1. Title
Home Production, Welfare, and the Distributional Consequences of the Covid-19 Lockdown

2. Authors
Fabio Cerina, University of Cagliari, Email: fabiocerina@gmail.com
Miguel León-Ledesma, University of Kent and CEPR, Email: m.a.leon-ledesma@kent.ac.uk
Alessio Moro, University of Cagliari, Email: alessiomoro@gmail.com
Michelle Rendall, Monash University, Email: mtrendall@gmail.com
Satoshi Tanaka, University of Queensland, Email: s.tanaka.0509@gmail.com

3. Abstract
Billions of people in most economies in the world are now subject to strict lockdown to slow the spread of the Covid-19 pandemic. There is no doubt that the almost complete shutdown of most non-essential sectors will lead to an unprecedented drop in GDP, increase in unemployment, firm bankruptcy, and government debt. GDP reflects the value of final production of market activities. However, a fraction of consumption by households is provided through non-market home produced activities. Home production is substitutable with certain market services, but not with other types of activities. At the same time, certain market services can be produced from home but others cannot. Without this context, analysing the welfare effects of the lockdown requires consideration of the role of home production and the extent to which work from home is feasible. Because not all sectors and occupations will be affected the same way, the lockdown will also have distributional effects. Skilled workers who perform cognitive tasks would be able to work from home and suffer less from the lockdown, while unskilled workers who provide manual, face-to-face services would be severely affected by the lockdown.

In this project, we propose using quantitative macroeconomic models with heterogeneous agents and multi-sector environments to analyse the welfare and distributional consequences of the lockdown. Specifically, we aim to answer the following questions:
• What are the welfare effects of the lockdown when considering the role of home production and sectors with different degrees of flexibility to work from home?
• What are the distributional consequences for different sectors, individual skill levels, gender, and household composition?

The models can be useful along two dimensions. First, they can serve as the basis for modelling the household sector with a limited degree of heterogeneity in larger macroeconomic models assessing the impact of the social distancing measures. Second, because of the distributional effects, they can be used to analyse the effect of alternative tax and transfer policies.

The project relates to an expanding literature on the distributional and sectoral effects of the Covid-19 pandemic. Without being exhaustive, we can mention Alon et al. [2020], Glover et al. [2020], Kaplan et al. [2020], Krueger et al. [2020], and Barrot et al. [2020]. Although it is not our intention to review them all in this short proposal, these papers either do not consider the effect of home production or they do so in a very simplified framework allowing for limited sectoral heterogeneity.

The model we plan to develop considers the endogenous consumption and time allocation of households. There will be heterogeneity in terms of production sectors, workforce sector-specific skills, and education. In versions of the model used to study distributional effects, we will also introduce gender and family composition heterogeneity to analyse the differential effect on families with children. Thus, it can be used to understand which types of workers/households/gender are most affected by the lockdown policies. The model will be based on previous work, which considers the role of home production in the U.S. economy and its role for the allocation of employment and production across sectors. In particular, we will build upon the frameworks in Moro et al., 2017 and Cerina et al., 2017. 

The model economy consists of three market sectors, services workable from home, sh, services not workable from home, sn, substitutable (to home) services, ss, and a home sector, h. Sectors workable from home are those activities where a large fraction of work can be done remotely from home (e.g. education, consultancy, software development). Services not workable from home are those that require a physical presence (e.g. parts of health provision, retail stores, construction, and most goods). Substitutable services are those that are provided in the market but can be substituted for home production (e.g. restaurant meals, home maintenance and repair, cleaning, nurseries). Each agent is endowed with a triple of skills corresponding to their productivity in each of the market services. Thus,
there is a density of agents with different skill characteristics and an agent is perfectly identified by a point in the support of the skills distribution. Each agent is also endowed with one unit of time, which is split between working at home or in the market. They can also be educated or non-educated. In versions with more heterogeneity we will distinguish agents’ distributions by gender and the decision unit can be a single household, single household with children, a married couple, and a married couple with children. Finally, we will start off with a static environment such that, given the fundamentals at time $t$, the equilibrium of the model is uniquely determined in that period. In that sense, the model assumes no savings and capital accumulation. Although these extensions can be introduced in a more fully-fledged version, we prefer to keep the environment simple to isolate the channels and margins of interest in the project. In the model, agents allocate consumption between different types of services. As in Moro et al., 2017 and Cerina et al., 2017 the utility function allows for a different degree of substitutability between home services and substitutable services, with respect to substitutability among all services. Agents also allocate time to home and market production. Firms maximize profits and use only labor to produce services. Labor is an aggregator of imperfectly substitutable educated and non-educated workers (both in efficiency units defined by the skills distribution).

The equilibrium conditions of the model will then define a set of relative prices and wages, and a set of optimal choices of consumption and labor supply. The model can then be used to compute a set of experiments corresponding to different scenarios under the lockdown. We will model the lockdown as a constraint to workers who cannot work from home that will force them to employ all their labor endowment in home production activities. Workers who can work from home instead, will keep their maximization problem unchanged (although we can also assume that they are affected, but to a lesser degree). The restriction will affect different sectors differently depending on the extent their labor demand is workable from home. The lockdown can also affect productivity levels differently depending on the family composition of the household (i.e. workable from home productivity falls more for households with children). We will work under the assumption of no labor mobility between sectors in the short run. This assumption allows us to work out the effects on the wages of different types of agents, relative sectoral prices, relative consumption allocations, and consumption equivalent welfare losses. Finally, we will experiment with different policy alternatives to alleviate the welfare impact of the lockdown: differential taxation between sectors, wage subsidies (with or without an upper limit corresponding to the UK and Australian proposals), childcare subsidies, and price subsidies to firms.

4. Data

The model will be calibrated using data for the US. The main source of data will be the American Community Survey (ACS). First, we will look into the different degree to which certain occupations can be performed remotely (see Dingel and Neiman [2020], and Hensvik et al. [2020]). This will allow to classify the different sectors of the economy by their degree of “workability from home” (WFH). This classification, together with the one developed in Moro et al., 2017 to classify substitutable services, will allow us to map the different sectors in the data into our three sector classification in the model: services workable from home, $sh$, services not workable from home, $sn$, and substitutable (to home) services, $ss$. Next, we will use data on the demographic structure, wages and hours worked from the ACS to calibrate the model for a specific year (similarly to Cerina et al., 2017). We plan to use the 2017 ACS as this is the most recent year available and we are interested in calibrating a model economy resembling the 2020 one. To run the calibration, we might also resort to the American Time Use Survey (ATUS) for data concerning the time allocated to the production of household services of specific demographic groups.

5. JEL classification codes

E21, E24, J22, J24

6. Keywords

Pandemic lockdown, home production, household heterogeneity, work from home, distribution effects.

References: