

Employment and Teleworking in the tourism sector during the COVID-19 pandemic. The case of Argentina

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Abstract

We estimate the effects of the COVID-19 crisis on employment and labor income, focusing on the tourism sector and the comparison with the rest of the sectors. To this end, we characterize the Argentine tourism sector and its sub-sectors in terms of types of jobs that comprise them to elucidate how the viability of remote work has been critical determinants of the evolution of employment in the sector during the COVID-19 pandemic. In addition, we analyze how job informality conditions the effective implementation of flexible work arrangements such as teleworking.

Resumen

El objetivo de este trabajo es estimar los efectos de la crisis del COVID-19 sobre el empleo y los ingresos laborales, con un especial interés en el sector turístico y la comparación con el resto de sectores. Se caracteriza el sector turístico argentino y sus subsectores en cuanto a los tipos de empleos que los componen para dilucidar cómo la viabilidad del trabajo remoto ha sido un determinante crítico de la evolución del empleo en el sector durante la pandemia de COVID-19. Además, se analiza cómo la informalidad laboral condiciona la implementación efectiva de alternativas de trabajo flexibles como el teletrabajo.

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1. Introduction

The COVID-19 pandemic represented an unusual and unprecedented shock worldwide and demanded policy responses with the same characteristics. In practically all countries, social distancing policies, mobility restrictions, and border closures were implemented, and the impact on economic activity has been devastating. Recent literature has been studying specifically the impact of COVID-19 on the labour markets. In particular, sectors of activity classified as non-essential and that requires a high degree of physical proximity, also characterized with high levels of informality, such as activities related to tourism (hotels, restaurants, cultural and entertainment services, among others), have been the most affected (Papanikolaou and Schmidt, 2020).

In this context, the adoption of remote work has represented a promising avenue to continue, at least partially, with work responsibilities in certain occupations. Although the ability to telework in service sectors such as tourism is scarce or practically nil, in certain activities, a new labour market model is emerging. Many parts of the tourism value chain are converting and adopting new technologies and digital issues into smart and innovative destinations models (Yavuz et al., 2018; Koo, 2021; Rucci et al., 2021a, 2021b) where teleworking has a role.

Tourism is a key generator of employment and income, representing 10.3% of world GDP, accounting for 1 in 10 jobs, and being the third most important international trade sector (WTTC, 2020). The sector creates jobs directly, but for every job generated in tourism, one job and one-half associated with the sector are indirectly created. As a consequence of COVID-19, the level of activity in this sector reached historic lows. According to the UNWTO (2020), international arrivals fell 74%, representing losses estimated at 1.3 trillion dollars in export earnings and putting at risk between 100 and 200 million direct jobs, mostly in small and medium-sized firms. In Latin America, where it also represents 10% of GDP (ECLAC, 2020), it is estimated that one million jobs will be lost in the sector, and at least 290,000 companies will have to close.

Despite the significant contribution to national added value, occupations in the sector are typically characterized by a set of negative characteristics: low wages, low-skilled workers, atypical working hours, and a high level of job precarity (informality, lack of social protection, etc.) (Dupeyras and MacCallum, 2013; ILO, 2017; OECD, 2018). In the context of the COVID-19 pandemic and the characteristics of the activity that make teleworking hardly feasible for most of the jobs in the sector, this implies that those employed in the tourism sector are more

exposed to losses of employment and labor income that could become permanent (Baum et al., 2020).

We analyze the effects of the COVID-19 crisis on employment in the tourism sector in Argentina, a major Latin American country which received 6.9 million international tourists' arrivals and around 5.6 billion dollars as receipts in 2018 (WTO, 2019). Moreover, in 2017 there were 51.4 million domestic trips (Ministerio de Turismo de la Nación, 2018). In addition, there is an overall high incidence of labor informality and precarity in this region (Gasparini and Marchioni, 2015). Therefore, we will pay special attention to the characterization of occupations based on the viability of remote work and precarious labor conditions. These are two fundamental dimensions for evaluating the dynamics of labor markets after the outbreak of the coronavirus pandemic. Nevertheless, beyond the viability of teleworking, the tourism sector depends crucially of the demand side, the tourist's arrivals.

During the peak of restrictions due to the pandemic, we find a positive effect of teleworking potential in the tourism subsectors but more pronounced in the other services subsectors. Among the rest of the services subsectors, we also find a positive effect of teleworking in construction, other services, trade, and transport and communication. Finally, we only find a significant positive impact in agriculture among the rest of the economy subsectors.

We contribute to the literature on the impacts of the COVID-19 pandemic on the labor markets and that of the viability of telework in response to the crisis, characterizing the Argentine tourism sector and its sub-sectors in terms of types of jobs that comprise them to elucidate how the viability of remote work has been critical determinants of the evolution of sectoral employment during the COVID-19 pandemic in Argentine economic sectors. In addition, we include in the analysis information on the rigidity of the restrictions and the government policies to support the labor market implemented.

The remainder of the work is organized as follows. The following section describes the literature review. In [Section 3](#), we describe the sources of information used. In [Section 4](#), we present the empirical evidence, first reviewing the stylized facts regarding restrictions, activity level, and employment. Then, in [Section 5](#), we analyse the relationship between teleworking and the results in the Argentine labour market during the pandemic. Finally, we concluded in [Section 6](#).

2. Literature Review

Since the pandemic outbreak, prolific literature is dedicated to analyzing its economic consequences and its impacts on labor markets outcomes (Cajner et al., 2020; Hassan et al., 2020; Lewis et al., 2020). Likewise, various studies have measured the viability of remote work given the social distancing policies and mobility restrictions implemented in response to the pandemic. Dingel and Neiman (2020) were pioneers on this issue, estimating the feasibility of remote work in the US using the description of job content and work context of more than 900 occupations. They find that 37% of jobs could be done remotely. Mongey and Weinberg (2020) state that the workers most affected by social isolation measures are those in occupations where remote work is not feasible or needs a high degree of proximity with clients. They also find that these occupations tend to be occupied by economically vulnerable workers with fewer years of education, limited access to health insurance, and lower wages.

In this line, Adams-prassl et al. (2020) and Bick and Blandin (2020) show that workers in occupations in which a small share of tasks can be done from home are more likely to lose their jobs, have reduced hours, or experience a decrease in earnings, while the opposite occurs if they have permanent contracts. Peluffo and Viollaz (2021) explore the connection between a teleworking index and sectoral changes in formal employment during the pandemic in Mexico. They find that the teleworking index is not significantly associated with inter-annual changes in formal employment between 2018 and 2019, while it is positive and significantly correlated with employment in 2020.

The tourism sector and those related activities, such as hotel services, restaurants, cultural and entertainment services, are among the segments that have suffered the most severely from mobility restrictions and social distancing policies (Avdiu and Nayyar, 2020; Papanikolaou and Schmidt, 2020). Many activities related to tourism need physical proximity and prevent the whole tourism experience to be done from home. At the same time, occupations in the tourism sector are typically characterized by a set of negative characteristics: low wages, low-skilled workers, atypical working hours, and a high level of job precarity (informality, lack of social protection, etc.) (Fernández *et al.*, 2009; Dupeyras and MacCallum, 2013; ILO, 2017; OECD, 2018). These factors severely hamper the possibility of jobs becoming remote in the tourism sector and related activities. Workers in informal jobs earn low incomes, lack access to sick leave or unemployment benefits, have insufficient health insurance, and their savings are limited or non-existent. According to ILO (2020), informal workers are more at risk of

losing their jobs and experience decrease in earnings given that they are over-represented in sectors like tourism.

Bonavida Foschiatti and Gasparini (2020) replicate the exercise of Dingel and Neiman (2020) for Argentina and find that only 26% of the employed could continue their work activities from home. Moreover, like Mongey and Weinberg (2020), they affirm that those not compatible with remote work have higher informality and receive relatively lower wages. . Regarding the telework's viability within the tourism sector, they find that it ranges from 19% to 41% of jobs. In addition, de la Vega (2021) find that during the peak of restrictions in the face of the pandemic, the potential for teleworking was positively correlated with the probability of being active and employed at the individual level. We contribute to this literature characterizing the Argentine tourism sector and its sub-sectors in terms of types of jobs that comprise them to elucidate how the viability of remote work has been critical determinants of the evolution of sectoral employment during the COVID-19 pandemic. In addition, we include in the analysis information on the rigidity of the restrictions and the government policies to support the labor market implemented.

3. Data Sources

We use various sources of information. Firstly, we rely on Permanent Household Survey (PHS) microdata from Instituto Nacional de Estadísticas y Censos (in English, National Statistics and Census Institute) of Argentina. The PHS consists of piled cross-sections that collect data from households with a continuous frequency and its geographic scope reaches 31 urban agglomerations (cities).

Second, we use the teleworking potential measures estimated in de la Vega (2021). Given that there is no information on the task composition of occupations for Argentina, the author extrapolate the potential for telework from three different labor market surveys to the National Classification of Occupations (CNO). The five alternative measures of teleworking potential are as follows: A measure based on O*NET (US-O*NET); two measures calculated from the PIAAC, one that considers the entire sample (PIAAC-24) and the other that only includes the non-advanced PIAAC countries (PIAAC-EME); and two measures estimated based on STEP, one that considers the entire sample (STEP-10), and another only based on Colombia and Macedonia, the countries with the closest per capita GDP to Argentina (STEP-2). By working at the 2-digit ISCO level, we have 40 occupations. The preferred estimate of de la Vega (2021), and the estimate that we use here, is PIAAC-EME because it has the highest correlation with

the fact of working from home during the pandemic, and it was estimated based on a sample of countries with levels of development similar to Argentina, so it is more reasonable to assume homogeneity of the composition of tasks between these countries.

Third, we use the information on the Argentine government response through the ATP program (Programa de Asistencia de Emergencia al Trabajo) that targets the labor market. Finally, we also use data on the rigidity of the isolation policies implemented by the different governments based on the indicators calculated by the Blavatnik School of Government (Oxford University) and the data on mobility published by Google (Google Mobility Trends).

4. Stylized facts

4.1 Characterization of employment

We characterize the tourism sector and differentiate it from the rest of the sectors of the economy in terms of the viability of remote work, understanding the critical role that this dimension plays in the context of the COVID-19 pandemic. We split economic sectors in tourism, the rest of services, and the rest of the economy. Following previous studies for Argentina (Espinola, 2012, 2013; Garcia, 2020; Porto and Espinola, 2016, 2019), we consider as **tourism subsectors**: (i) Accommodation, (ii) restaurants and food services, (iii) travel agencies, and (iv) cultural, sports, and entertainment services.³ Meanwhile, the **rest of the services** includes electricity, gas and water supplies; building; trade; transport and communication; financial intermediation; real estate, business and rental activities; public administration and defence; social security; teaching; social and health services; other social and personal community activities; private households with domestic service; extraterritorial organizations and bodies. Finally, the **rest of the economy** comprises agriculture, livestock, hunting and forestry; fishing; mining and quarrying; manufacturing industries.

[Figure 1](#) shows the distribution of the teleworking potential across sectors within the broad economic groups defined above. First, there is substantial heterogeneity of the teleworking potential within sectors. The sectors with the highest teleworking potential are some service sectors such as financial intermediation, public administration, and teaching. However, several service subsectors evidence also the lowest teleworking potential: construction, food and accommodation, and social and personal services.

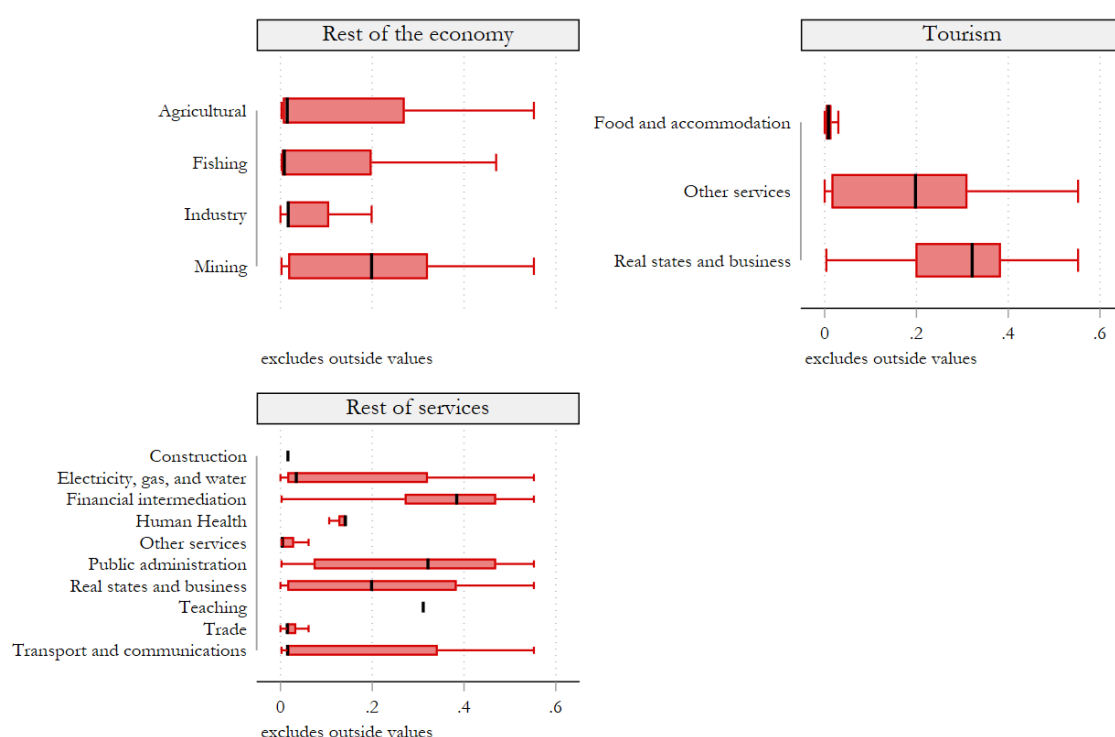
³ We do not include the transport sector as it is not possible to separate bulk versus passenger transportation.

In addition, we analyze how job informality conditions the effective implementation of flexible work arrangements such as teleworking considering two different definitions:

- Legal informality: identifies workers with no social security rights, and can only be estimated for wage earners; and
- Productive informality: identifies employees in small firms, non-professional self-employed, and workers without income

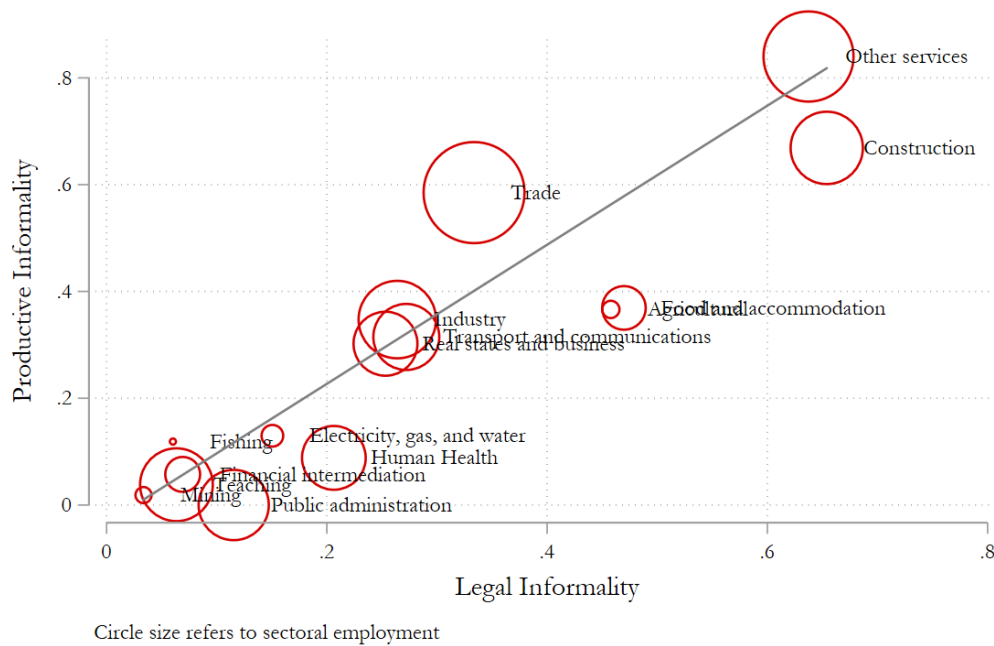
As there is a high positive correlation between the two definitions of informality ([Figure 2](#)), we decide to use productive informality in our analysis. [Figure 3](#) shows that there is a negative relationship between informality and teleworking at the sectoral level.

Figure 1. Average Teleworking Potential by sector



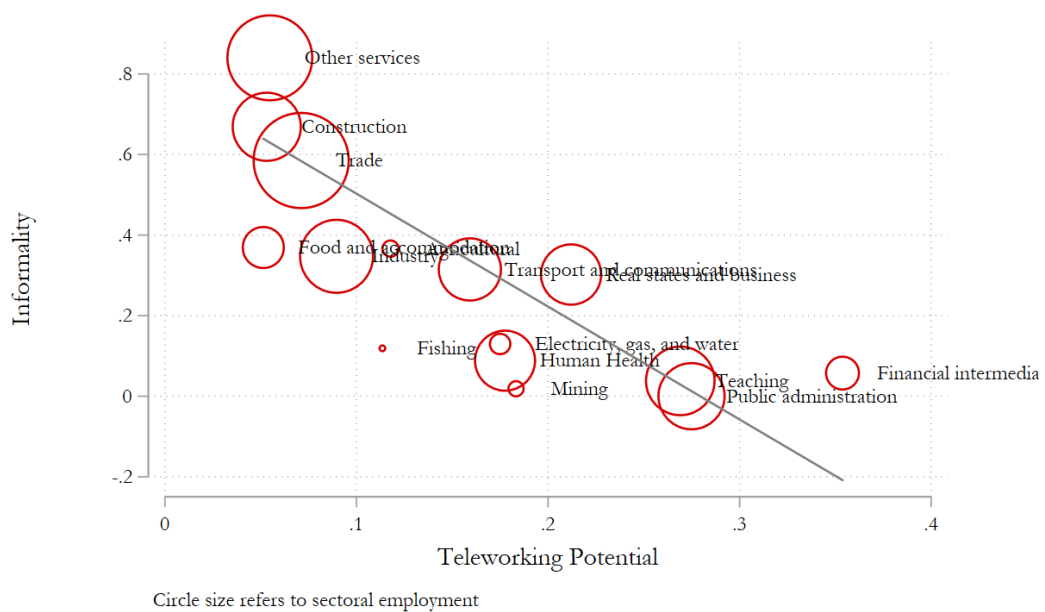
Own elaboration. Calculations for the year 2019. The black line is the median.

Figure 2. Productive Informality vs Legal Informality by sector



Own elaboration. Calculations for the year 2019. Legal informality is solely defined for wage earners.

Figure 3. Teleworking Potential vs Informality by sector



Own elaboration. The figure shows average informality as a function of average teleworking potential at the sectoral level. Survey weights was used. Calculations for the year 2019.

In summary, the tourism subsectors have the lowest teleworking potential but are also all non-essential activities. Meanwhile, the subsectors of the rest of the economy also have low teleworking potential but most of their activities were classified as essential. Finally, the subsectors of the rest of services are quite heterogeneous in their teleworking potential and also in term of the classification of essential vs. non-essential. However, sectors with low teleworking potential such as trade, electricity, gas, and water, and human health were declared as essential. The opposite occurs for financial intermediation, teaching given that they are non-essential activities but have high teleworking potential. Therefore, the tourism subsectors are among the activities that likely will suffer the most from the restrictions on mobility and physical interactions implemented in response to the pandemic.

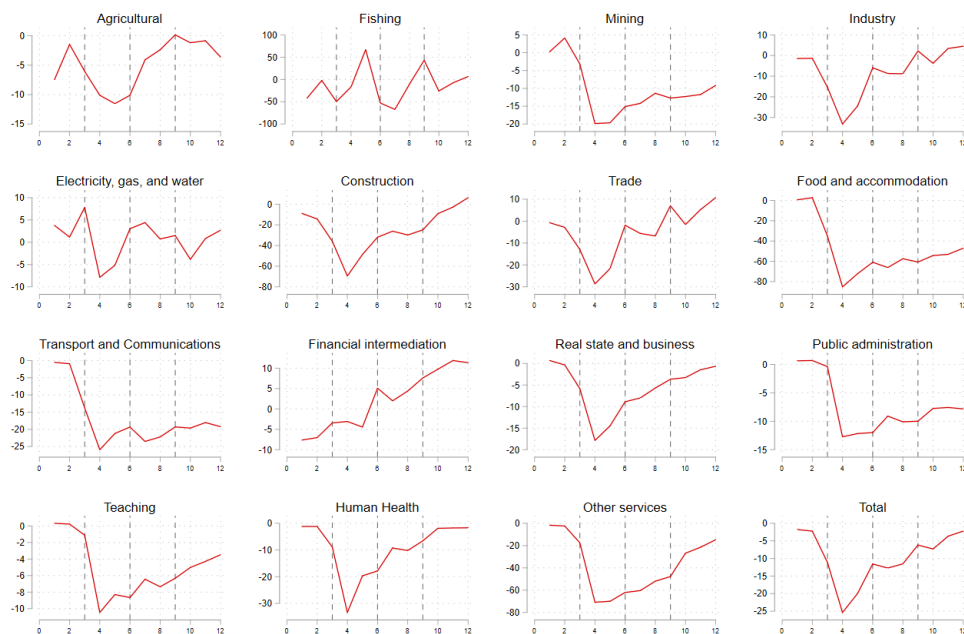
4.2 Exploratory analysis of employment during the pandemic⁴

Restrictions on mobility and physical interaction (quarantines and social distancing policies) implemented in response to the COVID-19 pandemic brought economic activity to a standstill in virtually the entire world. In Argentina, on March 20, 2020, the Preventive and Obligatory Social Isolation (ASPO) began, which sought to minimize the movement of people and close contacts and lasted until April 26, when territorially segmented measures were implemented. As shown in [Figure 4](#), already in March, there was a drop in activity level, but April was the worst month of the year, with the economy falling 25% year-on-year. Thus, the most severe drop in activity occurred in the second quarter when the economy fell 19% compared to the previous year. However, the impacts of the crisis are highly heterogeneous. The most affected sectors are those that require a high degree of physical proximity and therefore suffered the most from the restrictions: hotels and gastronomy, construction, and personal, social, and community services. On the contrary, essential activities such as public administration, electricity, gas and water, health, and primary sectors experienced limited declines. Likewise, non-essential sectors such as education and financial intermediation also showed relatively minor drops in activity level. The same patterns are observed in the recovery that began at the end of the second quarter and was accentuated in the second part of the year, hand in hand with the easing of restrictions (see [Figure 5](#)). The evolution of the sectors linked to primary activities (mainly fishing) has been quite independent of the supply and demand conditions linked to the

⁴ This subsection is based on de la Vega (2021).

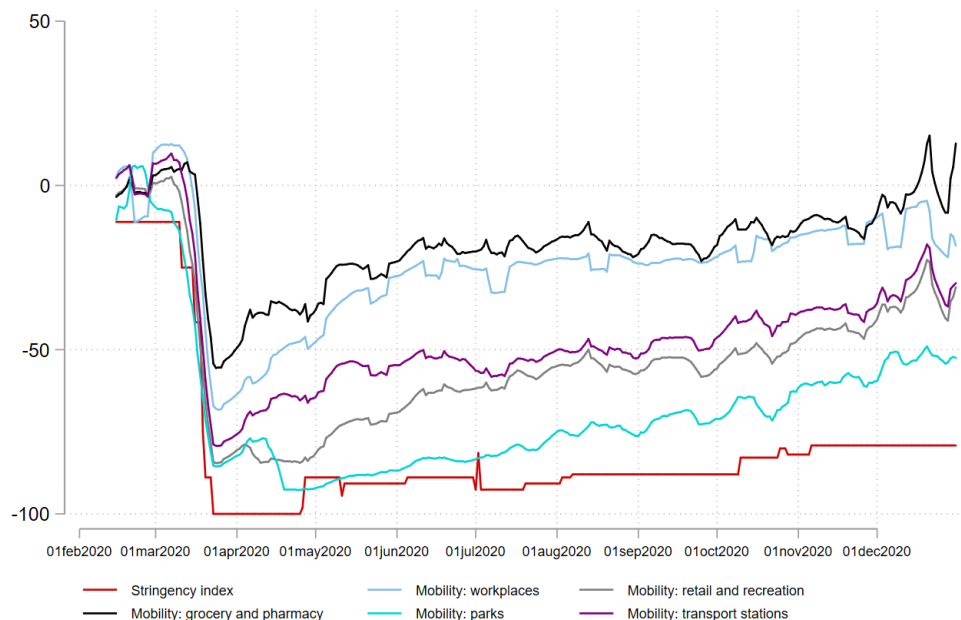
pandemic, except for certain restrictions on the operation of the mining sector in March and April (BCRA, 2021).

Figure 4. Monthly activity level, by sector. January to December 2020



Own elaboration based on INDEC. The figure shows the monthly interannual variation of the monthly economic activity estimator (EMAE) by activity sector. The vertical dotted lines separate the quarters.

Figure 5. Stringency Index and Mobility measures



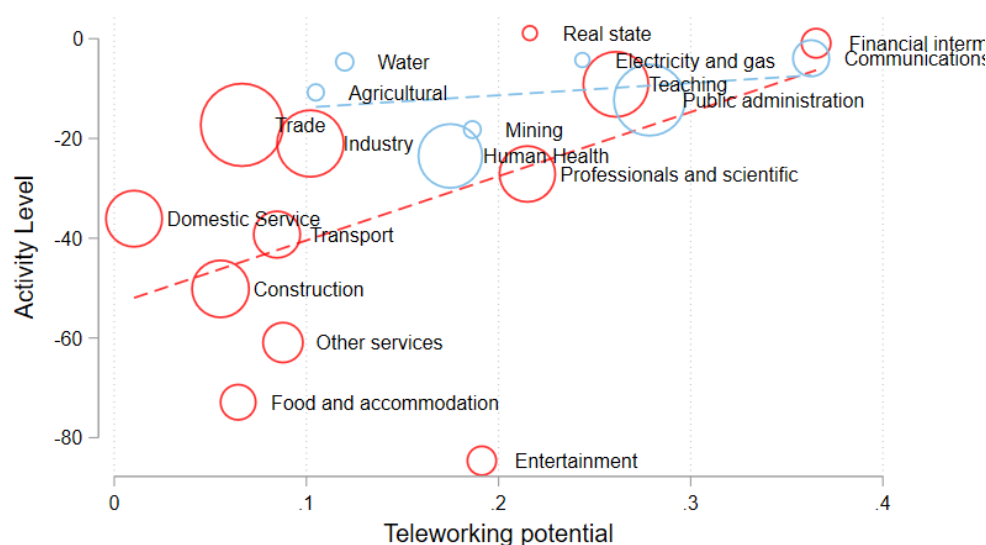
Own elaboration based on Blavatnik School of Government (Oxford University) and Google Global Mobility Trends. The Stringency Index of restrictions peaks at -100 and is a composite measure of seven indicators that include information on public policy responses such as school closings, transportation bans, border closures, etc.

(for more information, see Hale et al., (2021)). A 7-day moving average was calculated on the mobility series. The vertical dotted lines separate the quarters.

In terms of the labor market, in the second quarter, the employment rate fell 8.8 pp. compared to the first quarter, and 9.2 pp. compared to the same period in 2019. However, unemployment only increased 2.7 pp. compared to the first quarter and 2.5 pp. in interannual terms (INDEC, 2020). What happened is that the greater transit was evidenced out of the labor market: the activity rate fell 8.7 pp. in quarterly terms and 9.3 pp. year-on-year, so that the unemployment rate partially reflected the adjustments in the labor market during the pandemic (ILO, 2021). The easing of restrictions in the second semester was associated with an improvement in these indicators.

As shown in [Figure 6](#), the measure of teleworking potential is positively correlated with the economic performance of the sectors during the ASPO. With the exception of essential activities, the sectors whose occupations have a greater potential for teleworking are those that were able to transfer their tasks to this modality during the pandemic, such as financial intermediation, education, and public administration. The relationship is not clear in the case of primary activities, which is probably due to the urban nature of surveys such as the EPH, but also to the fact that, as already mentioned, the evolution of the sectors linked to primary activities has been quite independent from supply and demand conditions linked to the pandemic.

Figure 6. Teleworking potential and economic activity



Own elaboration based on PIAAC, EPH, and INDEC. The teleworking measure corresponds to the sectoral average for 2019 of the PIAAC-EME estimate. The activity level is defined as the year-on-year change in gross value added at constant prices in the second quarter of 2020. The size of the circle corresponds to the number of employed persons. The color blue (red) indicates sectors where more than (up to) 75% of employment is categorized as (not) essential during the pandemic. The dotted lines correspond to a regression of the change in the activity level in the teleworking potential by activity sector, for essential (blue) and non-essential (red).

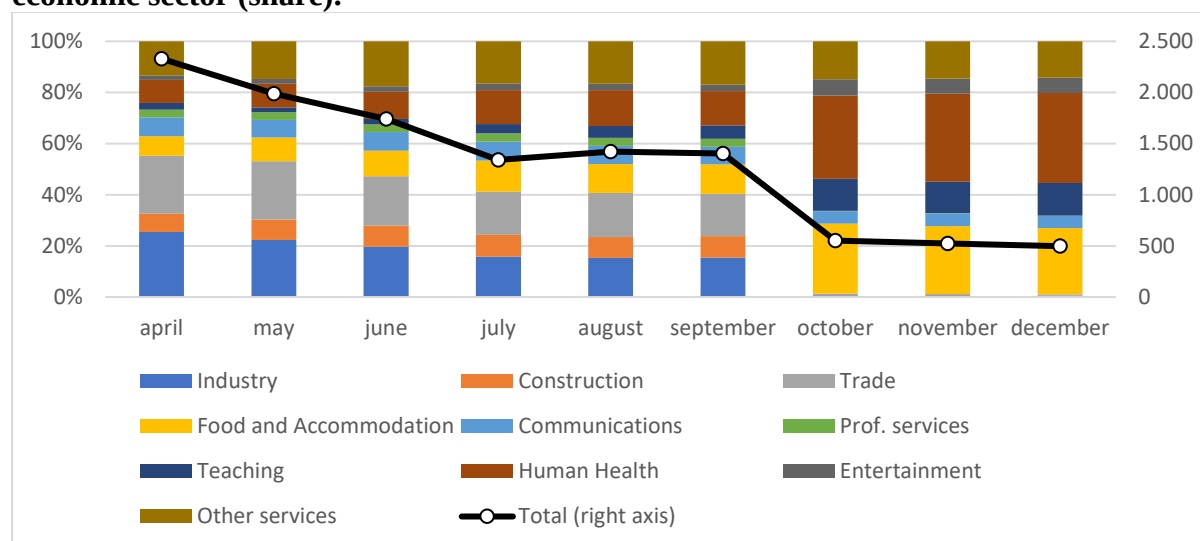
4.3 Government programs to mitigate the impacts of COVID pandemic

The Argentine government implemented a comprehensive package of measures in response to the pandemic. Regarding those aimed at the labor market (ATP program, Programa de Asistencia de Emergencia al Trabajo), we have data on three policies at the province and sector of activity on the number of beneficiary employers/workers. The first benefit consists of a compensatory salary allocation of 1.25 up to 2 minimum wages (SMVM, Salario Mínimo Vital y Movil) per employee to companies that carry out critical activities and whose 2020 turnover has fallen compared to the same month in 2019 ([Figure 7](#)). The second benefit refers to postponement or a 95% reduction in employer contributions ([Figure 8](#)). The third benefit consists of subsidized rate loans, an ATP tool that began to run from the fourth stage of the program ([Figure 9](#)). Other assistance policies consisted of granting subsidized credits and unemployment benefits.⁵

⁵ For more information, see [here](#).

In terms of the compensatory salary allocation ([Figure 7](#)), although there is a generalized downward trend in the number of recipients, the share of sectors such as industry, trade, construction, professional services, virtually vanish around October. Meanwhile, sectors such as human health, food and accommodation, teaching, and entertainment increase their participation in the total of recipients.

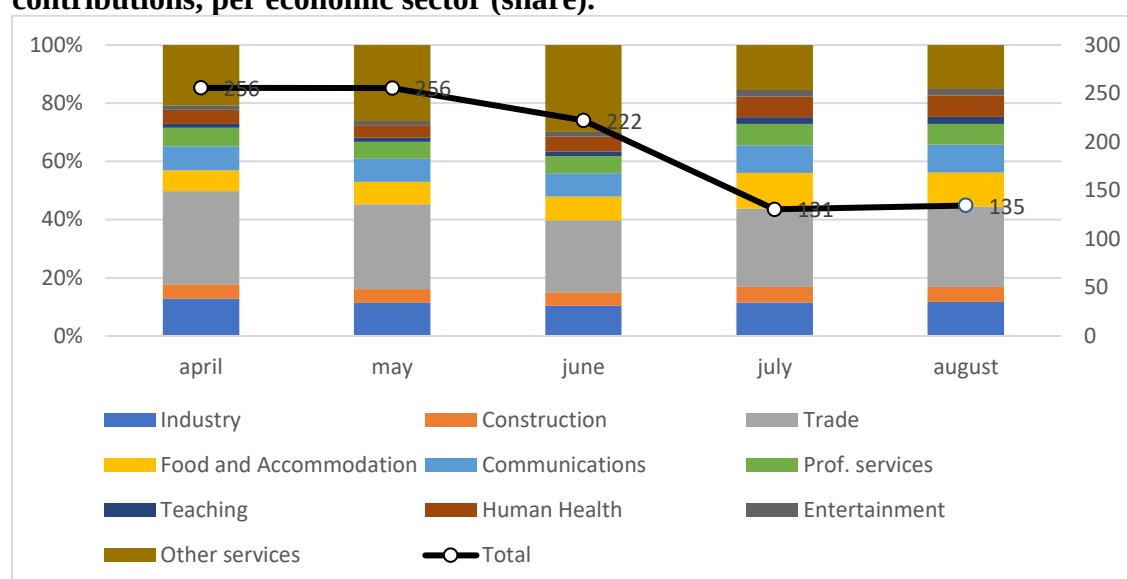
Figure 7. Number of employees recipients of compensatory salary allocation, per economic sector (share).



Own elaboration based on Ministerio de Desarrollo Productivo. Unidad Gabinete de Asesores. Dirección Nacional de Estudios para la Producción (CEP XXI). For more information see [here](#). Each month corresponds to one of the nine rounds of the ATP program in 2020.

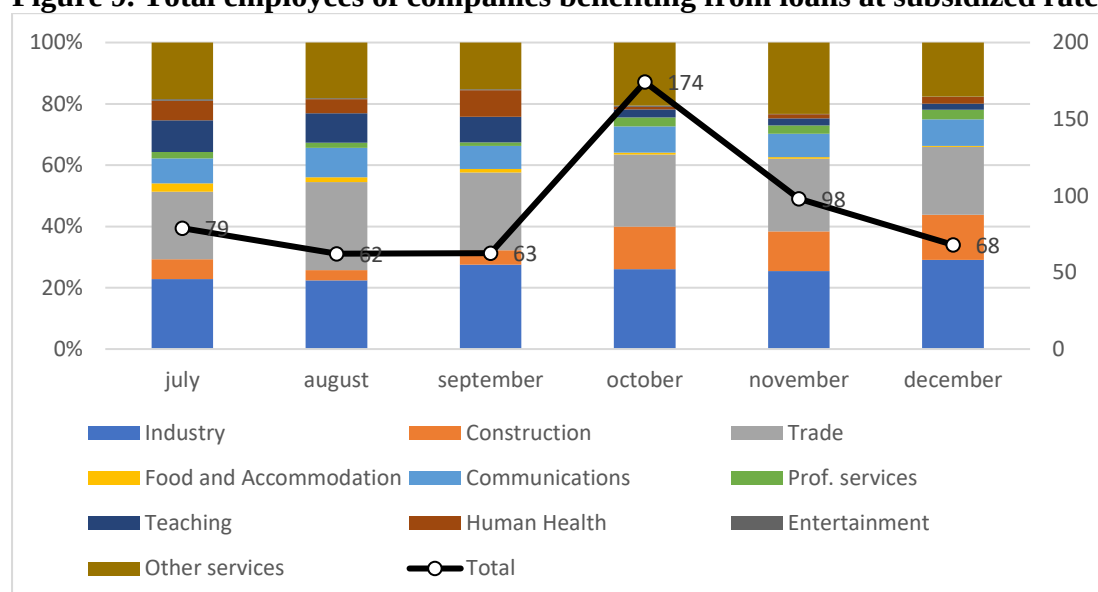
Regarding the postponement or a 95% reduction in employer contributions ([Figure 8](#)), it is worth noting that this benefit was available from April to August, the first five rounds of the ATP program in 2020. There is also a generalized downward trend in the number of recipients, which is much lower than [Figure 7](#). There is no substantial change in the sectoral participation in this case, but the other services sectors evidenced a decrease in their share in the last two rounds of the benefit. In the benefit of subsidized loans ([Figure 9](#)), which was available from July to December, the number of recipients was also lower than those who receive a compensatory salary allocation. The number of beneficiaries remains stable despite a surge in October when sectors such as construction and other services gain participation in the total beneficiaries.

Figure 8. Companies recipients of postponement or a 95% reduction in employer contributions, per economic sector (share).



List of companies benefiting from the deferral or reduction of employer contributions. Own elaboration based on: CEP-XXI based on information from AFIP and ANSES. Provisional list as of 10/28, subject to revision. For more information see [here](#). Each month corresponds to one of the first five rounds of the ATP program in 2020.

Figure 9. Total employees of companies benefiting from loans at subsidized rates (share)



List of companies benefiting from loans at subsidized rates, a tool of the ATP that began to operate as of the fourth stage of the ATP. Own elaboration based on Ministerio de Desarrollo Productivo. Unidad Gabinete de Asesores. Dirección Nacional de Estudios para la Producción (CEP XXI). For more information see [here](#). Each month corresponds to one of the last six rounds of the ATP program in 2020.

5. Empirical strategy

Our empirical analysis will be carried out at a specific unit determined by the combination of several characteristics: sector of activity, geographic region, type of employment (formal vs. informal), gender, educational level, and type of activity (essential vs. non-essential). Therefore, our quarterly total employment measure, L_t , is defined as follows:

$$L_t = \sum_s \sum_p \sum_i \sum_g \sum_k \sum_e L_{s,p,i,g,k,e,t} \quad (1)$$

where $L_{s,p,i,g,k,e,t}$ is the employment in sector s , region p , type of employment $i \in I = \{formal, informal\}$, gender g , educational level $k \in K = \{unskilled, semi - skilled, skilled\}$, and type of activity $e \in E = \{essential; non - essential\}$, in quarter $t \in T = [Q12018 - Q42020]$.

We have 5,654 groups (38,002 observations) representing combinations of 15 sectors, 24 regions, two types of employment (formal/informal), two gender, three skill levels, and two groups based of the classifications of essential activity.⁶ However, the panel is highly unbalanced and with gaps, thus we restrict the sample to those combinations which appear in all the last eight quarters between 2019 and 2020, the last two years in the sample. This left us with 2,374 groups and a total of 25,982 observations (68% of the original panel).

5.1 Teleworking and observables

To explore how the viability of teleworking is distributed, we estimate the relationship between the teleworking potential and various labor and demographic variables by estimating the following equation:

$$T_{s,p,i,g,k,e,t} = \gamma_s + \gamma_p + \gamma_i + \gamma_g + \gamma_k + \gamma_e + \gamma_t + u_{s,p,i,g,k,e,t}$$

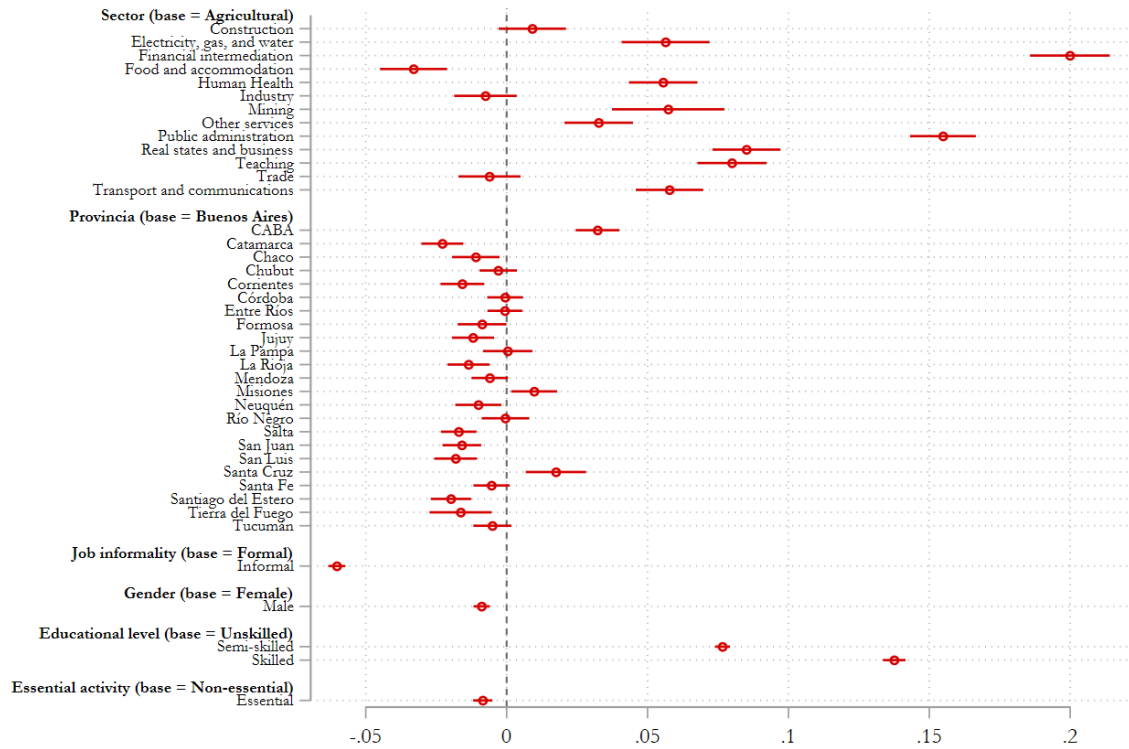
where $T_{s,p,i,g,k,e,t}$ is the average Teleworking Potential index for sector for sector s , region p , type of employment i , gender g , educational level k , and type of activity s in quarter t ; $\gamma_s, \gamma_p, \gamma_i, \gamma_g, \gamma_k, \gamma_e$ and γ_t are fixed effects; and $u_{s,p,i,g,k,e,t}$ is the error term. The results are presented in [Figure 10](#) (and in [Table 1](#) in the Appendix)

Briefly, the potential for teleworking is relatively greater for women, those with high qualifications, formal workers, and those who work in specific sectors of activity such as

⁶ The sample is restricted to those employed between 25 and 65 years old to avoid the influence of educational and retirement decisions on labor market participation.

intermediation, public administration, and teaching. The sectors with the least potential for teleworking are construction, industry, and food and accommodation. There are no big regional disparities, but provinces like CABA, Santa Cruz, and Misiones have higher teleworking potential than Buenos Aires, while San Luis and Catamarca are among those that have the lowest of the country. Strikingly, being employed in an occupation that is classified as "essential" during the pandemic is negatively related to the potential for teleworking. These results are in line with previous literature (Mongey et al., 2020; Saltiel, 2020; Guntin, 2020; Hatayama et al., 2020) and particularly for Argentina (Bonavida Foschiatti and Gasparini, 2020; de la Vega, 2021).

Figure 10. Teleworking Potential and observables



Own elaboration.

5.2 Econometric analysis

To explore the association between teleworking indexes and inter-annual changes in employment levels, we estimate models using information for Q12019–Q42020. We consider the following baseline specification with a three-way interaction:

$$\Delta L_{s,p,i,g,k,e,t} = \alpha + \rho T_{s,p,i,g,k,e,t-1} + \gamma_s + \gamma_t + \sum_{t=0}^T \beta_t^1 T_{s,p,i,g,k,e,t-1} \gamma_t + \sum_{t=0}^T \beta_t^2 T_{s,p,i,g,k,e,t-1} \gamma_s + \sum_{t=0}^T \beta_t^3 \gamma_s \gamma_t + \sum_{t=0}^T \beta_t^4 T_{s,p,i,g,k,e,t-1} \gamma_s \gamma_t + ATP_{s,p,t} + Mobility_{p,t} + \gamma_e + \gamma_p + \gamma_i + \gamma_g + \gamma_k + \varepsilon_{s,p,i,g,k,e,t} \quad (1)$$

where

$\Delta L_{s,p,i,g,k,e,t}$ is the inter-annual change in employment in sector s , region p , type of employment $i \in I = \{formal, informal\}$, gender g , educational level $k \in K = \{unskilled, semi - skilled, skilled\}$, and type of activity $e \in E = \{essential; non - essential\}$, in quarter $t \in T = [Q12019 - Q42020]$

$T_{s,p,i,g,k,e,t-1}$ is the average Teleworking Potential index for sector s , region p , type of employment i , gender g , educational level k , and type of activity s in the same quarter of the previous year.

$ATP_{s,p,t}$ is a measure of exposure to the government program ATP (Programa de Asistencia de Emergencia al Trabajo) to mitigate the economic and social impact of the pandemic. We have data of three different measures at the level of sector s and region p per quarter (see [Section 4.3](#)).

$Mobility_{p,t}$ is the median change in mobility to workplaces by province published by Google (Google Mobility Trends) since the onset of the pandemic. The aim is to control for different regional evolutions of the restrictions on mobility due to the sanitary situation.

$\gamma_s, \gamma_p, \gamma_i, \gamma_g, \gamma_k, \gamma_e$ and γ_t are fixed effects.

$\varepsilon_{s,p,i,g,k,e,t}$ is the error term.

This empirical strategy is similar to that used in Peluffo and Viollaz (2021). However, we improve that specification by including the three-way interaction that also considers heterogeneities by sector of activity and by expanding the dimensions to control for given they only consider groups of sector, region, and gender, and do not control for government programs nor regional shocks.

6. Results

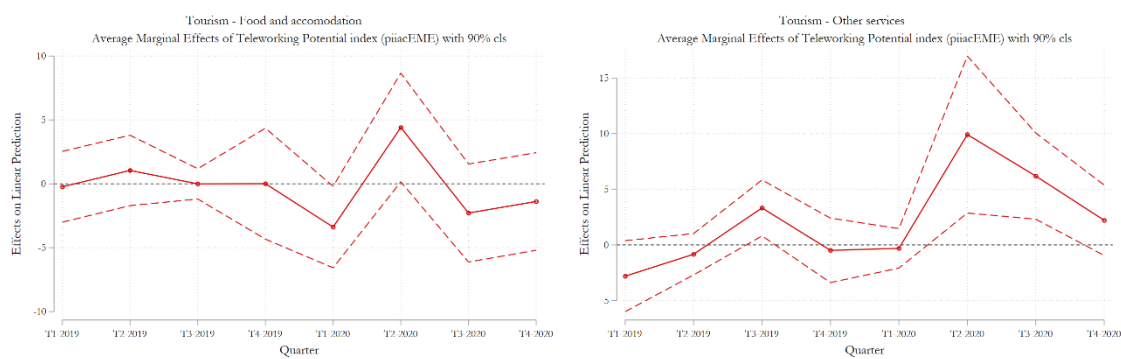
Because of the three-way interaction, the estimation results are a bit striking to understand by seen the estimated coefficients. Therefore, we present the result of interest, which is the marginal effect of the teleworking potential on the inter-annual change of employment level in [Figure 11](#).⁷ The results are grouped by broad economic sectors that were defined above: (i)

⁷ The complete results are available upon request. Moreover, we run estimations using alternative measures of the teleworking potential (de la Vega, 2021) and we obtained similar results which are available with reference to the authors.

tourism sectors, (ii) the rest of the service sectors; and (iii) the rest of the economy, but are presented at the subsector level.

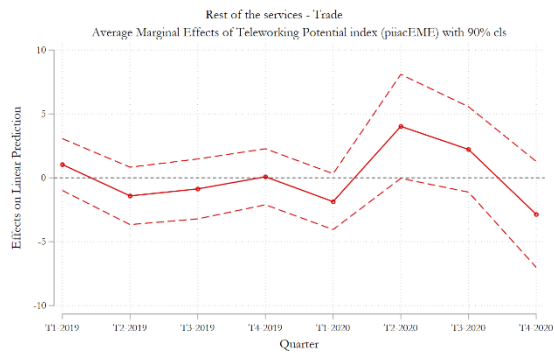
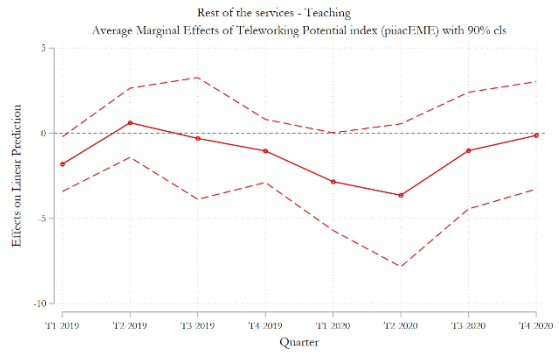
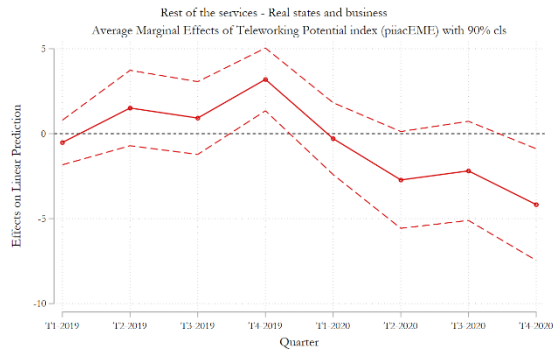
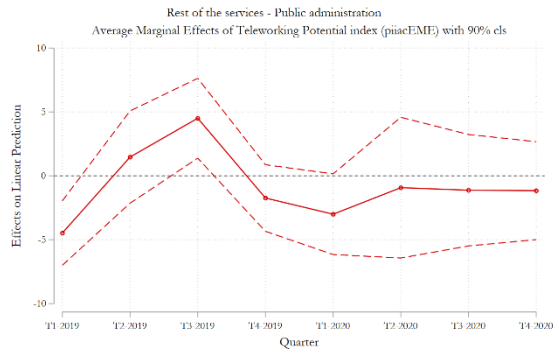
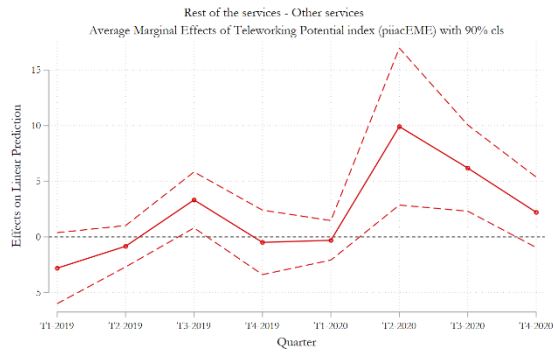
During the peak of restrictions due to the pandemic, we find a positive effect of teleworking potential in the tourism subsectors but more pronounced in the other services subsectors. Among the rest of the services subsectors, we also find a positive effect of teleworking in construction, other services, trade, and transport and communication. Finally, we only find a significant positive impact in agriculture among the rest of the economy subsectors.

Figure 11. Average Marginal Effects of Teleworking Potential index on employment
Panel A: Tourism subsectors

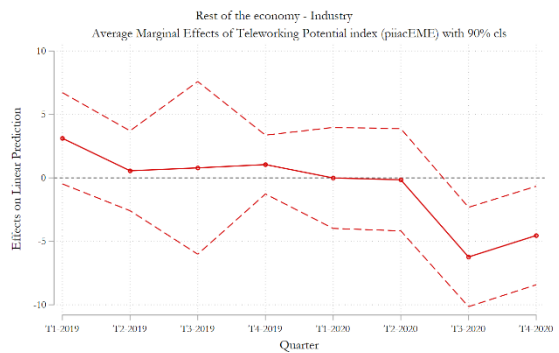
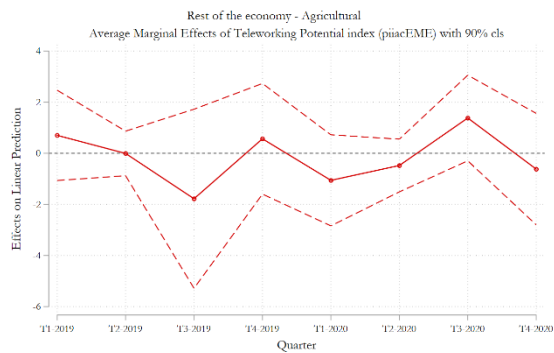


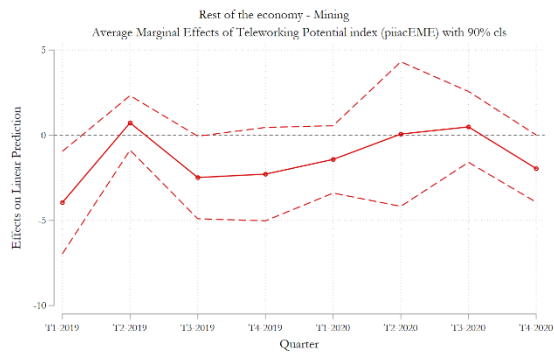
Panel B: Rest of the services subsectors





Panel C: Rest of the economy subsectors



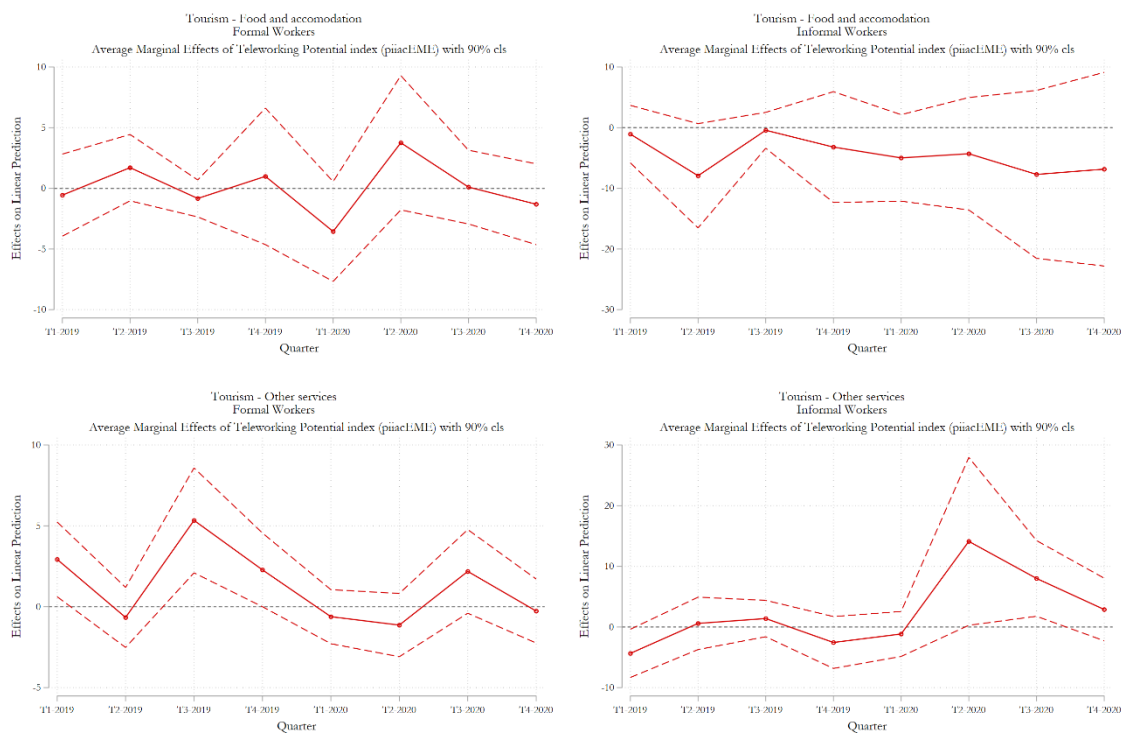


Own elaboration.

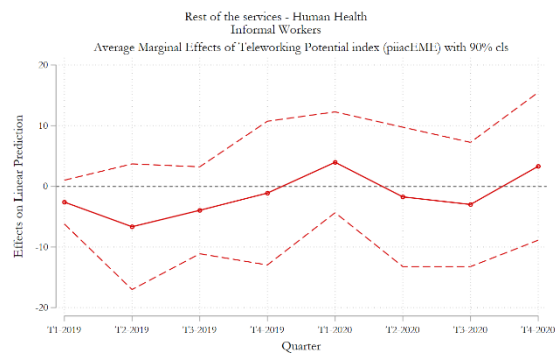
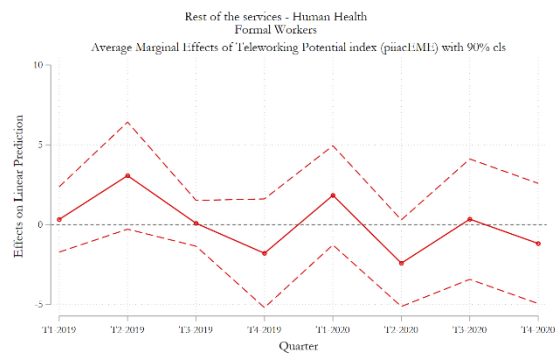
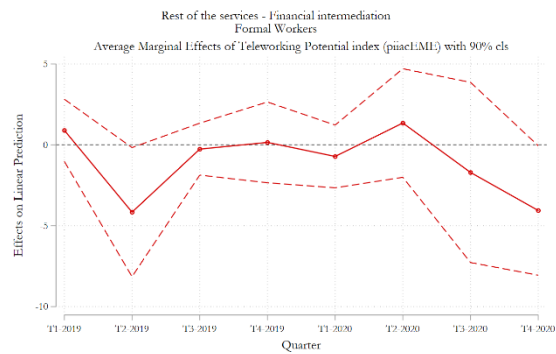
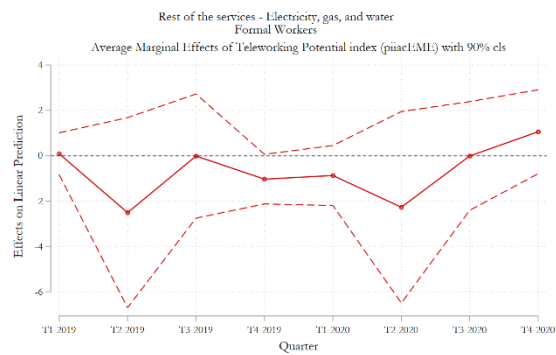
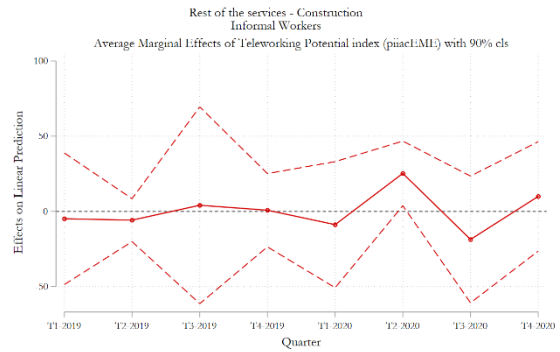
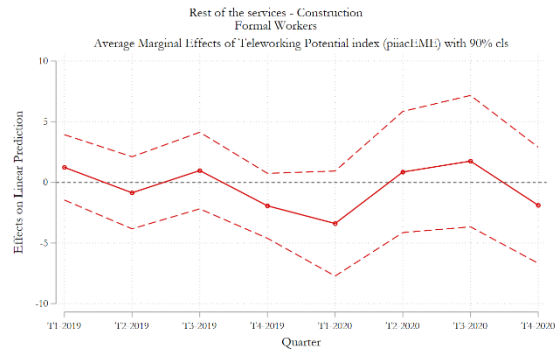
6.1 The role of informality

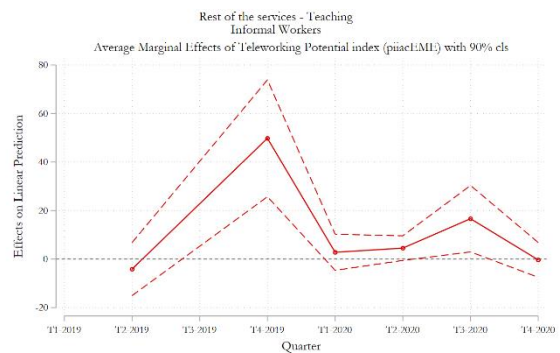
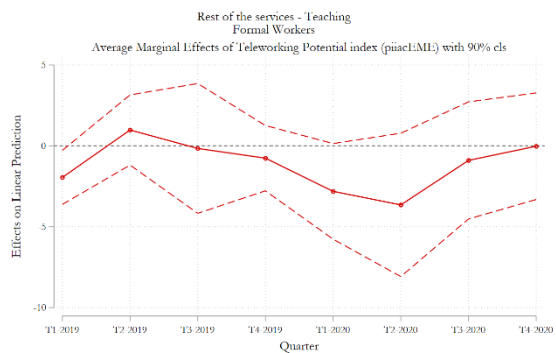
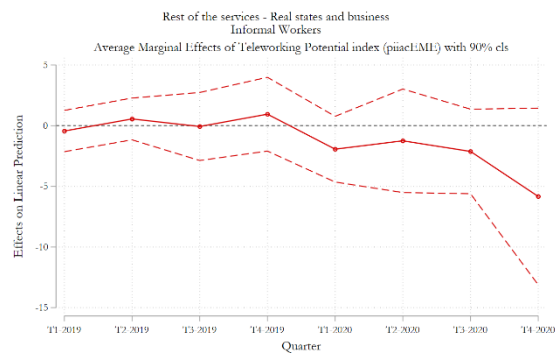
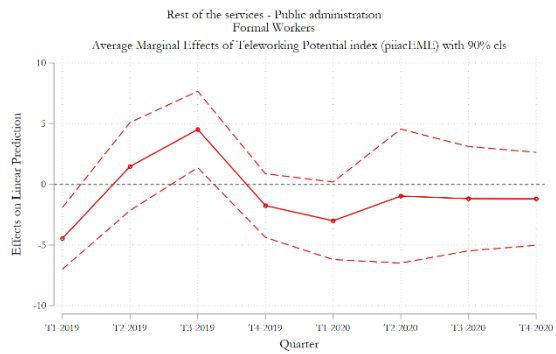
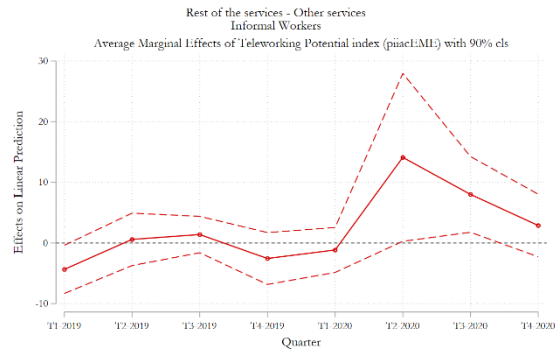
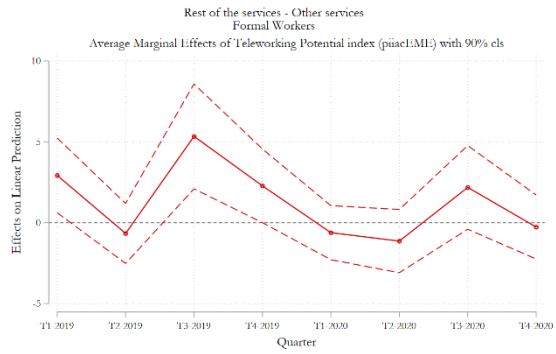
To analyse the role of informality in the adoption of teleworking during the pandemic, we estimate equation (2) for the subsample of formal and informal workers, separately. The results for the subsectors are presented in [Figure 12](#). Surprisingly, we find that teleworking potential had a positive effect on employment in the tourism subsectors (other services) only for informal workers. The same occurs in construction, trade, transport and communication, and industry. Similar results are obtained using the legal definition of informality (see [Figure 13](#) in the [Appendix](#)).

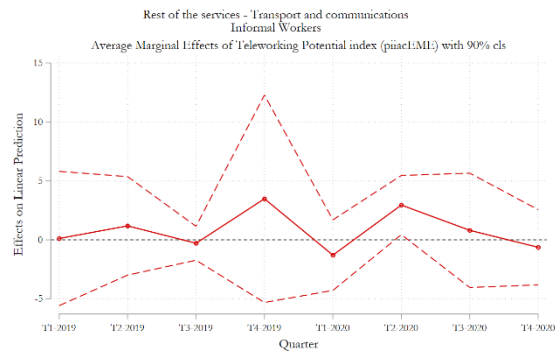
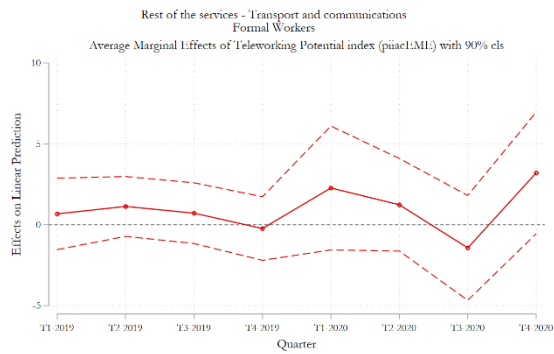
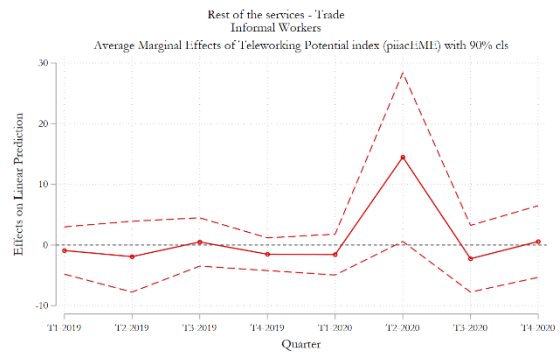
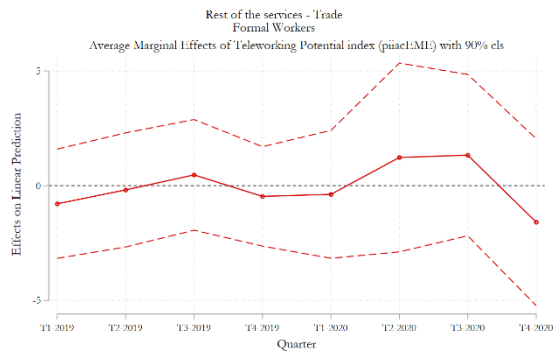
Figure 12. Average Marginal Effects of Teleworking Potential index on employment
Panel A: Tourism subsectors



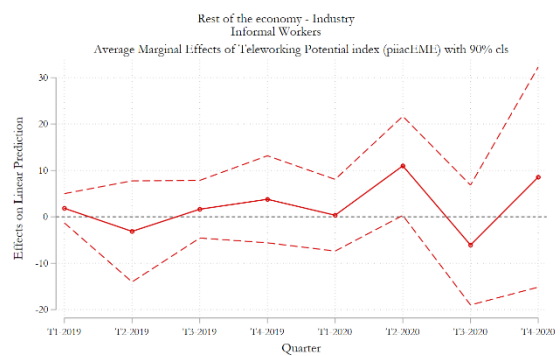
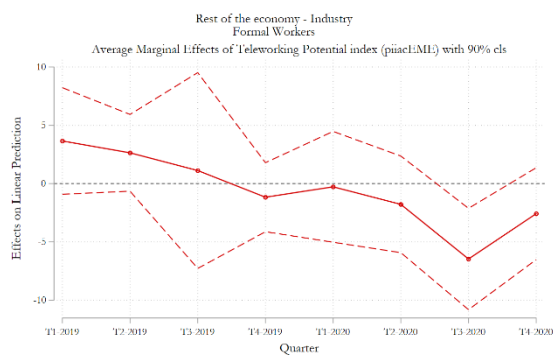
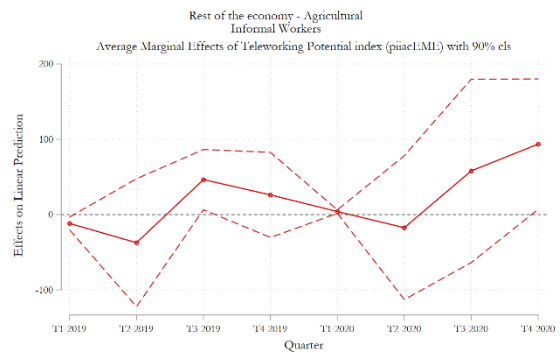
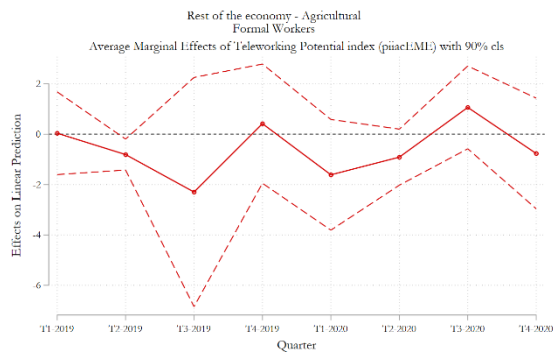
Panel B: Rest of the services subsectors

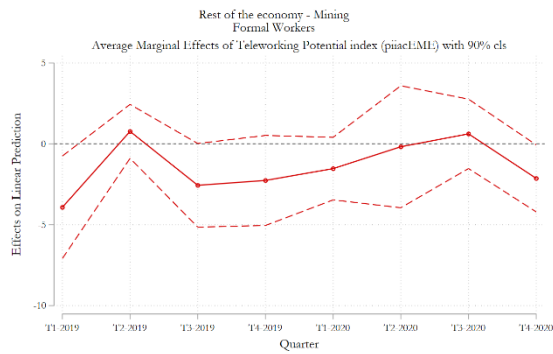






Panel C: Rest of the economy subsectors





Own elaboration.

7. Conclusions

The tourism sector and related activities are among the sectors most affected by the COVID-19 pandemic crisis (Papanikolaou and Schmidt, 2020). They are non-essential, require a high degree of physical proximity, and evidence high levels of informality. Although the ability to telework these sectors is scarce or practically nil, in certain activities, a new labor market model is emerging hand in hand with new digital technologies where teleworking has a role.

In this context, we analyze the effects of the COVID-19 crisis on employment in the tourism sector and the comparison with the rest of the sectors in Argentina, with special attention to how the viability of remote work has been critical determinants of the evolution of employment in the sector during the COVID-19 pandemic. In addition, we analyze how job informality conditions the effective implementation of flexible work arrangements such as teleworking.

During the peak of restrictions due to the pandemic, we find a positive effect of teleworking potential in the tourism subsectors but more pronounced in the other services subsectors. Among the rest of the services subsectors, we also find a positive effect of teleworking in construction, other services, trade, and transport and communication. Finally, we only find a significant positive impact in agriculture among the rest of the economy subsectors. In terms of job informality, surprisingly, we find that teleworking potential had a positive effect on employment in the tourism subsectors (other services) only for informal workers. The same occurs in construction, trade, transport and communication, and industry.

In this way, we contribute to the literature on the impacts of the COVID-19 pandemic on the labor markets and that of the viability of telework in response to the crisis. In addition, we include in the analysis information on the rigidity of the restrictions and the government policies to support the labor market implemented. Future research could try to identify regional

heterogeneities in the impacts of the pandemic based on the rigidity of the restrictions implemented, and the geographical distribution of the specialization in tourism.

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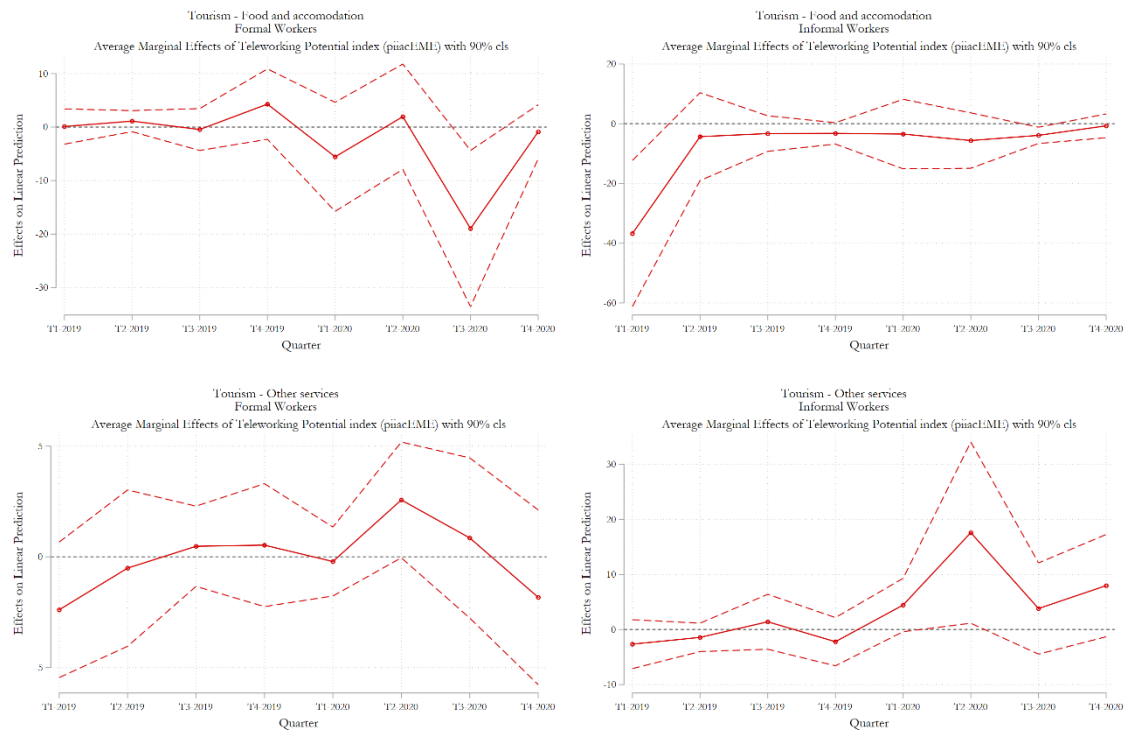
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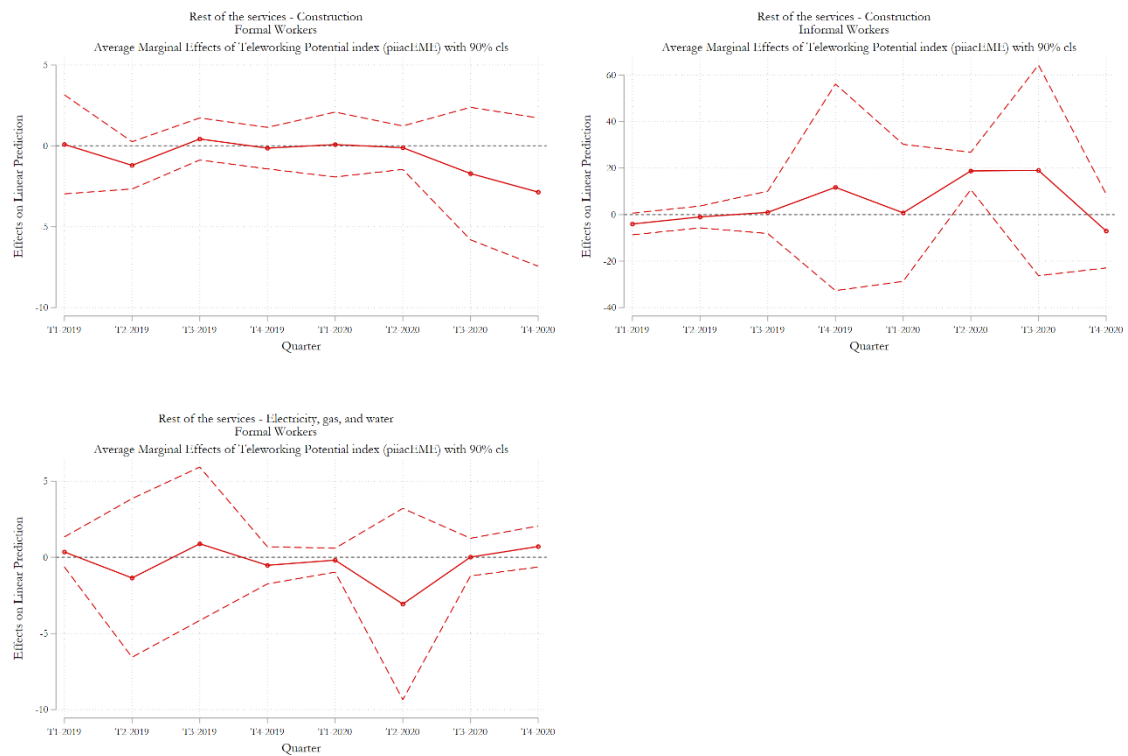
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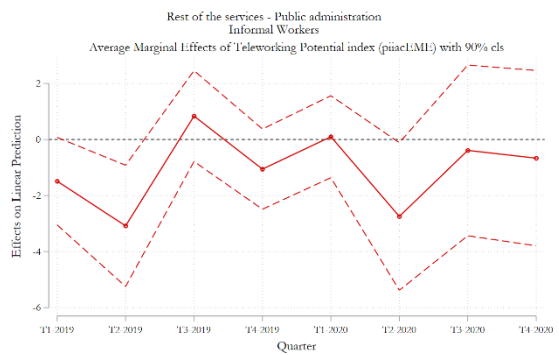
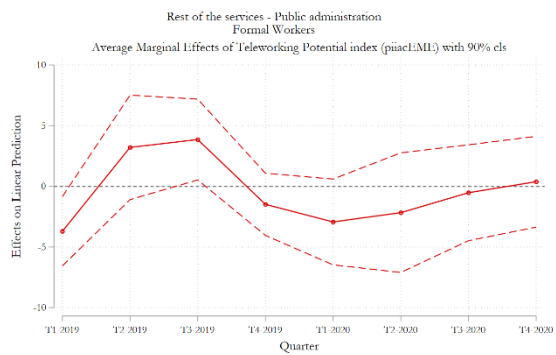
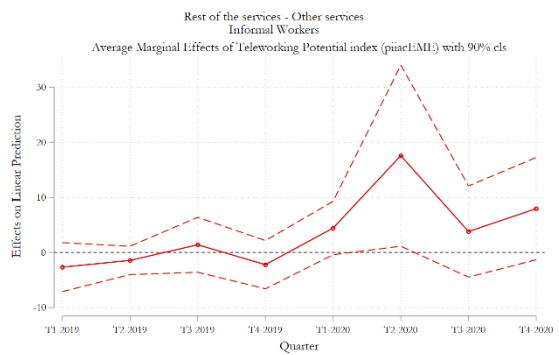
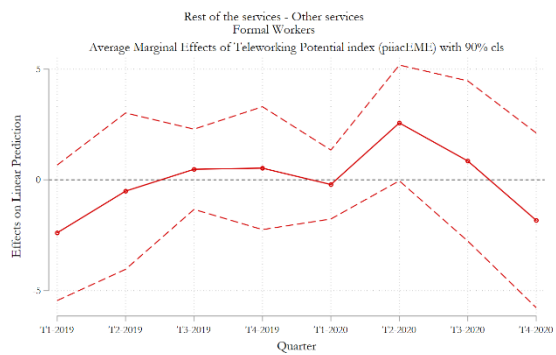
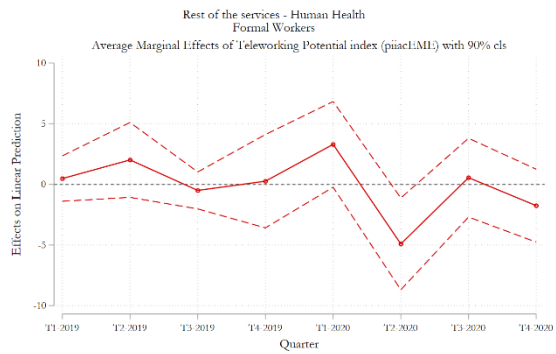
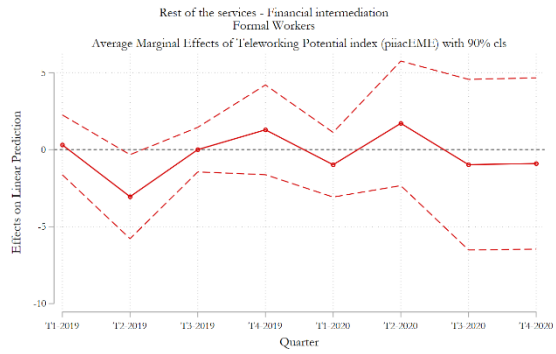
Figure 13. Average Marginal Effects of Teleworking Potential index on employment

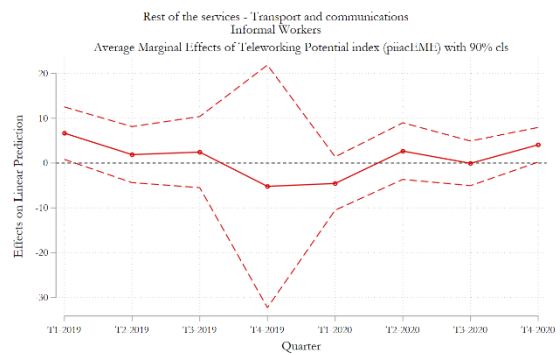
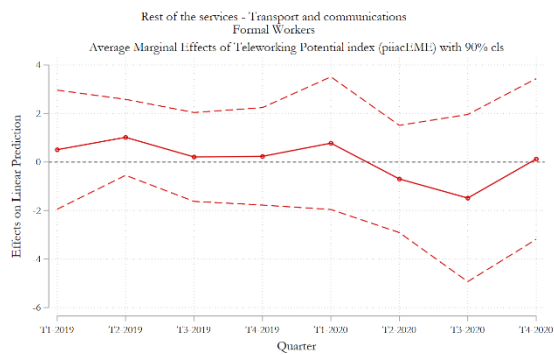
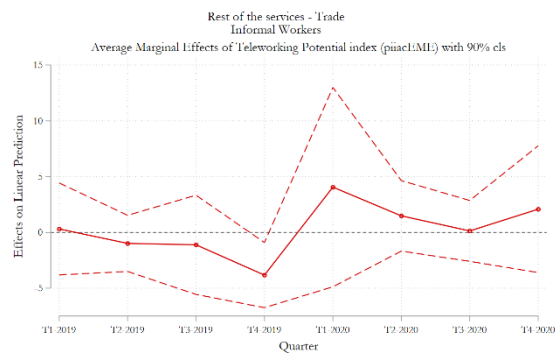
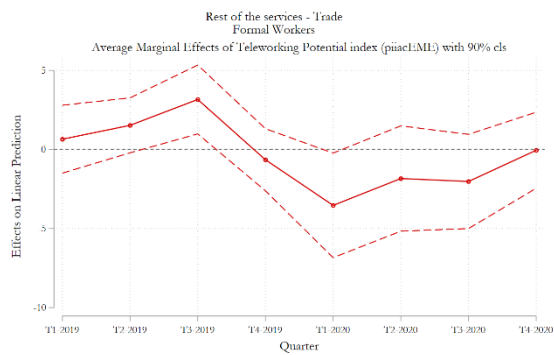
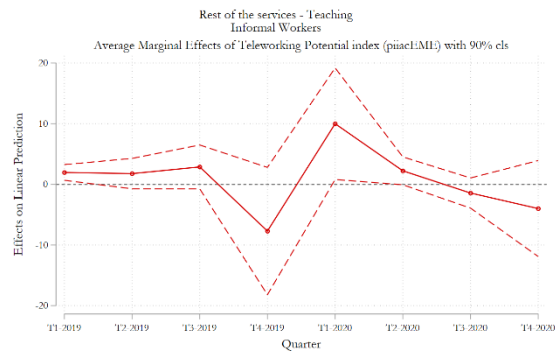
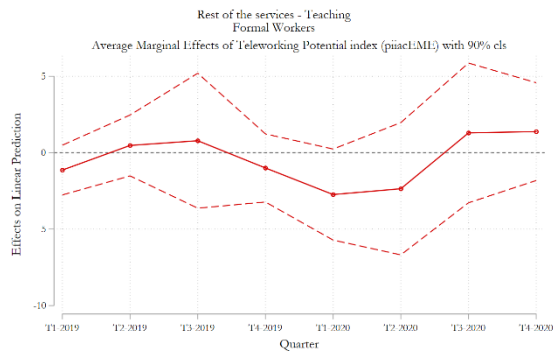
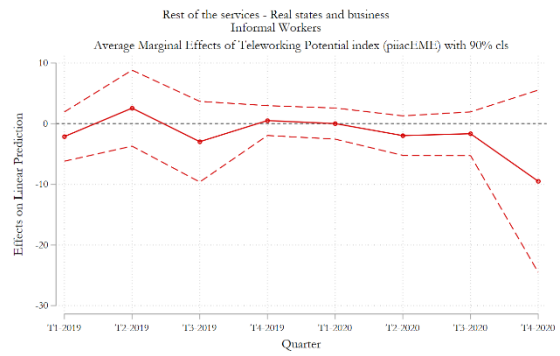
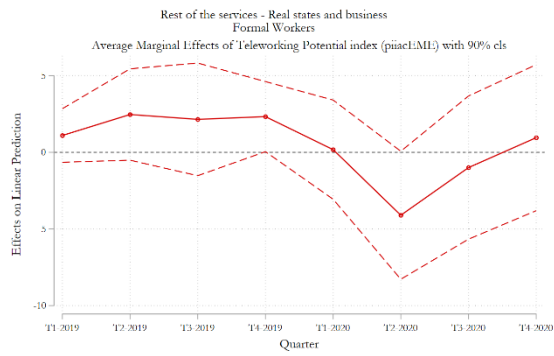
Panel A: Tourism subsectors



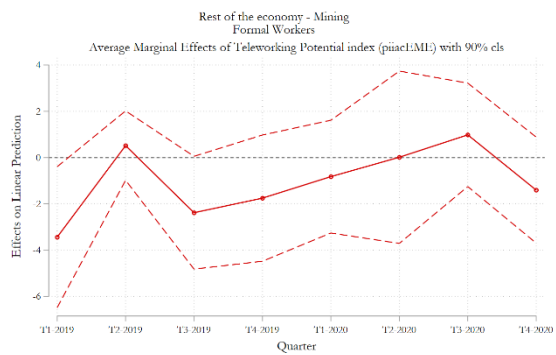
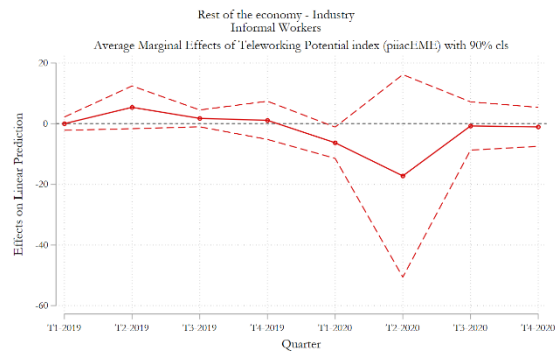
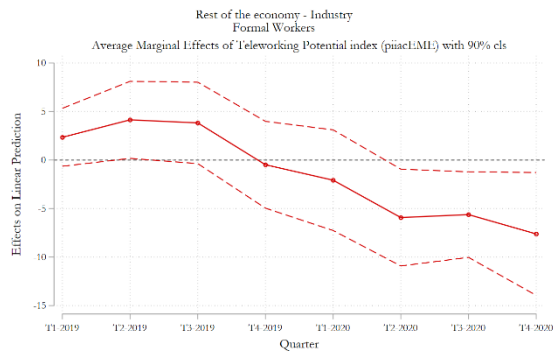
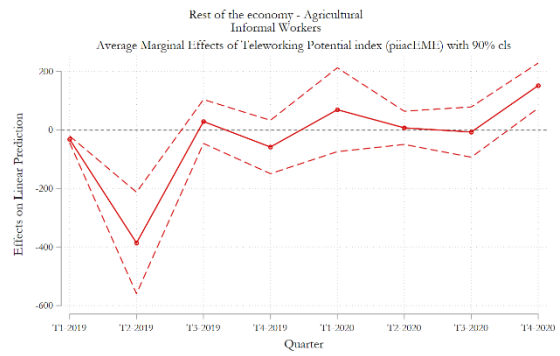
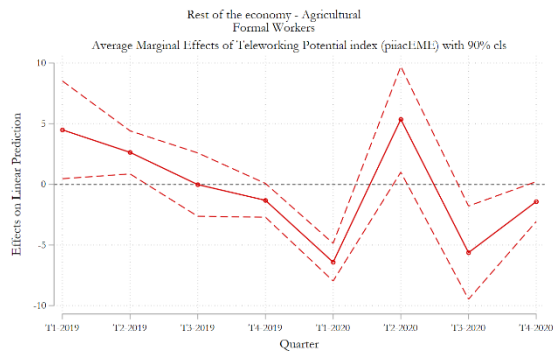
Panel B: Rest of the services subsectors







Panel C: Rest of the economy subsectors



Own elaboration.