Teleworking and commuting patterns: a case study in East Flanders, Belgium

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Extended abstract

With the widespread enforcement of teleworking – here defined as performing paid work from home during the work hours – during the COVID-19 lockdown-periods, many workers experienced this alternative work arrangement for the first time. After the relaxation of travel restrictions, a portion of these workers continued integrating teleworking into their schedules.

The sharp rise in teleworking adoption emerged as a response to the pandemic, but the potential of home-based teleworking as a strategy for reducing motorised travel, greenhouse gas emissions and traffic congestion has been discussed in literature for a longer time (Chakrabarti, 2018; Choo et al., 2005; Lachapelle et al., 2018; Ory & Mokhtarian, 2006; van Lier et al., 2012). Teleworking has the potential to reduce travel, and several earlier studies found evidence of home-based teleworking replacing and thus reducing travel (Choo et al., 2005; Ory & Mokhtarian, 2006; Helminen & Ristimäki, 2007). However, recent studies often reveal nuanced results, indicating various rebound effects, including increased non-work travel or residential relocation, which counterbalance the substitution effect of teleworking (Macias et al., 2022; Wöhner, 2022).

In this study, we will focus on teleworking frequency and commuting practices. On the one hand, several studies found that teleworkers make fewer commute trips than non-teleworkers (Budnitz et al., 2020; Wöhner, 2022). On the other hand, the commute

distance and commute time of teleworkers are, on general, longer than those of non-teleworkers (Helminen & Ristimäki, 2007; Ravalet & Rérat, 2019; Zhu, 2013). Some studies also concluded that teleworkers have a higher weekly or daily total travel than non-teleworkers because of a combination of longer commute trips and additional non-work travel (Caldarola & Sorrell, 2022; Zhu & Mason, 2014). Additionally, researchers noted variations in commuting practices based on the teleworking frequency and duration (part of the day or full day) of the group (Elldér, 2020; Stiles & Smart, 2021). For example, Caldarola and Sorrell (2022) found that the total weekly travel (work and non-work) of English teleworkers is higher than that of non-teleworkers. However, a tipping point seems to exist. The total weekly travel of frequent teleworkers, those who work three or more times a week, is found to be smaller than those of non-teleworkers.

The relation between teleworking and modal choice is less straightforward. On the one hand, some studies found that (full-day) teleworkers are more likely to use active travel modes (Elldér, 2020; Lachapelle et al., 2018). On the other hand, Elldér (2022) found that teleworkers are less likely to bike to work and Silva and Melo (2018) state that teleworkers also make more trips by car. Finally, we anticipate that commute satisfaction is associated with teleworking frequency. Travel satisfaction is determined by multiple factors, including trip duration, mode choice and trip purpose (De Vos, 2019). We hypothesise that travel stressed workers might want to avoid commuting if possible, and are therefore more likely to (frequently) telework. However, research on this relationship is very limited.

In this research we examine the relationship between teleworking frequency and commuting patterns in the East Flanders province, Belgium. The number of employed people usually working from home[1] increased in East Flanders by over 20% between 2019 and 2021. With almost 30% of the employees usually teleworking in 2021, the province is one of the top European regions in terms of teleworking adoption, making it an interesting case study (Eurostat, 2022).

The first set of research questions focuses on exploring the teleworking landscape in East Flanders using descriptive statistics. We explore the teleworking frequency of workers, the distribution of teleworking days throughout the week, and the duration of the teleworking sessions (part of the day or full-day). The second set of research questions delves into the commuting patterns of different groups of workers. All individuals are first classified into three distinct groups: non teleworkers, non-regular teleworkers, and regular teleworkers. We then assess whether statistically significant differences exist between the one-way commute distance, one-way commute duration, weekly number of commute trips, and commute satisfaction factors among different groups of teleworkers using one-way ANOVA. We also investigate whether there is a significant association

[1] "Usually working from home" was defined as doing at home any productive work related to the current main job for at least half of the days worked in a reference period of four weeks (Eurostat, 2022).

between the type of teleworker and the modal choice when commuting using a Chi-square test of independence.

To answer these questions, we collected data using an online survey on teleworking, travel and well-being. The questionnaire was designed in Qualtrics and invitations to participate to the online survey were distributed to the personnel of Ghent University, the City of Ghent administration, employees of the Province of East-Flanders and several companies located in the Province of East Flanders. We first reached out to these institutions and companies. If they were interested in sharing the survey, they could share the link to the survey with their employees. The data collection ran between 16 October 2023 and 15 January 2024, and we collected 1086 answers.

The survey comprised five main parts. First, some questions were asked about respondents' socio-demographics. The second part of the survey took a closer look at working and teleworking habits. Respondents were asked about their job status and their current, pre-COVID and preferred teleworking frequency. In addition, we provided some statements related to teleworking circumstances. In the third part, respondents specified their travel options and how they typically commute (i.e., mode choice, trip distance, trip duration, average weekly number of commute trips). This part also focused on peoples' commute satisfaction using the Satisfaction with Travel Scale (Ettema et al., 2011), on which aspects people value and dislike about their commute and on whether commute distance, travel time and mode choice influenced peoples' choices to (not) telework. The fourth part of the survey assessed respondents' living environment and their intentions to relocate. This part started with some general questions on the residential situation of the respondents, for example the postcode of their hometown, the type of neighbourhood and housing they live in, and if they are tenants or homeowners. This was followed by questions on their past behaviour and future intentions regarding residential relocation and changing jobs, and if these decisions were influenced by their teleworking situation. The last part of the survey focused on people's perceptions of teleworking and on their main telework motivation. This part also assessed whether the time freed up by making fewer commute trips is used to work more, to perform other activities or to make more (non-commute) trips. The effect of teleworking on respondents' well-being was also assessed in this part through statements on the effect of teleworking on their mood, on their work productivity, motivation and satisfaction, on relationships with their co-workers, employer and family members and on stress and mental-health.

Using a combination of descriptive statistics, one-way ANOVA, the Chi-square test of independence, and post hoc analyses, this research aims to offer an initial understanding of the teleworking landscape and the commuting behaviour among different teleworking groups in East Flanders, Belgium. We expect that regular and non-regular teleworkers perform fewer commute trips, but also have longer commute distances and durations than non-teleworkers. The association between teleworking frequency and modal choice is not fully clear yet. Additionally, the relationship between commute travel satisfaction

and teleworking frequency remains an understudied area. This research aims to address these gaps.

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