Policy Brief 06
06____June 2022
RESEARCH PROGRAMME
CROSSING BORDERS
LISER
LUXEMBOURG INSTITUTE OF SOCIO-ECONOMIC RESEARCH

The gap in the middle: Luxembourg attracts low and high-skilled cross-border workers

Andrea Albanese & David Marguerit, *Luxembourg Institute of Socio-Economic Research (LISER), Luxembourg*

on '*The Predictors of Cross-Border Employment Transitions*'

Since its foundation, the European Union (EU) has been committed to reducing restrictions on the free movement of people, goods, capital and services. As the EU proceeds with its integration, the geographical mobility of European citizens in terms of cross-border commuting flows is becoming more relevant: in 2020, the EU-27 counted 2 million individuals working in a country other than that of their usual residence. While this represents only about 1.1% of the total employed population, this share has almost doubled since 2005 (Eurostat, 2021). Cross-border flows are an important component of the labor market in several clusters of regions. This is particularly true for the regions comprising the Greater Region of Luxembourg, where the share of residents working abroad in the employed population reaches 29.4% in the Province of Luxembourg (Belgium), 13.7% in Trier (Germany), and 11.1% in Lorraine (France).

The growing importance of cross-border flows raises several questions that policymakers must consider to support this phenomenon and take full advantage of it. Among these questions, identifying the individual predictors of cross-border workers is crucial. Importantly, we aim at understanding the skill profile of the workers that are more likely to start a new job in Luxembourg. Are higher or lower educated individuals more likely to be hired beyond the border? What about middle-skilled workers? Is this association also reflected in the previous salaries of the individuals or in their household income? Answering these questions will help us understand the type of workers that Luxembourg is able to attract from the bordering regions.

Cross-border workers are an essential part of the Luxembourg economy, as about 46% of workers live outside the country in neighboring regions (i.e. 209,000 individuals, according to STATEC, 2021). Our study focuses on individuals living in the Belgian Province of Luxembourg and neighboring municipalities in the Province of Liege. This area of Wallonia is one of the regions in the EU with the highest share of cross-border workers out of the total employed population (Eurostat, 2021). This greater propensity to work across the border makes this target population of high interest.

Andrea Albanese is a Research Scientist at LISER. He is also affiliated with Ghent University (Belgium), IZA (Germany), GLO (the Netherlands) and Université Catholique de Louvain (Belgium). His research interests are labor economics, causal analysis and policy evaluation.

Contact:
andrea.albanese@liser.lu

David Marguerit is a PhD candidate at LISER. His main research interests are social and income inequalities, well-being, skills demand in the labor market, and the UN's Sustainable Development Goals.

Contact:
david.marguerit@liser.lu

Previous research

Previous research has analyzed the different characteristics of local and cross-border workers. In general, the willingness to accept employment in other countries rises with education, probably because higher educated people have better language skills and they find better opportunities (Hansen and Nahrstedt, 2000; Huber, 2014). In terms of socio-demographic characteristics, it has been found that cross-border workers tend to be relatively young (Huber, 2014; Huber and Nowotny, 2013), which may be due to the greater geographical mobility of this group. Women are less likely to be cross-border workers, possibly because they face higher domestic production and more frequently have part-time jobs (Gottholmseder and Theurl, 2007).

Household characteristics may also affect the decision to work across the border. For instance, it has been shown that the probability of cross-border employment decreases with the number of children. Individuals with children might have a stronger preference for spending time together at home (Gottholmseder and Theurl, 2007). In contrast, individuals living in a household experiencing economic deprivation have a greater willingness to work abroad (Nowotny, 2014).

Previous studies have shown that individuals reduce commuting costs by minimizing the distance between their workplace and residence (Clark et al., 2003; Rouwendal, 1999). Furthermore, a higher unemployment rate leads to more outgoing commuting because jobseekers are more willing to look for job opportunities across the border (Broersma et al., 2020; Matha & Wintr, 2009).

Finally, it has been found that previous experience as a cross-border worker increases one's chance of working across the border. Working experience abroad can increase the potential network effect, significantly reducing mobility and job-search costs (Huber and Nowotny, 2013).

Data and Method

Our research aims to analyze the association between the probability of becoming a cross-border worker and a large set of predictors such as education, socio-demographic and household characteristics, previous geographical location and labor status, information about the previous job, previous labor market experience as a cross-border worker, and cross-border employment of other members of the household. We analyze the yearly transition to a cross-border job for individuals who, at the end of a given year (2014, 2015 or 2016), did not work in Luxembourg (yet) and lived in Belgium. This is different from previous research, which explored the characteristics of individuals who are already cross-border workers.

> We use administrative data on cross-border employment transitions to characterize the skill profile of recent movers compared to stayers.

To find the most important predictors of the transition to a cross-border job, we rely on supervised machine learning methods, such as the random forests algorithm, which are increasingly being used in economics (see, for example, Athey, 2019). Our research relies on Belgian administrative data, namely the Belgian Crossroads Bank for

Social Security (CBSS), which contains information from several social security institutions, and the National Register of all Belgian residents. Data at the individual level is very rich and, notably, contains information on cross-border employment from health insurance registries. Importantly, we observe the educational level for individuals who have ever been unemployed since 2007, or the past salaries of individuals who have worked since 2003 (73% and 78% of our sample, respectively). Our sample includes 53,632 individuals aged between 24 and 44, or 142,765 yearly observations. Of those, 3,712 transitions to a cross-border job realized.

Predictors of cross-border employment

Our results show a U-shaped selection along the past daily wages, level of education and household income, which suggests that Luxembourg attracts a highly polarized distribution of skills. Individuals at the bottom and the top of the distribution have a higher probability of becoming cross-border workers, while medium-skilled workers have the lower propensity. This result shows a higher mobility level for lower and higher skilled workers, who may be looking for better opportunities than the ones they can find locally.

As shown in Panel (a) of Figure 1, individuals with a primary school diploma (9% of the sample) are almost as likely as individuals with a Bachelor degree to find a job in Luxembourg within the year. Individuals with a high-school diploma have the lowest propensity, whereas it is only for individuals with at least a Master's Degree (8% of the sample) that we find a higher likelihood of finding a cross-border job than the lowest educated individuals. In the same vein, Panel (b) shows that individuals at the bottom of the daily gross wage distribution have as much propensity to start a job in Luxembourg as individuals at the 98 percentile of the distribution (above 200 euros per day in 2010 prices). Furthermore, a U-shaped distribution is also observed for household income earned in Belgium during the previous year, though skewed to the left (See Panel (c)).

Luxembourg attracts cross-border workers at both tails of the skill distribution.

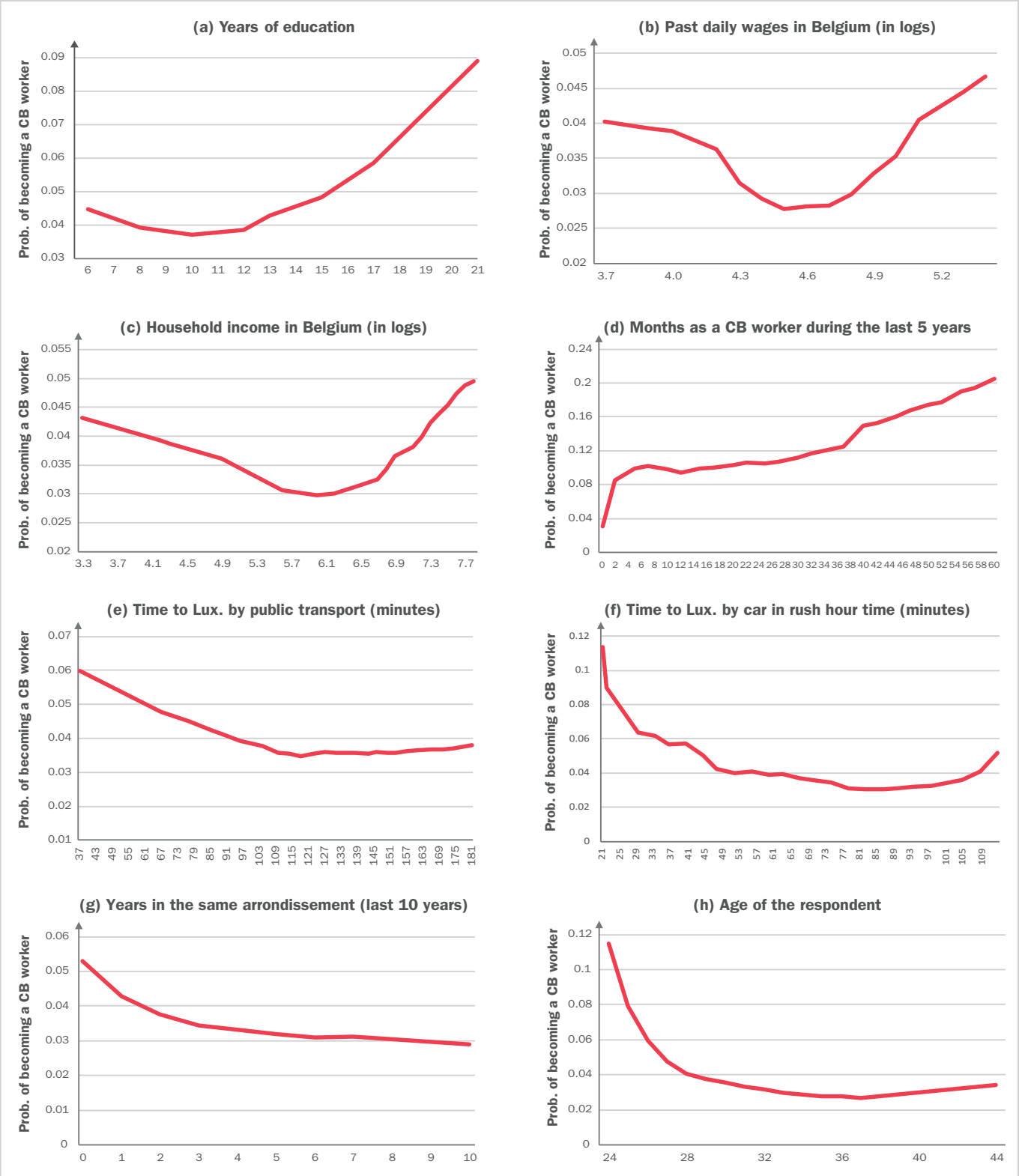

Figure 1:
Determinants of the (partial) probability of becoming a cross-border worker

Notes: Partial dependence plots from a random forests algorithm. The outcome is the yearly transition to a cross-border job. The sample for the figure on education only includes individuals who have been registered at least one time at the public employment agencies since 2007 (73% of the sample). The sample for the figure on past wages only includes individuals who have been workers in Belgium since 2003 (78% of the sample). The sample for the other panels is the general population under investigation.

The most important variables picked up by the machine learning algorithm are shown in the other panels of Figure 1 and confirm what we expected. The strongest predictor of starting a cross-border job is having previous experience working across the border in the previous five years. Similarly, the presence of another member of the household working beyond the border increases the chances of transitioning to a cross-border job. These results confirm that the network effect plays an important role in becoming a cross-border worker, by reducing mobility and job-search costs. People who are not currently employees are more likely to start a job in Luxembourg. In contrast, commuting time to Luxembourg City, either by public transport or by car, shows a similar decreasing evolution until reaching a plateau. Furthermore, recent internal migrants tend to have a higher probability of transitioning to a job beyond the border, suggesting that individuals move to this border area of Belgium to start a job in Luxembourg. The probability of becoming a cross-border worker is at its maximum for the youngest people in our datasets (age 24). The relationship decreases until 37 years of age and then increases again. Finally, contrary to previous research we do not find any association between becoming a cross-border worker and the presence of children in the household. This is also the case for the unemployment rate in the settling area.

The typical cross-border workers is young, lives closer to the border, has previous experience and network members abroad.

Main takeaways

During the last decades, cross-border flows have increased sharply. This phenomenon has profound effects on the regions of residence and the countries of work. Identifying the characteristics of cross-border workers can help us better understand the drivers of working across the border. Our results show that some predictors increase the probability of becoming a cross-border worker. Individuals with previous experience working in Luxembourg, the unemployed, young workers, and those living close to the border have a higher chance of starting a job in Luxembourg. Interestingly, we find a U-shaped relationship between our proxies for individual skills and the probability of finding a job beyond a border, which may be due to the industrial composition of Luxembourg as well as the difficulty for Belgium to offer attractive positions to those workers.

Based on

Albanese Andrea & Marguerit David (2021). The Predictors of Cross-Border Employment Transitions: Insights from Administrative Data and Supervised Machine Learning. Luxembourg Institute of Socio-Economic Research, Mimeo.

The authors acknowledge financial support from the Luxembourg National Research Fund (C17/SC/11700060). We thank the Crossroads Bank for Social Security for the delivery of the data (contract nr. ART5/18/033 of the Sectoral Commission of Social Security and Health, department Social Security).

Reference

Athey, S. (2019). The Impact of Machine Learning on Economics. In *The Economics of Artificial Intelligence* (pp. 507–552).

Broersma, L., A. Edzes, and J. van Dijk (2020). Commuting Between Border Regions in The Netherlands, Germany and Belgium: An Explanatory Model. *Journal of Borderlands Studies*.

Clark, W.A.V., Y. Huang, and S. Withers (2003). Does commuting distance matter?: Commuting tolerance and residential change. *Regional Science and Urban Economics*, *33*(2), 199–221.

Eurostat (2021). *Employment and commuting by sex, age and NUTS 2 regions. Code: lfst_r_lfe2ecomm. Retrieved on the 23rd of August 2021.*

Gottholmseder, G., and E. Theurl (2007). Determinants of cross-border commuting: Do cross-border commuters within the household matter? *Journal of Borderlands Studies*, *22*(2), 97–112.

Hansen, C.L., and B. Nahrstedt (2000). Cross-Border Commuting: Research Issues, and a Case Study for the Danish – German Border Region. In *Borders, Regions and People*, eds. M. van der Velde and H. van Houtum, 69-84. London: Pion.

Huber, P. (2014). Are Commuters in the EU Better Educated than Non-Commuters but Worse than Migrants? *Urban Studies*, *51*(3), 509–525.

Huber, P., and K. Nowotny (2013). Moving across borders: who is willing to migrate or commute? *Regional Studies*, *47*(9), 1462–1481.

Matha, T., and L. Wintr (2009). Commuting flows across bordering regions: A note. *Applied Economics Letters*, *16*(7), 735–738.

Nowotny, K. (2014). Cross-border commuting and migration intentions: the roles of risk aversion and time preference. *Contemporary Economics*, *8*(2), 1–123.

Rouwendal, J. (1999). Spatial job search and commuting distances. *Regional Science and Urban Economics*, *29*(4), 491–517.

STATEC (2021). *Emploi salarié intérieur par lieu de résidence et nationalité 1995 - 2021*.