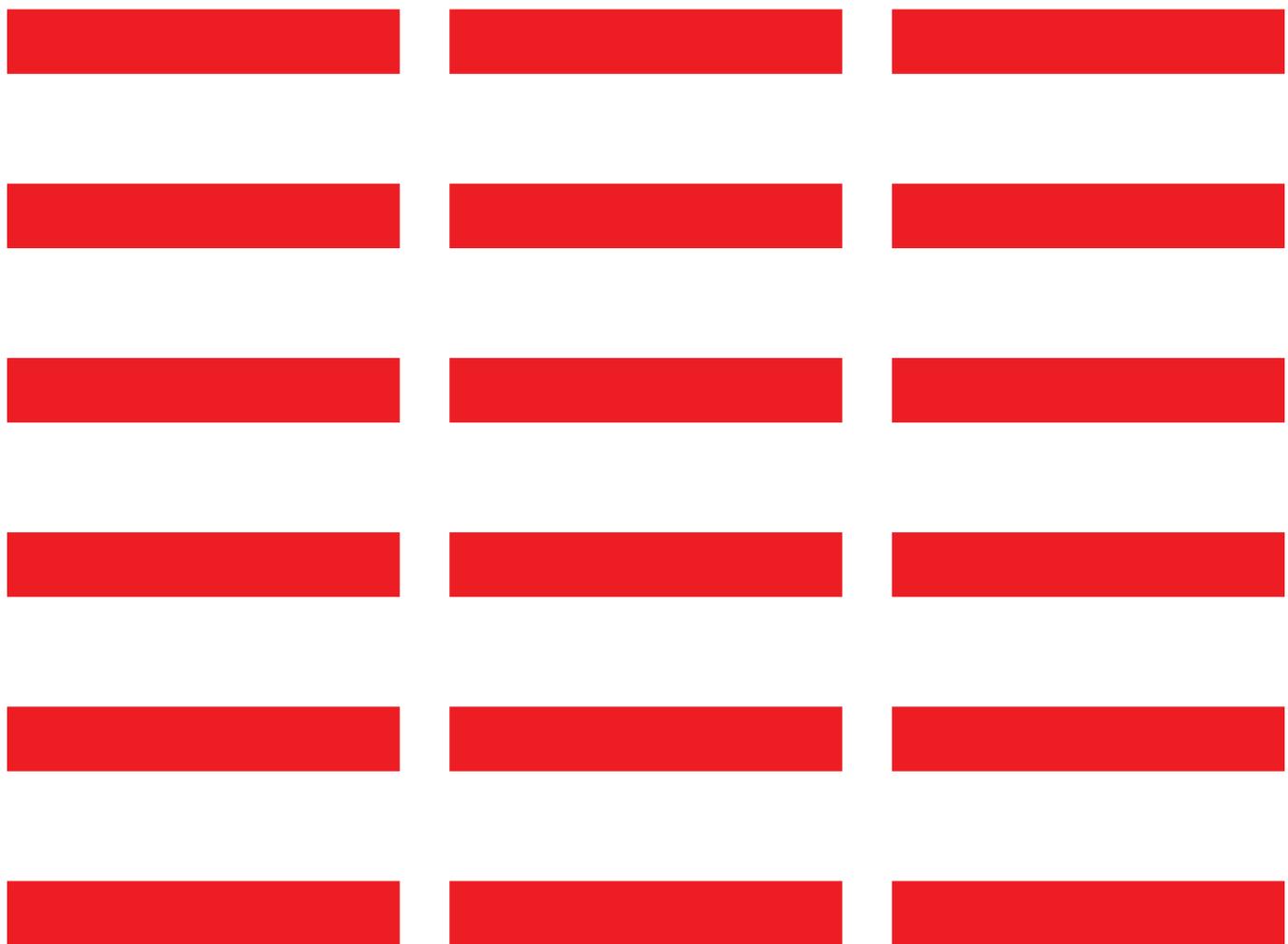


COVID - 19

COVID-19 AND SOCIETY: MOBILIZING SCIENTIFIC EXPERTISE DURING THE PANDEMIC



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“LE MAL QUI EST DANS LE MONDE VIENT PRESQUE TOUJOURS DE L’IGNORANCE, ET LA BONNE VOLONTÉ PEUT FAIRE AUTANT DE DÉGÂTS QUE LA MÉCHANCETÉ SI ELLE N’EST PAS ÉCLAIRÉE.”

ALBERT CAMUS

LISER SCIENCE ENLIGHTENING SOCIETY

PROF. ALINE MULLER

CHIEF EXECUTIVE OFFICER
OF LISER

Aline Muller is Chief Executive Officer of LISER (Luxembourg Institute of Socio-Economic Research), affiliate Professor of Economics and Finance at the University of Luxembourg and the University of Liège as well as Member of the Board of Directors of the Luxembourg Central Bank.

LISER's mission is to provide well-grounded and clear-cut answers to policy relevant questions with the objective to advance knowledge in economic, social and spatial sciences. Since 2016, Aline demonstrates a fierce commitment to develop a strong research institution of international scientific standing as a driving force for Luxembourg's policy-making as well as societal and economic development.

Aline's contributions in financial economics have been presented at numerous leading international conferences and have been published in top ranked journals like the *Journal of International Money and Finance*, *Journal of Empirical Finance*, *Journal of Banking and Finance*, etc. She has been regularly teaching financial economics and applied econometric courses at the Radboud University of Nijmegen, Maastricht University, Erasmus University Rotterdam, University of Luxembourg and University of Liège. She has moreover been lecturing frequently at several universities in Europe, the Middle East, Africa and Australasia.

Aline Muller has developed over the last 20 years a solid experience in the strategic management of research and business projects and organisations across different countries and institutional environments.

Aline was member of the Advisory Board of the Belgian Ministry of Cooperation focusing on the *Coherence of Development Policies*. In Luxembourg she was member of the Scientific Advisory Board of the National Research Fund (2010 – 2014). At an international level Aline is member of the European Network for Research Evaluation in the Social Sciences and the Humanities as well as member of many renowned academic financial economics associations.



It is a widely held view that the Covid-19 pandemic crisis is unprecedented. But let us take a good look at it in all its dimensions. First of all, it is a global crisis which, starting in a previously little-known city in China, has affected more or less every country on the planet. It is also a deep and multidimensional crisis. From the day the first confinement began, it ceased to be a highly critical health crisis and became an economic, social and psychological crisis that affected all levels of society. The real extent of its consequences in all these aspects has yet to be assessed. But there is little doubt that we will be suffering from them for years or even decades to come.

Despite this deep damage, there are many positive lessons to be learned from this crisis. Firstly, it has been an opportunity to bring science to the fore. Rarely have scientists in such a wide range of fields been able to present their research and participate meaningfully in the public debate. In Luxembourg, the crisis was also an opportunity for remarkable and unprecedented coordination of research institutions in order to better inform both political decision-makers and society. While in some neighbouring countries quarrels between experts and institutions have raged, the collective will to overcome this crisis has prevailed in Luxembourg.

The collective response does not only concern the field of research. In this storm, Luxembourg society has tried to stand together, despite its great heterogeneity. The crisis has also been an opportunity for Luxembourg society, in all its components, to become aware of its flaws and weaknesses, and of their costs in such circumstances. In such a multifaceted crisis, we have seen that everything is linked and that, depending on one's social situation, the resultant hardship has been of a totally different nature. This is

true for health, but even more so for restrictions and their consequences.

As an applied research centre at the service of society, the economy and decision-makers, LISER must play its role both in identifying and evaluating socio-economic challenges and in proposing concrete avenues for societal change. To do this, it is more important than ever to work in close collaboration between research fields, both within the social sciences and in collaboration with technological advances and health. Indeed, there has rarely been a crisis that has required scientists to broaden their frame of reference and develop their profession to such an extent. These are the objectives that we will pursue with dedication and commitment through our strategic plan 2022-2025 in order to contribute to building a resilient and inclusive society.





THE LUXEMBOURG INSTITUTE OF SOCIO-ECONOMIC RESEARCH (LISER)

Initiated in 1989 and established in 2014, the Luxembourg Institute of Socio-Economic Research (LISER) is a public research institute located in Luxembourg under the supervision of the Ministry of Higher Education and Research. Integrated into a unified legal framework (law of 3 December 2014) LISER's missions are to undertake both fundamental and applied research in social sciences that aim to advance knowledge, support public policy both at the national and European level and inform society.

LISER contributes to the advancement of scientific knowledge in social and economic matters across the activities of its three research departments "Living Conditions", "Labour Market" and "Urban Development and Mobility".

In parallel, the institute aligns itself with national and European priorities and fosters interdisciplinarity by focusing its research work on three priority research programmes: "Crossing Borders", "Health and Health Systems" and "Digital Transformation".

LISER hosts two complementary infrastructures, key drivers of its research development and excellence.

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- The Behavioural and Experimental Economics dedicated to investigating human decision-making by means of experiments performed in controlled environments. Its experimental approach contributes to improving the understanding of human behaviour in a large variety of socioeconomic contexts.

LISER aims to be an internationally recognized socio-economic research institute specializing

in the analysis of societal changes. Through its inter-and-multidisciplinary research, it makes a proactive and targeted contribution to the sustainable and inclusive development of societies at the national and international levels.

The Luxembourg Institute of Socio-Economic Research (LISER) is devoted to the advancement of knowledge in economic, social and spatial sciences. In the particular context of Luxembourg and in the heart of Europe, it is committed to contribute in a proactive and targeted manner to the sustainable and inclusive development of societies at national and international level.

Mission

To develop an innovative interdisciplinary research force of world-class scientific standing undertaking both fundamental and applied research in social sciences that aims to advance knowledge, support public policy both at the national and European level as well as inform society across economic, social and spatial matters.

Vision

An internationally recognised interdisciplinary research center at the frontier of socio-economic research and societal innovation at the heart of Europe

Baseline

Science enlightening society

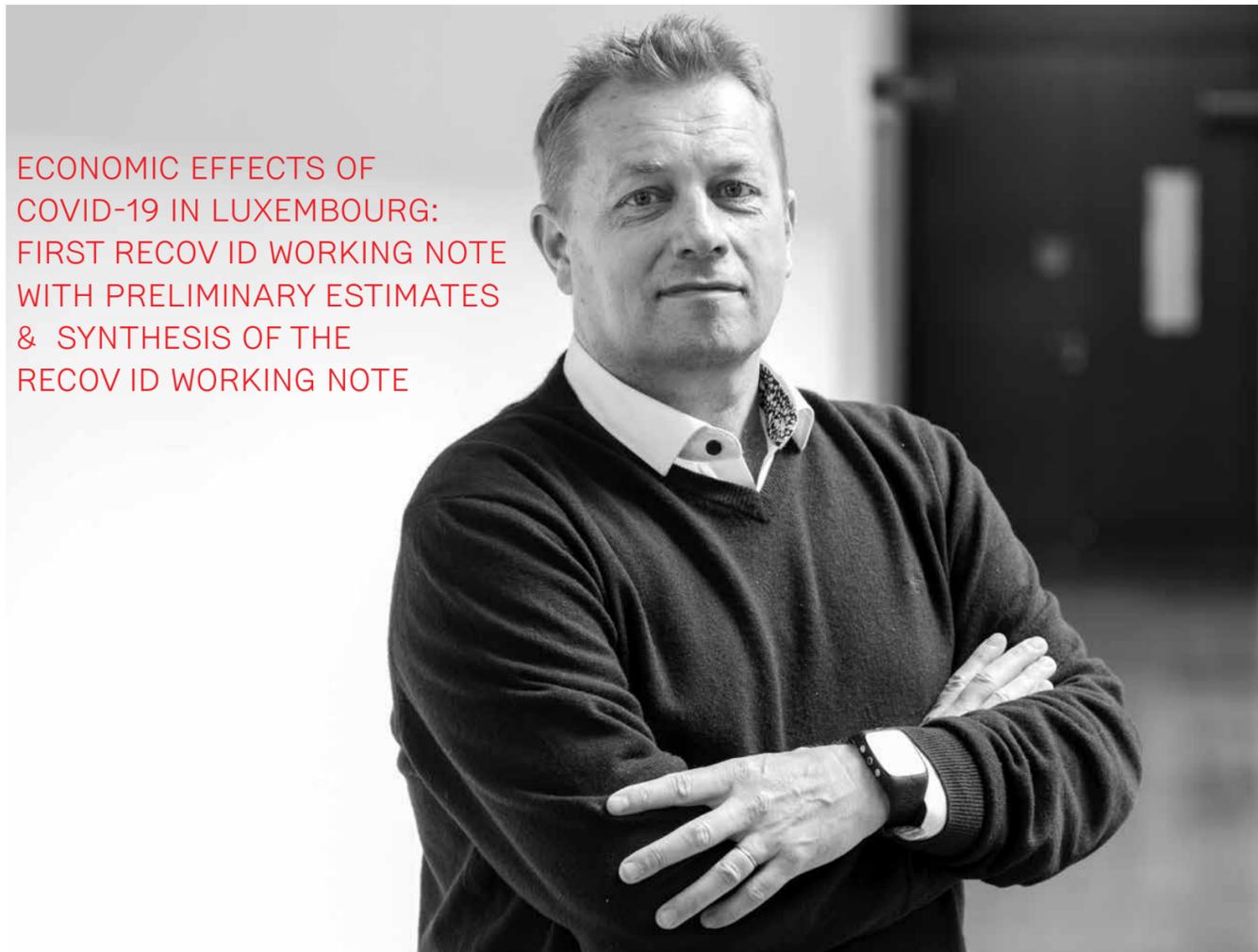
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"I INVITE YOU TO DISCOVER IN THESE PAGES
HOW OUR TALENTED RESEARCHERS
AND ALL OF LISER'S SCIENTIFIC AND TECHNICAL
EXPERTISE HAVE BEEN MOBILISED THROUGHOUT
THESE LONG MONTHS THAT NONE OF US
WILL FORGET AND WHOSE IMPLICATIONS
HAVE TRANSFORMED AND WILL CONTINUE
TO TRANSFORM OUR SOCIETY."

Aline

PROF. FRÉDÉRIC DOCQUIER

RESEARCH PROGRAM LEADER –
CROSSING BORDERS



ECONOMIC EFFECTS OF
COVID-19 IN LUXEMBOURG:
FIRST RECOV ID WORKING NOTE
WITH PRELIMINARY ESTIMATES
& SYNTHESIS OF THE
RECOV ID WORKING NOTE

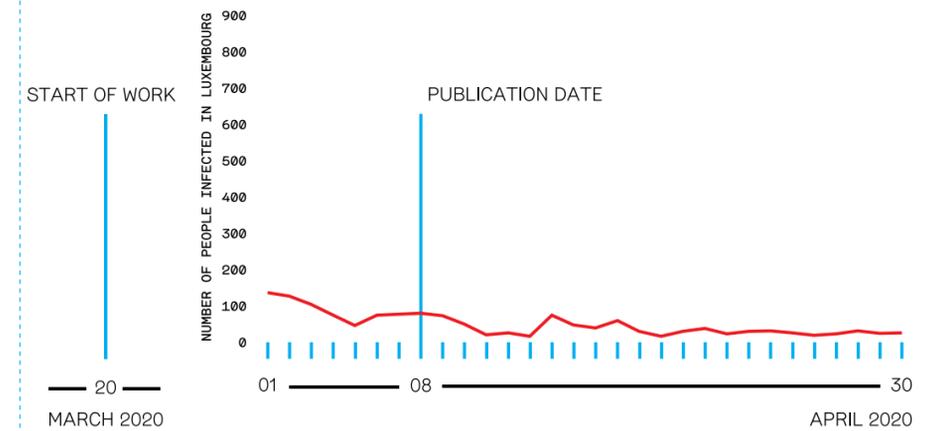
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RECOVid working note
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What's about
[Prof. Frédéric Docquier](#)

Frédéric Docquier is Research Program Leader (on Crossing Borders) at the Luxembourg Institute of Socio-Economic Research (LISER), and Professor of Economics at the Université catholique de Louvain. He holds a PhD in Economics from the University of Aix-Marseille. His research interests are in economics of migration, quantitative development theory, economic growth. He has been acting as a ST Consultant for the World Bank since 2004, and as an external expert for the United Nations (UNESCO and High-Level Panel on the post-2015 Development Agenda) and Agence Française de Développement. He acted previously as a Research Associate at the National Fund for Economic Research (2005-2019), and Associate Professor at the University of Lille (1997-2005). He edited four books and published articles in Journal of Economic Theory, Journal of Economic Literature, Economic Journal, Journal of Economic Growth, Journal of Economic Geography, Journal of International Economics, Journal of Development Economics, and many other journals.



JUST BETWEEN US PROF. FRÉDÉRIC DOCQUIER

What was the major challenge in coordinating and writing the RECOVid Note?

The challenge was threefold. Firstly, in March 2020, we were in uncharted territory. Uncertainty around the scale of the direct economic damages, behavioural responses, effectiveness of health and economic policy responses, and timing/extent of a potential recovery remains substantial. Secondly, we also stressed that COVID-19 crisis is above all a public health crisis that requires expertise from health scientists. However, the socioeconomic aspects of the crisis are also crucial for society. A difficulty was to find the right wording when discussing the potential trade-off concerning human lives versus material goods and/or social losses in terms of interactions between people. Typically, the premise of our report is that all priority measures should be focused on saving lives and improving health of people. Thirdly, it was also important to bring together a large number of economists based in Luxembourg around this project and to come up to some consensus about the messages to convey.

Finally, what did you get out of this experience?

Ex-post, I would say that one of the greatest sources of satisfaction is the common intention to help policymakers to manage the crisis and the contagious enthusiasm shared by all contributors to this report. Economists are sometimes criticized for developing dehumanized models. When preparing this report, it was obvious that all of us considered health-related measures as an absolute priority and understood that our role as economists was to prepare an economic policy response to minimize the depth of the recession and avoid a surge in inequality, poverty and long-run welfare deterioration.

What do you think the social sciences can contribute to the fight against the COVID-19?

If I may put on my hat as an economist, I think it is now obvious that economic and epidemiological trends are interdependent. It has been abundantly documented that non-pharmaceutical measures implemented at the beginning of the crisis affected public health and economic indicators jointly. In particular, lockdown and social distancing measures were necessary to flatten the infection curve and avoid a collapse of the health care system, while generating a disciplined and sizeable cut in economic output. Furthermore, after the phase of lockdown measures, policymakers have been implementing gradual measures to restart the economy. Lifting containment measures induces changes in employment, which in turn, revive on-the-job interactions between workers as well as between workers and customers. This justified our decision to build a new epidemiological model to address the short and medium-term challenges raised by the crisis. In addition, the pandemic and the inevitable resulting recession might induce uncertain long-term effects on firms and individuals' behaviours. The long-term impact of this crisis will depend on its effect on human, social and financial capital accumulation, on attitudes towards risk and preferences for the present, on wealth and task sharing within households, on attitudes and political decisions towards globalization, immigration and global inequality. Research effort in social science is needed to better understand these mechanisms and to propose preventive measures to limit the adverse long-term consequences of the crisis.

THE PUBLICATION AT A GLANCE

Let's put ourselves in the context of March 2020, at the very beginning of the pandemic in Luxembourg. Medical staff was serving on the front lines and we were all convinced at LISER that each research discipline should offer its humble contribution to the battle against the pandemic. The public health crisis and the measures implemented to make it less severe were more than likely to lead to a deep economic recession, which even opened up the possibility of systemic collapse of the global economy or of the European financial market. Lack of hindsight and information available for research at that time made any forecasting exercise difficult. That is what motivated Frédéric Docquier and Eugenio Peluso to coordinate a working note that roughs out the subject and provides knowledge on short-term and long-term economic issues related to the COVID-19 crisis. RECOVid was on track and gathered a group of economists based in Luxembourg who joined forces to assist the Task Force for the Coordination of the Public Research Sector in the Context of the COVID-19 Pandemic.

The working note provides a summary of ongoing research as well as back-of-the-envelope estimations of the "direct" economic impact of the health crisis and resulting policy measures. It discusses forces that may drive to a breakdown of the global economic system and policy options that are available to decision makers to mitigate the short-run costs and the risk of a systemic collapse. With limited data, the main issues covered in the working note are: What are the likely effects of COVID-19 on Luxembourg's economy? What can be done to maximize the likelihood of a quick recovery... and to minimize the adverse effects of the crisis on inequality, poverty and welfare? What are the strategies to exit the lockdown? What are the potential long-term effects on the economy? RECOVid delivered important

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messages to take away at the onset of the crisis. First, short-run macroeconomic damages from COVID-19 are impelled by mechanical effects and uncertain behavioural responses: (i) mortality and morbidity impacts labor supply and the productivity of workers; (ii) necessary measures implemented to flatten the infection curve exert mechanical effects on output; (iii) in a globalized world, disrupting global supply chains induces contamination effects; (iv) the public health crisis alone can generate panic and (potentially drastic) changes in individual behaviours. Second, back-of-the-envelope calculations suggest that the lockdown could reduce Luxembourg's monthly output by 28 to 42% depending on the deterioration of the international economy and budget support policy. Each month of lockdown mechanically reduces Luxembourg's annual GDP by 2.0 to 3.5%. Greater or smaller effects can be obtained if we account for cascading business and individual bankruptcies, or if we assume greater resilience. Third, as workers in "lockdown industries" have lower earnings to start with, we may fear a rise in inequality. Fiscal measures are needed to compensate for their losses. Fourth, during the lockdown, generous budget support policies are unanimously recommended and have been implemented to relieve corporate cash flow and household income. Maintaining a satisfactory state of hibernation that allows the economy to recover quickly would require a deficit equal to the loss of activity due to the lockdown. Fifth, given the previous finding, the risk of a systemic collapse of the financial system both globally and at the European level cannot be excluded. Implementing coordinated and preemptive policies such as (i) defining a lender of last resort at the European and national levels and (ii) announcing an unconditional commitment of the EU to support all European economies would reduce this systemic risk, thereby reducing investors' fear and guaranteeing that all other fiscal poli-

cies remain effective. Sixth, several strategies to bring workers back to work and unfold the return of economic activity are discussed. Their implementation in the case of Luxembourg is complex due to the high reliance on cross-border workers. Seventh; the report also discusses some "double-edged" mechanisms that can (i) either jeopardize the recovery and lead to protectionist and populist pressures... or make global institutions stronger in the longer term, (ii) either increase global inequality... or induce more solidarity between rich and poor countries, (iii) slow down technical progress... or accelerate a transition towards a new form of digital capitalism. From a longer-term perspective, the COVID-19 crisis might lead to permanent effects. In addition to slowing down capital accumulation, it might induce long-term changes in deep preference parameters and in political preferences, affect international linkages and cooperation, lead to a collapse of the neo-liberal model of globalization, and require increasing development assistance.

Let's put ourselves in the context of March 2020. Frédéric Docquier and Eugenio Peluso to coordinate a working note that roughs out the subject and provides knowledge on short-term and long-term economic issues related to the COVID-19 crisis. RECOVid provides a summary of ongoing research as well as back-of-the-envelope estimations of the "direct" economic impact of the health crisis and resulting policy measures. With limited data, the main issues covered in the working note are: What are the likely effects of COVID-19 on Luxembourg's economy? What can be done to maximize the likelihood of a quick recovery... and to minimize the adverse effects of the crisis on inequality, poverty and welfare? What are the strategies to exit the lockdown? What are the potential long-term effects on the economy? RECOVid delivered important messages to take away at the onset of the crisis.

PROF. KONSTANTINOS TATSIRAMOS

JOINT PROFESSOR
UNIVERSITY OF LUXEMBOURG - LISER



Title:
Estimating worldwide effects of non-pharmaceutical interventions on COVID-19 incidence and population mobility patterns using a multiple-event study

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Nikolaos Askitas, Konstantinos Tatsiramos, Bertrand Verheyden

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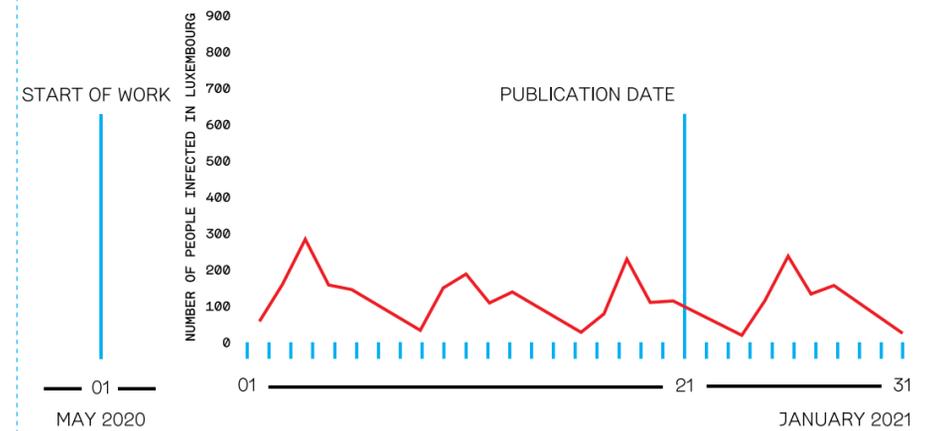
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What's about Prof. Konstantinos Tatsiramos

Konstantinos Tatsiramos holds a Joint Professorship in Labour Economics at the University of Luxembourg and LISER. He received a Ph.D. in Economics from the European University Institute in Florence, an M.Sc. in Economics from University College London and a B.Sc. in Economics from Athens University of Economics and Business. Prior to joining the University of Luxembourg and LISER he worked as an Associate Professor at the University of Nottingham (2013-2017), as a Reader and Lecturer at the University of Leicester (2011-2013) and as a Researcher at IZA-Institute of Labor Economics (2005-2011). His main research interests lie in labor economics and applied micro-econometrics, with particular emphasis on labor market institutions, unemployment dynamics, mobility and inequality.

In the context of this global pandemic crisis, Prof Tatsiramos has co-authored an article with another LISER researcher, Dr B. Verheyden and with Dr Nikolaos Askitas from IZA, studying the

effect of lockdown policies on the incidence of COVID-19 infections and on mobility patterns, titled "Estimating worldwide effects of non-pharmaceutical interventions on COVID-19 incidence and population mobility patterns using a multiple-event study" published in *Nature Journal: Scientific Reports* 11, 1972 (2021) <https://doi.org/10.1038/s41598-021-81442-x>



JUST BETWEEN US

PROF. KONSTANTINOS

TATSIRAMOS

How is your expertise relevant in the current COVID-19 context?

In my research, I am interested in understanding how policies implemented by governments impact various labour market outcomes, such as employment and wages, combining statistical methods and data. The question of how lockdown policies impacted outcomes such as pandemic incidence or population mobility lends itself to the same research methods. Usually, in the context of the labour market, we are interested in quantifying the effects of a single policy implemented at a time on workers, consumers, or firms. In the case of the COVID-19 pandemic, all countries introduced several interventions, or lockdown policies, to contain the infections and manage the pressure over their health systems.

An important feature of those interventions is that they were often implemented almost in parallel within a country. This poses an interesting methodological challenge in the attempt to understand the independent effect of each policy when they occur simultaneously. We therefore needed to adapt the standard methods used for the evaluation of single policies to be able to estimate the net effect of multiple policies on reducing new infections, freed from the confounding effect of possibly other concurrent policies. This was achieved by exploiting the different level of intensity with which each intervention was implemented both within and across countries.

How can your research inform public policies?

The aim of the policy interventions during the first wave of COVID-19 was to slow down the pandemic by restricting mobility, and thus allowing countries around the world to remain within the capacity of their health systems. Evaluating the effectiveness of these policies is important as

policy makers seek to achieve an optimal health outcome in the fight against the pandemic at the lowest economic cost. Our research combined detailed information on the intensity of eight different interventions across 175 countries with a statistical model that accounts for multiple interventions showing which of the adopted interventions worldwide were the most effective in reducing the incidence of COVID-19 and restricting mobility. Understanding what works in the attempt to mitigate the spread of COVID-19, and the channels through which these effects operate, can inform policy makers about the most effective policies among the many that have been implemented. This knowledge can serve as a benchmark for future waves of the COVID-19 or future pandemics.

Can you summarize the main findings of your evaluation of the effects of lockdown policies?

Our findings establish that cancelling public events and enforcing restrictions on private gatherings, as well as closing schools and workplaces, had the largest effects on curbing the pandemic. These four policies led to large declines in the incidence of COVID-19. Cancellation of public events and restrictions on private gatherings contributed to reducing COVID-19 incidence by preventing exposure to numerous and dense locations, where the two-meter social-distancing rule is more likely to be violated and contact tracing is difficult. Workplace and school closures were also effective by reducing activities at locations which are less dense and less populous than public events and private gatherings, as well as easier to track, but they have a much higher frequency. Restrictions on internal movement and public transport were not as effective in reducing the incidence of COVID-19 because of the spillover effect on mobility of other interven-

tions imposed earlier, such as workplace closures and cancellations of public events and private gatherings. As a result, when these restrictions were introduced, their net incremental effect on reducing infections was limited because the remaining risk of infections was already low.

THE PUBLICATION AT A GLANCE

In December 2019, the COVID-19 outbreak was registered in Wuhan, China. The World Health Organization declared it a 'Public Health Emergency of International Concern' on 30 January 2020 and escalated it to a pandemic on 11 March 2020. To save human lives and shield health systems from being overwhelmed, several lockdown policies were implemented around the world. While crucial for public health, these measures contributed to an unprecedented economic shock whose consequences remain to be fully understood. What was interesting at the onset of the crisis was the expression of different views regarding the need, the level of intensity and possible effectiveness of different lockdown policies. Some countries adopted less stringent interventions to restrict mobility of people aiming at herd immunity, while others adopted hard lockdowns restricting most human activities. This heated debate about the effectiveness of each lockdown policy to contain COVID-19 infections motivated us to study "what works" in the fight against the pandemic.

The study combines data across 175 countries on daily COVID-19 infections, daily human mobility, and information about the date of adoption and the stringency of several interventions such as international travel controls, closure of public transport, cancellation of public events, restrictions on private gatherings, closure of schools, closure of workplaces, restrictions on internal movement and stay-at-home requirements. Since multiple policies were introduced almost simultaneously, the study measures the effect of each policy on the incidence of COVID-19 and on mobility patterns net of the effect of other concurrent policies. This is possible by exploiting the differences in the level of intensity of the various interventions, which varies over time and across policies within countries, as well as across countries. The analysis delivered several

important insights about the effectiveness and the mechanisms through which lockdown policies operate.

First, the most effective policies at reducing the daily incidence of COVID-19 are cancellation of public events, restrictions on private gatherings and the closure of schools and workplaces. These are interventions aiming at reducing contacts in large groups, such as cancelling public events and restricting private gatherings, or reducing contacts with high frequency, such as closing schools and workplaces. Second, each policy delivers its effect against the pandemic by changing people's whereabouts to reduce contagion. This effect is delivered both directly to the place or type of behaviour the policy targets (e.g., closing workplaces directly targets the workplace) as well as indirectly by affecting additional places and behaviours. For example, preventing people from going to work causes them to stay at home longer, e.g., telecommuting or being unemployed, but also reduces their use of public transport and changes their consumption habits. Third, international travel controls failed to prevent the pandemic despite some early and short-lived effect, because they were implemented with the lowest mean intensity value among the eight policies considered in this study. Fourth, restrictions on internal movement and public transport were not as effective in reducing the incidence of COVID-19 because of the spill over effect on mobility of other interventions imposed earlier, such as workplace closures and cancellations of public events and private gatherings. As a result, when these restrictions were introduced, their net effect on reducing infections was limited because the remaining risk of infections was already low.

DR. MICHAL BURZYNSKI

RESEARCH SCIENTIST –
LABOUR MARKET DEPARTMENT



COVID-19 CRISIS
MANAGEMENT
IN LUXEMBOURG:
INSIGHTS FROM
AN EPIDEMIONOMIC
APPROACH

Title:

COVID-19 Crisis management in Luxembourg:
insights from an epidemionomic approach

Authors:

Burzynski, M., Machado, J., Aalto, A., Beine, M.,
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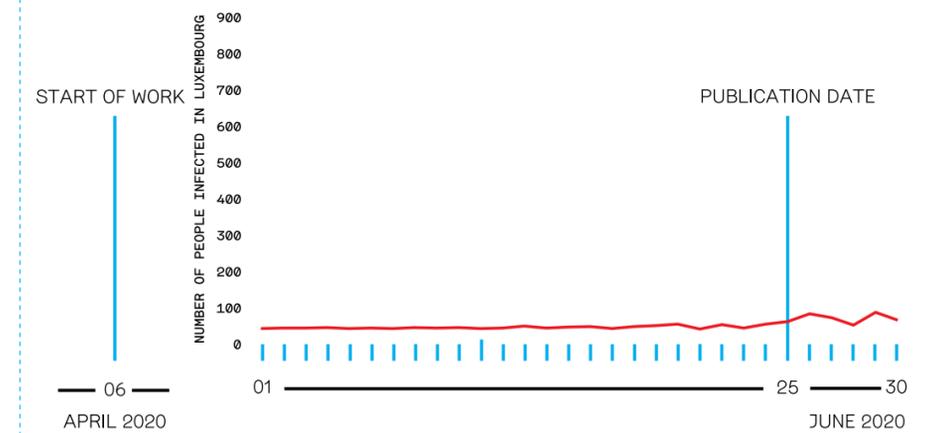
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Docquier, F. (2020).

COVID-19 Crisis Management in Luxembourg:
Insights from an Epidemionomic Approach.
(Working papers; No. 2020-08). LISER, 52 p.

What's about

Dr. Michal Burzynski

Michal Burzynski holds a Summa Cum Laude diploma from the Research Master track at Université Catholique de Louvain, Belgium. He defended his PhD in April 2016 as a F.R.S - FNRS research aspirant at IRES (Institut de Recherches Economiques et Sociales), Université Catholique de Louvain, Belgium and Poznan University of Economics, Poland. After holding a post-doc position at the University of Luxembourg, in September 2018 he joined the Labor Market Department at Luxembourg Institute of Socio-Economic Research (LISER). His research interests are broadly related to international macroeconomics and labor markets. By publishing six papers in top journals, he contributed to studies of the economic effects of international migration, the relations between migration and trade, efficiency of immigration policies, the impact of climate change on migration and distributive labor market effects of immigration policies. Recently, he contributed to the analysis of the implications of COVID-19 on the economy of the Greater Region in the short and the medium term.



JUST BETWEEN US

DR. MICHAL BURZYNSKI



Dr. Burzynski, what was your personal contribution in the said publication? And what was your main challenge in co-writing this publication?

My main responsibility as a team member was to program, calibrate and simulate the epidemiological model that has jointly been developed under the supervision of Professor Frédéric Docquier. My first task was to compile the data from different internal and international sources, to choose the relevant degree of granularity when standardizing them, and to compute the indicators that represent key characteristics of the Luxembourgish economy. Then, I designed the solution algorithm for the model and I programmed the calibration and simulation procedures in R language. I was responsible for designing and running the counterfactual simulations of the model, which analysed the susceptibility of the Luxembourgish economic system to various pandemic scenarios, and verified the efficiency of different policies that we proposed to mitigate the detrimental impact of COVID-19. The biggest challenge in running this computational task was gaining the access to sufficiently detailed data. Our goal was to obtain a trustworthy mapping of the real economy onto our theoretical model. Oftentimes we had to refrain from adding important components to the model only due to the lack of data for credible calibration. Sometimes we had to reduce our ambitions and simplify our model, as the granularity of available data was not sufficient. However, after all, we succeeded in building a satisfactory model that produced projections that were realised to be close to reality, and which highlighted the importance of specific policies. We feel that we accomplished our initial goal, and we are proud of the final product.

How is your expertise relevant in the current COVID-19 context?

I am a quantitative theorist in the field of economics of international migration, and my main interest is in building structural macroeconomic models of complex economic systems. In other words, my daily tasks are related to describing economic reality with equations, and making these equations explain a piece of real world. On daily basis, in my research I build theoretical models with an aim to bring them to the data and run simulations of counterfactual (non-existent, but interesting from the policy point of view) states of the world. In this way, we develop a sort of artificial laboratory in which we can analyse and evaluate economic policies. In that sense, the project with Professor Docquier appeared as a natural opportunity to use my skills for a societally important purpose, by producing a model that blends economics and epidemiology. We managed to build on our expertise in macroeconomics and by joining forces with researchers in epidemiology. The cooperation was not straightforward, as we speak different scientific languages, but in the end we succeeded in incorporating main epidemiological ingredients in an economic model. This led our project into a new, interdisciplinary space, which was instrumental in communicating our messages to the broader audience. Personally, I learned a great deal of useful modelling techniques during the development of the model, and I am grateful I could be a part of such a motivated and action-biased group of co-authors.

THE PUBLICATION AT A GLANCE

The COVID-19 pandemics have hit the global economy in a rapid way, precluding any sort of preparation or anticipation by the policymakers. As the level of economic uncertainty has risen to unprecedented magnitudes in the early weeks of March 2020, some actions taken by many governments were intuitive, ad hoc, and sometimes over reactive. Among decision-makers, consultants and scientists there was a general lack of reference points in managing the outbreak of the crisis. This paper serves as an early support in economic and epidemiological decision-making by proposing a short-term economic model of the Greater Region enriched with an epidemiological block.

The proposed quantitative tool includes four fundamental features of COVID-19 consequences for the regional economy. First, we allow for a simultaneous dynamic coevolution of economic and epidemiological variables, all of which are interdependent and mutually contagious, e.g. an increase in the number of infected or quarantined workers reduces the level of economic activity. In this way, an accelerated number of infections, followed by restrictive lockdown policies causes a direct downward pressure on the economic performance of Luxembourg. Second, we take a relatively disaggregated point of view of the regional economy of Luxembourg by analysing twenty economic sectors, all of which are characterized by different propagation mechanisms of the virus, different probabilities of infection, and various intensities of workers' teleworking. Knowing that the extent to which COVID-19 impacted firms and workers across sectors was tremendously different, the model allows to study mitigation policies that are specific to particular sectors. Third, the model makes a link between professional and social lives of citizens, allowing for infections beyond workplaces, that is: through social contacts, at schools or on

The proposed quantitative tool includes four fundamental features of COVID-19 consequences for the regional economy. First, we allow for a simultaneous dynamic coevolution of economic and epidemiological variables, all of which are interdependent and mutually contagious, e.g. an increase in the number of infected or quarantined workers reduces the level of economic activity.

This project serves as an early support in economic and epidemiological decision making by developing a short-term economic model of the Greater Region enriched with an epidemiological block. The main focus of the analysis includes sectoral, geographical and age structures of infections, sectoral distributions of unemployment, teleworking, and production, as well as country-wide aggregates of macroeconomic and epidemiological variables. Moreover, we study various policies that aim at mitigating the spread of the disease, including sectoral lockdowns, the intensity of PCR testing, the length of quarantine period, contact tracing, closing the country borders, slowing down or stopping social life, and supporting teleworking in sectors that can afford it. As a conclusion, the paper evaluates the epidemiological efficiency and economic costs of the proposed policies and formulates a set of recommendations about further steps that can potentially improve the control over COVID-19 spread and ameliorate the process of crisis management.

holiday. Consequently, the process of contagion is multidimensional, allowing for an important feature of spreading the virus both within and across economic sectors. Fourth, we take an explicit focus on the specificity of the Greater Region's economy by modelling infection rates that originate in cross-border provinces outside Luxembourg. Since a significant share of workers in Luxembourg commute from Belgium, France and Germany, the geographical dimension of COVID-19 contagion is an important detail that has been controlled for and investigated in the proposed paper.

With this model in hand, the article proposes a series of projections of the evolution of the COVID-19 pandemics in Luxembourg under different scenarios. The main focus of the analysis includes sectoral, geographical and age structures of infections, sectoral distributions of unemployment, teleworking, and production, as well as country-wide aggregates of macroeconomic and epidemiological variables. Then, the quantitative model is used to predict the economic and epidemiological consequences of various policies that aim at mitigating the spread of the disease. This includes sectoral lockdowns,

the intensity of PCR testing, the length of quarantine period, contact tracing, closing the country borders, slowing down or stopping social life, and supporting teleworking in sectors that can afford it. As a conclusion, the paper evaluates the epidemiological efficiency and economic costs of the proposed policies and formulates a set of recommendations about further steps that can potentially improve the control over COVID-19 spread and ameliorate the process of crisis management.

PROF. FRÉDÉRIC DOCQUIER

RESEARCH PROGRAM LEADER –
CROSSING BORDERS



Acronym:
MODVid

Project duration:
From June 15th, 2020 to December 14th, 2020

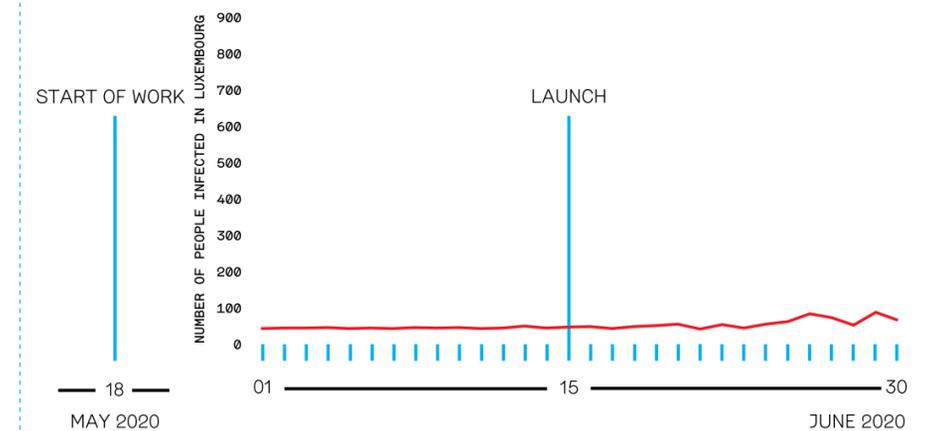
LISER members:
Michal Burzynski, Nizamul Islam, Jules Linden, Kristell Leduc, Joël Machado, Denisa Sologon, Philippe Van Kerm.

Contracting partners:
Atte Aalto (LCSB), Jorge Goncalves (LCSB), Françoise Kemp (LCSB), Stefano Magni (LCSB), Laurent Mombaerts (LCSB), Daniele Proverbio (LCSB), Alexander Skupin (LCSB), Tom Haas (STATEC), Ferdy Adam (STATEC), Michel Beine (UL/FDEF), Pierre Picard (UL/FDEF), Louis Chauvel (UL/FHSE), Francisco Ceron (UL/FHSE), Jason Settels (UL/FHSE).

Project granted by the National Research Fund Luxembourg (FNR)

What's about Prof. Frédéric Docquier

Frédéric Docquier is Research Program Leader (on Crossing Borders) at the Luxembourg Institute of Socio-Economic Research (LISER), and Professor of Economics at the Université catholique de Louvain. He holds a PhD in Economics from the University of Aix-Marseille. His research interests are in economics of migration, quantitative development theory, economic growth. He has been acting as a ST Consultant for the World Bank since 2004, and as an external expert for the United Nations (UNESCO and High-Level Panel on the post-2015 Development Agenda) and Agence Française de Développement. He acted previously as a Research Associate at the National Fund for Economic Research (2005-2019), and Associate Professor at the University of Lille (1997-2005). He edited four books and published articles in Journal of Economic Theory, Journal of Economic Literature, Economic Journal, Journal of Economic Growth, Journal of Economic Geography, Journal of International Economics, Journal of Development Economics, and many other journals.



JUST BETWEEN US PROF. FRÉDÉRIC DOCQUIER

Can you explain how your expertise has been put to use in the current COVID-19 context?

Initially, my expertise in public health is limited. My research interests are clearly in migration economics. However, I consider myself as an applied macroeconomist, and there was an urgent need for developing new applied macroeconomic models to understand and anticipate the economic consequences of the crisis. Interestingly, migration economists are more and more interested in highlighting how migration propagates cultural traits, beliefs and technologies across space. This probably explains why the tools used by epidemiologists to predict the propagation of the virus are very intuitive to me. After a few discussion with my colleagues from the Department of Economics and Finance at the University and with epidemiologists from The Luxembourg Centre for Systems Biomedicine (LCSB), we quickly agreed that the level of economic activity influences the number of social contacts and the propagation of the virus. At the same time, through confinement measures, parental and sick leaves, the evolution of the pandemic affects the level of employment and economic activity. This convinced me that a model endogenizing public health and economic outcomes jointly is the most relevant approach. That's how the MODVid project was born.

At the same time, through confinement measures, parental and sick leaves, the evolution of the pandemic affects the level of employment and economic activity. This convinced me that a model endogenizing public health and economic outcomes jointly is the most relevant approach. On the heels of the RECOVid-19 report, the MODVid project started in May 2020. The core of this project has been the development of an epidemionomic model that jointly analyses the health and economic responses to the COVID-19 crisis and related public health policy measures implemented in Luxembourg and in the Greater Region. That's how the MODVid project was born.

THE PUBLICATION AT A GLANCE

On the heels of the RECOVid-19 report, the MODVid project started in May 2020. The core of this project has been the development of an *epidemionomic* model that jointly analyses the health and economic responses to the COVID-19 crisis and related public health policy measures implemented in Luxembourg and in the Greater Region. At the end of the first wave of COVID-19, when optimism was the order of the day (remember the number of COVID-19 cases was close to zero at that time), we highlighted the risk that re-increasing the density of employees at the workplace and resuming social activities would induce a second wave of COVID-19. Though the prediction was quite unpleasant to hear, it has proven to be a correct one ex-post. A few months later, the COVID-19 second wave had hit much of Europe. Our analysis suggests that this second wave has mainly been driven by an increase in transmission rates in social life (outside the labor market), low participation in testing (around 25% in June), and higher numbers of COVID-19 cases in some neighbouring regions (i.e., France and Belgium in September). The latest version of the model has been used to quantify the effect of the second wave on the economy. The analysis explains why the Luxembourg economy has resisted better than other European countries in 2020. We also assessed the sensitivity of GDP growth in 2021 to sanitary measures, international developments and vaccination scenarios. The forecasts have been included in the Note de *Conjoncture* of STATEC, which serves as a basis for the preparation of the government budget for 2021.

In parallel, we used microsimulations to assess the implications of the *epidemionomic* model predictions (or alternative nowcasts) for the distribution of household incomes. All results converged to a reassuring conclusion that household incomes were well cushioned by the

existing automatic stabilizers and by the short-time compensation scheme. The inequality-generating evolution of market earnings has been overpowered by a significant increase in redistribution. In 2020, average income losses have been limited. Both inequality and poverty have declined slightly compared to a "no-COVID-19" counterfactual scenario because of the weaker cushioning targeted at high earnings workers.

Another study sheds light on the potential consequences of an enduring crisis using more sophisticated model that accounts for firms' bankruptcies, relative price adjustments, and a restoration of the pre-crisis fiscal policy – i.e. a restoration of standard unemployment scheme and the interruption of COVID-19 specific schemes such as chômage partiel. This implies different eligibility conditions and less generous benefits in case of parental leave. This study predicts that, without generous transfers, market inequality will gradually increase in the Luxembourgish labor market. Under a long-lasting shock with bankruptcies and higher occupational reallocations of workers, the average income loss before redistribution would converge towards -7%. The bottom 40% of workers lose nearly 8% of their real wages, while top 20% lose less than 6%. In the same vein, the last part of the project focuses on the "young-mid-aged adult" (YMAA) population, one of the most vulnerable groups. YMAA are no longer searching for a first job, but are stabilizing in a durable trajectory (creating family projects, raising young children, investing in home ownership with strong wealth and debt consequences). There, our empirical results exemplify the labor stresses and family transformations of YMAA, and impact of difficulties in indicators of wellbeing. Adverse demographic outcomes (family disruptions and declining number of young couples) are already observed. All indicators illustrate the vulnerability of indebted

YMAA if the crisis were to continue beyond the summer months.

DR. LAETITIA HAURET

RESEARCH SCIENTIST -
LABOUR MARKET DEPARTMENT



Title:

The Impact of Telework induced by the spring 2020 lockdown on the use of digital tools and digital skills

With the collaboration of the DIGITUP Team:

Pauline Bourgeon, Franz Clément, David Marguerit, Uyen Nguyen, Nicolas Poussing, Fanny Robert (LISER), Irina Gewinner (Université du Luxembourg), Thierry Pénard (Université de Rennes 1), Julie Rosaz (Université de Lyon), Angela Sutan (Burgundy School of Business), Radu Vranceanu (ESSEC)

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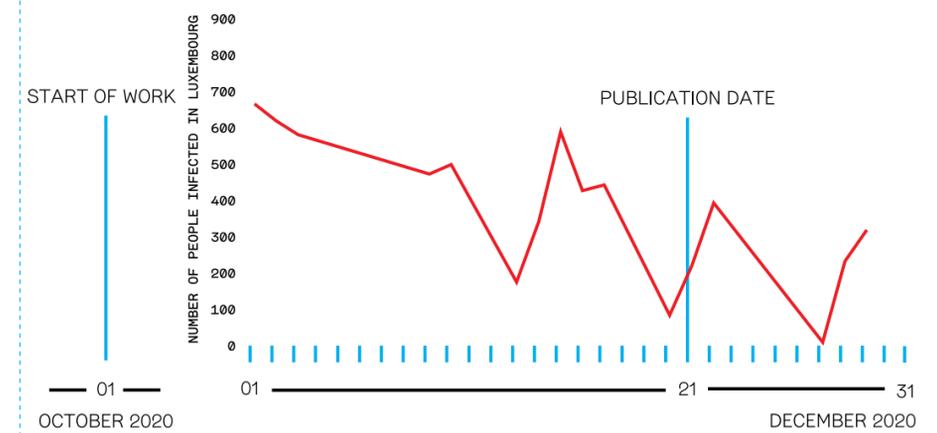
Hauret, L. (Ed.), Martin, L. (Ed.), Bourgeon, P., Clément, F., Marguerit, D., Nguyen-Thi, T. U., Poussing, N., Robert, F., Gewinner, I., Penard, T., Rosaz, J., Sutan, A., & Vranceanu, R. (2020). L'impact du télétravail imposé par le confinement du printemps 2020 sur l'usage des outils digitaux et les compétences digitales. LISER, LISER (Policy Brief; 12), 8 p.

What's about

Dr. Laetitia Hauret

Laetitia Hauret is a researcher associate at the LISER in the labor market department.

She obtained a PhD in Economics from the University Nancy 2. Her research interests focus on labor market and more particularly on professional integration, skills, working conditions and well-being at work. She has recent publications in *Economic and Industrial Democracy, Equality, Diversity and Inclusion, Journal of Happiness Studies, and Industrial Relations*. She has contributed to policy projects on labor market topics and to the design of several surveys that she co-supervised. The COVID-19 health crisis shed light on the workplace organization practice of teleworking, which is increasing but still infrequent before the crisis. In a report carried out for the RETEL (Réseau d'Etudes sur le Travail et l'Emploi au Luxembourg) and published in 2019, she analysed, on the one hand, the mechanisms that lead employees to telework and, on the other hand, the link between teleworking and employees' well-being.



JUST BETWEEN US DR. LAETITIA HAURET

Since the start of the health crisis in March, the world of work has been experimenting with teleworking instead of on-site work. Do you think that this form of work organisation, initially imposed by the exceptional situation we know, will change our way of working in the future by opening the door to telework?

Before the crisis, Luxembourg was one of the European countries with the highest proportion of teleworkers. However, in 2013, 88% of employees in Luxembourg (residents and cross-border workers) do not have the opportunity to telework: 52% because their job is not "teleworkable" and 36% because their firm does not allow them to telework. Among the employees who did have the opportunity to telework, they used this opportunity as 80% of them did telework, at least occasionally. The spring 2020 lockdown has led many employees to begin teleworking: during this period, 63% of employed people in Luxembourg reported to be teleworking. The health crisis showed the need to offer employees alternative working methods to on-site work. We can expect that the telework use will be widespread after the crisis for several reasons mentioned in Barrero, Bloom and Davis (2020):¹ Among these reasons is the idea that teleworking may stick due to the investments done by firms and employees: investments in IT equipment but also in human capital. In addition, the generalization of teleworking during the crisis has changed the way teleworkers are seen, they are less stigmatized. Finally, the imposed practice of teleworking during the lockdown shows that telework experience is better than expected. However, given the

¹ Barrero J.M., Bloom N. and Davis S.J., 2020, Why working from home will stick, Working paper, Becker Friedman Institute.

cross-border nature of the Luxembourgish labor market, a wide adoption of teleworking will have to go through changes in tax and social rules for cross-border workers.

Even if teleworking offers many advantages such as a better balance between work and family life, time saving because of no commuting, less pollution and traffic worries, is there any inconvenience from a human point of view? Could teleworking lead to a feeling of isolation?

Prior research on the impact of teleworking on employees shows both positive and negative aspects. On the negative side, teleworking may increase role ambiguity and decrease the opportunities for professional advancement, team collaboration and knowledge transfer due to the lack of face-to-face relationships. According to some studies, teleworking could lead to a feeling of isolation if it is practiced more than 2.5 days a week. However, the use of mobile ICT by teleworkers helps reduce this feeling of isolation.

Literature shows mixed results on the link between teleworking and job satisfaction. Some studies show a positive link, others a negative or no link. Other studies show an inverted U-shaped relationship between teleworking and job satisfaction. When teleworking is occasional, satisfaction increases because of more flexibility, less stress related to commuting, less tasks interruptions etc. But, when teleworking reaches a certain threshold, satisfaction decreases because of a feeling of isolation, an over-investment in work and a poorer work-life balance. Our previous study, based on 2013 data, showed that teleworkers are more prone than other employees to work outside working hours. The question of the "right to disconnect" needs to be asked.

When we look at job satisfaction, we find that employees who have the opportunity to telework are generally more satisfied, but when they telework, they are not more satisfied than others. It is therefore more the opportunity to telework that seems to play a role in job satisfaction.

THE PUBLICATION AT A GLANCE

Regarding the impact of telework induced by the spring 2020 lockdown on the use of digital tools and digital skills, with the DIGITUP team, we assess whether telework imposed by the lockdown led to an extensive and/or intensive growth in the use of digital tools by teleworkers and whether it enabled them to increase their digital skills. With 63% of employed people in Luxembourg reported to be teleworking, for 83% of them, it was a new work organization.

This topic was analyzed in the framework of the DIGITUP project (Digital up-skilling in a telework environment) funded by the National Research Fund of Luxembourg (COVID-19/2020-1/14736055/DIGITUP/Martin).

Regarding the impact of telework induced by the spring 2020 lockdown on the use of digital tools and digital skills, with the DIGITUP team, we assess whether telework imposed by the lockdown led to an extensive and/or intensive growth in the use of digital tools by teleworkers and whether it enabled them to increase their digital skills. To do so, we used data from the first wave of the COVID-19 socio-economic impacts in Luxembourg survey (SEI) conducted between May and July 2020 by LISER and the University of Luxembourg with the support of the FNR.

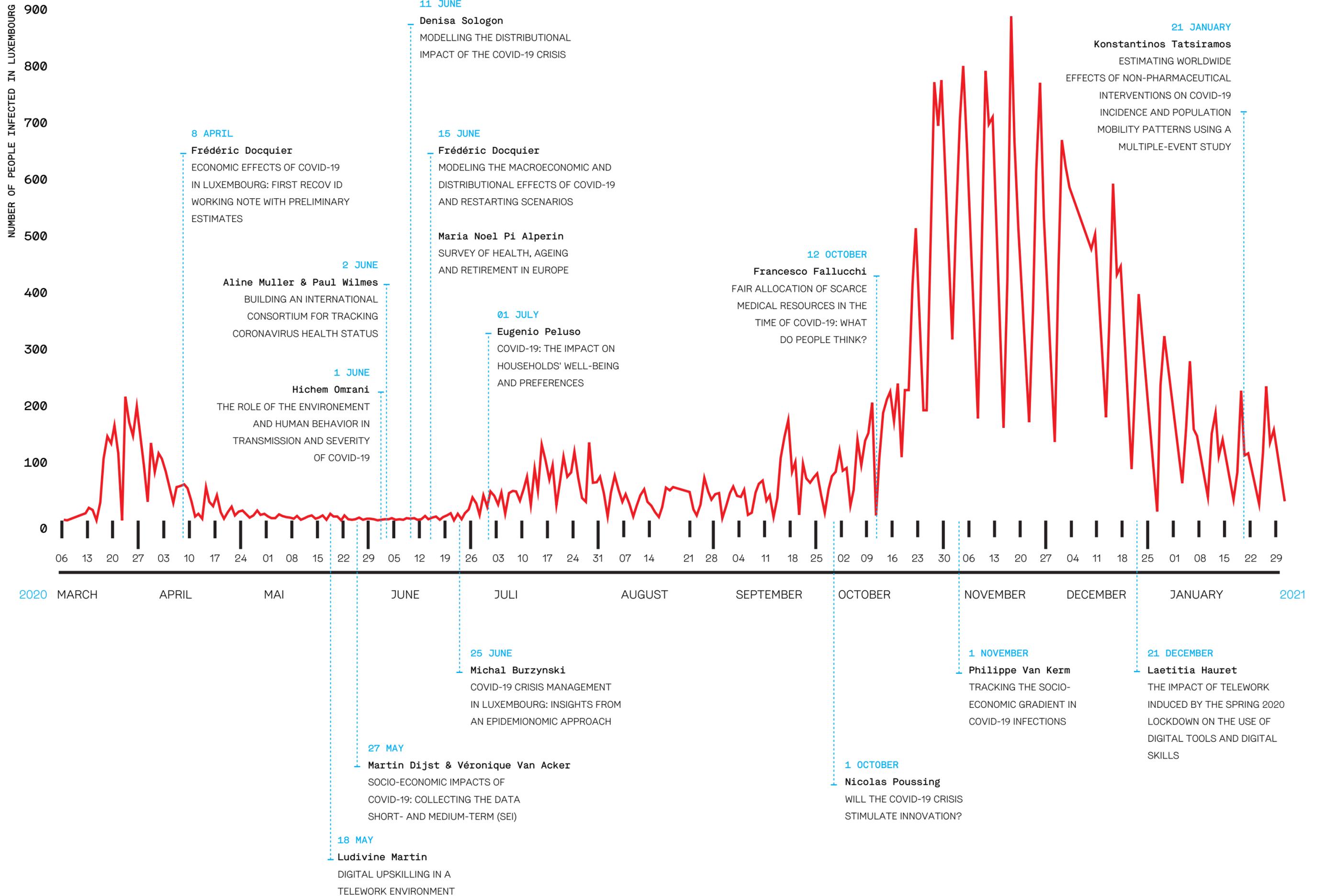
Our main results are the following. First, the spring 2020 lockdown has forced many employees to begin teleworking. With 63% of employed people in Luxembourg reported to be teleworking, for 83% of them, it was a new work organization. Second, the digitalization of work imposed by telework has underlined the importance for employees to know how to use digital tools. More specifically, during this period, teleworkers used on average of a bit more than 4 types of digital tools out of the 10 types studied.² Unsurprisingly, tools aimed at compensating for the lack of face-to-face interactions are those that have seen their share of users increase. For example, tools related to web conferences, instant mes-

² Company social network, internal blogs and wikis; Computer-assisted design/manufacturing (CAD); Client relationship management (CRM); Enterprise resource planning (ERP); Instant messaging; Intelligent and self-learning technologies; Platform for collaborative work and documents sharing (Groupware); Process automation tool (workflow); Support tool for meetings, trainings, ...; Web conference tool.

saging, and collaborative tools like groupware and workflow. Thus, 88% of teleworkers used videoconferencing tools, 81% used instant messaging tools, 75% groupware and 52% workflow. For 43% of teleworkers, the lockdown offered the opportunity to discover new tools. Among teleworkers who experienced new types of tools they had not used before, 50% reported using web conference tools, 40% using workflow-type tools, and 37% using instant messaging.

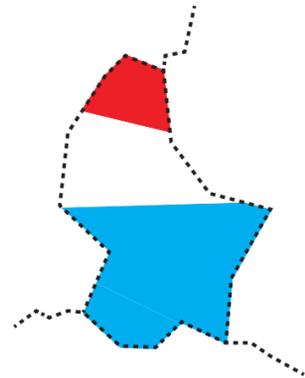
Third, we observe a more intensive use of digital tools. Indeed, 58% of teleworkers who used digital tools in the past used them more frequently during the lockdown. Once again, web conference tools have seen the highest increase in their frequency of use. For artificial intelligent and self-learning technologies tools (artificial intelligence), half of their users reported a reduction in their intensity of use during the lockdown. Finally, we observe that three out of ten teleworkers estimate that their digital skills increased during the lockdown. Teleworkers who have experienced new digital tools during lockdown and who have used them intensively are those, all other things being equal, who estimate the most that their digital skills improved during the lockdown.

Regarding individual characteristics, we found that teleworkers who live in an optimal environment characterized by a house where the surface area per inhabitant is high and who enjoy an outside area (access to a garden, terrace and nearby public park), women, teleworkers aged 30 to 39 years, those aged 50 and more, those with a tertiary education degree and those working in the public administration or education sector and those in the finance or insurance sector are those who have benefited the most from the lockdown to improve their digital skills.



LISER IN THE BATTLE AGAINST THE COVID-19: IMPACTS & FORECASTS

National data



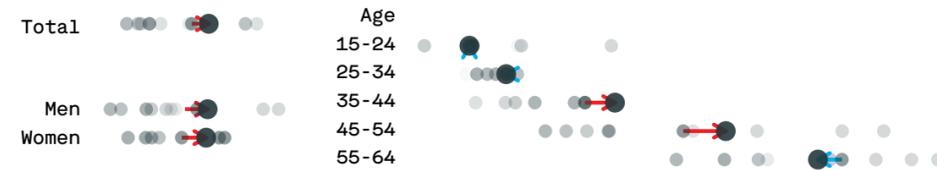
Inputs on

- International trade
- Labor market structure
- Social structure
- Health policies
- Economy
- Social inequalities
- Containment policies
- COVID-19 statistics

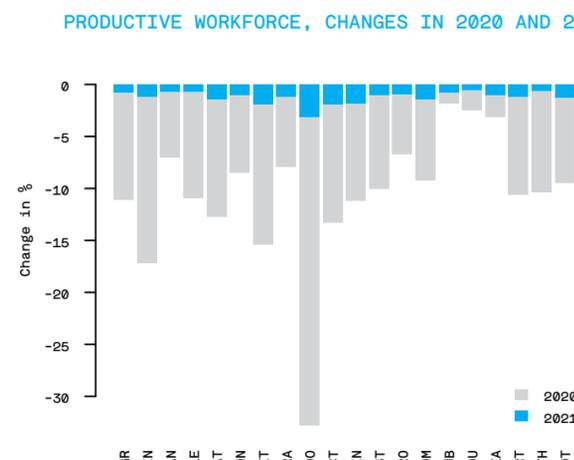
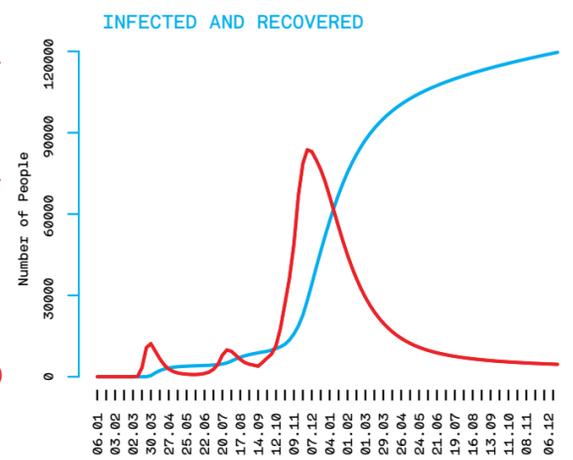
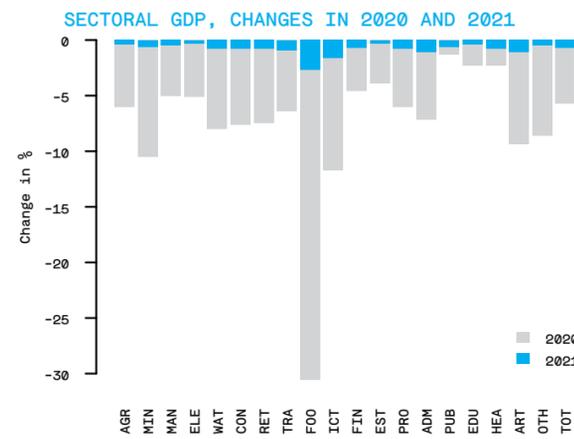
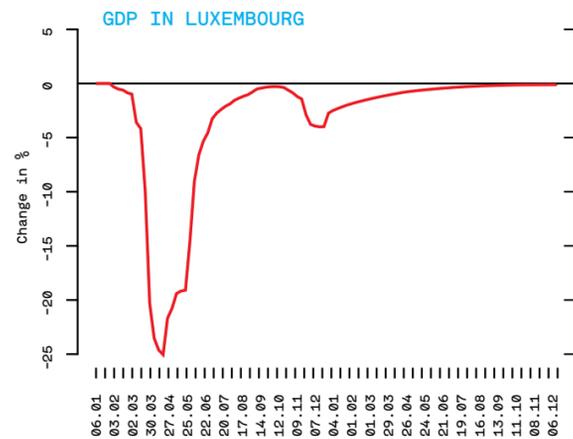
LISER members offered their contribution to the battle against the COVID-19 pandemic. They developed complementary approaches to study the economic and epidemiological consequences of the crisis. Research was conducted in partnership with epidemiologists from LCSB as well as economists from the University of Luxembourg and STATEC, who joined forces to assist the Task Force for the Coordination of the Public Research Sector in the Context of the Covid-19 Pandemic

In drawing the socio-economic profile of COVID-19 infections, we exploited comprehensive data provided by health authorities to follow the evolution of the pandemic across different subgroups of the population according to multiple demographic, social or economic characteristics – such as age, gender, household composition and family size, income, employment status, sector of occupation, canton or of residence. Weekly updates allowed us to pinpoint spots of infections –for example, in particular sectors of activity– and to identify vulnerable population subgroups.

Socio-economic Profiling



Modelling The Macroeconomic & Distributional Effects & Restarting Scenarios (Modvid)

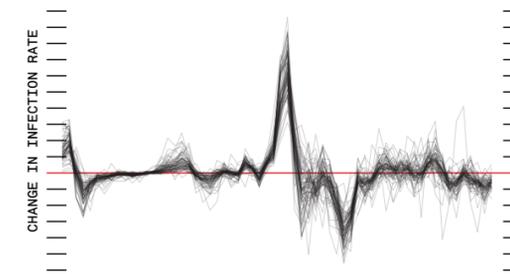


Effect on the economy and on the health

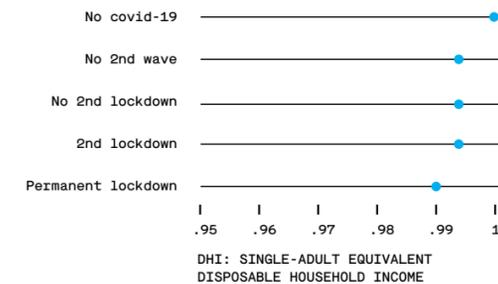
Effect on activity sectors

MODVid consists of a set of interrelated quantitative tools, which were used to analyze the health, macroeconomic and inequality responses to the COVID-19 crisis and to the related public health policy measures implemented in Luxembourg. An epidemionomic model was used to nowcast the evolution on GDP, employment and number of Covid cases by sector. These nowcasts were injected into microsimulation models to predict their implications in terms of income inequality and poverty.

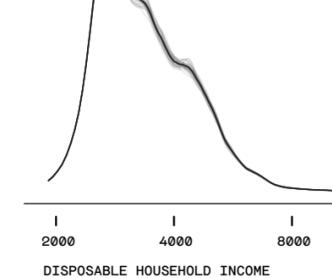
EVOLUTION OF GROWTH IN INFECTIONS BY SOCIO-DEMOGRAPHIC CHARACTERISTICS



GINI COEFFICIENT OF DHI RELATIVE TO NO COVID-19

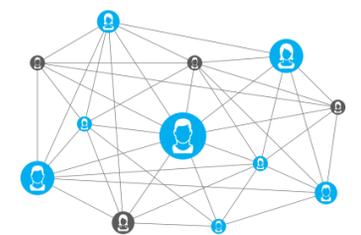
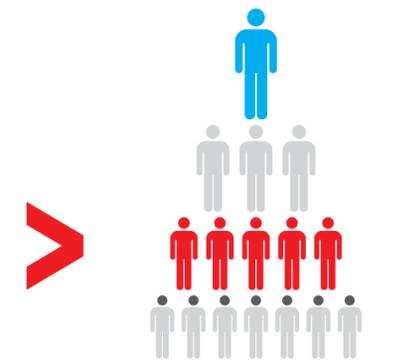


PROJECTED HOUSEHOLD INCOME DISTRIBUTION



Effect on distribution (inequalities & poverty)

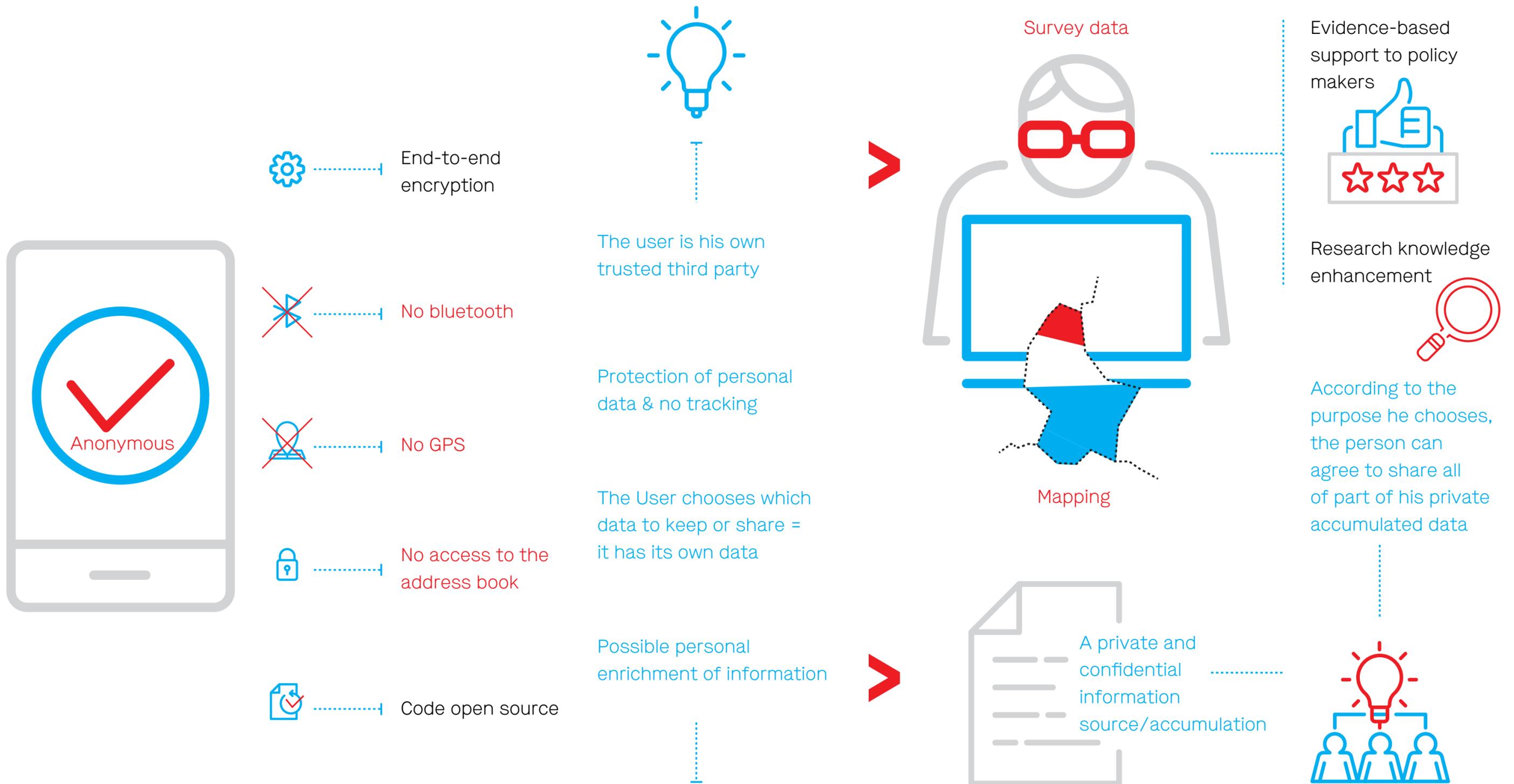
Cross-Functional dashboard in relation to the country's COVID-19 data



This dashboard is a collaborative decision support tool where decision makers can play with variables in governing scenarios and “what if” scenarios. It is presented on a Visual Wall composed of an impressive digital-screened wall full of data and graphs. Data from LISER is visible relating to predictions on the impact e.g. on GDP, globally and by economic sector in various different scenarios.

LISER IN THE BATTLE AGAINST THE COVID-19: A NEW DATA COLLECTION TECHNOLOGY

IN ORDER TO FACE THE CHALLENGES LINKED TO DATA COLLECTION IN THE CONTEXT OF THE COVID PANDEMIC, LISER DEVELOPPED
A « MADE-IN-LUXEMBURG » CUTTING-EDGE DATA COLLECTION APPLICATION THAT COULD BE DEPLOYED IN THE FUTURE



CROSSED GLANCES ON TELEWORK AND DIGITAL TOOLS BETWEEN DR. LUDIVINE MARTIN & DR. LAETITIA HAURET

The labour market faces many changes, notably linked to the introduction of new digital technologies in the workplace. The coronavirus pandemic with the generalization of teleworking during the spring 2020 lockdown has accelerated these trends. The development of digital skills at all levels of an organisation seems necessary for at least three main reasons.

Dr. Laetitia Hauret

Do you think that the development of digital skills at all levels of an organisation is necessary?

The labour market faces many changes, notably linked to the introduction of new digital technologies in the workplace. The coronavirus pandemic with the generalization of teleworking during the spring 2020 lockdown has accelerated these trends. In this context, the European Commission has put in place a new skills strategy for sustainable competitiveness, social equity and resilience. This strategy establishes 2025 targets for adult participation in learning and the acquisition of digital and ecological skills. The Commission sets the objective that 70% of 16-74 year olds in 2025 will have at least basic digital skills. The development of digital skills at all levels of an organisation seems necessary for at least three main reasons.

Firstly, employees need to develop their digital skills to match new firms' needs and the evolution of their tasks. In Luxembourg, firms request for digital skills is high since, between June and December 2020, 68% of online job offers required basic digital skills, 33% required digital skills applied to management and 30% required digital skills in data analysis. Developing at least basic digital skills is therefore important for accessing and maintaining employment.

Secondly, employees need to develop their digital skills in order to better manage the possible information overload associated with the simultaneous use of new digital tools, emails and videoconferencing.

Thirdly, employees need to develop their digital skills in order to achieve fulfilment in the context of telework. We can expect that telework use will be widespread after the crisis. Therefore, it is important that employees have sufficient digital skills to benefit from this new work organisation. Previous research has shown that teleworking can generate a feeling of isolation and that this negative effect has shown to be more prevalent for disadvantaged employees in terms of digital skills who are at a greater risk of diminished interactions. Indeed, being able to use video conferencing tools or online collaborative tools helps to reduce isolation of teleworkers.

Dr. Ludivine Martin

If I say to you: "Telework is good, but it cannot replace the human aspect of face-to-face interactions. What do you think about this statement?"

Existing studies show that telework offers many benefits to employees by promoting their well-being and job productivity. For instance, telework offers great flexibility to employees by allowing them, in particular, to work during their most productive hours. Telework also offers more autonomy than work on site and limits interruptions in performing tasks, allowing for better concentration. However, telework is not a universal remedy and induces drawbacks. Telework may induce professional isolation, hinder collaboration, decision-making in teams and knowledge transfer due to the reduction of face-to-face interactions. In my opinion, the use of digital tools for work purposes has an important role to play in compensating for the lack of face-to-face interactions, particularly in the context of widespread teleworking. Although, their use needs to remain reasonable to be beneficial. This is what we show in a study carried out at the Luxembourg and Greater Region level. In particular, this study shows that teleworkers who used videoconferencing during the lockdown have seen an increase of their well-being at work, but it is not enough to say that it made them more productive. It is the reasonable and non-intensive use of various collaborative and communication digital tools (document sharing platform, collaborative work platform, instant messaging, videoconferencing) that allows teleworkers to be more productive. Conversely, teleworkers who daily use the four studied digital tools have seen, more than other teleworkers, their well-being and their productivity at work deteriorate during the lockdown. Good collective management practices for

the use of digital tools and of the notifications generated need to be developed so that workers can benefit from them.

Existing studies show that telework offers many benefits to employees by promoting their well-being and job productivity. For instance, telework offers great flexibility to employees by allowing them, in particular, to work during their most productive hours. However, telework is not a universal remedy and induces drawbacks.

DR. LUDIVINE MARTIN

RESEARCH SCIENTIST -
LABOUR MARKET DEPARTMENT



DIGITAL
UPSKILLING
IN A TELEWORK
ENVIRONMENT

Acronym:
DIGITUP

Project duration:
From May 18th, 2020 to January 17th, 2021

Martin Ludivine, Clement Franz,
Poussing Nicolas, Robert Fanny,
Nguyen-Thi Thuc Uyen, Hauret Laetitia,
Bourgeon Pauline, Marguerit David,
Gewinner Irina, Penard Thierry, Sutan Angela,
Vranceanu Radu, Rosaz Julie

Granted by
The National Research Fund Luxembourg (FNR)

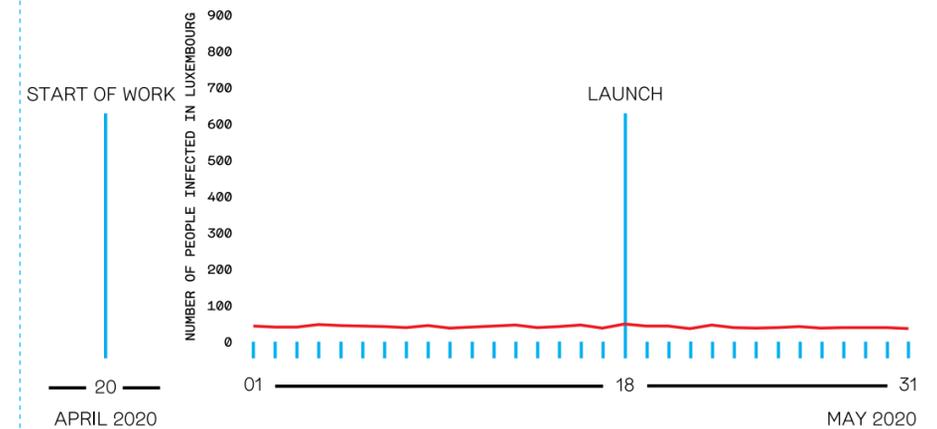
What's about
Dr. Ludivine Martin

Ludivine Martin is researcher at LISER (Luxembourg Institute of Socio-Economic Research) in the Labour Market department and associate research fellow at CREM (UMR CNRS 6211 - Rennes, France), since July 2008. She holds a PhD in Economics from the University of Rennes 1 (2008), and habilitations to supervise research, HDR from the University of Strasbourg/BETA and ADR from the University of Luxembourg (2020).

Her research fields are personnel economics, labour economics and the economics of digitalization.

Her research work is focused, first, on the influence of innovative work practices and the use of Information and Communication Technologies (ICT) at the workplace on employees' well-being. Her second main research question assess the impacts of digitalization on skills of the future.

Her research is based on an empirical approach and she uses both survey data and experimental data. Her work has been published in academic journals such as *European Economic Review*, *Industrial Relations*, *Economic and Industrial Democracy*, *Applied Economics*.



JUST BETWEEN US

DR. LUDIVINE MARTIN

Dr. Martin, could you tell us more about your expertise and how it is being put to use in the current COVID-19 context?

My research is concerned with personnel economics, labour economics and the economics of digitalization. My main research expertise is about the consequences of the use of digital tools for work purposes on employees' well-being, their job quality and the future of work. I base my expertise on empirical studies conducted on survey and experimental data. I highlighted in my previous work that the use of information technologies like workflow, allows the planning and ordering of the tasks to be performed by the members of a team (such as Slack, Freedcamp), permitting the development of a motivational work environment, but the adoption of these tools was low in the 2010s decade.

At the beginning of the 2020 spring lockdown, together with colleagues from LISER, the University of Luxembourg, the Université Rennes 1 (CREM), the Université de Lyon (GATE), the University of Réunion, the Burgundy School of Business (BSB) and ESSEC, we saw this period of lockdown as an opportunity for firms to adopt these digital tools, for teleworkers to discover them, and to raise their digital skills through learning-by-doing. The improvement of digital skills can be also useful in a labour market characterized by the increasing digitalization of firms' processes.

Did you think that teleworking was a subject to be studied in more detail from a scientific point of view and that the COVID-19 crisis has only emphasized it?

We estimate, using data from a joint LISER/UNILU survey (COVID-19 Socio-Economic Impacts survey) that 63% of resident and cross-border employees, who actively worked during the spring lockdown, were teleworkers. In comparison, 20% of resident employees teleworked in 2019 (STATEC, 2020) ¹.

In the same time, digital service providers announced that the use of digital tools boomed during the spring lockdown. As an illustration, during the last week of March 2020, more than 12 million new members joined the workflow Microsoft Teams worldwide, and at the end of April the number of active users exceeded 75 million.² In terms of videoconference applications, Zoom had more than 300 millions daily users at late April 2020, compared to only 10 millions in December 2019.³ We observe also a raise in our data, where teleworkers declared huge increases in their use of both tools: 61% increase in the use of workflow and 45% increase in the use of videoconference.

With the discovery of telework for around 80% of teleworkers during the first lockdown and the boom of digital tool use, we saw this spe-

¹ STATEC. (2020). Le télétravail explose : une expérience jugée positive par la majorité des travailleurs. STATNEWS.

² <https://www.presse-citron.net/microsoft-teams-la-crise-est-un-accelérateur-du-bureau-de-demain/>

³ <https://www.journaldunet.fr/web-tech/guide-de-l-entreprise-digitale/1443796-zoom-telecharger-l-app-gratuite-visio-alternative120520/>.

cial period as a life-size experience to analyse the consequences of telework on employees' well-being, productivity and improvement of their digital skills.

THE PROJECT AT A GLANCE

The DIGITUP project is a research project funded by the National Research Fund of Luxembourg (COVID-19/2020-1/14736055/DIGITUP/Martin). The research questions treated during this project are the following:

What is the impact of the COVID-19 first lockdown on the use of digital tools among teleworkers? Does the use of digital tools help teleworkers to improve their digital skills?⁴ Have job satisfaction, job stress, and job productivity been affected by the use of digital tools? Which managerial practices and good practices should be spread?⁵ How do Luxembourg and cross-bordering countries adapt their legal frameworks of the telework practice?

For years, the labour market has undergone massive changes due to the digital transformation, affecting a growing number of employees. Nevertheless, the increased use of digital tools was not experienced by many employees, and some of them were afraid of changes that digital transformation could introduce. The COVID-19 lockdown changed the situation drastically by enforcing teleworking and fostering the use of digital tools. The objective of DIGITUP project was to investigate the consequences of the digitalization of work on teleworkers during the COVID-19 first lockdown. For this purpose, LISER

⁴ Hauret, L. & Martin, L. (eds.) (2020). L'impact du télétravail imposé par le confinement du printemps 2020 sur l'usage des outils digitaux et les compétences digitales. LISER, Policy Brief 2020-12. <https://liser.elsevierpure.com/en/publications/the-impact-of-telework-induced-by-the-spring-2020-lockdown-on-the>

⁵ Cucchi Fuhrer, C., Hauret, L. & Martin, L. (2021) Usage des outils digitaux pendant le confinement et évolution du bien-être et de la productivité des télétravailleurs, LISER, Policy Brief 2021-03 <https://liser.elsevierpure.com/en/publications/usage-des-outils-digitaux-pendant-le-confinement-et-%C3%A9volution-du>

and the University of Luxembourg conducted new survey data between May and July 2020 and new experimental data were used. The analyses show several results. First, the project identifies various profiles of digital tools users following the lockdown. Second, the project provides novel evidence on the impact of digital tools use profiles on the digital up-skilling of teleworkers. Thus, teleworkers who experienced new digital tools and used them intensively during the lockdown are those who have developed their digital skills the most. Third, the use of digital tools has affected the self-perceived job well-being (job satisfaction and job stress) and job productivity of teleworkers. Indeed, the use of videoconferencing is likely to enhance teleworkers' job well-being because it permits to maintain social interactions between co-workers. Nevertheless, an intensive daily use of communication and collaborative digital tools is detrimental to job satisfaction, mainly due to work interruptions and the flow of information generated. Using communication and collaborative digital tools in a reasoned manner and when necessary is favourable to job productivity. Fourth, managerial practices such as internal support (from colleagues and managers) and training programmes that help employees to acquire new digital skills required in their jobs need to be encouraged. Good practices in the use of digital tools, especially the management of notifications and the time slot dedicated to virtual interactions, need to be shared to ward off information overload, interruptions, and hyper-connectivity. Finally, the project provides an overview of the evolution of the legal frameworks of the telework practices both in Luxembourg and cross-bordering countries. A harmonization appears necessary in order to avoid potential frustrations between colleagues who can feel treated differently.

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PROF. MARTIN DIJST

HEAD OF THE RESEARCH DEPARTMENT
URBAN MOBILITY & DEVELOPMENT



SOCIO-ECONOMIC
IMPACTS OF COVID-19:
COLLECTING THE DATA
SHORT- AND MEDIUM-
TERM (SEI)



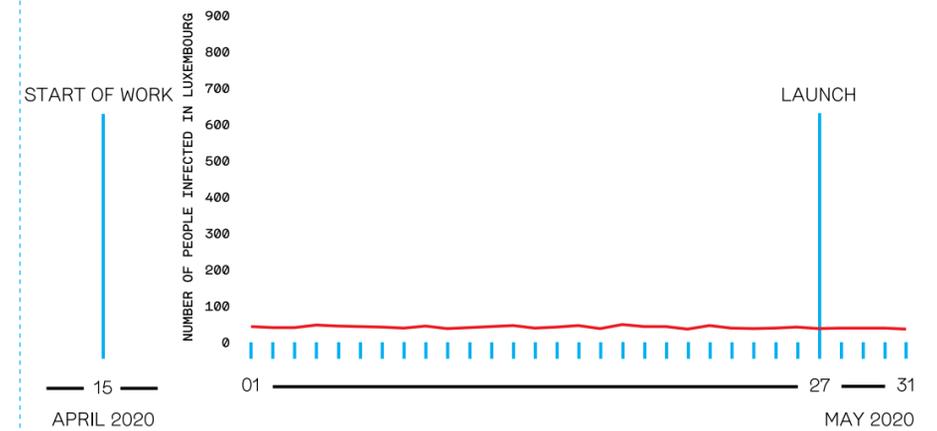
Collaborative partner:
University of Luxembourg

Survey granted by the National Research
Fund Luxembourg (FNR)

PI:
Prof. Martin Dijst
Director of the Research Department
Urban Mobility & Development at LISER

What's about
Prof. Martin Dijst

By discipline, Martin Dijst is urban geographer and was appointed in 2009 as full professor of Urban Development and Spatial Mobility at Utrecht University, the Netherlands. In December 2017, he started his position as director of the department Urban Development and Mobility at LISER, Luxembourg. He is also Affiliate Professor of Urban Development and Mobility at the University of Luxembourg. His research is focused on mobility, housing, Information and Communication Technologies, immersive Virtual Reality, climate change, weather conditions, urban metabolism and health. His recent work on health includes analysing the impact of exposures to environments on health and studies on the meaning of new digitalized sensors, monitoring techniques and self-management methods to stimulate health behaviours. Recently, he received as PI a Marie Curie ITN grant from the European Commission (2021-2024) for the project SURREAL: Systems approach of URban enviRonmEnts and heALth which includes budget for in total 15 PhD students. This project is interdisciplinary as well as intersectoral in nature.



JUST BETWEEN US

PROF. MARTIN DIJST

What were your motivations for setting up this survey on the socio-economic effects of the COVID-19 health crisis?

The motivation to initiate this survey on socio-economic impacts of the COVID-19 pandemic was twofold. First, I noticed that in Luxembourg but also abroad many studies were initiated on the short-term health implications of the pandemic but hardly anything on the medium and long-term effects of this infectious disease and related confinement measures on the daily lives of people. The short-term behavioural consequences of a virus, which spreads via contacts between people but also various confinement measures to limit these contacts, were large. As far as possible, people stayed at home for work, school and stores were closed and leisure activities were limited to the home place. However, the question I asked myself was whether these changes in daily life are only temporal or could have long-lasting effects. To address that question, a design and implementation of a survey with at least 2-3 waves to understand behaviours before, during, after the lockdown, and after the pandemic was necessary. Such a survey could also offer opportunities to policymakers and other stakeholders to limit harmful effects of the pandemic and confinement and to reduce social inequalities.

Another reason to start this project was the unique opportunity to work closely together between representatives of various disciplines, like economists, geographers, sociologists and psychologists from the University of Luxembourg and all research departments of LISER. The complexity of the socio-economic behavioural consequences of the pandemic and confinement was in need of a strong interdisciplinary team of world-class researchers. I felt privileged to coordinate the activities of this team.

Could you have imagined a year ago that this crisis would be still extant? So your survey is proving to be of public interest. Can you explain why?

Researchers in health within my network were largely focused on what we call non-communicable diseases, like cardiovascular disease, diabetes and cancer and mental health. Infectious diseases were seen as largely concentrated in less developed countries in which also contacts between wild animals and people are more common than in developed countries. However, we are living in an increasingly globalizing world in which face-to-face contacts between all kind of people and environments for holiday and work reasons are becoming habitual. Based on this trend, one could have expected such an outbreak. Virologists have warned us before about this risk but at that time they were voices in the wind. For most of us, it was a shock to notice that the virus was able to spread so rapidly and at such a large scale all over the world. Although, it is impressive to see how quickly different types of effective vaccines were developed, which are now being gradually distributed over the population. With this in mind, I am afraid that COVID-19 will be succeeded by new variants or other types of infectious diseases and will stay for many years amongst us. In that respect, it is very important that we have started with the socio-economic impact survey to develop an understanding of the structural implications of a pandemic and confinement measures. The first wave of the survey already shows that daily lives have changed and probably will not return to the lives people had before COVID-19. Follow-up waves will show how long-lasting behavioural changes are.

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DR. VÉRONIQUE VAN ACKER

RESEARCH SCIENTIST - URBAN MOBILITY
& DEVELOPMENT DEPARTMENT



SOCIO-ECONOMIC
IMPACTS OF COVID-19:
COLLECTING THE
DATA SHORT-
AND MEDIUM-
TERM (SEI)

Collaborative partner:
University of Luxembourg

Survey granted by the National Research
Fund Luxembourg (FNR)

PI:
Prof. Martin Dijst
Director of the Research Department
Urban Mobility & development at LISER

What's about
Dr. Véronique Van Acker

Veronique Van Acker currently works as a research scientist at LISER, Urban Development and Mobility department. She is also a guest professor in Spatial Analysis at Ghent University, Department of Geography. Her research focuses on the interaction between the built environment and travel behaviour. Topics include, among others, the importance of soft factors such as lifestyles and attitudes, behavioural change towards sustainable mobility, travel satisfaction and well-being, peak car and differences between generations, social and spatial impacts of new innovations in transport such as MaaS and Autonomous Vehicles (AVs). With Professor Martin Dijst, director of the Urban Development and Mobility department at LISER, Dr. Van Acker organised and coordinated a survey on the Socio-Economic Impacts of COVID-19 (SEI-project). Largely unknown are the short- and medium-term socio-economic impacts of the pandemic on work and employment, daily activities and mobility, and (not directly COVID related) health and health behaviours. To understand these impacts, a data collection was necessary.

JUST BETWEEN US

DR. VÉRONIQUE VAN ACKER



What were the main barriers you were facing in the survey?

Most important was probably the size of the survey. Many researchers from LISER and the University of Luxembourg are involved in this survey. A timely delivery of survey questions, revisions, translations, ethical clearances, implementation in the survey software ... sometimes proved to be a real challenge. Furthermore, we do not only focus on the impacts on daily activities and mobility, but also employment, development of digital skills, living conditions, health and lifestyles, time use and household interactions. We have considered organising a series of surveys, but we soon realised too many surveys were being organised at that time (spring 2020) and this could easily lead to a fatigue among the population. We therefore decided to organise our survey in such a way that all topics were covered simultaneously and respondents were randomly assigned to one of three modules being (i) employment and living conditions, (ii) daily activities and mobility, or (iii) health and health behaviours. But finding a sufficient number of respondents took more time than planned. It was only when the social media campaign was intensified, that we reached our goal of having a minimum of 1000 respondents per module. The resulting sample is however not representative for the population, but we are able to correct for this by using weights in our analyses. Some people have asked me why we did not start with a representative sampling of the population. But creating such a sample involves respecting certain procedures which take time. Time which we unfortunately did not have because information on the impacts of COVID-19 was expected as quickly as possible.

Can you explain what the results of the survey can tell us, and how they will be useful?

With our survey, we can analyse a much wider variety of socio-economic impacts than other studies. For example, people's worries about their jobs and incomes, the development of digital skills at work, changes in online shopping, the use of public spaces and the fear of using public transport after a lockdown, changes in indirect health behaviours such as exercising or mental well-being, and household interactions especially between spouses. The structure of the survey allows for a detailed analysis per module. For example, it is possible to study the effect of education and profession on the development of digital skills at work, the relationship between changes in physical exercising and mental health, or to compare time use between women and men. Associations between the modules can also be studied, but only at an aggregated level since different respondents participated in different modules. For example, changes in out-of-home activities by gender and mental health. Our analyses will help in identifying effective policies differentiated by socio-demographics (e.g., gender, age, income, employment status) and also geographical location (e.g., urban versus suburban, different accessibilities). In doing so, social but also spatial inequalities in the impact of COVID-19 can be studied. A first survey was organised in Spring 2020 identifying multiple short-term impacts but multiple waves of data collection are needed to see if these effects persists in the long term and whether there is a 'new normal'. We therefore have organised a second survey in spring 2021, and plan a third wave later onwards.

The structure of the survey allows for a detailed analysis per module. For example, it is possible to study the effect of education and profession on the development of digital skills at work, the relationship between changes in physical exercising and mental health, or to compare time use between women and men. Based on this survey, two major socio economic impacts of the COVID-19 pandemic can be identified: one related to work and the other one related to daily life.

THE PUBLICATION AT A GLANCE

The populations of Luxembourg and of other countries worldwide have been suffering from the COVID-19 pandemic and related confinement measures for over a year. Vaccination efforts are ongoing and hopefully will bring back the daily life we had before the start of the pandemic in March 2020. However, the question is whether our daily lives will get back to pre-pandemic 'normal' or if the pandemic has fundamentally changed the way we work, shop, use transport modes and interact with others. There is also a risk that this pandemic in another variant will come back again and will lead to new confinement measures. Is living with a pandemic and confinement measures the 'new normal' in our daily lives? Is everybody equally hit by this health situation or are some people suffering more from the socio-economic consequences than others? Answering these questions is very important to identify ways to mitigate harmful consequences and to design tailor-made responses to combat social inequalities. However, since it takes time to analyse behaviours of the people in several stages of the pandemic it also demands patience from all stakeholders in society.

To address these fundamental questions, a large scale survey has started in spring 2020 in Luxembourg to collect information on the short- and medium-term socio-economic impacts of the pandemic and confinement measures on work and living conditions, daily activities and mobility, and (not directly COVID-related) health and health behaviours of individuals and their households. In this survey, questions were asked about three periods: just before the pandemic, during the peak of the pandemic and immediately after the first COVID-19 lockdown in spring 2020. An interdisciplinary project team composed of economists, geographers, sociologists and psychologists from the University of Luxembourg and all research departments of LISER, is

responsible for this data collection. The project is aligned with the WHO's 'Coordinated Global Research Roadmap: 2019 Novel Coronavirus', which emphasizes the importance of social sciences in this crisis, to be able to understand and act upon the economic, social, behavioural and contextual dimensions of the pandemic's impact.

Based on this survey, two major socio economic impacts of the COVID-19 pandemic can be identified: one related to work and the other one related to daily life. First, due to a variety of economic measures, the impact of the pandemic on unemployment and financial situation of households was limited. Nevertheless, employees did experience some fear of job and income loss, which might strengthen in the future if combatting the pandemic takes longer than the financial situation of the country allows. Working from home became the default work situation for high-educated employees with professions that allow for remote working using digital tools. As such, they could protect themselves against the risk of exposure to a COVID-19 infection. However, this was less the case for lower educated employees, which were not able to work remotely.

Second, the confinement measures have set back the daily lives of many people to their home and surrounding residential environment. Out-of-home activities, such as social activities and visiting stores, were substituted by domestic activities, caring and school tasks of children. The implications for gender inequalities were mixed. Women, especially in households with small children, showed larger reductions in out of home activities than men. On the other hand, the subjective experience of men is that due to working from home and larger flexibility, they could contribute more to household activities than before the pandemic. Working from a home in which also the partner and/or children are present

increases the stress experience of the household members, which on the long-term might have detrimental effects on people's well-being.

Over time people developed fears of being exposed to the COVID-19 virus in public places, public transport and even in medical settings. A confinement measure of keeping two meters distance between each other also created a social distance between people. The more time the pandemic takes, the higher the risk that people will develop a people- or crowd-averse habitual behaviour that might harm social life and sustainable mobility goals.

One survey is not sufficient to understand the often-complex behavioural changes of people. To that purpose, a second wave was carried out in spring 2021 with a focus put on their current behaviours in order to compare them with spring 2020. The intention is to schedule a final third wave when COVID-19 will mostly be behind us, with the majority of people vaccinated and most confinement measures removed.

DR. MARÍA NOEL PI ALPERIN

RESEARCH SCIENTIST -
LIVING CONDITIONS DEPARTMENT



SURVEY OF HEALTH,
AGEING AND RETIREMENT
IN EUROPE



Acronym:
SHARE

Project duration:
From March 1st, 2013 to December 31st, 2024

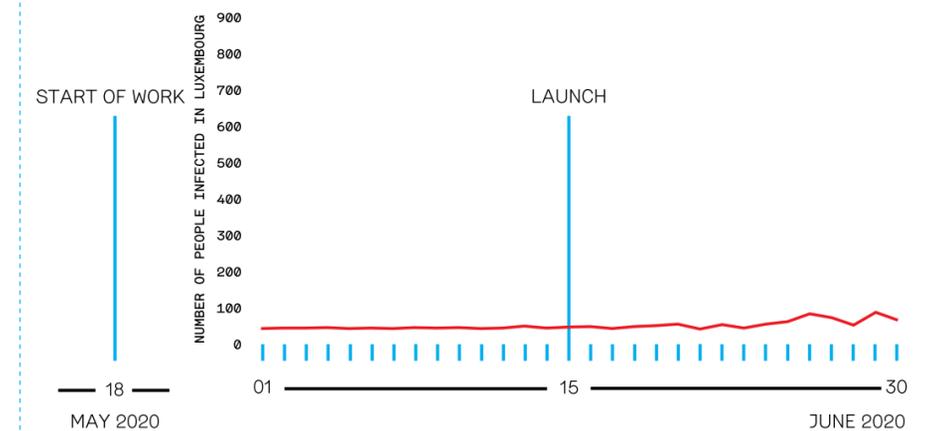
LISER members:
Gaetan de Lanchy, Jordane Segura,
Iryna Kyzyma, Thierry Kruten,
Sylviane Breulheid, Benjamin Boehm.

Funded by the Ministry of Higher Education
and Research of Luxembourg

What's about
Dr. María Noel Pi Alperin

María Noel Pi Alperin has been a tenured Research Scientist in LISER in the Living Conditions department since 2010. She holds a PhD in Economics from the Université de Montpellier (France). She has expertise in the fields of economic analysis, modelling, and the measurement of social phenomena. Her main areas of research include the measurement of health and health inequalities, equality of opportunity in health, multiple deprivation, and microsimulation. Her work has been published in peer-reviewed journals such as European Journal of Operational Research, European Journal of Health Economics, Economic Modelling, Review of Income and Wealth, and Social Indicators Research. She also has extensive experience as a team and project manager. She has been the Country Team Leader of the SHARE survey for Luxembourg since 2013. She was the Leader of the Health Research Unit in the Living Conditions department for six years. She was the principal investigator of the HEADYNAP project funded by the Luxembourg National Research Funds and the coordinator for Luxembourg within the FP7 project EuroREACH

(Improved access to health care data through cross-country comparisons) funded by the European Commission. Lastly, she is currently coordinating a national project with the Ministry of Family about the needs of people with disabilities.



JUST BETWEEN US

DR. MARÍA NOEL PI ALPERIN



Due to the health situation, what adaptations did you have to make to launch the survey?

The Corona outbreak hit SHARE in the middle of the main data collection of Wave 8 and the fieldwork with face-to-face interviews had to be suspended in Luxembourg as well as in all participating countries in March 2020. But by June 2020, SHARE restarted the fieldwork and successfully conducted a new “SHARE COVID-19 survey”. Since SHARE-ERIC provides an ideal infrastructure to study the effects of the pandemic, a big effort from all SHARE Country Teams was made to switch from face-to-face to telephone interviews and conduct a shortened version of the survey with Corona-specific questions about the situation of people who are 50 years and older in 27 European countries and Israel.

In addition to the normal objectives of the SHARE survey what do the new issues in relation to the Covid-19 crisis bring?

The SHARE COVID-19 questionnaire covers the most important life domains for the target population. It asks specific questions about infections and changes in life during the lockdown: health and health behaviour (general health before and after the COVID-19 outbreak, practice of safety measures; mental health (anxiety, depression, sleeping problems, loneliness before and after the COVID-19 outbreak); infections and healthcare (COVID-19 related symptoms, SARS-CoV-2 testing and hospitalization, forgone medical treatment, satisfaction with treatments); changes in work and economic situation (unemployment, business closures, working from home, changes in working hours and income, financial support); and social networks (changes in per-

sonal contacts with family and friends, help given and received, personal care given and received).

The information from the SHARE COVID-19 survey can be matched with the regular panel information and will allow to identify, among others, healthcare inequalities before, during and after the pandemic, to understand the lockdown effects on health and health behaviours, analyse labour market implications of the lockdown, assess the impacts of the pandemic and lockdown on income and wealth inequality, mitigate the effects of epidemic control decisions on social relationships and optimize future epidemic control measures by taking the geographical patterns of the disease and their relationship with social patterns into account as well as to better manage housing and living arrangements choices (choosing between independence, co-residence or institutionalization).

The first round of the SHARE COVID-19 survey was successfully conducted in Luxembourg as well as in all twenty-seven other participant countries between June and August 2020. 932 individuals responded to this Corona-specific questionnaire. The first results of this survey were available from beginning of this year. To analyse the long-term effects of the pandemic and the epidemiological containment decision, a second round of the SHARE COVID-19 questionnaire will be fielded in spring 2021. The EU Commission supports the new SHARE COVID-19 project by funding it through Horizon 2020 and the Coronavirus Global Response initiative.

THE PROJECT AT A GLANCE

Population ageing is one of Europe's most pressing problems in the 21st century. In order to meet its manifold challenges, scientific research is needed. SHARE, the Survey of Health, Ageing and Retirement in Europe, was created in 2004 to deliver the data to conduct this research. SHARE is a research infrastructure for studying the effects of health, social, economic and environmental policies over the life-course of European citizens and beyond.

SHARE collects data based on more than seven hundred questions on health (e.g. physical health, mental health, health behaviour, healthcare), socio-economic conditions (e.g. living conditions, employment status and opportunities, income, pensions, wealth), and social and family networks (e.g. intergenerational support, volunteering, activities) for individuals aged 50 years or older. This data is complemented by large-scale objective physical health measures, such as grip strength, lung function and chair stand. SHARE's multi-disciplinary approach allows not only for social and economic analyses of various phenomena but also, for example, for medical insights.

SHARE operates in all continental Member States of the European Union as well as in Switzerland and Israel. Strictly harmonized questionnaires guarantee cross-national comparability. SHARE is also embedded in a global network of sister studies, such as the US Health and Retirement Study (HRS), the English Longitudinal Study of Ageing (ELSA), the Irish Longitudinal Study on Ageing (TILDA), the Japanese Study of Aging and Retirement (JSTAR), the Longitudinal Aging Study in India (LASI), and many others, thus allowing comparative research on a truly global scale.

In order to grasp the dynamic character of the ageing process, SHARE has been conceptualized as a longitudinal study. This means that, unlike cross-sectional studies, which compare different individuals with the same characteristics, SHARE is able to follow the ageing process because it tracks the same people and their development over time. By conducting multiple survey waves, SHARE documents how respondents react to the same questions and measurements in the individual waves and, by comparing them, developments over time are rendered visible. Furthermore, SHARE combines the prospective collection of data in each new wave with retrospective data collection, thus making it possible to evaluate the impact of past policy measures on the lives of the respondents. Its longitudinal character means that SHARE's scientific value increases with each new wave of data collection: the more waves have been conducted, the better the ageing process can be analysed.

With the help of SHARE data, researchers can provide a better understanding of how individuals and families are affected by ageing. The survey exploits Europe's institutional, economic, social and cultural diversity as a “natural laboratory” to investigate the population ageing process, bringing together many scientific disciplines, including demography, economics, epidemiology, psychology, sociology, medicine, biology, and statistics. SHARE also offers several special data sets. These include retrospective data on the respondents' entire life course, the linkage of survey data with institutional pension information, or more recently, a Corona-specific questionnaire on important changes in life during the lockdown.

SHARE has become a major pillar of the European Research Area, selected as one of the projects to be implemented by the European Strategy Forum on Research Infrastructures (ESFRI) in

2006, given a new legal status as the first ever European Research Infrastructure Consortium (SHARE-ERIC) in March 2011, and becoming an ESFRI landmark in 2016. In February 2021, SHARE recorded more than 12.000 data users and over 3100 scientific publications, books, and articles in specialised journals.

Luxembourg has been part of the SHARE project since 2013 and it is funded by the Ministry of Higher Education and Research. More than 2.000 residents have already participated in the first four waves of the survey in the Grand Duchy. The country also registers 53 users from different research institutions such as LISER, University of Luxembourg and Luxembourg Institute of Health, as well as from public and private non-academic institutions like Central Bank of Luxembourg, Ministry of Health, STATEC, D'Ligue Asbl, among others.

Thus, SHARE is the largest pan-European social science panel study providing internationally comparable longitudinal micro data, which allow insights in the fields of public health and socio-economic living conditions of European individuals.

PROF. PHILIPPE VAN KERM

JOINT PROFESSOR LISER -
UNIVERSITY OF LUXEMBOURG



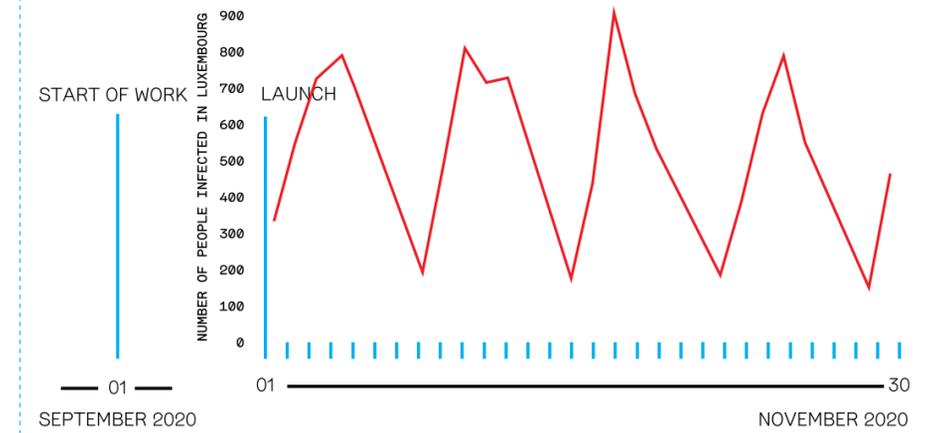
LISER member:
Anne-Sophie Genevois
Start date:
November 1st, 2020
Project elaborated by
The Luxembourg Task Force

What's about
Prof. Philippe Van Kerm

Philippe Van Kerm holds a joint professorship in Social Inequality and Social Policy at LISER and at the Department of Social Sciences of the University of Luxembourg. Before starting his current position in 2017, Philippe was head of LISER's Living Conditions department. He is a fellow at the Institute for Social and Economic Research (University of Essex), the Institute for New Economic Thinking (University of Oxford) and the Stone Center on Socioeconomic Inequality (City University of New York). He is an associate editor of the Journal of Economic Inequality and of the Stata Journal.

Economist by training –he holds a PhD in Economics from the University of Namur (Belgium)-- he has long worked in multi-disciplinary environments and co-authored with demographers, sociologists, social policy analysts and statisticians.

His research interests are in applied micro-econometrics, welfare and labour with particular reference to poverty and income distribution dynamics, wealth inequality, and social mobility. More broadly, his research work is motivated by the search for the social, economic, or policy determinants of various dimensions of inequality and social disparities.



JUST BETWEEN US
PROF. PHILIPPE VAN KERM



How do you think this project is useful?

This project is one of the many components of the work conducted by the "Research Luxembourg" COVID-19 Task Force. The task force was established in the Spring of 2020 as a coordinated effort of the Luxembourg public research partners to provide broad multidisciplinary expertise and research-based support and evidence to help the government manage the pandemic. Research Luxembourg as a whole involved LISER alongside the Luxembourg Institute of Health (LIH), the Luxembourg Institute of Science and Technology (LIST), the University of Luxembourg, Luxinnovation and the Luxembourg National Research Fund (FNR), under the coordination of the Ministry of Higher Education and Research. In the face of a crisis of unprecedented nature and magnitude, the nationally coordinated effort to provide wide ranging evidence and projections about the evolution and the impacts of the spread of COVID-19 provided decision-makers with much-needed instruments to try and handle the pandemic and its impacts. Our work in this context first confirmed that COVID-19 was not simply hitting at random, but that there has been a relatively strong socio-economic gradient in infection and hospitalization rates –and therefore pointed to groups or areas where targeted interventions was desirable to help contain the spread of the virus. By drawing a weekly update of the socio-economic profile of infected residents, our estimations also allowed tracking the spread of the disease across different economic sectors, areas and age groups week after week, thereby helping monitoring the evolution of the disease in the country.

What did you learn through this project?

It comes as no surprise that we have not all been facing the same risks of being infected and of developing severe symptoms requiring hospitalization and intensive care. Of course, age has been the primary determinant of death or severe forms of COVID-19. But beyond age, the magnitude of differences in infection and morbidity by level of household income remains striking even in a rich country with widely accessible health infrastructure. People in the bottom fifth of the income distribution, for example, appeared twice more likely to require hospitalization than people in the top fifth, even 'controlling for' age and gender differences. Similarly; people receiving social assistance benefits have been fifty percent more likely to be tested positive.

When looking at such social gradients, it is essential to bear in mind that correlation is not causation, however. Infections are transmitted through social contacts, not through the thickness of one's wallet. What socio-economic gradients reflect are a combination of differences in risky exposure through social contacts in the workplace, at school or at home, differences in the capacity to adopt preventive measures (such as social distancing, mask wearing, strict quarantining), or differences in the prevalence of comorbidities (such as obesity or diabetes) -- among potentially other factors influenced by one's income or socio-economic status and that also affected the risk of being infected by the coronavirus.

Aren't socio-economic differences in infections simply reflecting differences in testing rates?

Not quite. The often-heard argument that higher infections just reflect more frequent testing ---over time, across different population, etc. – does not hold in the data we have examined. It is true that significant differences in testing rates emerge across socio-economic groups. For example, just above seventy-five percent of residents affiliated to the social security aged 75 or more have been tested at least once since the onset of the pandemic, while this share is almost ninety percent among people aged 35-40. Differences can also be found according to income, employment status, and perhaps surprisingly, gender. And, of course, with the gradual roll-out of the testing infrastructure and the implementation of the large-scale testing strategy in the Summer and Winter, testing rates varied over time. But in many cases evidence showed that testing rates and infection rates are not, or are even negatively, correlated. Populations with higher estimates of infection often exhibited *lower* testing rates, not *higher* testing rates. This is true in particular with respect to income groups: residents in low income households exhibit both higher estimates of infection rates and lower testing rates than richer households – so, in this case, differences in testing rates could, if anything, hide a stronger gradient in infections.

Our work in this context first confirmed that COVID-19 was not simply hitting at random, but that there has been a relatively strong socio-economic gradient in infection and hospitalization rates –and therefore pointed to groups or areas where targeted interventions was desirable to help contain the spread of the virus.

It comes as no surprise that we have not all been facing the same risks of being infected and of developing severe symptoms requiring hospitalization and intensive care. Of course, age has been the primary determinant of death or severe forms of COVID-19. But beyond age, the magnitude of differences in infection and morbidity by level of household income remains striking even in a rich country with widely accessible health infrastructure.

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When facing the rebound of COVID-19 in the Summer of 2020, this project set out to draw a "social map" of exposure to COVID-19 in Luxembourg. Was the virus spreading across all social strata? Was the virus hitting economically vulnerable populations harder than the well-off? Or had infections been blind to social or economic status?

THE PUBLICATION AT A GLANCE

When facing the rebound of COVID-19 in the Summer of 2020, this project set out to draw a "social map" of exposure to COVID-19 in Luxembourg. Was the virus spreading across all social strata? Was the virus hitting economically vulnerable populations harder than the well-off? Or had infections been blind to social or economic status? To shed light on such "health inequalities" and to inform health authorities about the potential need for targeted interventions in populations most at risk, the project developed a "social cartography" of coronavirus infections by exploiting administrative records on COVID-19 compiled by health authorities in combination with records on socio-economic data held by the Inspection Générale de la Sécurité Sociale (IGSS). Access to such data –completely anonymized– almost in real-time was made possible by the development of the IGSS's secure Luxembourg Microdata Platform on Labour and Social Protection and the effort of the health authorities to compile multiple sources of COVID-19 information for research purposes (on test results, hospitalizations, and, sadly, COVID-19 related deaths).

We calculated infection and hospitalization probabilities across a range of socio-economic characteristics of individuals or households, with particular focus on potentially economically or socially vulnerable groups. We examined differences in infections and hospitalizations along household income, employment status, nationality and country of birth, household composition, areas of residence. Zooming in on salaried employees, we examined infections along dimensions of work such as the sector of employment, the type of employment contract or the level of wage. These calculations allowed us to uncover social gradients in infections and, tracking the evolution of these gradients over time, to monitor the evolution of infections through different segments of the population. Of course, all

calculations needed to take into account potential differences in age and gender across the various socio-economic groups, so as to capture the impact of socio-economic characteristics, unconfounded by age and gender-related risk factors – this was most important for examining hospitalizations and the most severe forms of affections since those are first and foremost driven by age.

The analysis was helped by the large number of tests conducted in Luxembourg since soon after the first wave of infections, in particular in the context of the 'Large Scale Testing' initiatives. Most statistics on COVID-19 indeed focus on "confirmed cases" or simply the number of positive tests. Asymptomatic infections remain less likely to be detected. Widespread testing of asymptomatic cases in the context of the LST revealed useful to our "cartography" (we also closely monitored the evolution of testing rates over time and across population groups).

Concretely, we produced since November 2020 a weekly dashboard summarizing the evolution of infections, and COVID-19 related hospitalizations for a range of population subgroups classified according to salient social, economic or demographic characteristics. This short dashboard is part of a policy brief on the COVID-19 situation monitoring provided weekly by the Research Luxembourg Task Force to the government of Luxembourg to help develop policy decisions. While the weekly reports targeted at decision-makers were not meant for widespread dissemination, we are currently working with colleagues at STATEC, the IGSS and the Ministry of Health on a series of publications that will summarize the work done and will show how COVID-19 spread across the population since the outbreak of the pandemic.

DR. FRANCESCO FALLUCCHI

RESEARCH SCIENTIST -
LIVING CONDITIONS DEPARTMENT



FAIR ALLOCATION OF
SCARCE MEDICAL
RESOURCES IN THE
TIME OF COVID-19:
WHAT DO PEOPLE
THINK?



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Fair allocation of scarce medical resources
in the time of COVID-19: what do people think?

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Fallucchi, F., Faravelli, M., & Quercia, S.

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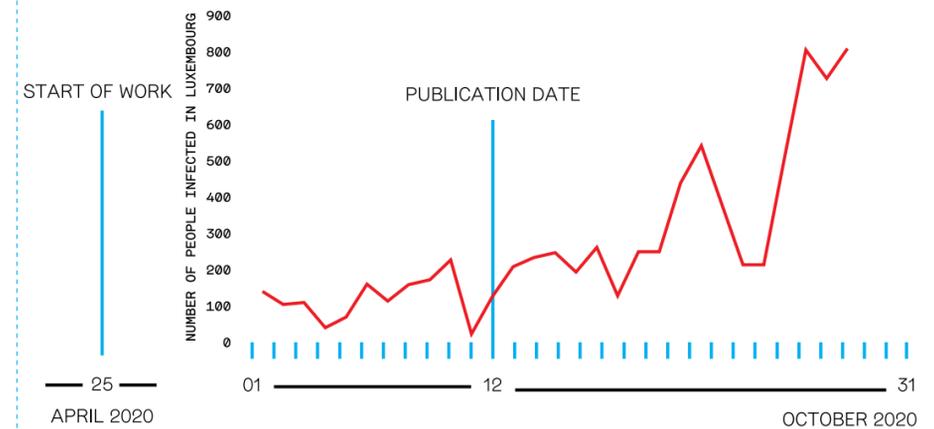
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What's about Dr. Francesco Fallucchi

Francesco Fallucchi joined LISER in July 2017 after earning a PhD in Economics at the University of Nottingham in 2014 and spending three years as a Research Fellow at the University of East Anglia and CBESS. Francesco uses experimental methods to explore individual behaviour, focusing on contests and tournaments as a testbed for labour market hypotheses and labour market policies. His expertise extends to how individuals comply with social norms. Recently, he used newly developed machine learning techniques applied to behavioural data. He has published 12 articles in field and general interest journals such as the European Economic Review, Experimental Economics, the Journal of Economic Behaviour & Organisation, and the International Journal of Game Theory. Since his arrival in LISER he contributed to the success of 6 grants at national and EU level and the development of the LISER-eLAB, a platform to conduct online experiments with the wider population of Luxembourg.



JUST BETWEEN US

DR. FRANCESCO FALLUCCHI

Why did you decide to focus your research on people's feelings towards directives issued by policy makers?

From the onset of the SARS-CoV-2 pandemic, governments were worried about the shortage of medical resources, from masks to oxygen, and ultimately, beds in Intensive Care Units (ICU). Together with my co-authors, we immediately thought this last element was decisive for public policy decisions since the choices of governments to go in lockdown mostly depend on the number of beds available in hospitals and ICUs. Still, these are also the most unfamiliar ones to the citizens. On the other hand, the dilemma of what life to save has always been of research interest to researchers in philosophy, psychology, and economics. The so-called 'trolley problem' (Foot, 1967) is the first example of this research stream. Recent developments in this area of research have provided valuable insights on public policies and the development of Artificial Intelligence ethics. For example, psychologists and ethicists study how to instruct automated guided vehicles about what to do in life-savings choice scenarios (see the research published in Nature titled 'the moral machine experiment'). Therefore, we decided to investigate how people would perceive directives issued by policy makers over such unfamiliar tasks. Moreover, we checked how the public opinion would differ from what experts worldwide suggested in their guidelines and why these discrepancies emerged.

You conducted a survey among a sample of American citizens. Do you think that the results of your survey will be similar in Europe, and in Luxembourg?

Three reasons have dictated the choice of conducting a set of surveys among American citi-

zens. First of all, we wanted to check the evolution of individual preferences across the various phases of the pandemic. We (optimistically) thought that in May 2020, the peak of the spread in Europe was over while the peak had not yet been reached in the US. Secondly, we wanted to ask individuals their opinion over various scenarios that could somehow feel either unrealistic or linked to other dynamics out of our control in Europe. For example, some Europeans may associate ethnic minorities with immigration, while this is not always the case in the US. The third reason was the readily available and inexpensive data collection via various online platforms with American citizens that social scientists frequently use. Despite this, we believe that at least some of our results can be generalised to Europe. We say so because, for example, over the past months, we witnessed national associations representing disabled people in Europe and the USA call for a fairer allocation of medical resources. These problems arose worldwide, with the most fragile strata of the populations left behind when the health systems were under stress. In our research project, we find worrisome beliefs about who should be helped first, justifying the concerns raised by these associations.

This publication is linked to the project titled "An Experimental test of Hospital Admission Guidelines" (granted by the National Research Fund Luxembourg). Could you tell us a bit more about this project in general, so that we can put this publication in its context...

The project explored, throughout a series of anonymous surveys, 1) whether the popular sentiment is in accordance with hospital guidelines regarding the allocation of scarce medical resources and 2) how public opinion evolves as

the pandemic escalate. We believed this was of paramount importance for several reasons. First of all, understanding whether the utilitarian view of maximizing overall life expectancy is widely accepted or becomes more widely accepted as the health crisis worsens. Secondly, and more relevant for Luxembourg, public opinion could suggest further indication about the guidelines over the allocation of scarce medical resources to apply in all EU countries. The first, immediate results suggest these ethically sensible recommendations do not always reflect the views of citizens. We found considerable heterogeneity in people's judgments, and we believe this heterogeneity must be addressed by (better) informing citizens regarding the rationale behind each principle adopted. Regarding our second result, we find that public opinion does not switch toward a more utilitarian view over time, despite the worsening of the crisis. We also took advantage of these survey for a spillover, health related project together with other colleagues at LISER (Joel Machado and Marc Suhrcke) to understand if individual preferences and willingness to comply with social norms could affect the individuals' willingness to get tested. The project is now at his second revision round in a peer-reviewed journal and we hope to disclose our findings soon.

THE PUBLICATION AT A GLANCE

Guidelines for allocating scarce resources during the COVID-19 pandemic are essential and can guarantee a fair and consistent allocation across cases. We have shown, through survey results, that these ethically sensible recommendations do not always reflect the views of citizens. The project consisted of a series of anonymous survey experiments on hospital guidelines, administered to a sample of the United States' population. We ask roughly 1000 respondents to imagine several hypothetical scenarios on intensive care units (ICU) admission rules during pandemics, whether they agree with them or, instead, they think alternative guidelines may be more suitable.

The project's main aim was to understand if the citizens' agreed with the rules that governments set up to allocate scarce medical resources during the pandemic crisis; The main result is that individual's choices about how to allocate scarce medical resources differ in various aspects from those proposed by experts. We find a discrete level of agreement that workers in the health sector, either as doctors and nurses or as researchers in drug discovery, should be prioritised over other patients if they contract the COVID-19. We do find, however, some worrisome results.

Firstly, many individuals prefer that scarce medical resources should be allocated to a first-come-first-serve basis rather than following other principles. This idea contradicts the central tenet of treating people equally when they have the same prognosis.

The second result is that most people surveyed would discriminate against people with other conditions during pandemics. We think that principles of behavioural economics such as saliency, the sunk cost fallacy, and status quo bias can explain the rationale behind these choices.

The third, most striking finding is that disabled people are discriminated against more than other patients, even if they have a minor disability that does not affect their overall life expectancy. This result rightly supports the protests that many organizations representing disabled people are reporting around the world.

All in all, we find considerable heterogeneity in people's moral judgments. As the guidelines are likely to affect many citizens directly, we believe this heterogeneity must be addressed by (better) informing citizens regarding the rationale behind each principle. Our results call for policy interventions to inform citizens and patients on the ethical rationale behind physicians' or triage committees' decisions to avoid resentment and feelings of unfairness. These results also raise an interesting point of awareness for the future challenges that policymakers will face. Since the allocation of scarce medical resources does not restrict to the extreme case of ICU beds, we believe that a thorough informative approach should be applied to other areas, such as the justification of the priority lists for the vaccination campaign.

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PROF. EUGENIO PELUSO

HEAD OF RESEARCH DEPARTMENT -
LIVING CONDITIONS



COVID-19:
THE IMPACT ON
HOUSEHOLDS'
WELL-BEING
AND PREFERENCES

Acronym:

FAREWELL-to-C19

Project duration:

From July 1st, 2020 to April 30th, 2021

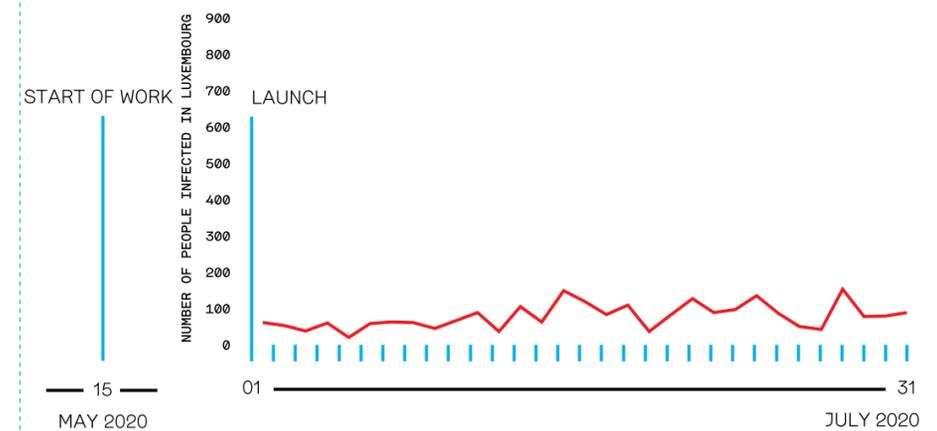
LISER members:

Peluso Eugenio (PI), Van Kerm Philippe, Boussein Audrey, Alieva Aigul, Verheyden Bertrand, Licheron Julien, Sauer Petra, Olivera Javier, Paccoud Antoine, Theloudis Alexandros, Gorczyńska-Angiulli Magdalena, Fallucchi Francesco, Görge Luise, Chabé-Ferret Bastien

What's about

Prof. Eugenio Peluso

Eugenio Peluso joined LISER in 2019 as Director of the Living Conditions Department. He is also associate professor of Economic Policy (on leave) at the Department of Economics University of Verona, where he acted as director of the Master's in International Economics and Business Management. He was lecturer of Public Economics and Economics at the Catholic University and at the State University of Milan. His research interests cover the analysis of inequality between and within groups, the political effects of targeted policies, the assessment of multi-dimensional risk and deprivation, the measurement of local inequalities, and the analysis of segregation patterns at the urban level. His articles on intra household inequality discrimination measurement and multidimensional deprivation were published in prestigious journals as the *Journal of Economic Theory* and *Journal of Public Economics*. He also launched the Canazei Winter School on inequality and welfare theory and led several research projects on inequality, taxation, and redistributive policies.



JUST BETWEEN US

PROF. EUGENIO PELUSO



How is your expertise relevant in the current COVID-19 context?

The health, social, and economic crisis caused by the COVID-19 virus is allowing a few people to increase their wealth immeasurably, threatening at the same time the economic stability and the quality of life of many others. Like many other economists, I am passionate about this phenomenon and curious to study its implications in the short and long term. As a result, I am developing two new research projects on Luxembourg, aiming to study the effects of the ongoing pandemic on gender disparities, and on living conditions of Luxembourgish families. This analysis spans health and behavioural changes to economic decisions about saving and human capital accumulation. A methodological approach based on the analysis of surveys and administrative data will analyse the effects of the ongoing crisis on these different dimensions and their ultimate impact of human well-being. A special focus will be dedicated to the consequences of the COVID-19 pandemic on children and human capital accumulation. My expertise on inequality and discrimination measurement will offer suitable insights to analyse gender disparities and perform robust assessments of unequal outcomes/opportunities. Multidimensional inequality and deprivation analysis will be useful to measure individual well-being by taking into account several dimensions, their aggregation, and the role played by correlation.

Why were you motivated to choose the theme of family well-being in this scientific project? Do you think that the lockdown has been an ordeal for the majority of families?

The "Farewell-to-C19" project focuses on the role of the family as a place that can both buffer

and amplify the shockwave of the ongoing pandemic. The behavioural changes necessary to limit the COVID-19 risk and the exceptional policy responses implemented by the Government also drastically affect people's living conditions. Looking across households, demographic characteristics and socio-economic factors such as housing and occupational conditions cause different degrees of exposure to the COVID-19 threat in Luxembourg and determines the intensity of the indirect effects of the pandemic. People most likely to be working from home were already better off, and children of already better-off households are possibly suffering less in terms of loss of human capital and are also less exposed to material deprivation. Is the family a shield against these threats providing mutual insurance and absorbing external shocks, or does the shock, the induced change of habits, and the lack of freedom of lockdown rules undermine family relations? To answer these questions, we are developing a research project funded by FNR, which explores the impact of the current health and economic crisis on the preferences and well-being of households and children in Luxembourg. This research rests on the analysis of new data collected on the effects of the COVID-19 crisis on families and children's well-being.

Looking across households, demographic characteristics and socio-economic factors such as housing and occupational conditions cause different degrees of exposure to the COVID-19 threat in Luxembourg and determines the intensity of the indirect effects of the pandemic.

THE PROJECT AT A GLANCE

Lockdowns and the economic crisis induced by COVID-19 are imposing unprecedented constraints on families in terms of freedom of choice, consumption opportunities, time use and social interactions. For example, a spouse that already had higher earnings before the crisis will (in most cases) continue to work more, and absorb less of the increase in the unpaid workload due to childcare, likely amplifying gender-specific sharing rules and inequalities within the household - a factor that has been shown to affect the well-being of its members (Peluso and Trannoy 2007, Couprie et al. 2010). However, compared to singles, the family plays a natural inequality-reducing role due to the insurance possibilities offered by multiple income sources or consumption and time-sharing.

To investigate how these interlaced effects will impact Luxembourg households, the "Farewell-to-C19" project will be developed by a team of researchers of LISER, in collaboration with the University of Glasgow and the AMSE Marseille, in order to investigate the effects of the pandemic in Luxembourg, by focusing on families' behaviour and well-being.

This project is organized in three work packages (WP): The first WP compares different types of households to identify how individual preferences can be affected by family ties in the circumstances induced by the COVID-19 crisis. The second WP analyses several effects of the COVID-19 crisis on children's conditions. The third WP focuses on preferences, their development within the family and their transmission to children.

The project will exploit the WP7 ongoing surveys of the Luxembourg Research COVID-19 Task Force and implement a follow-up of the Survey on Children Well-being to study how the

The "Farewell-to-C19" project focuses on the role of the family as a place that can both buffer and amplify the shockwave of the ongoing pandemic. The behavioural changes necessary to limit the COVID-19 risk and the exceptional policy responses implemented by the Government also drastically affect people's living conditions.

COVID-19 crisis is altering family life in Luxembourg along several dimensions:

- 1) How these changes affect the “balance of power” among housing members, and definitely within-household inequality.
- 2) The impact on children’s conditions, not only due to change in learning environment and lockdown, but also due to financial insecurity and housing constraints.
- 3) The possible long-term effects on equality of opportunity and inequality via the crisis’ impact on human capital formation.
- 4) The formation of preferences and attitudes within the family. We will also study how parents’ views and attitudes influence and are mirrored by their children’s preferences.

To carry out our study, we will do a follow-up to the Survey on Children Well-being in Luxembourg (2019), a representative large-scale survey among young children residents in Luxembourg. The data of the first wave was collected by LISER on behalf of the Ministry of Education in spring 2019. Data collection was carried out through an open-source questionnaire from the International Survey on Child Well-being (IScWeb). All children aged 8, 10, and 12 years old and living in Luxembourg (18,000) were invited to reply to an online, anonymous questionnaire. The survey contains data on children’s lives and daily activities, their time use and their perceptions and evaluations of their well-being. The survey will be repeated before Summer 2021, with the introduction of an additional section on COVID-19 effects. Some questions will be asked also to parents, in order to see the link between the experiences of parents and children and how this is affected by their socioeconomic conditions.

The project will contribute to:

- Collecting new original data, that is able to foster innovative scientific results
- Integrating and extending some previous and parallel studies, in order to develop synergies and collaborations with the UL and ministries.
- Evaluating the societal impact of the socio-economic analysis of the effects of COVID-19 crisis, by providing a picture of the main effects arising between and within families
- Useful to improve the policy response to the crisis.

Is the family a shield against these threats providing mutual insurance and absorbing external shocks, or does the shock, the induced change of habits, and the lack of freedom of lockdown rules undermine family relations? The project will exploit the WP7 ongoing surveys of the Luxembourg Research COVID-19 Task Force and implement a follow-up of the Survey on Children Well-Being to study how the COVID-19 crisis is altering family life in Luxembourg along several dimensions:

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DR. DENISA SOLOGON

RESEARCH SCIENTIST -
LIVING CONDITIONS DEPARTMENT



Title:
Modelling the distributional impact of the COVID-19 Crisis

Authors:
O'Donoghue, C., Sologon, D., Kyzyma, I., & McHale, J.

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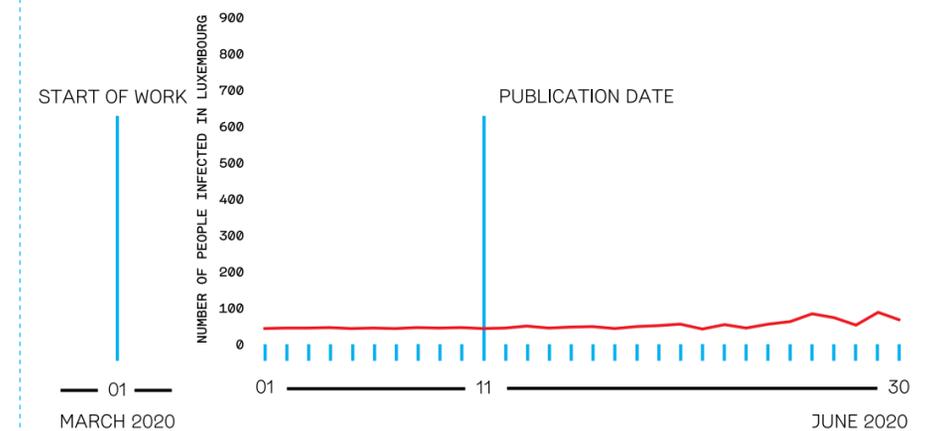
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What's about Dr. Denisa Sologon

Denisa M. Sologon received her PhD in Economics in 2010 from Maastricht University, The Netherlands. Her research was financed by a Marie Curie PhD Fellowship and an AFR PhD Fellowship from the National Research Fund in Luxembourg (FNR). During her PhD, Dr Sologon had a Visiting Research Fellowship at Harvard University - Harvard Kennedy School of Government, The Wiener Center for Social Policy. In 2010-2012, she was awarded the Marie Curie Post-Doc Fellowship, co-funded by the FNR for the project "Earnings dynamics and microsimulation".

She joined LISER as a Research Economist in 2013. She was appointed the Head of the "Income, Wealth, and Poverty" Unit in the Living Conditions Department in 2017 and the Interim Director of the Living Conditions Department between October 2018 and February 2019. She was elected as member of the Board of the International Microsimulation Association in 2017 and became its Treasurer in 2019.

Dr Sologon has expertise in welfare and labor economics, public policy analysis, social protection policy and applied econometrics. The particulars of her research are income inequality, mobility, income distribution dynamics, income volatility, policy modelling, microsimulation techniques and policy evaluation. She was granted "Full Authorization" to supervise/promote PhD projects at University of Luxembourg (ADR) in 2017. Dr. Sologon is currently co-supervising several PhD projects at National University of Ireland Galway, Maastricht University and Tilburg University.



JUST BETWEEN US

DR. DENISA SOLOGON

This publication originates from a project. Could you explain the context of the project and the method you chose to use to build it?

LISER, through an international partnership with colleagues from the National University of Ireland Galway (NUIG) and University of Canberra, has developed a cutting-edge modelling capacity to understand the drivers of distributional outcomes (e.g. inequality). This research is built upon a decade of developmental research funded by various sources, including the National Research Fund in Luxembourg (FNR). The focus of this developmental research has been building a scalable modelling infrastructure (Sologon et al. 2021).

This infrastructure has been initially applied to understand the drivers of differences in household disposable income inequality between countries. Over time, our modelling framework has generated a rich seam of research with applications across countries (EU, MENA, India, China, Indonesia), across time (EU, China) and across policy areas (health, environment).

The emergence of the COVID-19 crisis put our expertise and the flexibility of our microsimulation infrastructure to the test. We were confronted with a sudden asymmetric shock and a lack of timely data to evaluate its likely impacts on household incomes. As we have been developing capacity over a decade, we were able to move quickly. In cooperation with Cathal O'Donoghue (NUIG), we built swiftly on our existing infrastructure and delivered a tool for policy monitoring in times of crisis. We developed a microsimulation-nowcasting model to help understand and predict the income distribution implications of the COVID-19 emergency in "near-real" time.

Our methodology relies on a dynamic microsimulation approach that combines a household income generation model of markets at an individual level, estimated on the latest survey data with novel nowcasting techniques to calibrate the simulations using external macro controls reflecting the macroeconomic climate during the crisis (O'Donoghue et al. 2020; Sologon et al. 2020).

We have piloted this work in Ireland and Luxembourg, and we are in the process of extending this across Europe. We have done initial work comparing the policy responses during the Financial and the COVID-19 crises in Ireland and Luxembourg (O'Donoghue et al. 2021). As this exercise proved to be informative, we are in the process of scaling it across Europe. We have looked at the two crises across selected EU countries, but we have not compared yet the two crises across these countries. We have a framework in place that can look at broader drivers of purchasing power and novel welfare state responses to protect it.

Our work is having global impact, with the World Health Organisation interested in using the framework to assist in understanding the social determinants of health, particularly in the post COVID-19 environment. Our results were showcased to the WHO Global Webinar and to the UN Regional Forum on Sustainable Development.

THE PUBLICATION AT A GLANCE

Lessons from our research on Ireland and Luxembourg

Policies aimed to improve income protection during the COVID-19 crisis were accompanied by an increase in public trust in Government in 2020 both in Ireland and in Luxembourg (Eurobarometer). The nature of the policy responses differed between Luxembourg and Ireland, as the capacity of these welfare systems to cushion consequences of COVID-19 largely depend on their design. Whereas Ireland introduced radically different policies from its existing system, Luxembourg introduced minor tweaks to the existing tax-benefit system, which already contained strong social insurance instruments that gave certainty during the crisis.

One of the key lessons is the resilience of the Luxembourgish system, its capacity to move swiftly by minor changes in exiting policy instruments able to cope with the shock.

The income-support policy changes were effective in cushioning household incomes and mitigating an increase in income inequality in the early stages of the pandemic. The share of labour incomes dropped, but was compensated by an increase in benefits, reflecting the cushioning effect of the transfer system. Overall market incomes dropped and became more unequal. Their disequalizing evolution was, however, overpowered by an increase in tax-benefit redistribution, which stabilized the distribution. Our research shows the same stabilization effect of the tax-benefit system also during the Financial crisis.

The impact of the COVID-19 pandemic in Ireland has been faster and more profoundly felt than the Financial crisis. It posed significant challenges to the welfare state due to the sudden increase in

the number of unemployed people, the share of jobless family members and the share of middle class families out of work.

The inadequacy of the existing social protection system was acknowledged at the onset of the crisis. More generous policy innovations were introduced to cushion incomes from the shock.

Market income losses occurred across all deciles of the income distribution, with larger losses at the top than at the bottom. Despite this, income inequality increased compared to the immediate pre-emergency situation. Benefits and taxes had a strong redistributive effect, leading to a reduction in inequality compared to the pre-emergency situation.

Welfare generosity and coordinating private institutions enabled the protection of purchasing power or capacity to spend. It was a demonstration of "in it together". Due to the importance of non-discretionary spending - housing costs, child-care and commuting - policies were targeted at the private sector such as mortgage interest deferrals, rent freezes and non-completion of child-care contracts. Transport savings added another layer of protection right across the income distribution, unlike in the financial crisis, where every decile saw a reduction.

The timely analysis of the likely effects across the income distribution at the early stages in the COVID-19 emergency demonstrates the value of the Microsimulation-Nowcasting framework in modelling the impact of the emergency in "near-real" time. The model is a real-time analysis and decision support tool to monitor the recovery, with high applicability to policy makers. Models that can capture the complexities of real world systems, while swiftly incorporating the latest available data -whether epidemiological or eco-

nomics -should be important aids for navigating through this devastating health, economic and social emergency.

In an era challenged by climate change, globalisation and ageing, there is an ongoing necessity for institutions to protect people from economic shocks and boost people's trust in institutions, thereby providing confidence in the future.

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DR. NICOLAS POUSSING

RESEARCH SCIENTIST -
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WILL THE COVID-19
CRISIS STIMULATE
INNOVATION?

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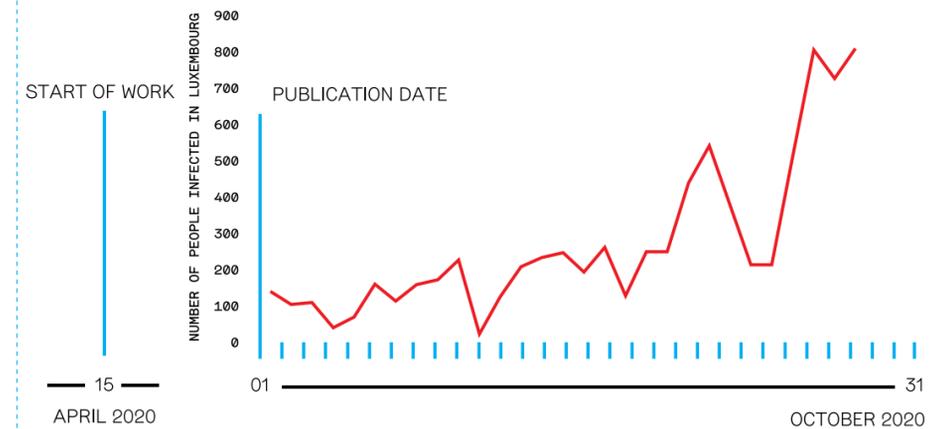
What's about Dr. Nicolas Poussing

Nicolas Poussing has been a Research Fellow at LISER since 2000 and is also a Research Associate at the *Centre de Recherche en Economie & Management* (CREM - Rennes 1 - France). He is a member of the Scientific Council of Excelia Group and has served as Board Member of the Business Science Institute from July 2013 to April 2021.

Nicolas received a PhD in Economics from the Université Nancy 2 and an accreditation to supervise research (*Habilitation à Diriger des Recherches, HDR*) from the Université Rennes 1.

His research interests are directed towards the Knowledge society and, in particular, Information and Communication Technology and Corporate Social Responsibility. He analyses the effects of ICT on happiness and Job Satisfaction and the effect of CSR on firms' performance (innovation, social dialogue, diversity). Nicolas has adopted an empirical approach based on survey data.

His work is rooted in economics, but he actively collaborates with researchers in Management Science. His research has been published in the *Journal of Business Ethics*, *Long Range Planning*, *Corporate Social Responsibility and Environmental Management*, *Journal of Cleaner Production*, *Journal of Socio-Economics*, and others.



JUST BETWEEN US

DR. NICOLAS POUSSING

Do you think that this health crisis has radically changed operational practices within companies to the point of considering new economic models that are more respectful of the social and environmental issues?

I am not very optimistic about the commitment of firms to social and environmental issues following the health crisis. The pursuit of profit remains the primary objective of companies. Nevertheless, the working conditions are going to change with pressure from employees. The health crisis imposed the use of teleworking. On the one hand, teleworking increases well-being by reallocating time; in particular, with the time saved during commuting, employees allocated more time to the family sphere or physical activities. On the other hand, teleworking appears to increase stress due to isolation. As a consequence, the solution seems to be a mixed situation between working all of the time inside the organization and working exclusively at home. The implementation of these new working conditions will emerge from social dialogue at the firm level. There are many questions to be addressed. Questions include working conditions at home: IT equipment (screen, computer, printer, internet connection etc.), IT Skills, organization of work, remote access to the resources and information required, health and safety at home, recast managerial practices and role definition. And, questions also encompass new working conditions in the organizations: office occupancy could be different, offices could be safer, better located and offering news services.

Luxembourg, apart from its size and geographical position, is unique in many areas, both economic and otherwise. Do you think that the COVID-19 crisis could have a significant leverage effect on business innovation?

What I observed from this health crisis is that the movement of goods and people was massively impacted. With the decrease in economic activity, companies not only saw their turnover decline, but also encountered supply challenges, particularly from countries strongly impacted by COVID-19. Many of them have sought alternative supply sources. The question of relocation arises. Should industrial production be relocated to control and secure supply chains? Can we really talk about innovation when the adoption of new products or new processes for our companies consists, ultimately, of re-appropriating skills and know-how that we had let go to the other side of the world? Real innovation probably lies in a change in work organisation to deal with the second issue we have faced: restrictions on the movement of people. A new work organisation should enable the Luxembourg labour market not to fear a limitation of the free movement of persons, in particular the numerous cross-border workers. Telework is probably the key. But which telework? A chosen telework could be assisted and supported by all economic and political actors beyond the country's borders.

Should industrial production be relocated to control and secure supply chains? Can we really talk about innovation when the adoption of new products or new processes for our companies consists, ultimately, of re-appropriating skills and know-how that we had let go to the other side of the world?

THE PUBLICATION AT A GLANCE

The paper written by Caroline Mothe (Savoie Mont-Blanc University) and Nicolas Poussing (LISER) gives a quick overview of the impact of the health crisis on companies and invites them to learn from this crisis by committing themselves to favour sustainable development and energy transition.

As a result of the COVID-19 pandemic, companies have experienced a significant decrease in their activities. The industrial sector, the hotel and restaurant sector as well as tourism have been heavily impacted. Consumers have changed their consumption habits. There has been an overconsumption of some products and, on the contrary, a significant drop in the consumption of other products. These outcomes have affected businesses. They have had to repatriate employees working abroad, particularly those working in countries strongly affected by COVID-19.

Employers have limited face-to-face contact between employees. Where possible, they have adopted teleworking. They have generalised the use of information and communication technologies. The intensive use of ICTs has made it possible to maintain employee activity, but employees have sometimes felt isolated and left to themselves. The use of ICTs has also brought to light issues related to computer security and changed the relationship between companies and their customers. The health crisis also affected the relationship between companies and their suppliers. The challenge was to ensure continuity of supply. For some companies, contracts needed to be renegotiated and the question of finding alternative suppliers or relocating all or part of their production was raised. These social effects were also combined with positive environmental effects such as a reduction in pollution linked to the drop in activity.

This new context leads us to question the opportunity to adopt a new growth model. Innovation can be a response to this crisis. But this crisis is not an economic crisis. It is above all a health crisis. The answer cannot therefore lie solely in technological innovations - as it is often the case when we talk about innovation. Innovation can be organisational, managerial, social, linked to business models and to the very nature of the company's activity and its values. Innovation can be embodied in closer relationships with stakeholders, including employees.

Finally, innovation is commonly associated with growth. But what kind of growth do we want today? Globalisation and trade have shown their limits. The innovation that will get us out of this health crisis should undoubtedly favour products and processes that save raw materials, favours forms of organisation and production that serve the greatest number of people without preying on essential goods such as water, biodiversity, health, human rights, etc.

DR. HICHEM OMRANI

RESEARCH SCIENTIST -
URBAN MOBILITY &
DEVELOPMENT DEPARTMENT



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Partners:

Nhien Nguyen, University of
Science of Technology
Benoit Parmentier, University of Maryland,
Baltimore

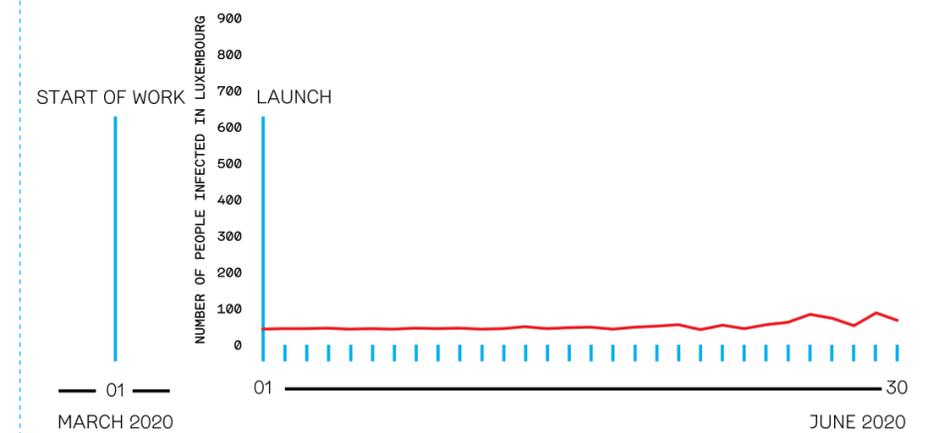
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What's about Dr. Hichem Omrani

Hichem Omrani is a research scientist with more than ten years of experience in developing new methods and algorithms for performing spatial and environmental data with various remote sensing images, and sensors data to cite a few. He also has more than five years of experience in teaching machine learning, applied statistics, and coding. He is passionate about developing new solution approaches in the field of machine learning and data science that are applied to a wide range of concrete applications (environment, socio-economic and health domains). During his latest scientific leave (2016-2017), he served as a senior visiting researcher at Purdue University (USA), working jointly with Prof Bryan Pijanowski, an internationally recognised specialist in the field of environmental science. To date, Hichem won nine competitive projects with completed and accurate deliverables. So far, he has attracted around 4.2 million euros in funding, supported mainly by the National Research Fund Luxembourg (FNR), EU, and industry.

He has published 45+ articles in referred journals, 100+ papers in conferences proceedings, one book, and three book-chapters in partnership with his colleagues in Luxembourg and with scholars at other institutions and in other disciplines. He has also supervised five PhD students, three post-doc and 21 MSc/engineer students.



JUST BETWEEN US

DR. HICHEM OMRANI

How did you get the idea to build a project that explores the possible interrelationship between air pollution and COVID-19?

Besides the great amount of epidemiological literature that was rapidly published elsewhere about the COVID-19 pandemic, there is still some criticism about the scientific rigor of some investigations that do not fully consider enough covariables and confounding factors in their analyses. Naturally, given the short timeframe of the published scientific research (which normally demands longer timeframes) the emergence of research gaps are expected. For instance, to our knowledge COVID-19 infections and death rates have not been studied in relation to socio-economic, environmental and demographic factors, an issue that has been raised previously, which is evident given the existence of socio-economic, environmental and demographic inequalities across the planet. Another important factor to address is the scale of analysis. Published studies have been carried out at the country level or less, without the possibility to analyse variations in COVID-19 within and between countries simultaneously. Considering these gaps, we have proposed a large-scale study with the aim to address the relationship between COVID-19 infection and death rates with environmental (e.g., air pollution, temperature) socio-economic, demographic, and land use factors, at the continental level (across European countries).

What tool do you use to measure the interrelationship between the environment, human behaviour, public policy, and socio-economic factors with COVID-19 infection and death rates?

In order to reveal the relationship between COVID-19 mortality and the driving factors, statistics methods such as the negative binomial regression model were used to characterize the

significant factors across the spatial dimensions. The dependent variable (outcome) was the COVID-19 mortality (count values from the beginning of the pandemic until August 31st 2020).

The independent variables were environmental factors (e.g., air pollution (NO₂, PM_{2.5}), temperature, wind speed, night light intensity, precipitation, and solar radiation), demographical (e.g., percent of elderly people over 60 yrs, percent of men), economical (e.g., income) and social factors (e.g., poverty rate) which were resampled from different available spatial resolution to a unified spatial resolution of 1km². We estimated negative binomial regression models for each European country and revealed the association between the outcome (i.e., COVID-19 mortality) variation and the set of driving factors.

Environmental stressors like air pollution have been reported to be positively associated with COVID-19 infections and death rates. Additionally, recent efforts have been allocated to address the relationships between meteorological conditions and COVID-19 infections. Virus infection has been reported to be inversely related with wind, precipitation, humidity, and solar radiation, while positive and negative relationships have been detected with temperature.

THE PROJECT AT A GLANCE

Since the beginning of the 2000's human health and society have been challenged by viral epidemics. For instance, outbreaks of influenza, Ebola, MERS-CoV (Middle East respiratory syndrome), SARS-CoV (severe acute respiratory syndrome CoV), have hit humankind stressing healthcare systems, economies and governments worldwide. SARS-CoV2 is not an exemption, which has created the worst pandemic situation of the 21st century with more than 129 million infections, almost 2.8 million deaths to date, and 73 million recoveries to date (<https://coronavirus.jhu.edu/map.html>). As a respiratory disease, COVID-19 has spread in urban contexts where pollution levels are high and infection rate increases with population size and movements. Evidence from other respiratory infections like influenza, rhinovirus, respiratory syncytial virus, adenoviruses, and SARS-CoV indicate that environmental conditions are related with the susceptibility to and severity of infections.

Environmental stressors like air pollution have been reported to be positively associated with COVID-19 infections and death rates. Additionally, recent efforts have been allocated to address the relationships between meteorological conditions and COVID-19 infections. Virus infection has been reported to be inversely related with wind, precipitation, humidity, and solar radiation, while positive and negative relationships have been detected with temperature. Land use has not been studied as a possible covariate of COVID-19 infections or deaths, although the role of the urban environment has been analysed because social networks and mobility are increased within cities. Other landscape features, such as the Normalised Difference Vegetation Index (NDVI) has been found to be negatively related to COVID-19 incidence and mortality rate, suggesting a possible advantage of green spaces to reduce the probability of infection.

Socio-demographic factors have been studied as covariables of COVID-19 infections and deaths. People from different age groups have been observed to be differently impacted. Patients older than 60 years are more prone to have the highest death rates (> 62.3%) among all age groups. Death rates are even aggravated if patients present chronic comorbidities like cardiorespiratory and cerebrovascular diseases, or diabetes, for instance. Other sociological factors have been analysed as potential determinants of COVID-19 infections and death rates. It has been studied that people suffering socioeconomic deprivation or are part of minority racial groups, are exposed to worse socio-environmental conditions increasing the chances to be infected or die from COVID-19. Thus, understanding the variations of multiple socio-environmental conditions among different populations seems relevant to delineate public policies, reduce health risks, delineate epidemiological studies, and increase environmental justice.

Besides the great amount of epidemiological literature that was rapidly published elsewhere about the COVID-19 pandemic, there is still some criticism about the scientific rigor of some investigations that do not fully consider enough covariables and confounding factors in their analyses. Naturally, given the short timeframe of the published scientific research (which normally demands longer timeframes) the emergence of research gaps are expected. For instance, to our knowledge COVID-19 infections and death rates have not been studied in relation to socio-economic, environmental and demographic factors, an issue that has been raised previously, which is evident given the existence of socio-economic, environmental and demographic inequalities across the planet. Another important factor to address is the scale of analysis. Published studies have been carried out at the country

level or less, without the possibility to analyse variations in COVID-19 within and between countries simultaneously. Considering these gaps, we have proposed a large-scale study with the aim to address the relationship between COVID-19 infection and death rates with socio-economic, demographic, land use, and environmental factors at the continental level (across European countries).

Publication linked to the project:

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BUILDING AN INTERNA-
TIONAL CONSORTIUM FOR
TRACKING CORONAVIRUS
HEALTH STATUS

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Building an international consortium for tracking coronavirus health status

Authors:

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What's about Prof. Aline Muller

Aline Muller is Chief Executive Officer of LISER (Luxembourg Institute of Socio-Economic Research), affiliate Professor of Economics and Finance at the University of Luxembourg and the University of Liège as well as Member of the Board of Directors of the Luxembourg Central Bank.

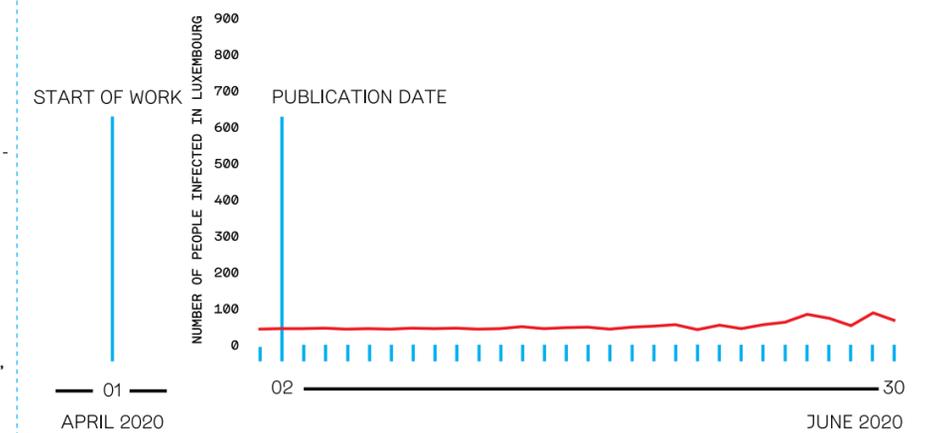
LISER's mission is to provide well-grounded and clear-cut answers to policy relevant questions with the objective to advance knowledge in economic, social and spatial sciences. Since 2016, Aline demonstrates a fierce commitment to develop a strong research institution of inter-

national scientific standing as a driving force for Luxembourg's policy-making as well as societal and economic development.

Aline Muller has developed over the last 20 years a solid experience in the strategic management of research and business projects and organisations across different countries and institutional environments.

Aline was member of the Advisory Board of the Belgian Ministry of Cooperation focusing on the *Coherence of Development Policies*. In Luxembourg she was member of the Scientific Advisory Board of the National Research Fund (2010 – 2014). At an international level Aline is member of the European Network for Research Evaluation in the Social Sciences and the Humanities as well as member of many renowned academic financial economics associations.

She is fluent in Luxembourgish, French, English, German and Dutch thanks to an international career in France, the Netherlands, Belgium and Luxembourg and numerous assignments in New Zealand, Asia and Africa.



PROF. DR. PAUL WILMES

FULL PROFESSOR IN SYSTEMS ECOLOGY
UNIVERSITY OF LUXEMBOURG



BUILDING AN
INTERNATIONAL
CONSORTIUM FOR
TRACKING
CORONAVIRUS
HEALTH STATUS.

THE PUBLICATION AT A GLANCE

What's about Prof. Dr. Paul Wilmes

Paul Wilmes is Professor of Systems Ecology at the Luxembourg Centre for Systems Biomedicine (LCSB) of the University of Luxembourg, where he is Head of the Systems Ecology research group (Wilmes Lab). Paul obtained his PhD in 2006 from the School of Environmental Sciences at the University of East Anglia in Norwich (UK), a part of his doctoral research having been conducted at the Max Planck Institute for Marine Microbiology in Bremen (Germany). After three years of postdoctoral research at the University of California, Berkeley (USA), he returned to his native Luxembourg in early 2010 through an ATTRACT Fellowship of the Luxembourg National Research Fund (FNR). He initially established his research group at the Centre de Recherche Public – Gabriel Lippmann but later joined the LCSB.

Paul's main primary research focus is on using Systems Biology approaches to identify key functionalities of microbial communities including human-associated microbiota. His group has pioneered appropriate methodologies for carrying out systematic molecular measurements of microbial consortia over space and time. This allows, for example, to define lifestyle strategies of distinct populations and link these to genetic and functional traits. The same approaches allow the study of microbiome-host molecular interactions. In this context, his group has pioneered the development of a microfluidics-based in vitro model of the human-microbial gastrointestinal interface called HuMIX.

The rapid and global spread of COVID-19 led the World Health Organization to declare it a pandemic on 11 March 2020. One factor contributing to the spread of the pandemic is the lack of information about who is infected, in large part because of the lack of testing. This facilitated the silent spread of the causative coronavirus (SARS-CoV-2), which led to delays in public-health and government responses and an explosion in cases. In countries that have tested more aggressively and that had the capacity to transparently share this data, such as South Korea and Singapore, the spread of disease has been greatly slowed.

Although efforts are underway around the world to substantially ramp up testing capacity, technology-driven approaches to collecting self-reported information can fill an immediate need and complement official diagnostic results. This type of approach has been used for tracking other diseases, notably influenza. The information collected may include health status that is self-reported through surveys, including those from mobile apps; results of diagnostic laboratory tests; and other static and real-time geospatial data. The collection of privacy-protected information from volunteers about health status over time may enable researchers to leverage these data to predict, respond to and learn about the spread of COVID-19. Given the global nature of the disease, we aim to form an international consortium, tentatively named the 'Coronavirus Census Collective', to serve as a hub for amassing this type of data and to create a unified platform for global epidemiological data collection and analysis.

We call upon the research community to standardize efforts to use daily self-reported data about COVID-19 symptoms in the response to the pandemic and to form a collaborative consortium to maximize global gain while protecting participant privacy.

VÉRONIQUE HOFFELD

PRESIDENT OF THE BOARD



CONCLUSION

The COVID-19 pandemic impacted the world like no other event since World War II and triggered an unprecedented global crisis. Although virological experts had warned policy makers that such a pandemic could occur at any time, States were not really prepared for a health crisis of this magnitude and were forced to take action in a hurry.

The pandemic also demonstrated that we are a true “global village” and that we are all connected and interdependent. Originating in Wuhan, China, the pandemic quickly spread around the world. From a purely health crisis, the pandemic quickly turned into a socio-economic crisis, even though state aids that were quickly put in place absorbed and are still absorbing the shock that may be feared in the years to come.

Indeed, entire sectors of the economy have been brought to a standstill (e.g. events, catering, etc.), and other areas have been able to readapt (e.g. the financial sector) by promoting homeworking. The restrictions decreed by governments to combat the pandemic have already had and will have a considerable effect on the structure of our economy and society. Indeed, as in all crises, some sectors have benefited from the crisis, notably e-commerce, while others have been deeply affected.

LISER, as a socio-economic research institute, immediately joined the COVID Task Force and together with other public research institutions made a decisive contribution to making multi-dimensional recommendations to decision-makers. The crisis also demonstrated the capacity of the Luxembourg research sector to work together to help the government make decisions based on scientific research. This collaboration within the Task Force has laid the foundations for future collaboration between research institutes to have a short, medium and long-term social and economic impact in the interest of the Nation.

Véronique Hoffeld

The crisis also demonstrated the capacity of the Luxembourg research sector to work together to help the government make decisions based on scientific research.

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