(1.69)	(0.79)	(1.75)	(0.83)	
% of people > 55y		0.0174		0.0191		-0.00218	
		(0.35)		(0.27)		(-0.03)	
House prices	0.158	0.0499	0.228*	0.0688	0.168	0.0652	
	(1.65)	(0.55)	(1.89)	(0.86)	(1.67)	(1.00)	
Financial prices	-0.0138	-0.0603*	-0.000824	-0.0715**	0.00935	-0.0569	
	(-0.57)	(-2.03)	(-0.03)	(-2.36)	(0.31)	(-1.53)	
GDP	0.185**	0.172**	0.181	0.234***	0.227*	0.259***	
	(2.23)	(2.53)	(1.59)	(3.05)	(1.78)	(3.01)	
Advanced economies		1.868*		1.736*		1.478	
		(1.93)		(1.77)		(1.43)	
Constant	-0.411	14.90	-1.096	19.98*	-1.397	19.19*	
	(-0.22)	(1.66)	(-0.51)	(1.98)	(-0.62)	(1.79)	
Number of observations	37	37	37	37	37	37	
R-sq	0.389	0.580	0.313	0.604	0.272	0.519	
adj. R-sq	0.267	0.419	0.176	0.452	0.127	0.334	

### Table A.1: Restricting the sample to countries with population higher than 1 million

Note: t statistic between parentheses Robust errors. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

	(1)	(2)	(3)	(4)	(5)	(6)	
	202	21q2	202	21q3	202	2021q4	
Death tool rate	0.0694	0.251	-0.194	0.224	-0.0413	-0.0202	
	(0.27)	(1.15)	(-0.58)	(0.83)	(-0.14)	(-0.09)	
Vaccination rate		-6.165		-1.827		-0.863	
		(-1.25)		(-0.48)		(-0.23)	
% of women		-0.120		-0.210		-0.0762	
		(-0.54)		(-0.74)		(-0.24)	
Fiscal income support	-0.106*	-0.0955**	-0.124**	-0.138***	-0.109**	-0.128***	
	(-1.91)	(-2.05)	(-2.59)	(-3.52)	(-2.36)	(-2.97)	
Retention programs	0.221**	0.164*	0.117	0.110	0.135	0.108	
	(2.27)	( <b>1.97</b> )	(1.20)	(1.22)	(1.37)	(1.06)	
% of people > 55y		0.0483		0.120		0.0876	
		(1.01)		(1.57)		(1.21)	
House prices	0.0901	0.00411	0.138	0.0573	0.101	0.00902	
	(1.18)	(0.05)	(1.32)	(0.73)	(1.08)	(0.13)	
Financial prices	-0.0473	-0.0773**	-0.0606	-0.0947**	-0.0345	-0.0746	
	(-1.49)	(-2.34)	(-1.44)	(-2.33)	(-0.80)	(-1.60)	
GDP	0.254**	0.253***	0.280*	0.408***	0.278*	0.377***	
	(2.50)	(2.92)	(1.94)	(3.19)	(1.95)	(2.88)	
Advanced economies		2.038**		2.235*		1.677	
		(2.14)		(1.97)		(1.45)	
Constant	0.614	3.513	1.209	5.474	0.293	0.854	
	(0.35)	(0.32)	(0.60)	(0.39)	(0.16)	(0.05)	
Number of observations	41	41	41	41	41	41	
R-sq	0.395	0.575	0.311	0.541	0.223	0.405	
adj. R-sq	0.288	0.433	0.190	0.387	0.086	0.207	

Table A	2.	Using	death	tool	rate	instead	of	stringency	inde	ρv
I abic A		Using	ucam	1001	Iaic	msicau	<b>UI</b>	sumgency	mue	сл

Note: t statistic between parentheses Robust errors. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

# B. Robustness checks on baseline results: panel data

	(1) 2015q1- 2021q4	(2) 2019q4- 2021-q4	(3) 2020q1- 2021q4	(4) 2020q1- 2021q4	(5) 2020q1- 2021q4
Stringency index	-0.0256	-0.0267*	-0.00750	0.00666	-0.00136
	(0.0186)	(0.0139)	(0.00911)	(0.0151)	(0.0169)
% of women			-0.0333	-0.160	-0.236*
			(0.132)	(0.129)	(0.127)
Fiscal income support	-0.118*	-0.101	-0.143***	-0.168***	-0.161**
	(0.0642)	(0.0640)	(0.0386)	(0.0567)	(0.0615)
Social protection				0.0393	0.0670
				(0.0477)	(0.0585)
Retention program	0.103***	0.0830***	0.0976***	0.147***	
	(0.0239)	(0.0251)	(0.0281)	(0.0427)	
% of people > 55y			0.122***	0.163**	0.162**
			(0.0364)	(0.0601)	(0.0633)
House Price	0.0269	-0.0116	0.0314	0.0346	0.0573
	(0.0169)	(0.0282)	(0.0287)	(0.0325)	(0.0466)
Financial prices	0.000255	-0.00686	-0.0146	-0.0111	-0.0151
	(0.00739)	(0.0106)	(0.0133)	(0.0190)	(0.0179)
GDP	0.122	0.188*	0.204***	0.142*	0.157*
	(0.0850)	(0.101)	(0.0686)	(0.0787)	(0.0788)
Advanced economies	-0.0438	2.783***	1.217**		
	(0.245)	(0.732)	(0.527)		
Informality				-0.0121	-0.0248
				(0.0167)	(0.0207)
Constant	-0.291*	-2.288***	-4.370	1.181	5.519
	(0.148)	(0.287)	(6.669)	(5.769)	(5.707)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	No	No	No
Number of observations	1040	378	336	248	248
R-sq	0.426	0.598	0.460	0.518	0.424

### Tabla B.1: Dependent variable: LPR gap with respect to trend

Note: standard errors between parentheses. Clustered errors at country level. \* = (0.10 \* \* = (0.05 \* \* \* = (0.01))

\* p<0.10 \*\* p<0.05 \*\*\* p<0.01

	(1)	(2)	(3)	(4)	(5)
	2015q1- 2021q4	2019q4- 2021q4	Change v 2	vith respect to 020q1-202 <u>1q</u>	o 2019q4. 4
Stringency index	-0.0415*	-0.0338**	-0.0170	-0.0170	-0.0254**
	(0.0207)	(0.0131)	(0.0105)	(0.0103)	(0.0112)
% of women			-0.115	-0.0502	-0.133
			(0.0918)	(0.112)	(0.108)
Fiscal income support	-0.0705	-0.0863	-0.125***	-0.126**	-0.117**
	(0.0693)	(0.0642)	(0.0405)	(0.0473)	(0.0556)
Social protection				0.0116	0.0384
				(0.0553)	(0.0667)
Retention programs	0.107***	0.0930***	0.101***	0.164***	
	(0.0221)	(0.0243)	(0.0284)	(0.0459)	
% of people $> 55y$			0.113***	0.0655	0.0710
			(0.0348)	(0.0461)	(0.0557)
House prices	0.00808	0.0193	0.0700***	0.0336	0.0530
	(0.0193)	(0.0277)	(0.0216)	(0.0372)	(0.0548)
Financial prices	0.00173	-0.00227	-0.00113	0.0126	0.00547
	(0.00553)	(0.00838)	(0.00903)	(0.0118)	(0.0112)
GDP	0.115	0.186	0.182**	0.0240	0.0435
	(0.0833)	(0.121)	(0.0765)	(0.0441)	(0.0537)
Advanced economies	8.007***	10.26***	0.877		
	(0.258)	(0.704)	(0.523)		
Informality				-0.0265	-0.0398
				(0.0221)	(0.0262)
Constant	56.76***	55.89***	0.528	0.219	4.709
	(0.240)	(0.282)	(4.552)	(4.862)	(4.612)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	No	No	No
Number of observations	949	342	304	232	232
R-sq	0.957	0.936	0.513	0.654	0.522

Table B.2: Restricting the sample to countries with population higher than 1 million

Note: standard errors between parentheses. Clustered errors at country level. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

	(1)	(2)	(3)	(4)	(5)
	2015q1- 2021q4	2019q4- 2021q4	Change	with respect to	o 2019q4.
Stringency index	0.0315	2021q4 _0 0250*	0.00/38	02001-20210 0.00/08	+
Sumgency macx	(0.0241)	(0.0250)	(0.00430)	(0.00+90)	(0.0167)
Vaccination rate	0.256	(0.0141)	(0.0107)	0.652	(0.0107)
v accination fate	(0.250)	-0.239	-0.392	-0.033	-0.028
0/	(0.555)	(0.180)	(0.510)	(0.304)	(0.317)
% of women			-0.0374	-0.0824	-0.150
			(0.107)	(0.121)	(0.120)
Fiscal income support	-0.0957	-0.0933	-0.135***	-0.154***	-0.147**
	(0.0710)	(0.0637)	(0.0393)	(0.0492)	(0.0550)
Social protection				0.0234	0.0498
				(0.0478)	(0.0569)
Retention programs	0.0938***	0.0881***	0.111***	0.142***	
	(0.0243)	(0.0243)	(0.0270)	(0.0433)	
% of people $> 55y$			0.139***	0.176***	0.175***
			(0.0384)	(0.0599)	(0.0630)
House prices	0.0236	-0.00476	0.0386	0.0493	0.0710
	(0.0210)	(0.0288)	(0.0274)	(0.0310)	(0.0445)
Financial prices	-0.00989	-0.00848	-0.0178	-0.0118	-0.0155
	(0.00890)	(0.0108)	(0.0130)	(0.0193)	(0.0184)
GDP	0.133	0.188*	0.228***	0.156*	0.171**
	(0.103)	(0.108)	(0.0723)	(0.0830)	(0.0832)
Advanced economies	8.050***	10.58***	1.051*		
	(0.281)	(0.728)	(0.536)		
Informality				-0.0192	-0.0312
				(0.0152)	(0.0188)
Constant	56.73***	55.66***	-4.760	-3.068	1.096
	(0.249)	(0.309)	(5.505)	(5.506)	(5.454)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	No	No	No
Number of observations	1040	378	336	248	248
R-sq	0.955	0.938	0.473	0.552	0.469

 Table B.3: Adding the vaccination rate as a regressor

Note: standard errors between parentheses. Clustered errors at country level. p<0.10 \*\* p<0.05 \*\*\* p<0.01

	(1)	(2)	(3)	(4)	(5)
	2015q1- 2021q4	2019q4- 2021q4	Change v 2	with respect to 2020q1-2021q	o 2019q4. 4
Death tool	-0.177	-0.137	-0.0837	0.180	0.145
	(0.203)	(0.137)	(0.0950)	(0.176)	(0.187)
% of women			-0.0209	-0.109	-0.176
			(0.108)	(0.128)	(0.121)
Fiscal income support	-0.121*	-0.117*	-0.142***	-0.163***	-0.160***
	(0.0648)	(0.0640)	(0.0386)	(0.0489)	(0.0542)
Social protection				0.0142	0.0386
				(0.0485)	(0.0597)
Retention programs	0.101***	0.0820***	0.102***	0.143***	
	(0.0252)	(0.0272)	(0.0297)	(0.0435)	
% of people > 55y			0.133***	0.185***	0.183***
			(0.0369)	(0.0602)	(0.0633)
House prices	0.0194	-0.00892	0.0349	0.0448	0.0680
	(0.0252)	(0.0281)	(0.0275)	(0.0319)	(0.0466)
Financial prices	-0.00950	-0.00705	-0.0177	-0.00790	-0.0113
	(0.00918)	(0.0114)	(0.0142)	(0.0172)	(0.0165)
GDP	0.135	0.197*	0.225***	0.151*	0.167**
	(0.104)	(0.108)	(0.0747)	(0.0749)	(0.0740)
Advanced economies	7.951***	10.37***	1.010*		
	(0.281)	(0.777)	(0.516)		
Informality				-0.0148	-0.0281
				(0.0143)	(0.0187)
Constant	56.63***	55.71***	-5.344	-2.091	1.707
	(0.218)	(0.261)	(5.483)	(5.432)	(5.104)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	No	No	No
Number of observations	1040	378	336	248	248
R-sq	0.955	0.937	0.468	0.555	0.469

### Table B.4: Using death tool rate instead of stringency index

Note: standard errors between parentheses. Clustered errors at country level. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

# C. Robustness checks on analysis of heterogeneity

Table C.1: Three level panel data regressions including gender level. Changes with re	spect to
2019q4	

	(1)	(2)	(3)	(4)
Stringency index	-0.0105	-0.0102	-0.0105	-0.0134
	(0.0129)	(0.0117)	(0.0129)	(0.0123)
Female dummy (FD)	-0.0132	0.0172	-0.0318	-0.391
	(0.154)	(0.317)	(0.146)	(0.313)
Fiscal income support	-0.123***	-0.123***	-0.123***	-0.110***
	(0.0417)	(0.0418)	(0.0418)	(0.0391)
Retention programs	0.0847***	0.0847***	0.0680**	0.0709**
	(0.0261)	(0.0261)	(0.0266)	(0.0274)
House prices	0.0607**	0.0607**	0.0607**	0.0348
	(0.0294)	(0.0295)	(0.0295)	(0.0310)
Financial prices	-0.0186	-0.0186	-0.0186	-0.0175
	(0.0172)	(0.0173)	(0.0173)	(0.0168)
GDP	0.198**	0.198**	0.198**	0.187**
	(0.0839)	(0.0840)	(0.0840)	(0.0839)
Advanced economies	1.719***	1.719***	1.719***	1.712***
	(0.561)	(0.561)	(0.561)	(0.493)
Stringency x FD		-0.000594		0.00582
		(0.00678)		(0.00597)
Retention programs x FD			0.0334	0.0275
			(0.0219)	(0.0245)
Fiscal income support x FD				-0.0251
				(0.0231)
House prices x FD				0.0518*
				(0.0305)
Financial prices x FD				-0.00238
				(0.00752)
GDP x FD				0.0232
				(0.0183)
Advanced economies x FD				0.0142
				(0.409)
Constant	-1.985***	-2.001***	-1.976***	-1.797***
	(0.487)	(0.508)	(0.488)	(0.450)
Time fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	No	No	No	No
Number of observations	672	672	672	672
R-sq	0.354	0.354	0.355	0.358

Note: standard errors between parentheses. Clustered errors at country level.

	(1)	(2)	(3)	(4)	(5)
Stringency index	-0.0256*	-0.0256*	-0.0256*	-0.0256*	-0.0282**
	(0.0128)	(0.0128)	(0.0128)	(0.0128)	(0.0132)
Fiscal income support	-0.140*	-0.140*	-0.140*	-0.140*	-0.116**
	(0.0701)	(0.0703)	(0.0702)	(0.0702)	(0.0489)
Retention programs	0.0549*	0.0549*	0.0329	0.0549*	0.0392
	(0.0291)	(0.0291)	(0.0320)	(0.0291)	(0.0288)
Elderly group dummy (ED)	1.161***	0.724*	1.116***	1.166***	0.448
	(0.295)	(0.357)	(0.294)	(0.296)	(1.155)
House prices	0.0500	0.0334	0.0500	0.0500	0.0219
	(0.0326)	(0.0292)	(0.0326)	(0.0326)	(0.0229)
Financial prices	0.00596	-0.00595	0.00596	0.00596	-0.00834
	(0.00915)	(0.0105)	(0.00916)	(0.00916)	(0.0117)
GDP	0.0449	0.0449	0.0449	0.0326	0.0750
	(0.0655)	(0.0656)	(0.0655)	(0.0615)	(0.0737)
Advanced economies	1.003	1.003	1.003	1.003	0.891
	(1.289)	(1.292)	(1.290)	(1.290)	(0.781)
House prices x ED		0.0331			0.0561
		(0.0338)			(0.0361)
Financial prices x ED		0.0238***			0.0286***
		(0.00792)			(0.0103)
Rettention programs x ED			0.0440*		0.0313
			(0.0258)		(0.0301)
GDP x ED				0.0245	-0.0602
				(0.0212)	(0.0459)
Stringency index x ED					0.00522
					(0.00996)
Fiscal income support x ED					-0.0487
					(0.0590)
Advanced economies x ED					0.223
					(1.215)
Constant	-1.492	-1.274	-1.470	-1.495	-1.136
	(1.055)	(1.036)	(1.055)	(1.057)	(0.738)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	No	No	No	No
Number of observations	496	496	496	496	496
R-sq	0.422	0.434	0.423	0.422	0.441

Table C.2: Three level panel data regressions including age group level. Changes with respectto 2019q4

Note: standard errors between parentheses. Clustered errors at country level. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

	(1)	(2)	(3)
	Total	Male	Female
Stringency index	-0.0265*	-0.0249*	-0.0294*
	(0.0139)	(0.0134)	(0.0157)
Fiscal income support	-0.0959	-0.0786	-0.111
	(0.0642)	(0.0607)	(0.0700)
Retention programs	0.0813***	0.0735**	0.0905***
	(0.0256)	(0.0279)	(0.0279)
House prices	-0.00255	0.00204	-0.00397
	(0.0283)	(0.0280)	(0.0356)
Financial prices	-0.00898	-0.00714	-0.0116
	(0.0110)	(0.0103)	(0.0128)
GDP	0.191*	0.169*	0.211*
	(0.110)	(0.0982)	(0.120)
Constant	0.455	0.257	0.606
	(0.592)	(0.548)	(0.655)
Time fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Number of observations	378	378	378
R-sq	0.591	0.534	0.596

Table C.3: Panel data regressions. Heterogeneity by gender

Note: standard errors between parentheses. Clustered errors at country level. \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

	(1)	(2)	(3)
	Total	Prime group	> 55 years old
Stringency index	-0.0159	-0.0182	-0.0308*
	(0.0160)	(0.0129)	(0.0160)
Fiscal income support	-0.113	-0.0890	-0.119
	(0.0702)	(0.0675)	(0.121)
Retention programs	0.0866***	0.0620**	0.0983***
	(0.0275)	(0.0227)	(0.0199)
House prices	0.00643	-0.0244	-0.0218
	(0.0256)	(0.0268)	(0.0437)
Financial prices	-0.0133	-0.00553	0.0160
	(0.0149)	(0.0103)	(0.0112)
GDP	0.0717	0.0773	-0.0585
	(0.0737)	(0.0467)	(0.0457)
Constant	0.677	1.011*	0.985
	(0.583)	(0.556)	(0.992)
Time fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Number of observations	279	279	279
R-sq	0.695	0.730	0.792

Table C.4: Panel data regressions. Heterogeneity by age group

Note: standard errors between parentheses. Clustered errors at country level.\* p<0.10 \*\* p<0.05 \*\*\* p<0.01</td>