CAF - WORKING PAPER #2020/03
June 1, 2020

Jobs' amenability is not enough: The role of household inputs for safe work under social distancing in Latin American cities

Lucila Berniell[1] | Daniel Fernandez[2]

[1]Research Department, CAF-development bank of Latin America mberniell@caf.com

[2]External consultant at CAF-development bank of Latin America & UNLP daniel.mza@gmail.com

The recent literature has emphasized the role of occupations in quantifying the amount of telework possible under social distancing measures during the COVID-19 outbreak. However, telework requires not only a teleworkable occupation but also household inputs related to basic infrastructure (Internet connection and other housing services) and time availability. We use a recent household survey that includes rich information for large urban areas in eleven Latin American countries and we find that these household inputs are not available for more vulnerable workers. This introduces additional sources of inequality in the possibility of working from home, aside from those imposed by occupations, as well as it reinforces the association between economic development and the share of teleworkable jobs. We also analyze the profiles of workers in jobs that imply a higher exposure to the virus (high personal-proximity jobs), and we find important additional sources of inequality. In particular, workers in jobs of higher exposure to the COVID-19 also have other health risks, implying that this type of inequality should be carefully taken into account when designing deconfinement measures.

KEYWORDS

telework, occupations, social distancing, health, household arrangements, Latin America

CAF - WORKING PAPER #2020/03

June 1, 2020

Las ocupaciones no son suficientes: Importancia de los insumos domésticos para el trabajo seguro bajo distanciamiento social en ciudades latinoamericanas

Lucila Berniell[1] | Daniel Fernández[2]

[1]Dirección de Investigaciones Socioeconómicas, CAF-banco de Desarrollo de América Latina
mberniell@caf.com

[2]Consultor externo en CAF-banco de Desarrollo de América Latina; UNLP. daniel.mza@gmail.com

La literatura reciente enfatiza el papel que las ocupaciones tienen en determinar la cantidad de teletrabajo que sería posible bajo distanciamiento social en épocas de COVID-19. Sin embargo, el teletrabajo requiere también de insumos domésticos relacionados con cierto tipo de infraestructura básica (conexión a Internet y espacio apropiado dentro de las viviendas) y de disponibilidad de tiempo. Utilizamos una encuesta de hogares reciente que incluye información muy rica para grandes áreas urbanas en once países latinoamericanos y encontramos que estos insumos domésticos no están disponibles para los trabajadores más vulnerables. Esto introduce fuentes adicionales de desigualdad en la posibilidad de trabajar desde casa, que se suman a las ya impuestas por los tipos de ocupaciones. Además, esta falta de insumos domésticos refuerza la asociación entre el desarrollo económico de los países y la importancia relativa del teletrabajo en el empleo total. También analizamos los perfiles de los trabajadores en ocupaciones que implican una mayor exposición al virus (con alta proximidad física) y encontramos otras fuentes adicionales de desigualdad. En particular, los trabajadores en ocupaciones de mayor exposición al COVID-19 también tienen otros riesgos de salud, lo cual hace necesario considerar cuidadosamente a estos factores inequitativos en el diseño de las medidas de desconfinamiento.

KEYWORDS

teletrabajo, ocupaciones, distanciamiento social, salud, organización de los hogares, América Latina

1 | INTRODUCTION

Most countries around the world have taken social distancing measures to counteract the spread of the COVID-19, which became a global pandemic in March 2020. One of the economic consequences of social distancing is that some workers may be forced to work from home, if feasible. Recent evidence shows that occupations characterized by tasks that can be done remotely account for a sizeable share of the employment in developed countries -e.g., 37% in the US- and are much less frequent in lower-income economies (Dingel and Neiman, 2020; Gottlieb et al., 2020; Hatayama et al., 2020; Saltiel, 2020). In addition, the evidence shows that economic vulnerability is associated to high personal-proximity jobs, which in turn are associated with greater exposure to the COVID-19 infection (Mongey and Weinberg, 2020; Guntin, 2020).

These differences in the share of teleworkable jobs observed across countries can also be observed across individuals within a country, as described for the US in Mongey and Weinberg (2020). The evidence for less developed countries also supports an unequal access to the type of job amenities that can help workers and their families to lower their exposure to the virus (Saltiel, 2020; Hatayama et al., 2020). However, this inequality may be deeper if one considers other inputs, aside from the types occupations, that are needed to actually perform a job from home. In particular, teleworkable occupations often require the use of information and communication technologies (ICT) like computers and high-speed Internet connection as well as they require an appropriate physical space inside the house (e.g., a quite and not crowded room). Additionally, social distancing measures have added education and childcare services to pre-existing home production needs, since almost all countries have included school closures in their social distancing measures. As a consequence, during the COVID-19 crisis time may be an additional constraint for women, who usually bear with the burden of childcare (Schoonbroodt, 2018; Alon et al., 2020).[1]

On the side of high personal-proximity jobs, the dangers of continue working can be exacerbated for those workers with bad health conditions, or if these workers can become themselves spreaders of the disease. This may be the case of workers that live in intergenerational households (i.e., they can bring the virus to individuals of high COVID-19 risk) and also for those that frequently use mass-transport services to commute to and from work (i.e., they are exposed to contact with large crowds in their commuting). All these factors may be of more interest in the case of less developed economies, where living and housing conditions as well as health systems conform a more severe scenario for the expansion of the COVID-19.

We study the sources of unequal opportunities to effectively access to work arrangements that protect workers and their families from getting exposed to the virus. These sources are closely related not only to types of occupations but also to home inputs and household arrangements that may reduce in practice the feasibility of telework and increase the COVID-19 risk implied by high personal-proximity jobs. We analyze the case of large urban areas in a developing region, Latin America. We quantify the shares of teleworkable and high personal-proximity jobs in the overall employment in eleven cities in eleven Latin American countries. By means of a very recent household survey conducted in these cities (ECAF 2019), we are able to give a detailed socioeconomic characterization of workers in different types of occupations as well as to condition teleworkable and high personal-proximity occupations on workers' access to ICT and housing services, their health conditions, commuting modes and care arrangements inside their households.

[1] In addition, and even though the COVID-19 crisis is still very recent, past evidence on time use during recessions already shows that women allocate more of their reduced market hours (due to higher unemployment or labor inactivity) to childcare and housekeeping than men do (Aguiar et al., 2013).

The focus on Latin American cities is very relevant for the study of economic and public health consequences of the COVID-19 in the developing world. Latin America, along with Sub-Saharan Africa, is the region with the greatest inequality in the world (Messina and Silva, 2018). In addition, Latin America is among the most urbanized regions on the planet and most of its large urban areas are characterized by crowded and congested public and private spaces.[2] The dysfunctionality of Latin American large cities is clearly associated with the share of the population that lives in slums, a number that is somewhat over 10% for the whole world but it is two to three times higher in Latin America (Álvarez et al., 2017). In fact, as today (May 2020), the more rapid spread of the disease in countries like Argentina, Brazil or Colombia is observed inside of urban slums, where living conditions make it difficult to successfully implement social distancing measures to control a pandemic like the COVID-19.

In our analysis we follow the work of Dingel and Neiman (2020) to construct metrics regarding the feasibility of work from home for different occupations (telework), while we follow Mongey and Weinberg (2020) to define jobs that require high physical contact with other individuals (high personal-proximity, HPP, henceforth). Both approaches use questions from the "generalized work activities" and "work context" databases in the Occupational Information Network (O*NET) to classify occupations. We merge the results from these approaches to the data on occupations collected by the ECAF 2019. As described above, this survey contains unique information to uncover the sources of unequal access to safe work arrangements under the pandemic of COVID-19 in large Latin American cities.

We contribute to the very recent literature on new work arrangements under social distancing policies. One important piece in this literature is the work of Dingel and Neiman (2020), which studies the feasibility of working from home for different occupations, as well as it analyzes how teleworkable jobs are distributed across (US) cities, industries, and countries. The work of Mongey and Weinberg (2020) takes a similar approach, but instead focuses on describing the main sociodemographic characteristics of workers that are in teleworkable or high personal-proximity jobs. To do so, they take advantage of the rich information contained in large-scale household surveys in the US (CPS, PSID, and ATUS). While we are close in spirit to the work of Mongey and Weinberg (2020), we add the perspective of the plausible missing inputs needed for telework inside the households (connectivity, physical space and time) as well as we analyze how new work arrangements may interact with the division of household chores (childcare) in developing countries. The focus on such subgroup of countries brings us closer to the recent papers by Saltiel (2020), Hatayama et al. (2020), which instead of using data from O*NET to qualify jobs uses the description of occupations coming from other sources, like the Skills Toward Employability and Productivity (STEP) databases.[3] Last, our work is related to Gottlieb et al. (2020), which focuses on analyzing self-employed and farm workers in developing countries. Our

[2]Urbanization rates in Latin American are high (78% compared to 81% in the US and 73% in Europe, Álvarez et al. (2017)) and the rapid urban growth during the last half of the XXth century led to cities with high congestion costs, as those implied by traffic jams, pollution, high crime rates, and large informal human settlements.

[3]We prefer to use O*NET to characterize teleworkable occupations for comparability purposes with the results for developed economies, and because other alternative sources with the necessary cross-country data (like STEP, PIAAC, or LIMPS, which are all used in Hatayama et al. (2020)) only include two of the countries for which we have information in the ECAF 2019 (STEP includes Bolivia and Colombia). If we were to choose the approach of using STEP, we would also be forced to assume that the resulting characterization of occupations in La Paz and Bogota is a good representation of occupations in the remaining nine Latin American cities that we analyze (Buenos Aires, Sao Paulo, Santiago de Chile, Quito, Mexico City, Panama City, Asuncion, Lima, and Montevideo). For instance, Delaporte and Peña (2020) make that assumption to analyze 23 Latin American countries, but since they focus in the national levels (instead of in the larger, more productive and developed cities in the region, as we do) that assumption is likely to be less questionable.

work is different from all these related works since we emphasize the complementarity of inputs needed to produce work-from-home in large cities, which involve analyzing not only the type of occupation a worker has but also the material and household organization conditions that the worker faces. In addition, we also analyze how COVID-19 risks related to the degree of physical contact required across occupations can also interact with some key characteristics of workers and their households. In particular, we add to the discussion the role of workers' health conditions, whether they reside in intergenerational households and if they usually commute to work by the public transport system.

Our results show that the shares of teleworkable jobs in large urban areas in Latin America are somewhat lower than in richer economies like the US or Western European countries, but are higher than in poorer regions, which is in line with previous literature. This result is associated with differences in the (sectoral) productive structure as well as with larger informal sectors, which are less capital-intensive and they are characterized by less teleworkable occupations. We find that Latin American workers face additional restrictions to effectively perform teleworkable occupations from their homes. The restrictions related to access to Internet connection reduce the average feasibility of telework from 25.8% to 19.2%, that is, a 34% reduction. Not having sufficient space to work from home reduces the feasibility by an additional 32%, to 14,5%, while not having adequate childcare reduces the possibility of teleworking to a share of 11.9% of overall employment. That is, while the productive structure and the large presence of an informal sector in the region already condition the likelihood of telework, all the additional restrictions that workers face at home drastically reduce the number of jobs that could actually be performed from home to less than half (from 25.8% to 11.9%). We also find that these reductions in the feasibility of telework are unevenly distributed across population subgroups, notably penalizing lower-income groups and female workers. Additionally, we explore the incidence and distribution among the working population of "high-risk" for COVID-19 jobs (HPP occupations) and also find that these jobs are more concentrated among the more vulnerable workers, specially when we take into account those with poor health conditions. We also analyze whether these HPP workers commute using the public transport system, and find that this pattern of urban mobility for high-risk workers is more common among females, high-school dropouts and public sector employees, but not for informal workers, who usually are self-employed and work inside or very close to their own residences.

This paper is organized in 4 sections. Section 2 describes the data we use and the empirical approach we take to construct measures of telework and high personal-proximity jobs. Section 3 presents our main results, dividing the analysis in two subsections, the first one for results regarding telework and the second for high personal-proximity jobs. Section 4 concludes.

2 | DATA AND METHODOLOGY

2.1 | Data

We use data from ECAF (*Encuesta CAF*), a household survey run by CAF-development bank of Latin America, which covers around 11,000 households in urban areas of eleven large cities in an equal number of Latin American countries (Table 1). This survey gathers socio-demographic information about all individuals in each sampled household along with detailed information on labor market outcomes (including occupations) of the respondent.[4] In addition, each year the ECAF dedicates a set of special modules to a topic related to

[4] The respondent is an adult aged 25-65 years old and living in the sampled household.

development problems in Latin American cities.[5] In the year 2019 the ECAF focused on topics related to health, demography and social welfare systems.

We take advantage of the rich and recent information provided by the ECAF 2019, for which data collection took place between November and December 2019. This survey gathered information on key labor market outcomes among the adult population and also collected data about households' access to information and communication technologies (Internet connection), household composition, health status of household members, information that helps to describe the allocation of household chores with special focus on care arrangements (childcare and eldercare), as well as the patterns of commuting to work.

We present in Table 1 descriptive statistics regarding demographics and socioeconomic levels of individuals in the sample. In addition, this table summarizes households' access to ICT (WiFi connection), the health status of the respondent (self-reported health-status, SRHS), an indicator of the incidence of childcare activities, and the share of individuals that use the public transport system as their main mode of transport in a regular working day.

Additionally, we use the Occupational Information Network (O*NET) dataset since we follow the approach of Dingel and Neiman (2020) to define metrics about telework, and the methodology of Mongey and Weinberg (2020) to identify high personal-proximity jobs. We merge the characterization of occupations obtained following each one of these approaches by crosswalking from 8-digits SOC-10 to 2-digits ISCO08 classification, which is available in the ECAF 2019.

We divide our analysis in two parts. First, we address the issue of telework and then we consider workers in high personal-proximity jobs. We define next the main variables on which we focus such analyses.

2.2 | Telework: Who can work from home?

We classify occupations that can be done from home using the methodology proposed by Dingel and Neiman (2020). We first define non-teleworkable occupations, using the same information from O*NET that these authors use in order to consider job characteristics that would clearly rule out the possibility of working entirely from home. Then, we create a dummy variable that takes a value 1 for occupations not included in the non-teleworkable group. Thereafter, we crosswalk this classification to 2-digit ISCO08, resulting in our $telework1$ outcome variable which can be read as the share of 2-digit ISCO08 occupations that are teleworkable.[6]

We proceed to define a set of three additional and nested telework outcome variables. These additional variables help us to analyze not only the feasibility of working from home provided by the type of occupation a worker has, but also the role of some other constraints that she or he may face at home. We create a variable $telework2$ as the product between $telework1$ and a dummy variable that takes the value 1 for individuals who have access

[5] The ECAF 2019 focused on health, demography and social welfare systems. Every year, the sampling strategy of this survey is the same: stratifying by clusters (blocks) with probability of sampling proportional to population size.

[6] The crosswalk from 8-digit SOC-10 to 2-digit ISCO08 is not trivial. We follow Dingel and Neiman (2020) by going from an 8-digit to a 6-digit SOC-10 classification. Then, we recode occupations to ISCO08 using the crosswalk provided by the Bureau of Labor Statistics (BLS), that is also used by Dingel and Neiman (2020). This mapping is many-to-many, and therefore it needs to use employment weights to produce the sought aggregation. For that purpose, we use the employment distributions across occupations from BLS for occupations at the origin (6-digit SOC-10), and from ECAF 2019 for occupations at the destination (ISCO08). Notice that Dingel and Neiman (2020) uses employment weights obtained from cross-country data of the International Labor Organization (ILO) to construct their weights, and if we use this approach we find very similar results.

TABLE 1 Descriptives statistics from ECAF 2019

	Avg for all cities	Buenos Aires	La Paz	Sao Paulo	Bogota	Quito
Age (years)	**42**	42	40	41	42	40
Female (%)	**52.4**	51.5	53.4	52.8	52.5	52.7
High school dropout (%)	**27.5**	40.2	26.2	28.1	21.1	39.5
Bad or regular SRHS (%)	**32.0**	18.6	54.7	31.0	20.3	31.9
Intergenerational household[a] (%)	**13.1**	12.0	13.8	10.8	13.6	10.3
Dedicates time to childcare[b] (%)	**31.1**	37.1	45.1	28.3	25.5	33.4
Household members per room	**1.2**	1.2	1.4	1.0	1.2	1.3
WiFi at home (%)	**59.8**	68.3	40.6	67.0	62.3	52.4
Labor force participation (%)	**74.8**	82.5	79.7	73.2	79.8	82.7
Unemployed (%)	**14.6**	16.6	14.5	16.2	17.0	20.9
Public sector employee (%)	**10.0**	10.6	11.0	6.3	11.7	8.7
Informal worker (%)	**40.8**	45.3	55.3	45.9	30.7	46.0
Use of public transport (%)	**58.9**	72.2	6.6	58.6	58.0	79.7
N	**11,024**	1,005	1,000	1,000	1,000	1,002
	Lima	Montevideo	Panama City	Mexico City	Santiago de Chile	Asuncion
Age (years)	42	43	41	42	43	41
Female (%)	52.1	52.0	50.6	53.2	51.2	52.1
High school dropout (%)	17.0	53.2	30.1	23.4	22.5	43.2
Bad or regular SRHS (%)	46.7	25.9	34.1	36.4	35.8	30.4
Intergenerational household[a] (%)	18.3	13.8	16.8	11.9	15.2	19.0
Dedicates time to childcare[b] (%)	43.8	33.3	38.8	25.0	24.9	39.1
Household members per room	1.5	1.0	1.6	1.3	0.9	1.5
WiFi at home (%)	47.2	73.6	49.9	55.5	62.0	36.6
Labor force participation (%)	78.3	78.6	78.3	68.4	68.2	74.4
Unemployed (%)	11.7	15.7	29.0	9.1	17.8	12.8
Public sector employee (%)	10.0	16.8	14.2	11.4	9.8	10.2
Informal worker (%)	39.6	28.3	35.1	40.7	25.2	52.8
Use of public transport (%)	49.5	71.4	52.5	56.7	60.8	62.9
N	1,004	1,001	1,000	1,000	1,000	1,012

Notes: [a]At least one household member aged 65 years old or over. [b]The respondent declared to have dedicated at least one hour a day to childcare for children under 12 years old during the working day closest to the interview day.

to the basic needed ICT infrastructure (computer and WiFi connection) at home. Second, we define $telework3$ as the product product between $telework2$ and a dummy variable imposing the additional restriction of having enough physical space available to work remotely.[7] Last, we define $telework4$, as a product between $telework3$ and a dummy that takes the value 1 if the worker is not usually in charge of childcare.[8] These alternative definitions of the feasibility of teleworking go from the less constrained (only defined by the type of occupation of the worker) to the more constrained, and likely the more realistic, definition ($telework4$) that considers the minimum complements at home (connection, physical space, and time) that are needed to perform a job remotely.

[7]We consider that this condition is satisfied if workers live in houses with at least one room, distinct from kitchen or bathrooms, per household member sharing the same dwelling. This value of one room per household member coincides with the median value in our sample.

[8]This condition is trivially satisfied for individuals who do not share the dwelling with children below the age of 12 years old, and it also satisfied for those who do live with children of this age but do not dedicate time to childcare. In our sample of workers, two thirds of individuals do some childcare. As the information to define this variable was collected some months before the COVID-19 outbreak, the implicit assumption is that individuals who were in charge of childcare during a typical working day -as defined in the ECAF 2019- would be those assuming most of the burden related to the increase demand for childcare time induced by the closures of school and care centers.

2.3 | High personal-proximity jobs: Workers in high-risk jobs

We use the definition of high personal-proximity jobs proposed by Mongey and Weinberg (2020). Following this approach, we create a variable HPP1 to indicate the share of 2-digit ISCO08 occupations that require close physical contact with other individuals. Additionally, we define HPP2 that adds to HPP1 the condition of having a poor health status (below good self-reported health status). We define two more variables to study the possibility that workers in high-risk occupations become spreaders of the disease. First, we define HPP3, which adds to HPP1 the condition of living in the same household as an individual aged 65+ years old. This variable captures the fact that some individuals that are at risk in their jobs could bring that risk closer to older, and more vulnerable to the COVID19, household members. Second, we define HPP4, which adds to HPP1 the condition of using the public transportation system as the main mode of commuting. This variable is intended to capture the idea of workers who work in physical contact to others and who can become spreaders of the virus to larger crowds by means of their presence in the public transport system.

2.4 | Empirical strategy

Our strategy is very straightforward. We estimate the following OLS regression

$$Y_{ij} = \beta_0 + \beta_1 X_{ij} + \eta_j + \mu_{ij}, \tag{1}$$

where Y_{ij} is the outcome variable representing the feasibility of telework (four alternative definitions, see section 2.2) or the incidence of high personal-proximity occupations (another four definitions, see section 2.3), X_i is a vector of characteristics for individual i residing in city j, and η_j are city fixed effects. The set of control variables includes: education levels, age, gender, and sector of employment (public sector and informal sector).[9] We also estimate equation 1 separately for each city and in the Appendix we present all results regarding telework in tables A.1, A.2, A.3, and A.4, and all results for high personal-proximity outcomes in tables A.5, A.6, A.7, and A.8. The results of the full sample with city-FE are also shown in Figures 4 and 5.

3 | RESULTS

3.1 | Teleworking

We find that the shares of workers in occupations that are suitable for teleworking are considerable lower in Latin American cities than in more developed economies, a result that follows from comparing the unconditional averages in the first row of Table 2 (outcome variable telework1) with the results of Dingel and Neiman (2020). In our sample of cities, teleworkable occupations account for 19% to 31% of total employment, a result that is consistent with the findings of both Dingel and Neiman (2020) and Gottlieb et al. (2020). These works find that teleworkable occupations account for about 20% of total employment in poorer countries and 40% in rich economies. Given that the Latin American cities we study are among the most productive cities in countries that are medium-income economies, our results are very much in line with theirs.

A plausible explanation behind the pattern observed across countries is economic sec-

[9] The variable informal job takes the value 1 (and 0 otherwise) for all workers that are salaried but not entitled to pension benefits (the employer does not formally register this worker), zero-income or family workers, and low-skilled self-employed individuals.

TABLE 2 Shares (%) of teleworkable occupations in eleven Latin American cities

	Avg for all cities	Buenos Aires	La Paz	Sao Paulo	Bogota	Quito
Teleworkable[a]	**25.8**	23.2	20.4	22.5	31.2	22.7
Teleworkable + WiFi[b]	**19.2**	19.8	12.1	17.4	24.5	13.7
Teleworkable + WiFi + Room for work[c]	**14.5**	15.5	8.9	14.4	18.3	8.6
Teleworkable + WiFi + Room for work + Not childcare[d]	**11.9**	12.2	6.2	12.1	15.7	5.5
	Lima	Montevideo	Panama City	Mexico City	Santiago de Chile	Asuncion
Teleworkable[a]	21.0	27.0	28.9	31.0	30.4	18.7
Teleworkable + WiFi[b]	14.5	24.7	20.5	20.7	24.2	10.0
Teleworkable + WiFi + Room for work[c]	8.5	20.1	8.5	15.7	20.1	5.8
Teleworkable + WiFi + Room for work + Not childcare[d]	6.2	15.2	6.7	13.9	16.0	4.5

Notes: A more precise definition for each variable can be found in section 2.2. [a] *Telework1.* [b] *Telework2.* [c] *Telework3.* [d] *Telework4.*
Source: Own calculations based on data from ECAF 2019 and O*NET.

toral composition, as well as differences in the distribution of employment across occupations, which varies greatly with economic development (Gottlieb et al., 2020). Associated to this last idea, the size of the informal sector -typically less capital-intensive- may also play a role in differences in the shares of teleworkable jobs across countries. Figure 1 presents cross-city evidence on this regard. This Figure shows a negative association between the percentage of informal workers and the four alternative definitions of telework across the eleven cities in the sample.[10] Interestingly, the negative association is reinforced when adding to the definition of telework the constraint associated to the availability of WiFi connection at home (`telework2`).[11] Since Internet connectivity, as well as access to high-quality housing services, is by far more frequent in the developed world, the correlation between the actual possibility of teleworking and economic development is likely to be stronger than what the results of previous works have shown.

This first set of results indicates that during the COVID19 crisis, and if stringent social distancing takes very long to be relaxed, Latin American workers are likely to suffer from not being able to go back to work since the telework feasibility of their occupations is rather low. This conclusion is reinforced when we look at the average shares of telework under the more restrictive definitions. For instance, those workers in teleworkable occupations that have home access to WiFi connection, have a room available for work and are not usually in charge of childcare (`telework4`) account for only 11.9% of all workers in the 11 cities. The share of employment corresponding to this measure of telework also clearly differ across cities, going from 4.5% in Asuncion (Paraguay) to 16% in Santiago (Chile).

Moreover, all averages shown in Table 2 are not homogeneous across population subgroups. To analyze this heterogeneity we first discuss unconditional mean values for the alternative definitions of telework in different populations. Figure 2a shows an interesting pattern regarding telework feasibility across genders in our sample of cities: while according to the definition that only considers occupations (`telework1`) there are not considerable differences for male and female workers, a gap widens up when we compare the feasibility of telework for more restricted definitions of this variable. In particular, when we consider the restrictions associated with physical space and the need to dedicate time to childcare activities, women are less likely to be able to telework. The results across age groups (Figure 2b) show that initial advantages for telework for middle-age workers -relative to

[10] For the case of `telework1`, the coefficient of correlation is -0.36 and the $R^2 = 0.65$.
[11] In this case, the coefficient of correlation is -0.44, and the $R^2 = 0.77$.

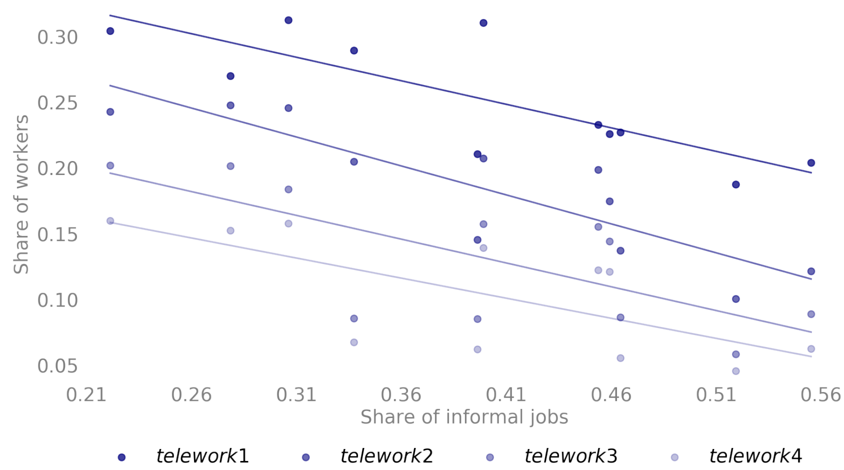


FIGURE 1 Telework (alternative definitions) and the size of the informal sector across cities.
Notes: The definitions of $telework1$, $telework2$, $telework3$, and $telework4$ can be found in section 2.2.
Source: Own calculations based on data from ECAF 2019 and O*NET.

older workers- vanish as we impose the constraints related with availability of a room for work, and the need to do childcare. Regarding socioeconomic groups, both Figures 2c and 2d present stark gradients: the disadvantage of the more vulnerable (lower educational attainment or lower income quintiles) increases as we impose additional constraints to the feasibility of telework. For instance, while telework defined merely on the basis of occupations is 3.5 more likely for college educated workers than for high-school dropouts, this ratio is 8.4 times for the definition of telework that considers connectivity, physical space and time availability. The comparison across income groups gives a similar result, since telework defined only by occupations is 2.9 more likely for workers in the 5th income quintile compared to those in the bottom quintile of the income distribution, and this ratio increases to about 8.3 times for the case of the most restrictive definition of the feasibility of telework.

We first can take this heterogeneity analysis to a simple regression framework (see section 2.4), in which we first describe the conditional means of $telework1$ as well as the means of $telelwork1$ plus each one of the three conditions that we include in the home inputs needed to telework: WiFi connectivity, a room available for work, and time availability (proxied by not doing childcare). Results in Figure 3 show that similar patterns for economically vulnerable workers, namely high school dropouts and those with informal jobs, because for both groups the feasibility of teleworking is lower after conditioning for the access to basic infrastructure services (WiFi and room available for work) but this feasibility is not reduced when imposing the condition regarding childcare. For female workers, the more important reductions in the measure of telework are observed with the conditions of having enough physical space (i.e., they are more likely to live in crowded houses than male workers) and with the lack of available time due to childcare activities.

We next perform a similar analysis but considering the four and nested definitions that we propose in section 2.2. These are our main results for telework, and they are summarized in Figure 4.[12] As this figure shows, the accumulation of constraints determines stark gradients that end up with very unequal chances of teleworking for the population subgroups that we compare. For instance, high-school dropouts see reductions in their

[12] More detailed results are shown in Tables A.1, A.2, A.3, and A.4 in the Appendix.

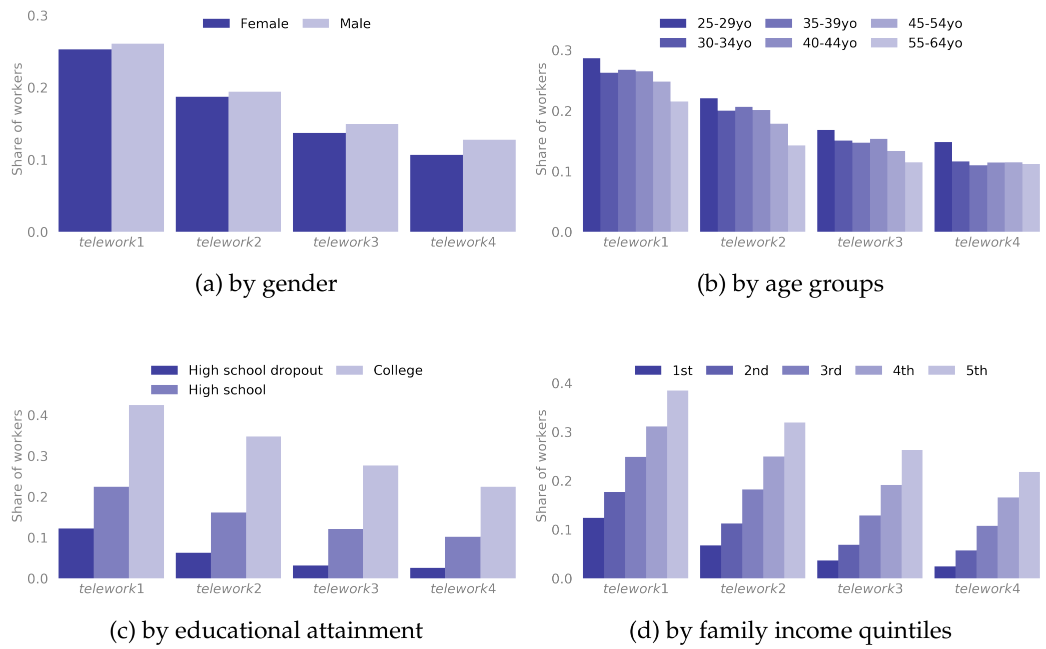


FIGURE 2 Telework by population subgroups defined according to gender, age, education, and income
Notes: The definitions of `telework1`, `telework2`, `telework3`, and `telework4` can be found in section 2.2.
Source: Own calculations based on data from ECAF 2019 and O*NET.

likelihoods of teleworking as we add one-by-one the constraints under analysis. A similar pattern is observed for informal workers comparing with formal workers and for females comparing with males. However, for population subgroups defined by age or public versus private employment results do not indicate a stark gradient.

For the case of female workers, we can also observe that the apparent gender neutrality in telework (not statistically significant differences in the probability of `telework1` with respect to males) disappears and a gap in favor of male workers widens up. For the variable `telework4`, which includes constraints regarding time allocated to childcare, women are less likely to telework than males and such difference in probabilities becomes statistically and economically significant (a drop of around 20% of the mean outcome variable). This result adds to the current debate about the impact of COVID-19 on gender equality. For instance, Alon et al. (2020) discuss how during the crisis working mothers are expected to be more affected in their employment outcomes. These authors argue that the closures of schools and daycare centers have imposed more child care needs, and that these needs are very likely to be covered as in the pre-COVID-19 times, that is, by women, who are those usually bearing with most of childcare and housekeeping activities. This pattern of time use has been documented for the case of recent big economic crises in developed countries (Aguiar et al., 2013). For the case of Latin America, where the lopsided distribution of housework and childcare is very much determined by traditional gender roles (Marchionni et al., 2019), these time constraints induced by school closures are likely to have a greater impact on women.

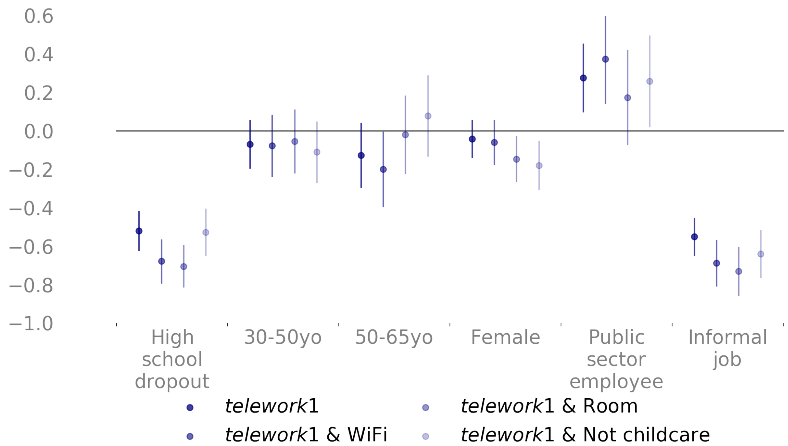


FIGURE 3 Profile of workers in teleworkable occupations (telework1) and the changes in this profile when adding one-by-one the conditions regarding connectivity, physical space, and time availability.
Notes: The definitions of all outcome variables in these regressions can be found in section 2.2. To facilitate the comparison between coefficients (which result from OLS regressions of equation 1, for outcome variables that clearly differ in their average values) we normalize the coefficients in this figure with the mean of the outcome variables.
Source: Own calculations based on data from ECAF 2019 and O*NET.

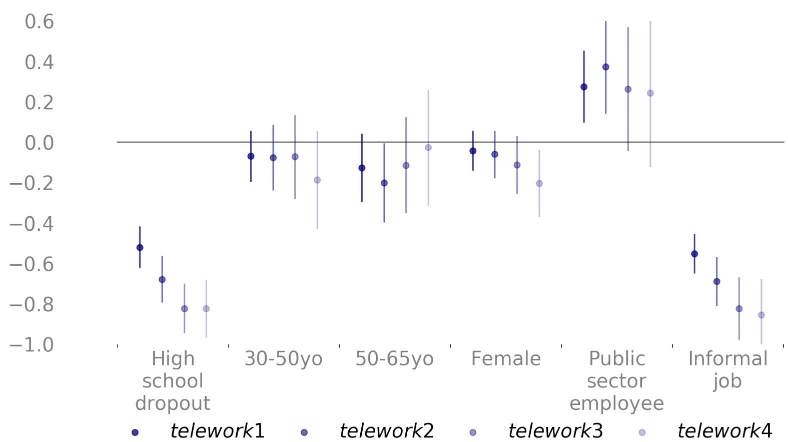


FIGURE 4 Sociodemographic characteristics and feasibility of telework (four alternative definitions).
Notes: The definitions of all outcome variables in these regressions can be found in section 2.2. To facilitate the comparison between coefficients (which result from OLS regressions of equation 1, for outcome variables that clearly differ in their average values, see Table 2) we normalize the coefficients in this figure with the mean of the outcome variables. The tables with the detailed results for all coefficients are shown in the Appendix.
Source: Own calculations based on data from ECAF 2019 and O*NET.

3.2 | High personal-proximity jobs

In Table 3 we present the shares of workers in occupations that imply high personal-proximity. Results in the first row say that about one in four (23.9%) workers in the Latin American cities that we analyze have jobs that under this definition could be considered as

TABLE 3 Shares (%) of "high-risk" workers (those in HPP jobs plus other risk conditions.)

	Avg for all cities	Buenos Aires	La Paz	Sao Paulo	Bogota	Quito
High personal-proximity job (HPP)	**23.9**	27.0	20.5	27.7	25.1	22.6
HPP + below good SRHS	**6.2**	3.2	9.3	7.5	4.4	5.6
HPP + intergenerational household	**3.1**	2.5	3.4	3.0	3.4	3.3
HPP + commute by public transport	**13.9**	17.9	1.8	15.9	14.6	17.4
	Lima	Montevideo	Panama City	Mexico City	Santiago de Chile	Asuncion
High personal-proximity job (HPP)	22.9	27.1	22.1	18.8	21.5	24.9
HPP + below good SRHS	9.0	5.6	6.8	6.0	6.8	6.4
HPP + intergenerational household (%)	4.6	3.3	3.6	2.6	3.2	4.6
HPP + commute by public transport	12.6	19.7	10.7	9.3	15.5	14.3

Notes: The precise definitions of all variables reported in this Table can be found in section 2.3.
Source: Own calculations based on ECAF 2019 and O*NET.

risky jobs during the outbreak of the COVID-19. If social distancing measures are relaxed and these workers have to go back to their job duties, they would be more exposed than other workers to the virus.[13]

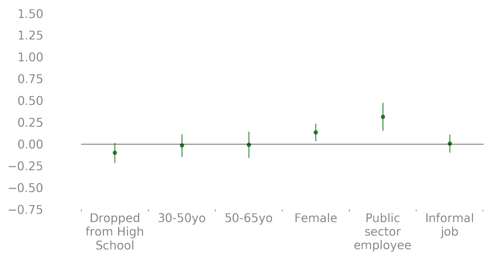
This is why it is important to look at the results for the three additional definitions of high-risk workers included in Table 3, as they impose additional risk factors. The second row in the Table shows that workers in HPP jobs who in addition are in bad health conditions (below good SRHS) account for a small but still non-negligible share of total workers (6.2%), with cities like La Paz or Lima where this type of high-risk workers is more common (9.3% and 9.0% of overall workers, respectively). We also summarize in this table the shares of workers in HPP jobs that live in the same household as an older, and therefore COVID-19 higher risk, individual, which for the whole sample is about 3.1%. Last, we consider another source of risk for the spread of the COVID-19: the use of public transport by workers in HPP jobs.[14] We find that the share of workers that frequently commute to and from their workplaces using the public transport system is about 13.9% for the pooled sample, but with important differences across cities.[15]

To describe the profile of workers that are at higher risk of exposure to the COVID-19 because of the condition of high personal-contact, we can look at the results in Figure 5a. Statistically significant differences in this first case are present for females versus males (females being more likely to have a HPP job) and for public sector employees. This result is likely to obey to the fact that both groups are over-represented in health services and also in sales/customer service, which typically require closer human contact. When we look at the profile of HPP workers with poor health (Figure 5b), we find more high-school dropouts, older individuals, females, public sector employees as well as informal workers. An expected result is in Figure 5c, where workers in HPP that live in intergenerational households are more common among older survey respondents. Last, the case of HPP workers that use the public transport system (Figure 5d) provides additional and interesting

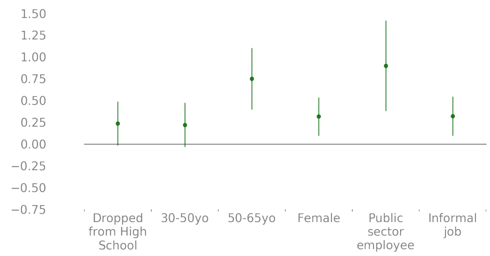
[13] Additionally, some of the workers in this high personal-proximity group never stopped working in the usual workplaces, since they belong to the so-called "essential activities" (e.g., health services, food sector, and security forces).

[14] Unlike the other sources of risk that we consider, the use of public transport may be easier to substitute for other modes of (private) mobility, specially for shorter commutes or for wealthier individuals.

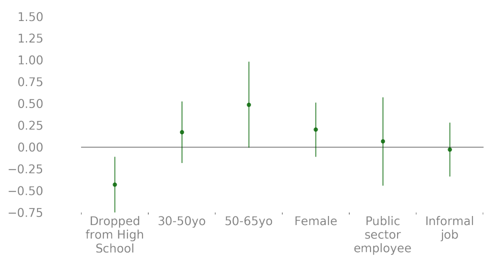
[15] Such differences may be due to the fact that in some of these cities the public transport system is rather small and very informal, like in La Paz.



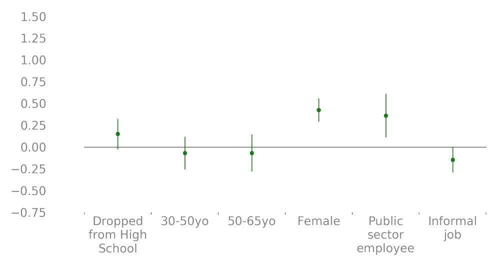
(a) High personal-proximity (HPP)



(b) HPP + below good SRHS



(c) HPP + intergenerational household



(d) HPP + commute by public transport

FIGURE 5 Sociodemographic characteristics of "high-risk" workers (those in HPP jobs plus other risk conditions)
Notes: The definitions of all the outcome variables in these regressions can be found in section 2.3. To facilitate the comparison between coefficients (which result from OLS regressions of equation 1, for outcome variables that clearly differ in their average values, see Table 3) we normalize the coefficients in this figure with the mean of the outcome variables. The tables with the detailed results for all coefficients are shown in the Appendix.
Source: Own calculations based on data from ECAF 2019 and O*NET.

information: while high-school are more likely to be in this group than more educated workers, informal workers are less common than formal workers. This result may be related to a special characteristic of the informal sector in Latin America, which largely consists of self-employed workers who work inside or very close to their own residences (Álvarez et al., 2013).

4 | CONCLUSION

For the case of large urban areas in Latin America, we show that workers in more economically vulnerable groups are less likely to access job amenities that ensure them to continue working from home (telework) under the stringent social distancing measures in place. Furthermore, they are less likely to safely go back to work since some of them, specially women, are over-represented in high physical-proximity jobs (i.e., they are more exposed to contact with other individuals, and therefore are more exposed to the virus).

Our analysis contributes to the very recent literature quantifying the possibilities of working from home by adding to the picture the constraints that different types of workers are likely to face at home, in addition to the technological description of her or his occupation, that are likely to reduce the feasibility of performing remotely the main tasks that the occupation contains. These additional restrictions are related to the access to basic infrastructure services (connectivity and physical space) and to the time availability. Taking into account the role of these home inputs would considerably reinforce the association between the share of teleworkable jobs and the level of economic development that has been recently documented in the literature. In addition, these home inputs are not equally distributed across households, specially under school closures and the implied situation where school-age children spend more time and demand more attention at home. Our results also indicate that health-risks related to work during the COVID-19 outbreak are also unevenly distributed, a fact that should be taken into account when designing deconfinement measures in developing countries.

REFERENCES

Aguiar, M., Hurst, E. and Karabarbounis, L. (2013) Time use during the great recession. *American Economic Review*, **103**, 1664–96.

Alon, T. M., Doepke, M., Olmstead-Rumsey, J. and Tertilt, M. (2020) The impact of covid-19 on gender equality. *NBER Working Paper*, **No. 26947**.

Álvarez, F., Arreaza, A., Berniell, L., Brassiolo, P., Kamiya, M., Ortega, D. and Sanguinetti, P. (2013) *RED 2013. Emprendimientos en América Latina. Desde la subsistencia hacia la transformación productiva*. CAF-development bank of Latin America.

Álvarez, F., Brassiolo, P., Daude, C., Estrada, R., Fajardo, G., Goytia, C., Sanguinetti, P. and Vargas, J. (2017) *RED 2017. Urban growth and access to opportunities: A challenge for Latin America*. CAF-development bank of Latin America.

Delaporte, I. and Peña, W. (2020) Working from home under covid-19: Who is affected? evidence from latin american and caribbean countries. *Covid Economics*, **14**.

Dingel, J. I. and Neiman, B. (2020) How many jobs can be done at home? *Working Paper 26948*, National Bureau of Economic Research. URL: http://www.nber.org/papers/w26948.

Gottlieb, C., Grobovšek, J. and Poschke, M. (2020) Working from home across countries. *Covid Economics*, **8**.

Guntin, R. (2020) Trabajo a distancia y con contacto en Uruguay. *Working Paper*.

Hatayama, M., Viollaz, M. and Winkler, H. (2020) Jobs' amenability to working from home: Evidence from skills surveys for 53 countries. *Working Paper 263*, CEDLAS-UNLP.

Marchionni, M., Gasparini, L. and Edo, M. (2019) *Brechas de género en América Latina. Un estado de situación*. CAF-development bank of Latin America.

Messina, J. and Silva, J. (2018) *Wage Inequality in Latin America: Understanding the Past to Prepare for the Future*. World Bank.

Mongey, S. and Weinberg, A. (2020) Characteristics of workers in low work-from-home and high personal-proximity occupations. *White Paper*, Becker Friedman Institute.

Saltiel, F. (2020) Who can work from home in developing countries. *Working Paper*.

Schoonbroodt, A. (2018) Parental child care during and outside of typical work hours. *Review of Economics of the Household*, **16**, 453–476.

A | APPENDIX

TABLE A.1 Teleworkable occupation (*telework1*)

	(1) **Avg for all cities**	(2) Buenos Aires	(3) La Paz	(4) Sao Paulo	(5) Bogota	(6) Quito	(7) Lima	(8) Montevideo	(9) Panama City	(10) Mexico City	(11) Santiago de Chile	(12) Asuncion
Dropout from High School	**-0.134*** **	-0.193***	-0.100***	-0.106***	-0.166***	-0.131***	-0.108***	-0.216***	-0.137***	-0.070	-0.225***	-0.136***
	(0.013)	(0.0230)	(0.0188)	(0.0231)	(0.0338)	(0.0227)	(0.0180)	(0.0304)	(0.0349)	(0.0446)	(0.0251)	(0.0209)
30-50 years old	**-0.018**	-0.006	0.038	-0.010	0.014	-0.061**	-0.054	0.025	-0.047	-0.053	0.044	0.030
	(0.016)	(0.0315)	(0.0313)	(0.0336)	(0.0364)	(0.0284)	(0.0358)	(0.0358)	(0.0524)	(0.0486)	(0.0444)	(0.0258)
50-65 years old	**-0.033**	-0.013	-0.015	-0.008	-0.040	-0.028	-0.043	0.028	-0.119**	-0.080	-0.006	0.040
	(0.022)	(0.0366)	(0.0309)	(0.0461)	(0.0455)	(0.0381)	(0.0425)	(0.0372)	(0.0577)	(0.0722)	(0.0526)	(0.0303)
Female	**-0.011**	-0.015	-0.044**	0.008	-0.023	0.007	0.037	-0.005	0.078**	-0.067*	0.010	-0.033
	(0.012)	(0.0245)	(0.0210)	(0.0266)	(0.0296)	(0.0244)	(0.0275)	(0.0272)	(0.0361)	(0.0377)	(0.0279)	(0.0235)
Public sector employee	**0.071*** **	0.127***	0.126***	0.002	0.039	0.130**	0.017	0.084**	0.162**	0.072	0.055	0.266***
	(0.023)	(0.0436)	(0.0481)	(0.0648)	(0.0500)	(0.0616)	(0.0574)	(0.0410)	(0.0658)	(0.0611)	(0.0611)	(0.0600)
Informal job	**-0.142*** **	-0.116***	-0.109***	-0.111***	-0.218***	-0.043*	-0.159***	-0.096***	-0.172***	-0.168***	-0.178***	-0.112***
	(0.013)	(0.0245)	(0.0272)	(0.0294)	(0.0274)	(0.0255)	(0.0229)	(0.0271)	(0.0390)	(0.0371)	(0.0245)	(0.0235)
Constant	**0.358*** **	0.350***	0.278***	0.304***	0.409***	0.322***	0.312***	0.365***	0.373***	0.459***	0.351***	0.257***
	(0.021)	(0.0334)	(0.0364)	(0.0386)	(0.0345)	(0.0347)	(0.0353)	(0.0410)	(0.0524)	(0.0518)	(0.0407)	(0.0302)
City FE	✓											
Observations	**6,272**	660	625	528	580	582	646	621	431	542	479	578
R^2	**0.123**	0.171	0.162	0.070	0.144	0.118	0.107	0.170	0.171	0.102	0.147	0.258

Notes: *** p<0.01, ** p<0.05, * p<0.1. Coefficients are OLS estimates of equation 1.

TABLE A.2 Teleworkable occupation and access to WiFi (*telework2*)

	(1) Avg for all cities	(2) Buenos Aires	(3) La Paz	(4) Sao Paulo	(5) Bogota	(6) Quito	(7) Lima	(8) Montevideo	(9) Panama City	(10) Mexico City	(11) Santiago de Chile	(12) Asuncion
Dropout from High School	**-0.130*** **	-0.192***	-0.070***	-0.107***	-0.175***	-0.114***	-0.083***	-0.221***	-0.146***	-0.078**	-0.195***	-0.116***
	(0.011)	(0.0226)	(0.0169)	(0.0218)	(0.0330)	(0.0176)	(0.0171)	(0.0301)	(0.0272)	(0.0351)	(0.0254)	(0.0175)
30-50 years old	**-0.015**	0.015	0.014	-0.007	0.028	-0.048*	-0.026	0.021	-0.033	-0.066	0.010	0.003
	(0.015)	(0.0296)	(0.0301)	(0.0331)	(0.0385)	(0.0280)	(0.0320)	(0.0354)	(0.0557)	(0.0476)	(0.0446)	(0.0236)
50-65 years old	**-0.038** **	0.001	-0.021	-0.033	-0.057	-0.056*	-0.006	0.027	-0.038	-0.107*	-0.029	0.038
	(0.019)	(0.0321)	(0.0294)	(0.0390)	(0.0462)	(0.0302)	(0.0403)	(0.0382)	(0.0577)	(0.0608)	(0.0506)	(0.0286)
Female	**-0.012**	-0.024	-0.046**	-0.016	-0.031	-0.020	0.045	-0.008	0.071**	-0.039	0.017	-0.059***
	(0.011)	(0.0253)	(0.0201)	(0.0261)	(0.0310)	(0.0211)	(0.0275)	(0.0276)	(0.0340)	(0.0292)	(0.0278)	(0.0193)
Public sector employee	**0.072*** **	0.100**	0.074	0.031	0.037	0.019	-0.002	0.094**	0.000	0.121**	0.058	0.093*
	(0.022)	(0.0456)	(0.0508)	(0.0606)	(0.0532)	(0.0441)	(0.0558)	(0.0414)	(0.0573)	(0.0583)	(0.0589)	(0.0541)
Informal job	**-0.132*** **	-0.112***	-0.104***	-0.103***	-0.193***	-0.050**	-0.139***	-0.095***	-0.160***	-0.162***	-0.172***	-0.090***
	(0.011)	(0.0249)	(0.0248)	(0.0282)	(0.0263)	(0.0234)	(0.0223)	(0.0277)	(0.0386)	(0.0309)	(0.0215)	(0.0219)
Constant	**0.318*** **	0.306***	0.207***	0.261***	0.335***	0.248***	0.210***	0.347***	0.289***	0.352***	0.306***	0.196***
	(0.020)	(0.0329)	(0.0354)	(0.0365)	(0.0338)	(0.0344)	(0.0314)	(0.0411)	(0.0524)	(0.0518)	(0.0397)	(0.0305)
City FE	✓											
Observations	**6,272**	660	625	528	580	582	646	621	431	542	479	578
R^2	**0.118**	0.163	0.118	0.075	0.136	0.098	0.083	0.176	0.117	0.126	0.130	0.158

Notes: *** p<0.01, ** p<0.05, * p<0.1. Coefficients are OLS estimates of equation 1.

TABLE A.3 Teleworkable occupation, access to WiFi and a room for work (*telework3*)

	(1) **Avg for all cities**	(2) Buenos Aires	(3) La Paz	(4) Sao Paulo	(5) Bogota	(6) Quito	(7) Lima	(8) Montevideo	(9) Panama City	(10) Mexico City	(11) Santiago de Chile	(12) Asuncion
Dropout from High School	**-0.119*** **	-0.178***	-0.043***	-0.106***	-0.158***	-0.084***	-0.060***	-0.207***	-0.076***	-0.079***	-0.168***	-0.077***
	(0.009)	(0.0195)	(0.0137)	(0.0199)	(0.0200)	(0.0153)	(0.0136)	(0.0271)	(0.0183)	(0.0259)	(0.0233)	(0.0160)
30-50 years old	**-0.010**	-0.027	0.010	0.003	0.046	-0.055**	-0.006	0.002	0.033	-0.050	0.013	0.015
	(0.015)	(0.0294)	(0.0296)	(0.0310)	(0.0377)	(0.0275)	(0.0242)	(0.0360)	(0.0361)	(0.0469)	(0.0463)	(0.0207)
50-65 years old	**-0.016**	0.003	-0.047*	-0.008	-0.041	-0.064**	0.053	0.020	0.041	-0.092	-0.008	0.064**
	(0.017)	(0.0311)	(0.0267)	(0.0339)	(0.0383)	(0.0282)	(0.0358)	(0.0384)	(0.0353)	(0.0560)	(0.0496)	(0.0271)
Female	**-0.016**	-0.029	-0.052***	-0.018	-0.019	-0.029	0.038	-0.019	0.031	-0.048*	-0.003	-0.044**
	(0.010)	(0.0231)	(0.0179)	(0.0256)	(0.0285)	(0.0183)	(0.0249)	(0.0258)	(0.0247)	(0.0263)	(0.0259)	(0.0175)
Public sector employee	**0.038***	0.031	0.055	0.025	0.007	0.005	0.023	0.067	-0.044	0.068	0.049	0.014
	(0.022)	(0.0435)	(0.0476)	(0.0613)	(0.0551)	(0.0416)	(0.0507)	(0.0434)	(0.0440)	(0.0601)	(0.0615)	(0.0443)
Informal job	**-0.119*** **	-0.104***	-0.097***	-0.114***	-0.169***	-0.034*	-0.086***	-0.091***	-0.094***	-0.158***	-0.160***	-0.050***
	(0.011)	(0.0248)	(0.0224)	(0.0278)	(0.0256)	(0.0202)	(0.0183)	(0.0250)	(0.0299)	(0.0298)	(0.0206)	(0.0178)
Constant	**0.262*** **	0.287***	0.176***	0.226***	0.246***	0.190***	0.100***	0.316***	0.099***	0.298***	0.258***	0.107***
	(0.020)	(0.0319)	(0.0339)	(0.0376)	(0.0340)	(0.0329)	(0.0228)	(0.0404)	(0.0339)	(0.0535)	(0.0398)	(0.0236)
City FE	✓											
Observations	**6,272**	660	625	528	580	582	646	621	431	542	479	578
R^2	**0.108**	0.138	0.114	0.084	0.122	0.080	0.067	0.153	0.061	0.123	0.108	0.086

Notes: *** p<0.01, ** p<0.05, * p<0.1. Coefficients are OLS estimates of equation 1.

TABLE A.4 Teleworkable occupation, access to WiFi, a room for work and do not allocate much time to childcare (*telework4*)

	(1) **Avg for all cities**	(2) Buenos Aires	(3) La Paz	(4) Sao Paulo	(5) Bogota	(6) Quito	(7) Lima	(8) Montevideo	(9) Panama City	(10) Mexico City	(11) Santiago de Chile	(12) Asuncion
Dropout from High School	**-0.098*** **	-0.144***	-0.029**	-0.095***	-0.138***	-0.053***	-0.044***	-0.161***	-0.063***	-0.061**	-0.133***	-0.068***
	(0.008)	(0.0182)	(0.0120)	(0.0191)	(0.0182)	(0.0132)	(0.0114)	(0.0233)	(0.0138)	(0.0238)	(0.0216)	(0.0152)
30-50 years old	**-0.022**	-0.056**	-0.008	-0.015	0.021	-0.025	-0.019	-0.047	0.013	-0.031	-0.021	0.029*
	(0.015)	(0.0282)	(0.0265)	(0.0301)	(0.0367)	(0.0177)	(0.0225)	(0.0332)	(0.0312)	(0.0459)	(0.0425)	(0.0167)
50-65 years old	**-0.003**	0.016	-0.034	0.003	-0.032	-0.013	0.038	0.027	0.040	-0.056	0.012	0.069***
	(0.017)	(0.0326)	(0.0251)	(0.0339)	(0.0370)	(0.0221)	(0.0332)	(0.0372)	(0.0334)	(0.0554)	(0.0498)	(0.0240)
Female	**-0.024** **	-0.019	-0.046***	-0.028	-0.011	-0.014	0.006	-0.019	0.037	-0.054**	-0.035	-0.052***
	(0.010)	(0.0228)	(0.0165)	(0.0244)	(0.0286)	(0.0137)	(0.0221)	(0.0248)	(0.0250)	(0.0259)	(0.0232)	(0.0164)
Public sector employee	**0.029**	0.058	0.016	-0.024	0.044	-0.025	-0.009	0.074*	-0.029	0.060	0.025	0.009
	(0.022)	(0.0426)	(0.0397)	(0.0581)	(0.0562)	(0.0280)	(0.0373)	(0.0429)	(0.0390)	(0.0612)	(0.0586)	(0.0409)
Informal job	**-0.102*** **	-0.082***	-0.073***	-0.102***	-0.148***	-0.029*	-0.061***	-0.071***	-0.070***	-0.147***	-0.136***	-0.037**
	(0.011)	(0.0208)	(0.0214)	(0.0271)	(0.0244)	(0.0164)	(0.0167)	(0.0235)	(0.0215)	(0.0289)	(0.0178)	(0.0166)
Constant	**0.223*** **	0.239***	0.141***	0.212***	0.217***	0.114***	0.092***	0.264***	0.078**	0.255***	0.233***	0.079***
	(0.019)	(0.0291)	(0.0321)	(0.0380)	(0.0352)	(0.0261)	(0.0211)	(0.0403)	(0.0303)	(0.0536)	(0.0398)	(0.0192)
City FE	✓											
Observations	**6,272**	660	625	528	580	582	646	621	431	542	479	578
R^2	**0.091**	0.126	0.071	0.070	0.104	0.043	0.044	0.125	0.053	0.104	0.085	0.084

Notes: *** p<0.01, ** p<0.05, * p<0.1. Coefficients are OLS estimates of equation 1.

TABLE A.5 High personal-proximity job

	(1) **Avg for all cities**	(2) Buenos Aires	(3) La Paz	(4) Sao Paulo	(5) Bogota	(6) Quito	(7) Lima	(8) Montevideo	(9) Panama City	(10) Mexico City	(11) Santiago de Chile	(12) Asuncion
Dropout from High School	**-0.024***	-0.029	-0.041*	0.003	0.072**	-0.038	-0.046	-0.062**	0.033	-0.064*	0.014	0.007
	(0.013)	(0.0254)	(0.0220)	(0.0340)	(0.0355)	(0.0248)	(0.0354)	(0.0296)	(0.0408)	(0.0356)	(0.0350)	(0.0248)
30-50 years old	**-0.004**	0.009	-0.056*	-0.030	-0.022	0.054**	0.010	0.026	-0.034	0.005	-0.015	-0.007
	(0.015)	(0.0346)	(0.0303)	(0.0429)	(0.0301)	(0.0268)	(0.0317)	(0.0282)	(0.0397)	(0.0310)	(0.0420)	(0.0321)
50-65 years old	**-0.002**	-0.020	-0.058	-0.025	0.025	-0.006	-0.004	0.060	0.082*	0.013	0.008	-0.044
	(0.018)	(0.0417)	(0.0375)	(0.0464)	(0.0370)	(0.0329)	(0.0364)	(0.0369)	(0.0478)	(0.0436)	(0.0456)	(0.0392)
Female	**0.032*****	0.054**	-0.039*	0.021	0.079***	0.029	-0.018	0.036	-0.009	0.037	0.096***	-0.027
	(0.011)	(0.0257)	(0.0207)	(0.0303)	(0.0247)	(0.0263)	(0.0228)	(0.0277)	(0.0291)	(0.0310)	(0.0282)	(0.0268)
Public sector employee	**0.075*****	0.030	0.190***	0.174***	0.013	0.025	0.096**	0.030	0.092**	0.057	0.088*	0.045
	(0.019)	(0.0357)	(0.0384)	(0.0628)	(0.0378)	(0.0486)	(0.0437)	(0.0353)	(0.0434)	(0.0440)	(0.0520)	(0.0426)
Informal job	**0.001**	0.009	-0.052**	0.017	-0.014	-0.052**	-0.006	-0.039	0.010	0.007	-0.027	0.013
	(0.012)	(0.0251)	(0.0255)	(0.0311)	(0.0310)	(0.0244)	(0.0291)	(0.0306)	(0.0296)	(0.0295)	(0.0338)	(0.0258)
Constant	**0.259*****	0.249***	0.287***	0.270***	0.216***	0.217***	0.231***	0.260***	0.203***	0.173***	0.177***	0.259***
	(0.019)	(0.0362)	(0.0322)	(0.0411)	(0.0284)	(0.0307)	(0.0315)	(0.0346)	(0.0372)	(0.0324)	(0.0378)	(0.0320)
City FE	✓											
Observations	**6,272**	660	625	528	580	582	646	621	431	542	479	578
R^2	**0.027**	0.015	0.111	0.023	0.027	0.033	0.018	0.031	0.053	0.019	0.048	0.007

Notes: *** p<0.01, ** p<0.05, * p<0.1. Coefficients are OLS estimates of equation 1.

TABLE A.6 High personal-proximity job and poor health conditions

	(1) **Avg for all cities**	(2) Buenos Aires	(3) La Paz	(4) Sao Paulo	(5) Bogota	(6) Quito	(7) Lima	(8) Montevideo	(9) Panama City	(10) Mexico City	(11) Santiago de Chile	(12) Asuncion
Dropout from High School	**0.015***	0.012	0.002	0.009	0.073***	0.017	0.046	0.000	0.051*	-0.018	0.052*	0.045***
	(0.008)	(0.0103)	(0.0189)	(0.0202)	(0.0266)	(0.0165)	(0.0314)	(0.0146)	(0.0285)	(0.0215)	(0.0291)	(0.0165)
30-50 years old	**0.014***	0.011	0.022	-0.011	-0.015	0.052***	0.040**	0.043***	-0.003	0.028*	-0.006	0.021
	(0.008)	(0.0107)	(0.0206)	(0.0247)	(0.0146)	(0.0149)	(0.0181)	(0.0125)	(0.0218)	(0.0144)	(0.0169)	(0.0167)
50-65 years old	**0.046*****	0.024*	0.048*	0.013	0.031	0.064***	0.049**	0.076***	0.116***	0.087***	0.047*	0.037
	(0.011)	(0.0139)	(0.0271)	(0.0304)	(0.0222)	(0.0213)	(0.0209)	(0.0195)	(0.0328)	(0.0317)	(0.0246)	(0.0244)
Female	**0.020*****	-0.004	-0.004	0.018	0.036**	0.025	-0.001	0.017	-0.014	0.037**	0.052**	0.037**
	(0.007)	(0.0103)	(0.0179)	(0.0197)	(0.0146)	(0.0160)	(0.0180)	(0.0156)	(0.0173)	(0.0182)	(0.0214)	(0.0159)
Public sector employee	**0.056*****	0.032	0.120***	0.154**	0.004	0.026	0.011	-0.003	0.014	0.050	0.125***	-0.009
	(0.016)	(0.0213)	(0.0387)	(0.0723)	(0.0184)	(0.0339)	(0.0300)	(0.0199)	(0.0286)	(0.0334)	(0.0461)	(0.0261)
Informal job	**0.020*****	0.016	0.007	0.053***	0.013	-0.010	-0.001	-0.005	-0.002	0.024	-0.038**	-0.012
	(0.007)	(0.0099)	(0.0175)	(0.0183)	(0.0158)	(0.0168)	(0.0199)	(0.0167)	(0.0197)	(0.0183)	(0.0185)	(0.0168)
Constant	**-0.015**	0.007	0.055***	0.034	0.015	-0.002	0.050***	0.008	0.039	-0.001	0.023	0.018
	(0.009)	(0.0128)	(0.0172)	(0.0245)	(0.0125)	(0.0131)	(0.0149)	(0.0167)	(0.0246)	(0.0135)	(0.0146)	(0.0187)
City FE	✓											
Observations	**6,272**	660	625	528	580	582	646	621	431	542	479	578
R^2	**0.035**	0.014	0.039	0.049	0.054	0.031	0.016	0.022	0.081	0.051	0.104	0.031

Notes: *** p<0.01, ** p<0.05, * p<0.1. Coefficients are OLS estimates of equation 1.

TABLE A.7 High personal-proximity job and live in intergenerational household

	(1) **Avg for all cities**	(2) Buenos Aires	(3) La Paz	(4) Sao Paulo	(5) Bogota	(6) Quito	(7) Lima	(8) Montevideo	(9) Panama City	(10) Mexico City	(11) Santiago de Chile	(12) Asuncion
Dropout from High School	**-0.014*** **	-0.004	-0.016**	0.001	-0.026**	-0.024	-0.023	-0.019	0.008	-0.034***	-0.019	-0.012
	(0.005)	(0.0100)	(0.0071)	(0.0160)	(0.0113)	(0.0148)	(0.0198)	(0.0123)	(0.0153)	(0.0094)	(0.0164)	(0.0131)
30-50 years old	**0.005**	-0.003	-0.021	0.015*	0.004	0.041***	0.021	-0.016	-0.015	-0.006	0.004	0.011
	(0.006)	(0.0154)	(0.0202)	(0.0085)	(0.0124)	(0.0146)	(0.0166)	(0.0172)	(0.0215)	(0.0163)	(0.0098)	(0.0150)
50-65 years old	**0.015***	0.004	-0.022	0.037*	0.017	0.007	0.010	0.016	0.008	0.000	0.046*	-0.007
	(0.008)	(0.0189)	(0.0218)	(0.0199)	(0.0176)	(0.0099)	(0.0193)	(0.0204)	(0.0260)	(0.0191)	(0.0240)	(0.0177)
Female	**0.006**	-0.002	-0.014	0.001	-0.005	0.029**	-0.006	0.021*	0.024	0.025*	0.017	0.031*
	(0.005)	(0.0108)	(0.0113)	(0.0124)	(0.0114)	(0.0140)	(0.0137)	(0.0114)	(0.0159)	(0.0131)	(0.0140)	(0.0162)
Public sector employee	**0.002**	-0.011	0.022	0.024	0.007	-0.009	-0.014	-0.004	0.019	0.002	0.003	0.006
	(0.008)	(0.0146)	(0.0311)	(0.0283)	(0.0162)	(0.0282)	(0.0183)	(0.0160)	(0.0280)	(0.0191)	(0.0271)	(0.0194)
Informal job	**-0.001**	-0.008	-0.029**	0.003	0.013	-0.008	-0.010	0.002	-0.025**	0.005	-0.011	0.018
	(0.005)	(0.0099)	(0.0144)	(0.0117)	(0.0153)	(0.0147)	(0.0163)	(0.0155)	(0.0121)	(0.0117)	(0.0123)	(0.0145)
Constant	**0.021*** **	0.033**	0.074***	0.011	0.030***	0.007	0.042**	0.037**	0.038	0.025*	0.015	0.023
	(0.008)	(0.0139)	(0.0280)	(0.0109)	(0.0113)	(0.0132)	(0.0171)	(0.0175)	(0.0234)	(0.0148)	(0.0103)	(0.0172)
City FE	✓											
Observations	**6,272**	660	625	528	580	582	646	621	431	542	479	578
R^2	**0.007**	0.002	0.040	0.012	0.008	0.031	0.008	0.018	0.028	0.026	0.027	0.015

Notes: *** p<0.01, ** p<0.05, * p<0.1. Coefficients are OLS estimates of equation 1.

TABLE A.8 High personal-proximity job and commuting by the public transport system

	(1) Avg for all cities	(2) Buenos Aires	(3) La Paz	(4) Sao Paulo	(5) Bogota	(6) Quito	(7) Lima	(8) Montevideo	(9) Panama City	(10) Mexico City	(11) Santiago de Chile	(12) Asuncion
Dropout from High School	**0.021***	0.010	-0.006	0.055	0.118***	0.001	-0.017	-0.005	0.079**	0.002	0.019	0.020
	(0.012)	(0.0240)	(0.0088)	(0.0337)	(0.0367)	(0.0249)	(0.0248)	(0.0270)	(0.0372)	(0.0273)	(0.0336)	(0.0220)
30-50 years old	**-0.009**	-0.010	-0.002	-0.042	-0.025	0.062**	0.042	0.022	-0.010	-0.012	-0.022	-0.025
	(0.013)	(0.0335)	(0.0109)	(0.0362)	(0.0288)	(0.0258)	(0.0257)	(0.0288)	(0.0266)	(0.0254)	(0.0376)	(0.0293)
50-65 years old	**-0.010**	-0.045	0.004	-0.018	-0.011	-0.022	0.018	0.042	0.030	-0.010	0.020	-0.030
	(0.015)	(0.0363)	(0.0137)	(0.0388)	(0.0345)	(0.0300)	(0.0254)	(0.0342)	(0.0341)	(0.0358)	(0.0404)	(0.0357)
Female	**0.059*****	0.123***	-0.010	0.074***	0.081***	0.045*	0.001	0.064**	-0.012	0.024	0.095***	0.051**
	(0.009)	(0.0233)	(0.0101)	(0.0250)	(0.0220)	(0.0252)	(0.0209)	(0.0257)	(0.0242)	(0.0193)	(0.0263)	(0.0240)
Public sector employee	**0.050*****	0.061*	0.024	0.097	0.026	-0.039	0.054	0.019	0.050	0.031	0.056	0.028
	(0.017)	(0.0369)	(0.0214)	(0.0663)	(0.0373)	(0.0352)	(0.0372)	(0.0346)	(0.0324)	(0.0363)	(0.0524)	(0.0335)
Informal job	**-0.020****	0.006	-0.003	-0.022	-0.022	-0.036	-0.023	-0.050*	-0.022	-0.031	-0.038	0.029
	(0.010)	(0.0218)	(0.0074)	(0.0272)	(0.0255)	(0.0226)	(0.0216)	(0.0298)	(0.0203)	(0.0217)	(0.0308)	(0.0215)
Constant	**0.158*****	0.130***	0.023**	0.146***	0.113***	0.140***	0.104***	0.158***	0.096***	0.101***	0.123***	0.118***
	(0.016)	(0.0321)	(0.0093)	(0.0320)	(0.0267)	(0.0275)	(0.0238)	(0.0326)	(0.0264)	(0.0251)	(0.0358)	(0.0291)
City FE	✓											
Observations	6,258	659	624	527	580	581	646	616	428	542	477	578
R^2	0.043	0.059	0.013	0.042	0.047	0.034	0.016	0.024	0.034	0.016	0.050	0.016

Notes: *** p<0.01, ** p<0.05, * p<0.1. Coefficients are OLS estimates of equation 1.