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THE IMPACT OF THE COVID-19 SHOCK ON LABOUR INCOME INEQUALITY: EVIDENCE FROM ITALY

by Francesca Carta* and Marta De Philippis*

Abstract

The spread of the pandemic and the consequent adoption of lockdown measures to prevent infections had severe consequences for business activity and employment. By using data from the Italian Labour Force Survey, this paper simulates the effect of the COVID-19 crisis on the dynamics and distribution of equivalized labour income in the first two quarters of 2020. Moreover, it assesses the effectiveness in smoothing labour income losses of the social insurance benefits that were in place before the crisis and of the temporary measures adopted by the Italian Government to face it. We find that the economic repercussions of the COVID-19 shock impacted low-income households more heavily than higher income families, implying a substantial increase in labour income inequality. However, our results show that the social insurance benefits temporarily introduced by the Italian Government were able, at least in the short term, to compensate for these income losses and for the increased inequality significantly more than the pre-crisis measures.

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1 Introduction[1]

The economic repercussions of the COVID-19 pandemic impacted workers asymmetrically. The existing evidence points out that inequalities increased, since the shock mainly affected workers with unstable and poorly protected jobs (see for instance Blundell et al., 2020).[2] Quantifying the distributive implications of the crisis and the effectiveness of the social insurance benefits introduced to support labour income all around the world is therefore of primary importance. Given the burden that such policies place on public finances, a timely analysis of their effects is informative as to how best to address economic resources during the recovery and in the event of new waves of infection.

This paper estimates the dynamics of the distribution of Italian households' labour income in the first half of 2020 and it assesses the short run effectiveness of the social insurance benefits put in place to support income losses. We focus on Italy, which was the first European country hit by the COVID-19 pandemic and that acted as a front runner in the implementation of lock-down and income support measures. The policies adopted to contain the spread of the pandemic were severe and let to the complete shutdown of many business activities. Many individuals were unable to work, with potentially dramatic consequences for overall employment and inequality. With the aim of limiting these losses, the Italian Government issued several decrees that enhanced existing social insurance benefits and introduced new ones. Some form of income support was basically guaranteed to all types of workers. This contributed to a substantial increase in public spending: according to the latest European Commission autumn forecast, current primary spending in 2020 will reach 828.8 billion euro (it was 748.3 billion in 2019).

The characteristics of the Italian labour market, with a relatively large share of self-employed and temporary workers, and of its social insurance system, which typically gives more protection to employees with permanent contracts, are such that the economic crisis due to COVID-19 might have triggered a rapid increase of income disparities and poverty. The incidence of poverty in Italy largely increased with the financial and sovereign-debt crises and it was still very high, in comparison with the European Union average, even before the COVID-19 emergency.[3]

For our analysis, we use data on the fourth quarter of 2019 from the Italian Labour Force Survey (ILFS),[4] the main database for the official labour market statistics. The ILFS contains information on monthly net wages for employees. To get a measure of labour income for self-employed individuals we follow the imputation methodology developed by Carta (2019),

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[2] Another strand of the literature has focused on how income poverty and inequality have contributed to increase the infection rate (see Brown and Ravallion, 2020 among others).

[3] According to the latest data released by Eurostat (2020), the share of people at risk of poverty or social exclusion was 27.3% in 2018 in Italy, 5.5 p.p. more than the EU average.

[4] Although we currently have the ILFS micro data for the first two quarters of 2020, we need to simulate the Government's intervention on the basis of the pre-COVID labour income, for this reason we use data for the last quarter of 2019. An alternative way to proceed is to use the panel component of the data. We prefer not to take this route this since the sample size is much smaller and, as reported by Istat, the impossibility to run the survey through in-person interviews reduced – presumably in a non-random way – the total number of interviews collected in 2020 by about 10% with respect to 2019. However, we employ the cross-sectional data for the first two quarter of 2020 to run robustness checks for the validity of our simulations.

which exploits both the richness of the ILFS and external data sources. In particular, we impute employees' wages to self-employed workers by means of a simple linear regression model as in Mincer (1974). Then, we rely on the Survey on Household Income and Wealth (SHIW, run by the Bank of Italy) – that provides self-employed incomes but with a significant delay with respect to the reference period – to adjust the average income of self-employed persons to take into account that it might differ statistically from employees' wages even when controlling for observable characteristics. Finally, we focus on the subset of Italian households that is more likely to rely on labour income as its main income source, i.e. households whose reference person is 15-64 years old and where there are no retirees. These households represent about 60% of Italian families (70% of the overall population) and for them labour income is about 80% of disposable income. This selection allows us to avoid the misclassification of households with no labour income as zero-income families, which would greatly affect the inequality measures and undermine the possibility to use them as proxies for the overall income inequality (Carta, 2019).

Based on the individual and family labour incomes computed for the last quarter of 2019, we simulate the average labour income losses for workers and their families in the first two quarters of 2020, in the absence of any income support programme. We introduce hypotheses on: *i*) the reduction in hours worked per sector, calculated on the basis of the information about the sectorial drop in value added recorded in the first six months of 2020 and by applying an elasticity of hours worked to GDP consistent with that observed at the aggregate level from the National Account data; and *ii*) the growth rate of hourly wages, which we assume to follow that observed for negotiated wages in the first two quarters of 2020. Then, we assess how the social insurance benefits in place before the COVID-19 emergency, and those specifically introduced to face the pandemic, are able to absorb the labour income losses, and what their implications are in terms of inequality. Starting from March 2020, the Italian Government has acted in two main directions to support workers:[5] on the one hand, it banned dismissals of all employees and it strongly increased the sectorial coverage of short-time work scheme programmes, which before the COVID-19 emergency were mainly available to firms with at least five employees or to companies operating in the industrial sector. On the other hand, it introduced a lump sum bonus, of the average amount of about 600 euro, for almost all self-employed workers who were not protected by any social insurance programme before the emergency.

We find that, in the absence of social insurance benefits, the crisis would have had a significant effect on the distribution of labour income. First, lock-down measures affected poorer families the most, as members of lower income households were more likely to be employed in non-essential sectors and to have, on average, fewer possibilities to work from home. The share of household members who, at the end of 2019, were employed in locked-down sectors is higher in households in the bottom 20% of the equivalized labour income distribution, and it is decreasing along the distribution. On the contrary, the share of household members employed in occupations that can be carried out from home increases along the equivalized labour income distribution. Moreover, younger individuals with temporary or seasonal contracts, who earn

[5]In this paper we focus only on social insurance programmes for workers and we neglect other types of income support programme, like the minimum guaranteed income (the "Citizenship income").

lower wages on average, were hit hardest by the crisis as they experienced the largest employment losses. Therefore we estimate that, in the absence of social insurance benefits, inequality would have increased significantly: the Gini index on equivalized labour income would have risen by 4.0 percentage points in the first semester of 2020, from 34.8% in 2019.

Moreover, we find that, in the short term, the social insurance benefits available compensated, at least partially, for income losses and for the increased inequality, especially thanks to the new measures specifically introduced by the Government to face the COVID-19 emergency. When taking into account the newly adopted social insurance benefits, the Gini index on equivalized labour income would have gone back to the pre-crisis levels. This result suggests that in the short term the policies implemented to support workers were, on average, effective and helped low-income households to a relatively greater extent. We find that most of the relief, relative to the pre-COVID safety nets, came from the lump sum bonus given to all self-employed individuals during the spring months of the emergency. This represents a substantial difference with respect to the pre-COVID safety nets scenario, since self-employed are traditionally not insured against cyclical income losses in Italy. The extension of short-time work schemes was also important, but it is less visible when we compare the scenario with COVID-19 instruments with that with the pre-existing safety nets. In the latter scenario, employees not covered by short-time work schemes access unemployment benefits, which provide quite similar income support. Differences between obtaining income support through unemployment benefits or through short-time work schemes arise in the longer term: while the latter preserve job matches during temporary downturns, they may create inefficiencies in the medium to long run (Giupponi and Landais, 2018). To assess the medium term consequences of the COVID crisis and the effectiveness of the safety nets introduced to face it in reducing labour income inequality, it therefore remains crucial to monitor the ability of the labour market to reabsorb displaced workers.[6]

The ILFS is not generally used for the analysis of income inequality, but – for the scope of our analysis – it has a clear advantage with respect to standard household income surveys. The ILFS is released on a quarterly basis, with a delay of about 5-6 months with respect to the reference period; standard household income surveys (like the European Union Statistics on Income and Living Conditions, SILC) have a delay of about 2-3 years. For this reason, the latter are not ideal for the study of more recent developments in inequality, which call for prompt government action, as the COVID-19 crisis does. To provide nowcasted estimates of inequality and poverty it is instead becoming popular to use microsimulation models, which are based on standard household income surveys and update past income information in the light of changes in macroeconomic conditions and in the social benefit system (see Navicke et al., 2014, among others). However, these models do not properly capture heterogeneous changes in labour market conditions occurring in the years not covered by the survey. The ILFS makes it possible to obtain a timelier measure of family and equivalized labour income, as developed in Carta (2019); in this way, we have information on inequality trends more than 12 months earlier than in standard household income surveys. Our microsimulation exercise is limited to only two quarters, rather than referring to 2-3 years.

Our paper contributes to several strands of the existing literature. First, to the growing

[6]For a comprehensive description of the channels affecting inequality in the long term see Blundell et al. (2020).

evidence of the impact of COVID-19 on the labour market and on the labour income distribution (see among the others Adams-Prassl et al., 2020, Han et al., 2020 and Aspachs et al., 2020).[7] We contribute to this literature by developing a simulation exercise able to provide timely estimates of the impact of the pandemic – and of the measures introduced by the Government – on the main inequality indices. Our methodology distinguishes us from the existing papers because it relies on a dataset, the Labour Force Survey, which is easily available with little delay in almost all countries around the world and, differently from most of the recently used private sector real time income data, it is representative of the entire population. Furthermore, our data contain very detailed information on individual past working experience, and therefore allow us to swiftly and accurately simulate the extent to which individuals are possibly eligible for the different policy instruments. We can thus assess which policy is more effective in absorbing the effects of the crisis, and which features of the design of these measures could possibly limit their effectiveness.[8] Our data moreover allow us to focus on the household dimension rather than on individual workers, and therefore to take into account intra-family transfers and the household composition. Finally, they allow us to include self-employed workers as well, that are often neglected in analyses on earnings inequality because of the difficulty in providing a reliable labour income measure (see, for instance Brandolini et al., 2012). Although we impute self-employed income, some robustness checks support the validity of our measure. In addition, our paper contributes to the existing literature because it considers a country, Italy, whose labour market features and institutions are similar to those of other countries in Continental Europe, and that was one of those hardest hit by the COVID-19 pandemic. We therefore believe that our results can provide useful insights also for other European economies that may experience the need to implement similarly extreme measures to contain the spread of the pandemic. As for Italy, to our knowledge this is the first paper using timely income data to evaluate the effect of the COVID-19 pandemic on labour income inequality in the first two quarters of 2020 (for analyses of the effects of the COVID-19 crisis relying on past income data and usually only focusing on the first three months of lock-down, see also Guiso and Terlizzese, 2020; Figari and Fiorio, 2020; IRPET, 2020; Gallo and Raitano, 2020 and MEF, 2020). Bonacini et al. (2020) also study the possible consequences of the COVID-19 pandemic on income inequalities in Italy, but they only explore the role of an increase in the number of working-from-home jobs; they find that there is a high risk of exacerbating existing inequalities.

More generally, our paper also contributes to the literature that studies the impact of economic downturns on labour market outcomes (for instance, among many, Hoynes et al., 2012 and Elsby et al., 2010, for Italy see D'Amuri, 2011), as well as to the studies that analyze the

[7] The literature on the immediate impact of the COVID-19 pandemic is flourishing and looks at several outcomes. For reviews see for example Brodeur et al. (2020); Boissay et al. (2020). Chetty et al. (2020) provide a broad analysis on many economic outcomes (spending, business revenues and employment rates) and the mechanisms through which the COVID-shock impacted the economic activity, by using private sector real time data. They conclude that social insurance policies are more effective than traditional macroeconomic tools (stimulus for aggregate demand, liquidity provision) when consumer spending is constrained by health concerns.

[8] In line with Han et al. (2020), we use non-standard data sources to gather information on updated trends in inequality and poverty. Similar attempts belong to the growing literature aimed at "nowcasting" main macroeconomic outcomes with the use of timelier-non standard datasets (see for example Banbura et al., 2013). Alternatives methods are developed with microsimulation models; see for example Navicke et al. (2014); Stoyanova and Tonkin (2016); Gasior and Rastrigina (2016).

importance of different social insurance policies in smoothing temporary economic shocks. For instance, we speak to the literature about short-time work schemes (Giupponi and Landais, 2018; Cahuc et al., 2018), as one of the main policies implemented by the Italian Government during the COVID-19 emergency was a generous extension of the short-time work scheme programme, and to the literature on the role of unemployment benefits in buffering economic shocks (see for instance Rothstein, 2011; Hagedorn et al., 2019; Boone et al., 2020).

The paper is organized as follows. Section 2 describes the characteristics of the data we use. In Section 3 we provide preliminary evidence of the impact of the COVID-19 crisis on employment across sectors. Section 4 illustrates the assumptions and results of our simulations according to different scenarios. Finally, Section 5 concludes.

2 Measuring family labour income in the ILFS

The ILFS is released on a quarterly basis, with a delay of about 5-6 months with respect to the reference period; standard household income surveys (like the SILC or the SHIW) feature a delay of about 2-3 years. For this reason, the latter are not ideal for the study of more recent developments in inequality, which call for prompt government action, as in the case of the COVID-19 crisis.

For our analysis we follow the methodology developed by Carta (2019) in order to estimate in the ILFS data a measure of individual and family monthly labour income on a quarterly or yearly basis. Indeed, as the author shows, the ILFS-based inequality indicators, provided for a certain sub-sample of Italian households, represent a good and timelier (of about 12 months earlier) proxy for overall disposable income inequality.

Carta (2019)'s approach builds on three main steps. First, she shows that labour income inequality is a good proxy for disposable income inequality, especially when focusing on those households most attached to the labour market – where the reference person is 15-64 years old and there are no retirees. Although the importance of income sources other than labour – such as social transfers or capital income that are not measured in the ILFS – has increased over time, labour income still represents a significant fraction of Italian households' disposable income: 60% for the entire population of households; 80% for the sub-sample of families mostly attached to the labour market (Bank of Italy, 2018, SHIW). Moreover, labour income inequality is the main driver of disposable income inequality, accounting for more than 50% of it (see also Raitano, 2016).

Second, following the previous point, she develops her analysis on the sample of Italian households that are more likely to rely on labour as their main income source. The sample is selected excluding families in which the Reference Person (RP) is not of working age (younger than 15 or older than 64) and in which there is at least one retiree. This selection aims at avoiding classifying a household that for instance receives some pension income as a no-income household.[9] The households selected represent about 60% of Italian households and 70% of all

[9]The inclusion of these misclassified households would lead to an overestimation the number of individuals and families without income, undermining the possibility of using the distributional indices computed on labour income as timely indicators for overall income inequality (Carta, 2019). Eurostat, in calculating the share of people living in jobless households, which is an indicator of income poverty, applies a similar selection, considering

individuals; almost all minors live in these households. As expected, given the adopted selection rules, the reference person in the selected sample is younger than in the full sample; the average size of households is larger mostly owing to the presence of children.

Third, since the ILFS data do not provide self-employed incomes (relevant for 23% of Italian workers), Carta (2019) relies on a standard imputation methodology that exploits contemporaneous information on employees' wages. Considering that even in standard household income surveys self-employed incomes are not measurable in a reliable way and are therefore often excluded from the analysis on income inequality (Brandolini, 2000), the inclusion of self-employed workers in the analysis is an advantage of our approach.

Carta (2019) imputes employees' hourly wage[10] to self-employed workers by means of a simple linear regression model as in Mincer (1974). In particular, the logarithm of hourly wage for the employees is regressed on a set of standard variables relating to the individual (i.e. sex, age, level of education, civil status and citizenship), to their working status (working time schedule, sector) and to their family background (number of children, province of residence). The coefficients of the Mincerian regression estimated on the ILFS for the employees are used to impute hourly wages for self-employed workers. Since the resulting distribution is less dispersed than that of the original wages of the employees, an error term is added in order to restore this variability.[11] Then, in order to take into account that, also controlling for observable characteristics, the average self-employed hourly income might statistically differ from that of the employees, Carta (2019) also estimates a Mincer equation model – similar to the one employed in the ILFS – for all workers using the SHIW data, which also include information on self-employed incomes. She then corrects the predicted hourly income of the self-employed in the ILFS with the estimated coefficient in the SHIW associated with being self-employed. Finally, given the predicted hourly labour income, the monthly income of the self-employed is obtained as the product of the predicted hourly income and the amount of hours worked in one month, as reported in the ILFS.[12] Some robustness checks that compare the imputed labour income measure with the observed one in the SHIW confirm the goodness of the imputation (see her paper for more details).

Finally, individual incomes are aggregated at the household level and, by applying the modified OECD equivalence scale,[13] a measure of the equivalized labour income is obtained, so as to allow comparisons across individuals taking into account the size and the age composition of the household to which they belong.

The final dataset built following this methodology augments the standard ILFS data with labour income measures, both at the individual and at the family level, for those households where the reference person is of working age and there are not retirees (as in Carta, 2019). We draw on them to perform our simulation analysis.

those households in which at least one 18-59 year-old lives who is not a full-time student.

[10] This is obtained as the ratio between monthly wage and weekly working hours times the average number of working weeks in one month, 4.3.

[11] Her results are similar if the correction is based on the variance of self-employed income as measured in the SHIW.

[12] Unemployed and inactive individuals are attributed a zero labour income.

[13] The modified OECD equivalence scale attributes a coefficient of 1 to the first adult in the family, 0.5 to additional family members who are at least 14 years old and 0.3 to those younger than 14.

3 The impact of the COVID-19 shock on Italian households: preliminary evidence

We now provide some first descriptive evidence on the possible impact of the COVID-19 shock on the distribution of labour income across individuals and households.

The lock-down measures implemented in March suspended or reduced activity in sectors that absorbed, in the last quarter of 2019, 44% of self-employed workers and 33% of employees (about 34% of total employment). For both types of work, the suspension of activities affected more low-wage/income individuals. In our data, the share of workers in locked-down sectors is almost ten points higher in the bottom 20% of the individual labour income distribution than in the top 20%, for both employed and self-employed workers. Furthermore, workers who belong to the bottom 20% of the labour income distribution have fewer chances to do remote working[14] than workers in richer quintiles.[15]

We observe similar patterns when we look at households rather than at individuals. In 38% of the households considered in our sample, there is at least one worker affected by the lock-down measures. Also in this case, households at the bottom of the equivalized labour income distribution are hit the most (Figure 1): the share of family members working in locked-down sectors over the number of employed individuals in the family is around 37% in the lowest 20% of the distribution, 29% in the highest 20%. Since in the bottom 20% the average number of employed individuals in each family is equal to one, many households could end up having no labour income.

Furthermore, even at the family level, the share of members employed in occupations with a greater possibility of working from home is larger for higher income households (Figure 2): in the top 20% of the distribution of equivalized income, the share of jobs that could be performed from home is about 30 percentage points higher than that observed for the bottom 20%.

4 The impact of the COVID-19 shock and social insurance benefits on labour income

4.1 Estimating the labour income loss at individual and family level

In our simulations, we start from the ILFS micro data referring to the fourth quarter of 2019 and we simulate the labour market dynamics of the first two quarters of 2020. We carry out our simulation exercises under three different scenarios: *i)* a scenario in which there are no social insurance benefits and no dismissal ban (baseline scenario); *ii*) a scenario with the social insurance benefits in force before the outbreak of the pandemic (pre-COVID benefits scenario); and *iii*) a scenario that also takes into account the social insurance benefits and the dismissal ban introduced to face the COVID-19 emergency (post-COVID benefits scenario).[16]

[14] Information on the possibility to work from home is obtained from Basso et al. (2020).

[15] This evidence is also observed in Bonacini et al. (2020).

[16] In the simulations, we focus on the properly anticyclical social safety nets, aimed at smoothing income drops due to the loss of employment; we do not therefore consider minimum guaranteed income schemes like the Citizenship income recently introduced in Italy. Moreover, in the ILFS, some information needed to evaluate the eligibility of a household for the Citizenship income, like the amount of assets and the other income sources,

To simulate our baseline scenario, we start from our measure of monthly labour income observed in the fourth quarter of 2019 and we introduce assumptions on: *i)* the reduction in hours worked at the sectorial level, which is determined on the basis of the estimated sectorial drop in value added observed in the first and second quarter of 2020,[17] to which we apply an elasticity of working hours to value added of about 100%, consistent with what observed in the data;[18] and *ii)* the hourly wage growth, which we assume to be in line with the increase observed in negotiated wages in the first two quarters of 2020 (0.6% with respect to the same period in 2019).

In the baseline scenario (i.e. in the absence of the dismissal ban and of any social insurance measure), we assume that the average reduction in hours worked per sector occurs entirely through employment losses and not through reductions in hours among the employed. With this aim, we need to simulate which worker – within each sector – loses his (her) job. We first assume that temporary contracts expiring in the months of the lock-down are not renewed. Second, we identify those workers who, within each sector, are more at risk of losing employment owing to the COVID-19 shock. In particular, we estimate the probability of becoming unemployed within the year based on some characteristics observed in the fourth quarter of 2019 (for example, gender, marital status, type of contract, sector of employment, age, level of education).[19] We then assume that those individuals belonging to the share of the population with a value for this probability above a certain threshold would lose their job. We define this threshold such that, at the sectorial level, the overall drop in hours worked generated by these employment losses, corrected by a factor that takes into account the average number of full-time equivalent employment units (FTE) in each sector, is equal to the average drop in hours worked estimated at sectorial level.

Appendix B provides details on the assumptions underlying each scenario for different types of workers, as well as on the main policies in place before and after the outbreak of the COVID-19 emergency. In summary, the Italian social insurance system before the COVID-19 pandemic was characterized by the presence of an unemployment benefit scheme, covering the large majority of workers who loose their jobs because fired by their employer or because their contract expires.[20]

is not available.

[17] To obtain an estimate of the drop in value added with the greatest possible sectorial detail, we start from the average reduction observed at the macro-sector level (agriculture, industry, construction, services) from the National Accounts statistics and we additionally assume that, within each macro-sector, the reduction in economic activity in each lower-level sector is proportional to the share of value added attributable, before the COVID emergency, to the activities suspended by the lock-down measures (we use the sectorial detail available in the National Accounts). For example, within the industrial sector, once the average reduction in value added is set equal to the National Account statistics, we attribute a greater decrease in activity to those sectors with the largest share of value added produced by activities suspended during the health emergency (like metallurgy, where this share is estimated at around 80 per cent).

[18] The actual aggregate National Accounts data available for the first two quarters of 2020 confirm this assumption: the sectorial drop in value added is almost equal to the observed average drop in working hours in each sector.

[19] To identify the characteristics of the individuals most likely to lose their job, we used a probit model to analyse, the characteristics observed most frequently among those who lost their jobs in 2019 (they were not employed in the fourth quarter of 2019 but, according to the retrospective question contained in the questionnaire, they were employed in the previous year). The variables used in this model are: the type of contract (fixed-term, permanent or self-employed worker), the sector of employment (12 categories), sex, age, marital status, number of children, level of education (three categories), the geographical area of residence (North, Centre and South).

[20] Eligibility for the unemployment benefit scheme requires 13 weeks of paid contributions in the last 4 years before the job loss.

Moreover, firms with at least five employees or companies in the industrial sector were allowed to use short-time work schemes programs, to avoid large employment adjustments when facing temporary economic difficulties. Finally, no income support program was basically envisaged to cover labour income losses of self-employed individuals, as well as of workers with very unstable individual careers who do not reach eligibility for the unemployment benefit scheme.

The Government's action during the months of the pandemic followed two main directions: on the one hand, it introduced a dismissal ban and simultaneously expanded the coverage of the short-time work schemes to almost all sectors. On the other hand, to protect workers who were not covered by any social insurance benefit (self-employed individuals in particular), the Government introduced a lump sum bonus, of about 600 euro on average, in the months of March, April and May.[21]

In the simulations that consider the role of social insurance benefits (pre-COVID benefits scenario and post-COVID benefits scenario), we assume that all individuals who meet the requirements for applying for a specific benefit would submit an application and receive the subsidy (full take-up), with the exception of the bonus for the self-employed, for which we have information on the observed average take-up. Our estimates are therefore to be considered as a lower bound of income losses. The hypothesis of full take-up appears realistic for workers in the short-time work scheme (since it is requested by firms and not by individual workers), for whom we assume they always access the programme in proportion to the loss of hours estimated for their sector of employment. The full take-up assumption may instead be less realistic in the case of unemployment benefits, since recent estimates show that it was around 50% in 2016 (Giorgi, 2019). However, it is likely that the take-up of this measure was higher during the COVID-19 crisis, due to the deteriorated employment prospects and the reduced possibility of finding employment in the short term. As for the bonus provided to self-employed workers, we use the available information about the take-up, of about 70% on average, as estimated by (Bovini et al., 2020).[22]

4.2 Results: the effects along the income distribution

According to our estimates, in the period March-May 2020, workers and households with at least one employed individual at the end of 2019 experience, on average, significant earnings reductions (Table 1). In the absence of any Government intervention (baseline scenario), the drop is, on average, of 17% relative to the 2019 labour income, and it is concentrated among temporary workers and self-employed individuals. The social insurance benefits in place before the surge of the pandemic only partially mitigate the earnings losses, of about 10%, on average, of the pre-crisis labour income. These "pre-COVID benefits" only smooth the earnings losses of employees only, through the short-time works schemes (available mainly in the industrial sector) and the unemployment benefit programme. The measures introduced by the Italian

[21] The income support provided by the Government in March and April consisted in a 600 euro benefit, given to all self-employed individuals independently of their previous income and of the income losses they actually experienced during those months; in May, the benefit was instead only provided to self-employed individuals who actually experienced at least a 33% revenue loss relative to 2019. See Appendix B for more details.

[22] Labour income losses are lower once we relax this assumption and we assume a full take-up for the self-employed bonus as well.

Government to face the crisis further offset, on average, the fall in labour income: the expected drop in earnings between March and May is 6% according to this scenario. The main difference between the "post-COVID benefits scenario" and the pre-crisis one is given by the *una tantum* benefit introduced for self-employed individuals in the months March-May, which reduces the drop in income for this type of workers from 24 to 5%, on average. The extension of short-time work schemes was also important and affected a large fraction of workers; however, its effect in mitigating earnings losses is less visible when we compare the scenario with COVID-19 instruments with that with the pre-existing safety nets. In the latter scenario, employees not covered by short-time work schemes have access to unemployment benefits, which provide fairly similar income support. Temporary workers are those who end up being less protected by the existing social insurance benefits and the newly introduced ones. Indeed, the COVID-specific interventions did not operate explicitly to address their income losses.[23]

When we evaluate the effects of the crisis and the ability of the social insurance benefits to smooth the earnings losses, we find that they are heterogeneous along the income distribution. Although in absolute terms, the drop in family labour income increases along the equivalized labour income distribution, the percentage loss with respect to the pre-crisis income level is instead larger at the bottom of the distribution (Figure 3, panels 3a and 3b respectively).

However, "pre-COVID benefits" and especially "post-COVID benefits" are able to significantly reduce the losses, mainly at the bottom of the equivalized labour income distribution. This is due to the structure of social safety nets. First, as for the benefits in place before and after the pandemic, the presence of some upper limits in the amount of the short-time work scheme allowances and the progressivity in the computation of the amount of unemployment benefits end up rewarding relatively more workers with a lower income. Second, the allowance introduced for self-employed workers in the "post-COVID benefits scenario", was paid to all workers in March and April irrespective of their income losses and from their pre-COVID income. This represents a significant gain which benefits relatively more lower income workers: in the bottom 20% of the individual earnings, 600 euro are about 80% of the average labour income of self-employed individuals. Even before the crisis, the share of self-employed workers who declared an income of less than 600 euro exceeded 10% (Bank of Italy, 2018).

4.3 The effects on inequality

According to our simulations, in the absence of social insurance benefits (the baseline scenario), inequality, as measured by the Gini index on equivalized labour income, rises from 34.8 in 2019 to 36.5% in the first quarter of 2020, and to 41.1% in the second quarter of 2020. These are highly significant increases, although they should be interpreted with caution given the assumptions

[23] For instance, the Government did not intervene with the aim of extending the duration of temporary contracts. The main measures introduced by the recent decrees that were effective for temporary workers (even if targeted to all employees, not specifically to them), were: (i) the 100 euro per month bonus given to those who could not work from home, which represented a 10% increase in temporary workers' monthly income and (ii) the extension of the short-time work schemes – but only for the residual duration of the contract – that benefited temporary workers relatively more because the way the short-time work scheme benefit is computed tends to favour low wage workers more than the unemployment benefit scheme. The combination of these two measures helped to reduce the income losses of temporary workers in the post-COVID benefits scenario, which, however remained at 11% of the pre-crisis income due to the very high probability of temporary workers to losing their jobs during the pandemic (because their contract expired) and becoming unemployed.

introduced in Subsection 4.1. The overall increase in the Gini index in the first semester of 2020 (of 4.0 p.p.) is even larger than the one observed over the entire period of the double dip recession (3.1 p.p. between 2009 and 2014).[24] On applying the decomposition of the Gini index proposed by Atkinson and Brandolini (2006), the increase in inequality is attributable by about 75% to the growth in the share of people belonging to households without labour income[25] (about 4.1 points higher in the first semester of 2020, from 9.9% in 2019); the remaining 25% is attributable to the increase in inequality between individuals living in households with positive earnings. These dynamics are similar to those observed during the entire period of the Great Recession and the sovereign debt crisis, but would occur in a much shorter time span.

Comparing the Gini index on individual and on equivalized labour income for a given subgroup of the population allows us to assess the role of the family in smoothing earnings differences among individuals and to get insights on the characteristics of those households who suffered the most during the crisis. We focus on the working age population living in the subsample of households considered in our analysis. Despite, on average, if one takes into account the family dimension inequality on labour income is about 30% lower, the Gini index on equivalized labour income increases relatively more than that on individual earnings between 2019 and the first half of 2020 (respectively by 12 and 9%). This is due to the fact that the share of individuals without labour income increased much less than that of individuals living in household with no earnings in the first two quarters of 2020 relative to 2019 (the share of individuals with no labour income increased by 14.8%, while that of families with no labour income increased by 41.3% in the same period). This suggests that during the COVID-19 crisis income losses affected less heavily single person than multi-person households, who ended up with no income at all.

Finally, we find that social insurance benefits are effective in significantly cushioning the increase in inequality in the short term. Those designed to face the COVID-19 emergency have more equalizing power than the social benefits in place before the pandemic: they restore equivalized labour income inequality to pre-crisis levels, both in the first and in the second quarters of 2020. Similar evidence is observed as for the share of individuals living in households with no labour income.

Figure 4 compares the distribution of equivalized labour income across our simulated scenarios, with and without the social safety nets. We can see that the scenario with post-COVID benefits, especially in the second quarter of 2020, is the one that better rebalances the distribution around the mean values of equivalized labour income, implying also a lower level of inequality.

4.4 Robustness checks

In this section, we perform a set of robustness checks to evaluate the reliability of our simulation exercise.

First, we use the available cross-sectional data of the ILFS for the first two quarters of 2020 to evaluate whether the labour income dynamics observed in the actual data are similar to

[24] Other inequality indices, such as the income quintile share ratio (S80/S20 ratio), also suggest an increase in inequality – even relatively larger – over the same period under the baseline scenario.

[25] This is a similar indicator to the share of individuals living in jobless households, computed by Eurostat as a proxy for poverty.

those obtained through our simulations.[26] Estimates of labour income are again obtained as in Carta (2019) and provide a measure of observed labour income net of any kind of income benefit. Thus, the actual data are comparable with the baseline scenario of our simulations, with the difference that the actual data also reflect the dismissal ban introduced in March 2020, while our baseline scenario simulates earnings by assuming the absence both of income benefits and of the dismissal ban. However, this difference is important for employment and less so for labour income dynamics; when excluding social benefits, both dismissed individuals and those in a 100% short-time work scheme programme obtain zero income. We find that our simulation of the baseline scenario captures the observed distribution of equivalized monthly labour income quite precisely (net of any income benefit; see Figure A.1 in the Appendix). The increase in the Gini index on equivalized labour income in the actual data is the same as that observed in our simulations of the baseline scenario in both quarters; the rise in the share of individuals living in households without labour income is also almost the same (4.3 rather than 4.1 percentage points over the first half of 2020).

Second, we verify the reliability of our assumptions on the drop in hours worked needed to simulate the loss in earnings. When we compare the aggregate reduction in hours worked in the first two quarters of 2020 from the National Accounts data (with the maximum possible sectorial detail available) with the results of our simulations, we find that our simulated results are quite in line with the actual data. The average difference across macro-sectors between our simulations and the actual data is about 2 percentage points (over an average reduction of about 15 percentage points).[27]

Finally, we exploit a real time survey conducted by the Bank of Italy at the beginning of April with the aim of timely evaluating the economic conditions of Italian households during the pandemic (the Special Survey of Italian Households).[28] The survey collects households' opinions on current and expected economic conditions relating to the COVID crisis. In Figure A.2 in Appendix A, we display the share of individuals reporting that their income (including any income support benefit) decreased, remained constant or increased as a result of the COVID-19 emergency. The figure shows that the crisis strongly hit families with lower earnings. Notice that by the beginning of April, when the survey was run, the payment of most income benefits to workers had not occurred yet. Therefore, the losses reported in the survey are similar to those found in our baseline scenario (net of income support benefits to workers).

5 Conclusion

This paper estimates the effect of the COVID-19 pandemic on the distribution of Italian households' labour income in the first two quarters of 2020. Moreover, it assesses the short run

[26] We do not employ the data for the first two quarters of 2020 in Section 4 since we need to simulate the Government's intervention – tailoring the amount of the benefits – on the basis of the pre-COVID labour income. Alternatively, we can use the panel component of the survey. We do not opt for this since the sample size is much smaller and, as reported by Istat, the impossibility to run the survey through in-person interviews reduced – presumably in a non-random way – of about 10% the total number of interviews collected in 2020 with respect to 2019.

[27] We cannot use the official data directly in our simulations because we need more disaggregated sectorial detail for our analysis.

[28] See https://www.bancaditalia.it/statistiche/tematiche/indagini-famiglie-imprese/indag-straord-famiglie-italiane

effectiveness of the social insurance benefits put in place by the Government to support labour income losses. In particular, the methodology relies on the Italian Labour Force Survey (ILFS) data, the main database for the official labour market statistics, augmented with information on individual and family labour incomes obtained following the methodology developed by Carta (2019). We introduce some assumptions on the transmission of the COVID-19 shock to employment, working hours and labour earnings.

We find that, in the absence of social insurance benefits, the crisis would have significantly increased equivalized labour income inequality. This finding is grounded on three main observations. First, workers belonging to lower income households were more likely to be employed in sectors involved in the lock-down measures and, secondly, employed in occupations characterized, on average, by fewer possibilities of working from home. Third, younger individuals with temporary contracts, who earn lower wages on average, were hit hardest by the crisis as they experienced the largest employment losses. We estimate that, in the absence of social insurance benefits, the Gini index would rise by 4.0 percentage points in the first semester 2020, from 34.8% in 2019. This increase in inequality is substantial: it is larger than the one observed over the entire period of the double dip recession (when the Gini index increased by 3.1 p.p. between 2009 and 2014).

Moreover, we find that in the short term, the pre-existing social insurance benefits were able to compensate for income losses and for the increased inequality, but those specifically introduced to face the COVID-19 emergency were significantly more. This result suggests that in the short term, the effort made by the Italian Government to sustain Italian households was effective on average. Relative to the pre-COVID safety nets, the main difference is due to the lump sum bonus given to all self-employed individuals during the months of the emergency. The long-run effects on inequality will depend on how long the Government will be able to support the economy with social insurance policies and on the market's ability to reabsorb the workforce currently not used in the sectors mostly hit by the crisis. Moreover, our work points out that the Italian social insurance system is highly fragmented and does not ensure the labour incomes for all workers against economic shocks; in particular, it does not protect temporary employees, usually the main margin of adjustment for firms, and self-employed individuals. Although there is an economic rationale behind the different degrees of protection across workers, the severity of the current crisis has shown the need to leave no one behind. It calls for a rethinking of the existing social insurance system. For instance, it could be optimal to introduce policies that incentivize self-employed individuals to ensure against adverse shocks or that directly provide insurance, envisaging some form of experience ratings to avoid moral hazard behaviours.

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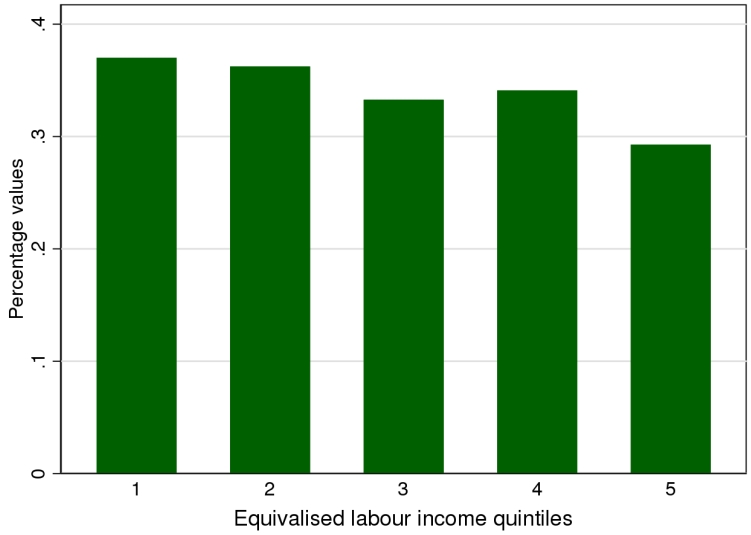
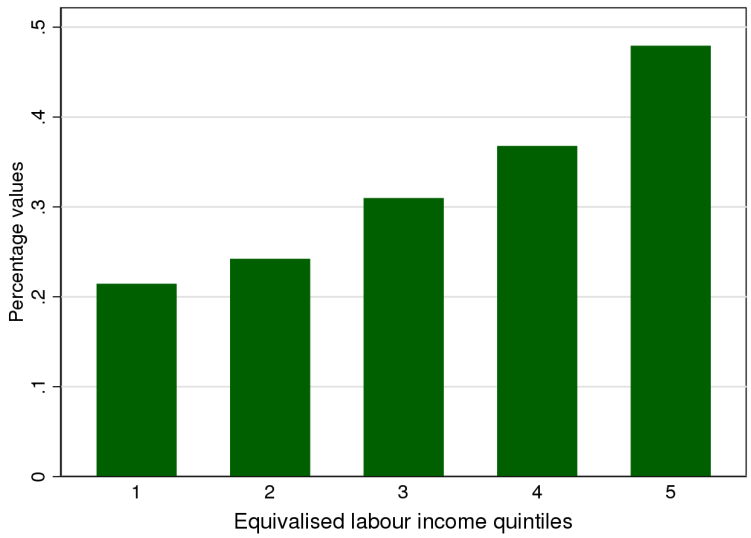
Figures and Tables

Figure 1: Share of household members employed in locked-down sectors over the equivalized labour income distribution



Source: ILFS, last quarter of 2019.
Note: Households with no retirees, with the reference person between 15 and 64 years old and at least one employed member.

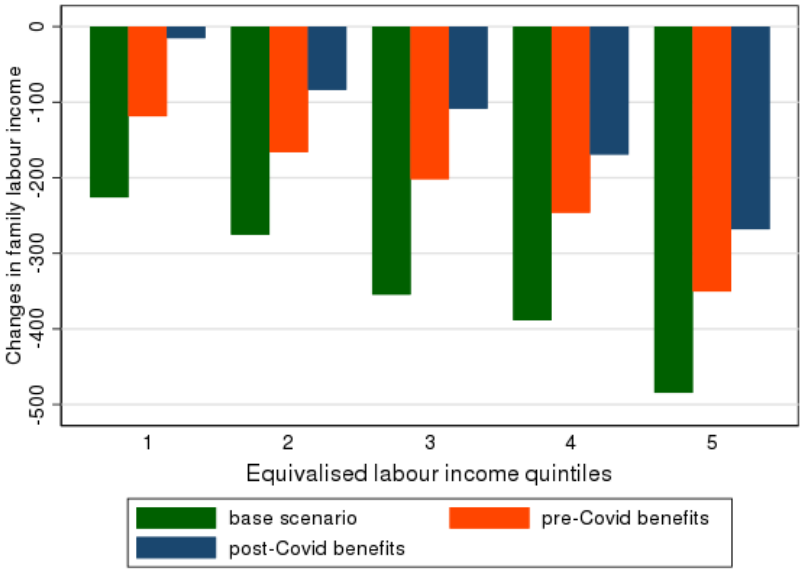
Figure 2: Share of household members with teleworking jobs over the equivalized labour income distribution



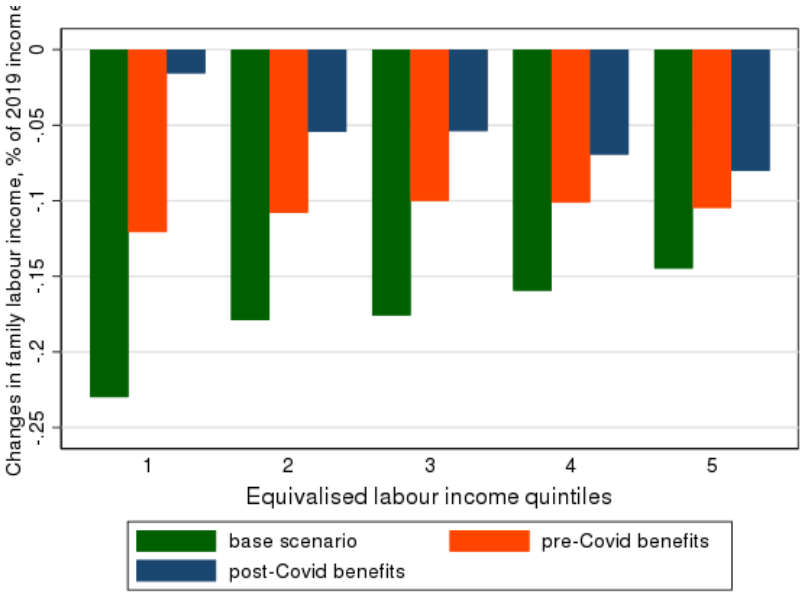
Source: ILFS, last quarter of 2019.
Note: Households with no retirees, with the reference person between 15 and 64 years old and at least one employed member. A worker can work from home according to the index developed by Basso et al. (2020).

Figure 3: Average change in household monthly net labour income in the period March-May 2020 by equivalized labour income quintiles (pre-crisis levels)

(a) Absolute value, euro



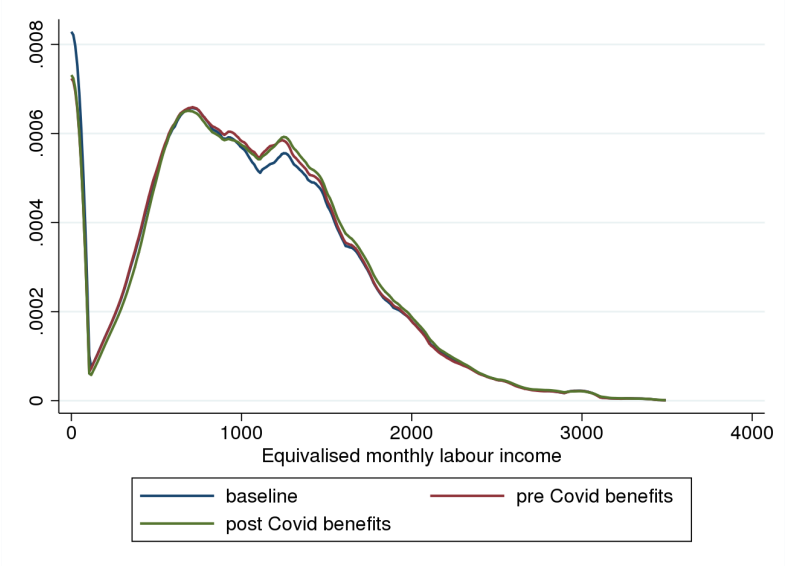
(b) % of pre-crisis levels of household net labour income



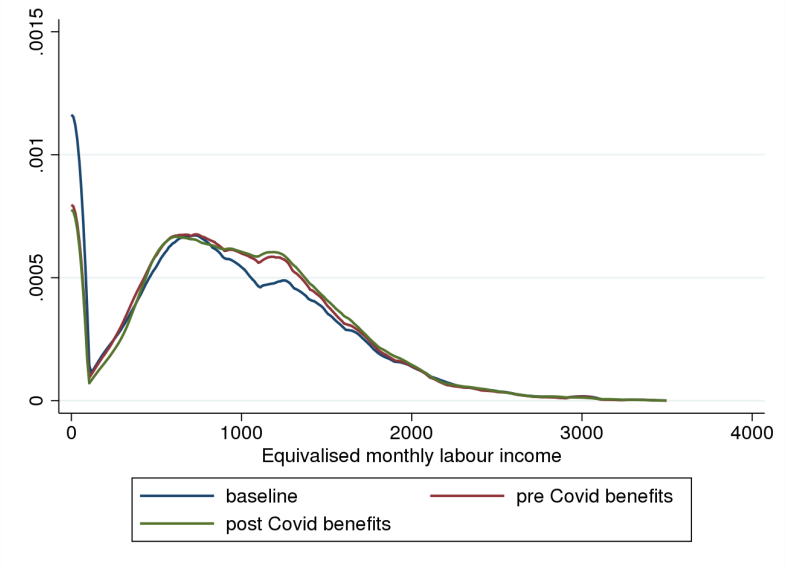
Source: Our simulations based on the ILFS, last quarter of 2019.
Note: Households with no retirees, with the reference person between 15 and 64 years old and at least one employed member.

Figure 4: Distribution of equivalized monthly labour income across different scenarios

(a) First quarter 2020



(b) Second quarter 2020



Source: Our simulations based on the ILFS, last quarter of 2019.
Note: Households with no retirees and the reference person between 15 and 64 years old.

Table 1: Average change in individual and household monthly net labour income in March-May 2020, % of the corresponding average income in the last quarter of 2019

	Base scenario	pre-COVID benefits	post-COVID benefits
Employees, open-ended contracts	-9	-5	-5
Employees, fixed-term contracts	-52	-18	-11
Self-employed	-24	-24	-5
Households, at least 1 empl.	-17	-10	-6

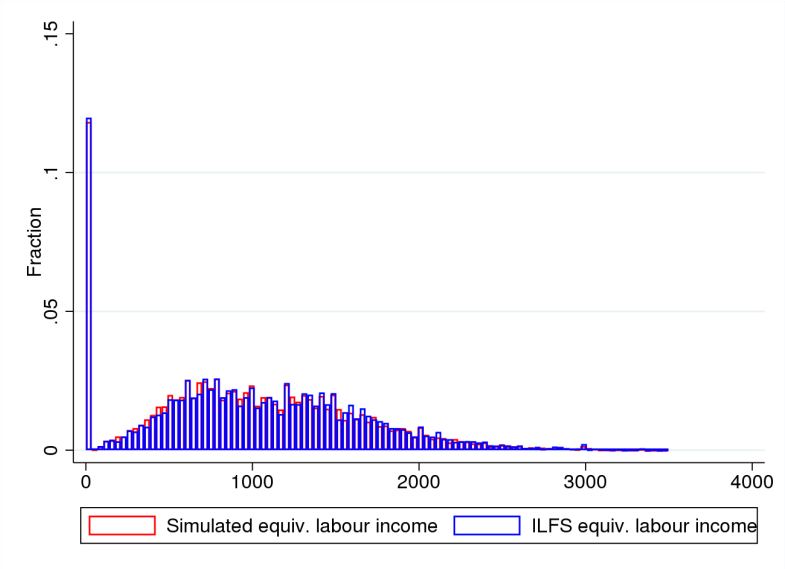
Source: Our simulations based on the ILFS, last quarter of 2019.

Note: Households with no retirees and the reference person between 15 and 64 years old. Within this sample, in the Table we focus on employed individuals between 15 and 64 years old. Average monthly net earnings in the last quarter of 2019 is 1,440 euro for an employee with an open-ended contract, 1,030 for a temporary worker and 1,370 for a self-employed. Average monthly net household income in households with at least one worker is 2,074 euro.

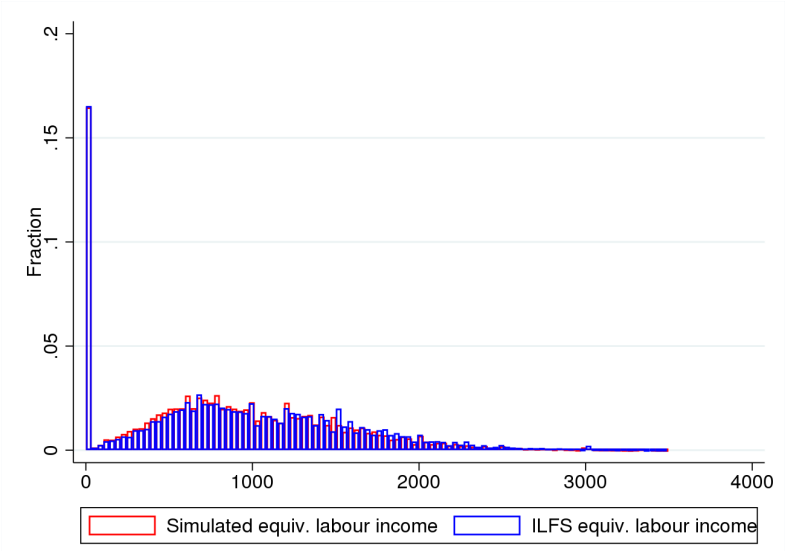
A Additional Tables and Figures

Figure A.1: Distribution of equivalized monthly labour income in the simulated baseline scenario and in the ILFS data

(a) First quarter 2020

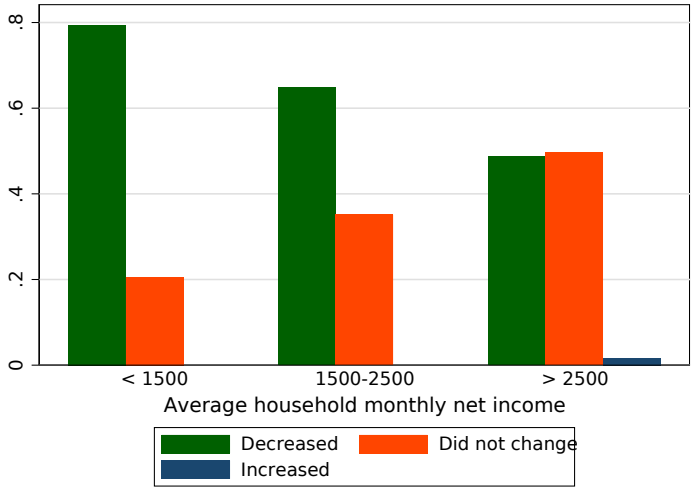


(b) Second quarter 2020



Source: Our simulations for the baseline scenario (with no social safety nets) on the ILFS data for the last quarter of 2019 and the ILFS data for the first two quarters of 2020.
Note: Households with no retirees and where the reference person is between 15 and 64 years old.

Figure A.2: Self-reported earnings losses by classes of average household income



Source: Bank of Italy's Special Survey of Italian Households.
Note: The Table reports the share of respondents reporting that their income decreased, increased, or remained constant in answer to the question "As a result of the COVID-19 emergency and also including any income benefit, how has the income of your family changed in the last two months?"

B Main features of the Italian social insurance benefits before and during the COVID-19 emergency

Permanent employees

- **Baseline scenario (no social insurance benefits)**: We assume that the estimated reduction in hours worked in each sector is entirely translated into a loss of employment for the workers most exposed to the risk of loosing the job (based on the assumptions described in Subsection 4.1). Hours per employee are instead left unchanged among those who remain employed.

- **Pre-COVID benefits scenario**: Workers employed in the industrial sector have access to the short-time work schemes (*Cassa Integrazione Guadagni*, CIG) in proportion to the estimated loss of hours in the sector where they are employed.[29,30] For those employed in other sectors, we follow the same assumptions made in the baseline scenario. Finally, we assume that all employees who lose their job obtain an unemployment benefit (Nuova Assicurazione Sociale per l'Impiego, NASpI in Italy).[31]

- **Post-COVID benefits scenario**: In this scenario, no permanent worker loses employment (due to the dismissal ban introduced by the Italian Government). All workers access the short-time work schemes, in proportion to the projected loss in hours worked per sector of employment. All employees who do not have the possibility to work from home in no-suspended sectors obtain a 100 euro bonus for the months of March and April in proportion to the share of hours actually worked (excluded from the short-time work scheme).[32,33]

Temporary employees

- **Baseline scenario (no social insurance benefits)**: As for workers whose contract did not expire in the first semester of 2020, we assume that the estimated reduction in hours worked in each sector is entirely translated into a loss of employment for those with the highest risk of losing their job (based on the assumptions described in Subsection 4.1). Hours per employee are instead left unaltered among those who remain employed. As for workers whose contract expired in the period we consider, we assume that contracts

[29] The hypothesis that only employees in the industrial sector have access to the short-time work schemes (CIG) is a simplification aimed at taking into account the absence of the CIG in the non industrial sectors before the COVID emergency. The results are robust to the elimination of this hypothesis (i.e. if we assume that the CIG covers all sectors, even before the COVID emergency).

[30] Individuals under short-time work schemes receive 80% of their labour income, subject to some upper limits decided yearly by the Government.

[31] The amount of the benefit is equal to 75% of the average monthly wage in the previous year, if it is lower than the upper limit yearly set by the Government, and is equal to 75% of the average monthly wage in the previous year plus 25% of the difference between the average monthly wage and the upper limit, when the average monthly wage is higher than the upper limit set by the Government.

[32] To compute the amount of the benefits obtained under the short-time work scheme we use the gross labour income, obtained by applying a rate calculated on the basis of the data available in the Survey on Income and Living Conditions (SILC), which reports both gross and net income from administrative sources.

[33] The possibility of working from home was estimated on the basis of the indicator calculated in Basso et al. (2020).

that expired in the months of the lock-down (March or April) are never renewed; in the other months (January, February, May and June) we assume that they are renewed with a probability similar to that observed in the same months of 2019.

- **Pre-COVID benefits scenario**: As for workers whose contract is in force, we assume that those employed in the industrial sector have access to the short-time work schemes in proportion to the estimated loss of hours in the sector where they are employed; for those employed in other sectors, we follow again the same assumptions made in the baseline scenario. Finally, we assume that all employees who lose their job or whose contract expires and is not renewed obtain an unemployment benefit (NASpI).

- **Post-COVID benefits scenario**: As for workers whose contract is in force, we assume that all workers have access to the short-time work schemes in proportion to the estimated loss of hours in the sector where they are employed. Moreover, all employees who do not have the possibility to work from home in no-suspended sectors obtain for the months of March and April a 100 euro bonus in proportion to the share of hours actually worked (excluded from the short-time work scheme). Finally, we assume that all employees who lose their job or whose contract expires and is not renewed obtain an unemployment benefit (NASpI).

Self-employed workers

- **Baseline scenario (no social insurance benefits)**: The drop in average monthly labour income is proportional to the loss in value added expected in each sector of employment, after having taken into account the presence of fixed costs.[34]

- **Pre-COVID benefits scenario**: Self-employed workers suffer the same decrease in earnings estimated in the baseline scenario and are not entitled to any social safety net.

- **Post-COVID benefits scenario**: Self-employed workers suffer the same decrease in earnings estimated in the baseline scenario and get a lump sum bonus of 600 euro on average starting from March.[35]

[34] We take into account the presence of fixed costs for self-employed workers (such as, for instance, rental costs) which must be paid in full, regardless of the sectorial loss of value added. We estimate the fixed costs using the balance sheet data for small businesses available for 2017. In particular, we exploit the information about the weight of long-term lease payments and of the leasing of goods over the overall gross operating income for small businesses. We then attribute this same fixed costs weight to the gross income of self-employed workers in our sample, assuming the existences of a minimum value of fixed costs, which needs to be paid even among workers with very low incomes. Our results are robust to changes in the assumptions regarding fixed costs for self-employed individuals.

[35] In March and April the Italian Government introduced a 600 euro bonus for all self-employed workers with the exception of professionals with a private pension fund whose labour income in 2018 was above 50,000 euro (or whose income was between 35,000 and 50,000 but who did not experience significant income losses in the first quarter of 2020). The bonus was also offered to collaborators, workers in the agricultural sector with fixed-term contracts who in 2019 were employed for at least 50 days and seasonal tourism workers who lost their jobs in the period between January 2019 and March 2020. In practice, given the information available in the ILFS, we assume that all tourist sector workers and agricultural workers are eligible for the bonus. Moreover, we exclude from the bonus all professionals enrolled in private pension funds with incomes exceeding 50,000 euro in 2019. We also exclude individuals who declare they have a second occupation; those over the age of 67, who presumably are not eligible because they receive retirement income (see Bovini et al., 2020). Starting from April, the Government issued a 500 euro bonus also for domestic workers with a regular contract. In May

the bonus for self-employed workers was raised to (minimum) 1000 euro, but was only issued to workers who experienced a loss greater than 33% of their revenues relative to the same period in the previous year. In June self-employed individuals did not receive any bonus, while workers in the tourism sector continued to receive a 1000 euro bonus.