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LAJOS TAMÁS SZABÓ

LABOUR FLOWS IN HUNGARY IN 2002–2021

BASED ON A COMPREHENSIVE SET OF

ADMINISTRATIVE DATA

MNB OCCASIONAL PAPERS | 152

2024

SEPTEMBER

“No one has the right to a certain job.

Everyone has the right to have the jobs filled well.”

Ernest Renan (1823–1892)



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The views expressed are those of the authors' and do not necessarily reflect the official view of the central bank of Hungary (Magyar Nemzeti Bank).

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Labour flows in Hungary in 2002–2021 based on a comprehensive set of administrative data

(Munkaerő-áramlás Magyarországon 2002-2021 között teljes körű, adminisztratív adatok alapján)

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Abstract

In our study, we present the job-to-job, hire and separation rates from 2002 to 2021 based on the comprehensive, anonymous database of the Hungarian State Treasury. We filtered out the distortions in the administrative data, for example company reorganisations, from the labour flows. Job-to-job rates occurred procyclical over the 20 years, while the rate of entries and exits responds less to the cyclical state of the economy. By different characteristics, the rates are heterogeneous in terms of level and dynamics. The regional pattern of entry and exit rates remains stable over time and correlates with the development of districts. There is no difference in cyclicity by gender, but men change jobs more frequently than women. Job transitions have a diminishing chance, as the age increases, and job-to-job flows of the younger age group are also more sensitive to economic conditions. Employees in jobs requiring lower qualifications are more likely to change jobs. The flows between firm size categories are mostly the highest within the same size category. Large companies have the lowest turnover rate relative to the number of employees.

Journal of Economic Literature (JEL) codes: J21, J61, J62

Keywords: labour flows, job-to-job rates, worker characteristics

Kivonat

Tanulmányunkban bemutatjuk a Magyar Államkincstár teljes körű, anonim adatbázisa alapján a munkahelyváltási, belépési és kilépési arányokat 2002-2021 között. Ehhez az adminisztratív adatokban megjelenő torzításokat, például a céges átalakulásokat kiszűrtük a munkaerő mozgásából. A munkahelyváltás prociklikusan alakul a vizsgált 20 év során, míg a foglalkoztatásba be-, és kilépők aránya kevésbé reagál a gazdaság ciklikus állapotára. A különböző ismérvek szerint bontva a ráták szintben és dinamikában is heterogének. A belépési és kilépési ráta területi mintázata időben relatíve stabil marad, valamint negatívan korrelál a járások fejlettségével. Nemenként a ciklikusságban nincs eltérés, de a férfiak gyakrabban váltanak munkahelyet. Az életkor növekedésével egyre kisebb az esélye a munkaerő áramlásának, emellett a fiatalabb korosztály munkahelyváltása a konjunktúra változásaira is érzékenyebb. Minél alacsonyabb képzettséget igénylő munkakörben dolgozik valaki, annál nagyobb valószínűséggel vált munkát. Az áramlások cégméretkategóriák között többnyire a saját kategóriába való váltásnál a legnagyobbak. A nagyvállalatoknál a legalacsonyabb a fluktuáció a létszám arányában.

Journal of Economic Literature (JEL) kódok: J21, J61, J62

Kulcsszavak: munkaerő-áramlások, munkahelyváltási arányok, munkavállalói jellemzők

1 Introduction

This study presents the magnitude and rate of flows between labour market statuses based on the comprehensive anonymous database of the Hungarian State Treasury (HST). In addition, we examine how flows differ by district, sex, age, occupation group and company size, using different criteria.

The database used is comprehensive and anonymous, including all those who have paid pension contributions in Hungary. In addition to the unique, anonymous identifier, we know individuals' year and month of birth, place of residence at the district level, wage level, occupation category (FEOR – Hungarian Standard Classification of Occupations), the first and last day of job spells, and the anonymous identifier of the workplace. This allows us to identify not only entries to and exits from the labour market but also transitions between jobs. Since an individual's workplace ID may change not only when they switch to another job but also due to various company reorganisations (mergers, demergers, etc.), such changes are not considered job-to-job flows.

An administrative database has several advantages compared to a sample panel database in several ways. On the one hand, there is no drop-out due to non-response. In the Labour Force Survey (LFS), attrition was particularly high during the coronavirus epidemic. On the other hand, individuals can be observed over a long period of time, there is no rotation as with sampling procedures. Thirdly, there is no sampling error, as the total employed population is included. Its main disadvantage compared with sample population surveys is that it does not include undeclared work.

In terms of labour market status, a distinction is made between employed and non-employed status. The database only includes unemployed people who pay contributions, so not all the unemployed can be identified. They typically pay pension contributions only for the duration of their unemployment benefit (which has been 3 months since 2012). Thus, those unemployed as defined in the Labour Force Survey (LFS) (non-working active jobseeker who can start work within 2 weeks) cannot be identified precisely. So those who receive unemployment benefits and pay contributions are grouped together with the inactive ("non-employed").¹ Based on the two labour market statuses mentioned above, we designate three types of flows: entry into employment (hire), exit from employment (separation) and job-to-job transition.

The Treasury's comprehensive database has been used in several studies for modelling, descriptive statistics and various estimations. Szabó (2022) examined the characteristics of public work programme. The impact of public work programme on the wages of non-public workers was covered in Szabó (2020). Using additional databases, Filep-Mosberger and Reiff (2022) estimated tax evasion rates and undeclared employment, while Mérő et al. (2023) modelled the Hungarian housing market. Research has also been done on certain economic issues using samples of different sizes from the database (e.g. Elek et al. (2009), Köllő (2013)).

Labour market flows are also often discussed in the international literature. Analyses are typically based on surveys (e.g. Elsby et al. (2013)) using labour force survey data. There are also studies that sample from administrative data (e.g. Dauth and Eppelsheimer (2020), Schaffner (2011), Berson et al. (2020)) or use them in their entirety (e.g. Hyatt et al. (2014)).

Our main findings are the following. The job-to-job rate moves with economic growth, with more people switching jobs in booms and fewer in recessions. This result is in line with the international literature (see for example Schaffner (2011), Karagedikli (2018)). The job-to-job flow rate moves with labour market tightness (the ratio between vacancies and unemployment). This means that the greater the labour shortage (tightness), the more often people change jobs. The dynamics of labour flows and that of the output gap, which is an indicator of the cyclical state of the economy, are similar. The number of people entering and exiting employment is less sensitive to the cyclical state of the economy and depends more on structural factors.

¹ 40.4 per cent of jobseekers registered with the National Employment Service (NES) did not receive any benefits in 2022.

The flows are heterogeneous in different aspects. Looking at the job-to-job flow rate by district, all districts saw an increase in the proportion of job changers in the 2010s. However, the relative position of the districts changed compared with the previous decade. While the more developed regions of the country were characterised by higher job turnover rates in the mid-2000s, after the financial crisis, this steadily spread to the less developed districts. In addition to the larger pool of employable labour, this is probably due to the public work programme which drew many inactive people to the labour market in less developed areas, and these people are more likely to change jobs.

The spatial pattern of people entering and leaving employment is stable over time. It is negatively correlated with economic development, i.e. the ratio is higher in less developed districts and lower in more developed ones.

The dynamics of job-to-job transition is very similar for both men and women, increasing in economic booms and decreasing in times of recession. However, the rate is higher for men than for women over the whole period reviewed. Men also have higher rates of hire and separation than women.

According to age, young people are more likely to change jobs than older workers. The job-to-job flow rate for the youngest age group (under 25) is around twice that of the 25 to 54 age group. Job-to-job flow rates are procyclical across all age groups, but workers under 25 are more sensitive to changes in the economic cycle.

Hire rates are also the highest among the youngest. The hire rate for 25–54-year-olds and those aged 54 and over is around a quarter to a fifth of that for young people. The youngest age groups also have a significantly higher separation rate than other age groups.

Regarding occupation categories, higher skilled workers have more stable jobs and change jobs less frequently. Among white-collar workers, job-to-job transition is the highest for those in lower skilled office and management occupations. For manual occupations, those in agriculture have the lowest job-to-job flow rate.

Hire and separation rates show a similar pattern by occupation category. In other words, the lower the level of the qualification required for a job, the higher the likelihood of being hired or of separation. Rates are significantly higher for non-skilled occupations.

The job turnover rate is the lowest among large companies (over 250 employees). This is followed by medium-sized enterprises (50 to 249 employees), then small (10 to 49 employees) and microenterprises. The job-to-job flow rate also moves with the economic cycle by firm size. The order of separation rates since the financial crisis has been similar to that of job-to-job flow rates. However, during the financial crisis in 2009, large firms had the highest separation rates for a short period. As regards hire, the order of firm size categories from 2014 onwards is as follows: large companies had the lowest rate, followed by medium and microenterprises, and then small firms. Flows between firm size categories tend to be the largest within the same category. However, if we add up the flows to companies larger than the current category for all sizes, we find that a higher share of workers moves to firms bigger than their own.

The structure of our study is as follows. Chapter 2 reviews the most important related studies. In Chapter 3, we introduce the database and present the main steps of preparation as well as the methods used to calculate labour flows and the rules of filtering. In Chapter 4, we examine job-to-job flows and hire and separation rates at the national level. In Chapter 5, we calculate rates for different social groups, geographical units and firm size categories. In Chapter 6, we summarise our findings.

2 Literature review

There are several reasons for labour flows, which can be examined from the perspective of both firms and workers. On the demand side, employers create or eliminate jobs as a result of changes in job responsibilities. While on the supply side, workers may switch jobs by entering the labour market, retiring or because of relocation. In addition, workers may change jobs to build their career, for better pay or better working conditions (Davis et al. (2006)). In our study, we do not explore these reasons, our main aim is to show how flows evolved in Hungary over a longer period of time.

Different types of data are needed to calculate flows on the demand and the supply side. While it is sufficient to use firm-level data to track changes in the headcounts of companies, it is necessary to monitor changes in the labour market status of individual people to track workers. Both approaches can be based on surveys (e.g. Labour Force Survey or Wage and Salary Survey), sample administrative data or comprehensive administrative data. In addition to calculating labour flows, several articles discuss the impact of different flow indicators on the evolution of wages.

2.1 DIFFERENT CALCULATIONS AND ESTIMATIONS OF FLOWS

Elsby et al. (2013) estimate inflows and outflows (from employment to unemployment and from unemployment to employment) in a labour force survey of 14 OECD countries. There were significant differences in the rates across countries, with Anglo-Saxon countries having much higher flow rates than other European countries, but the US stood out even among the Anglo-Saxon economies. The heterogeneity across countries reflects differences in the flexibility of labour markets.

A common source for German labour market research is the so-called SIAB (Sample of Integrated Labour Market Biographies) database, which contains a random sample of 2 per cent of the German social security population. According to Dauth and Eppelsheimer (2020), nearly 300 ongoing research projects are based on the SIAB or a variant thereof. The authors focus on how to prepare the original data for an empirical analysis, a process that is extremely complex and fraught with potential for error. We faced similar challenges in cleaning the HST database.

Schaffner (2011) conducted research on an earlier version of this SIAB database. Of the labour market transitions, the author studied job-to-job transition and its cyclicity. The job-to-job flow rate was procyclical, but the rates showed heterogeneity according to different criteria (age, sex, education). Women and low-skilled workers were more sensitive to economic cycles than the reference group (medium-skilled, middle-aged men). By contrast, older and younger, highly skilled job changers were less affected by economic cycles.

Examining Taiwanese data from 1998–2002 that cover the full population, Tsou and Liu (2008) found that job-to-job flows and job loss rates were countercyclical. Cyclical adjustment is mainly seen in the hiring of young workers and the dismissal of older workers.

Administrative data have also been used to calculate labour flows in Canada. Nakamura et al. (2019) calculated job-to-job flow rates and hire and separation rates using data from 1978 to 2016. With this study, the authors aim to establish how labour flows vary through economic cycles. They also found the job-to-job flow rate to be procyclical. Two thirds of those who quit their jobs will move to another job, while roughly one third will become unemployed or inactive.

For a specific labour flow indicator (e.g. job loss rate), even within countries, different rates can be obtained, depending on the data source used and the method applied to calculate the rates, see for example Davis et al. (2006) for a summary of the different sources in the US. A selection of indicators for different countries is presented in Table 1. Davis and Haltiwanger (1992) and Foster et al. (2016) examined headcount changes at company level, and calculated flows from them by separating firms with declining and growing staff. The change is weighted by firm size relative to the sector. The rates are calculated by weighting the number of employees in the period under review and the base period instead of

comparison with the base period. A similar approach is taken by Davis et al. (2006) when establishing the benchmark. In contrast, Bachmann (2005) looks at flows relative to the active population, while Nakamura et al. (2019) use the working-age population as a benchmark.

There may also be differences in the periodicity of the data used. They can be daily, monthly, quarterly or annual. In addition, it is possible to look at all the changes in a given period, or to count only the difference between given points in time. It is therefore not surprising that different studies report indicators of different magnitudes. In our study, we track flows on a monthly basis, always looking at the 15th day of the month (i.e. we take a single point in time). For more details, see Chapter 3.

Table 1
Flow indicators estimated by various studies

Study	Country	Period	Data	Magnitude of indicators	Method	Frequency
Davis and Haltiwanger (1992)	USA	1973-1986	Number of manufacturing enterprises with more than 5 employees	Job loss rate: 6 to 17% hire rate: 6.5 to 13%	Firm-level headcount changes are weighted by company size relative to sector, separately for firms with increasing and for firms with decreasing numbers of employees	Annual
Foster et al. (2016)	USA	1980 (1990)-2011	Administrative data and surveys	Job loss and hire rates – annual: 12–21%, quarterly: 5–10%		Annual, quarterly
Davis et al. (2006)*	USA	2000-2005	Monthly sample of 16,000 firms (JOLTS)	Job loss and hire rates – monthly: 3%, quarterly: 9%	The denominator is the average of employment during the period under review and the base period	Monthly, quarterly
Ball et al. (2020)	New Zealand	2000 (2001)-2018q2	Comprehensive data	Hire rate: 25–40% job-to-job flow rate: 4–11%	Hire denotes the percentage of unemployed people who were able to find a job	Quarterly
Nakamura et al. (2019)**	Canada	1978-2016	Combining comprehensive data and the LFS	Hire rate: 0.9% job loss rate: 0.9%, job-to-job flow rate: 1.8%	People changing status as a share of the working-age population	Monthly
Bachmann (2005)	Germany	1980-2000	A 2 per cent sample of workers	Hire rate – annual: 20–27% job loss rate – monthly: 1.45%, annual: 24–30% job-to-job flow rate – monthly: 0.82%, annual: 6–12%	Flows as a share of the active population	Monthly, annual (cumulative monthly)
Akgündüz et al. (2019)	Türkiye	2012-2016	Comprehensive data	Job-to-job flow rate: 7–11%	Flows as a share of the employed	Quarterly

*Note: Where a number is given, it represents the average, while intervals represent the maximum and the minimum. * There are several data sources mentioned in the article, but JOLTS is the one that is available for two frequencies and covers labour flows. ** The numerator of the job loss rate is the sum of the flows from employment to unemployment and from employment to inactivity, and that of the hire rate is the sum of the flows from unemployment to employment and from inactivity to employment. In both cases, the denominator is the working-age population.*

2.2 THEORETICAL MODELS

In economic theory, there are several explanations for the relationship between labour flows and the cyclical state of the economy. According to Lilien's (1982) assumption of a sectoral shift, some sectors experience a higher rate of decline during economic downturns; hence, labour flows from these sectors to other sectors. But before getting hired, this labour force is looking for a new job as unemployed. In this case, the job loss rate is countercyclical, while the hire rate is roughly acyclical. If the majority of people are able to find a job without being unemployed, then the job-to-job flow rate is countercyclical.

As summarised by Shimer (2004), the Keynesian sticky wage model arrives at a similar conclusion. In other words, firms cannot cut salaries in times of recession because of the stickiness of nominal wages (we saw a similar phenomenon in Hungary during the financial crisis when wages did not fall), so the marginal product of labour will be lower than wages.

Companies adapt to changing conditions by laying off workers, leading to a countercyclical job loss rate. The cyclicity of the hire rate depends on the degree of the wage stickiness of new jobs. If firms have considerable bargaining power and they are able to enforce lower wages due to changed circumstances, the hire rate will also be countercyclical. It then makes sense for companies to hire new workers cheaply during recession. Hall (2005) makes similar assumptions about the marginal product of labour during a downturn, but his conclusion is not an increasing layoff rate but that of the hire rate dropping significantly. In other words, people who lose their jobs during recession find it harder to get a new job. In Hall's argument, wages are not falling because of social expectations.

Bentolila and Bertola (1990) reach a similar conclusion. In their model, high layoff and recruitment costs (e.g. job advertising, onboarding new employees, etc.) do not prompt companies to increase their normal layoff rate, not even in times of recession. Instead, their hire rate is reduced until the marginal product of labour equals wages.

Shimer (2005) modelled different labour flows using US data. Based on the data, he found that the hire rate was procyclical, while the separation rate was roughly acyclical. He took these relationships as a starting point, and based on his model, found the job-to-job flow rate to be procyclical, in consistence with the US data. Schimer (2005) also analysed the hypothesised inverse case, i.e. if the separation rate was assumed to be countercyclical and the hiring rate acyclical, the model yielded a countercyclical job-to-job flow. Schimer (2005) argues that there are two reasons behind this phenomenon. On the one hand, an increase in redundancies raises the job-to-job flow rate. This is the case if a dismissed worker finds a job within a month because such movement still counts as a job-to-job transition. The second reason is that as the separation rate increases, the average hire quality decreases (i.e. the skills of the worker and the skills required for the job are less of a match). In this situation, more and more workers start looking for a new job, thus increasing the job-to-job flow rate.

2.3 THE IMPACT OF FLOWS ON WAGE VARIABLES

Berson et al. (2020) investigated the impact of job-to-job transition on wage growth by calculating labour flows from administrative, French and Italian microdata. Earlier results for the US (e.g. Moscarini and Postel-Vinay (2016)) showed that among the different types of flows, job-to-job played the largest role in wage dynamics, but this effect was found to be less profound for France and Italy.

Ball et al. (2020) also used administrative data for New Zealand from 2000 to 2018. They looked at whether the job-to-job rate or the hire rate (the proportion of people who found a job after unemployment or inactivity) had a greater effect on wage growth. They tested the validity of two theoretical models. The well-known Mortensen-Pissarides search model, according to which the hire rate matters for the cyclical movement of wages. This is because, according to the model, one of the important factors in the bargaining process is the reservation wage of workers. This is directly influenced by the hire rate. However, according to the other model (Moscarini and Postel-Vinay (2016)), it is competition between firms that affects wage developments. And this competition is better captured by the job-to-job flow rate. Ball et al (2020) found that the job-to-job change rate had a stronger effect. This effect is even more powerful for those earning lower wages.

A similar question was examined by Karahan et al. (2017) using US data. They used state-level quarterly data instead of a micro-database. According to their calculations, the job-to-job rate affects the cyclical movement of wages.

2.4 ESTIMATING FLOWS FOR HUNGARY

Labour flows in Hungary are calculated mainly from the Labour Force Survey (LFS) data. The LFS provides the best-known indicators of the Hungarian employment situation, and the respondents are included in the survey over several periods, so it can also be used to monitor labour movements. To address the difficulties and limitations that stem from the properties of the database, labour market flows can be estimated by the so-called raking (for more details, see Cseres-Gergely (2011)).

Flow indicators provide valuable additional information compared with stock data, especially in times of recession. Kónya (2021) looked at the labour market effects of the coronavirus crisis using flow data. At the height of the crisis, in 2020 Q2, employment outflows (both into unemployment and inactivity) increased without employment inflows decreasing, which

went up significantly in the following quarter, contributing to a rapid correction of the labour market. Varga and Csillag (2023) investigated the flow indicators over the period 2003–2022, focusing mainly on occupation change. They found that occupation changes took place mainly within the workplace and that the proportion of people changing occupation increased dramatically during the coronavirus pandemic.

2.5 HUNGARIAN ADMINISTRATIVE DATA IN LABOUR MARKET ANALYSES

An administrative database, which can also be used to analyse labour flows, has several advantages over LFS data. The LFS follows the surveyed individuals for only 6 quarters as at a point in time on a quarterly basis (Köllő (2022)), whereas administrative data have been available for more than 20 years for all contribution payers, on a monthly or even daily basis (essentially, continuously). In addition, the LFS is a survey, and owing to sampling, it has its limits in enabling analysis at the disaggregated level. The size of the LFS sample is roughly the same as 1 per cent of the HST database: in recent years, it has been close to 50 thousand persons (of which 20 to 25 thousand persons were considered employed before representative weighting).

Studies of the labour market were carried out in the past using samples of different time periods and sizes from the administrative database of the Treasury. Elek et al. (2009) estimated the prevalence of undeclared work based on a sample of about 5 per cent of the total database, the National Health Insurance Fund (OEP) database and the LFS. Using the declared number of employees, they estimate that the proportion of undeclared workers was 16 to 17 per cent in 2001–2005.

Elek and Szabó (2013) analysed labour outflows from the public sector in Hungary using LFS and sampled HST data. They found that both unemployment and the probability of leaving the public sector for other sectors and jobs were roughly half of the rates observed in the private sector. However, the probability of moving into inactivity (e.g. retirement) was essentially the same in the two sectors.

Köllő (2013) looked at the relationship between public sector wages and public sector inflows between 1997 and 2008. A 20 per cent sample of the HST data shows that the number of people moving from the private sector to the public sector did not increase but decreased during the public sector wage hikes in 2002. At the same time, the wage level of new hires improved relative to that of stayers, with the estimated effect being stronger for younger than for older workers.

Köllő et al. (2021) investigated whether foreign-owned firms had a wage advantage among skilled workers relative to domestic companies, using a 50 per cent sample of the HST data. They concluded that foreign-owned firms paid higher wages than domestic firms. If an employee working for a foreign-owned company starts working for a domestic company, their salary will be lower, but they will still earn more than other employees of the domestic company. In other words, domestic firms value the experience gained in a multinational environment. However, employees of a domestic company will also benefit from a new employee coming from an international firm. These workers earn slightly more than they would at a firm where there is no colleague with experience in a multinational setting.

Bíró et al. (2023) also used the aforementioned HST database, which they combined with very detailed health data. The main finding of their study is that absence from work of a few months (e.g. due to an accident) reduces an individual's pay by 2.5 per cent over a two-year period. This is because while they are away from work, they do not get the offers that others do. This prevents them from moving up the ranks within the company or finding a job at a company offering a better salary.

The full, i.e. non-sampled, database of the Treasury has already been used for several studies. Filep-Mosberger and Reiff (2022) investigated tax evasion in the labour market using various methods, including estimating undeclared employment by comparing the number of LFS (Labour Force Survey) and HST database employees. Mérő et al. (2023) modelled the Hungarian housing market at a 1:1 ratio, covering about 4 million households and their properties. Several comprehensive administrative databases, including the HST database, were used to calibrate the model.

Szabó (2020) also used the HST database when estimating the impact of the public work programme (PWP) on wages in the private sector. The average wage of the low-skilled in the private sector was 9 per cent lower between 2013 and 2017 in districts where more people worked in the PWP. Szabó (2022) presented in detail the characteristics of PWP workers on the basis of HST data. The study also looked at the chances of finding a job after public work programme and at the job turnover of PWP workers. While 79 per cent of job changers who worked exclusively in the primary labour market switched jobs only once in 2014, 73 per cent of those who also worked in the PWP changed jobs at least twice during the year.

Overall, the use of administrative data is becoming increasingly important in labour market research, and its level of detail offers many opportunities. As far as labour flows are concerned, it is more common in international publications to look at administrative data, especially for job-to-job transitions. A review of domestic studies shows that the LFS data are still the primary source of surveys on labour market transitions in Hungary.

3 Data and methodology

For the analysis of labour flows, we used anonymised data provided by the Treasury from 2 different administrative data tables: birth data and data on which pension contributions are based. These data can be connected by means of an anonymous identifier at the individual level.

Birth data include natural persons with a social security number. The unit of observation is therefore a natural person whose year and month of birth and sex are known. The table also includes those who have not earned any income or received any benefits.

The data on which the pension contribution is based (contribution payment data) form the backbone of the database. This table includes natural persons who have declared income, even if just for one day, on which they paid pension contributions (or pension insurance contributions before 2012). Hereafter we refer to them simply as contributors.

In the contribution table, the unit of observation is the period of continuous (uninterrupted) work or (non-pension type) benefit of a contributor, separated by job and benefit, with start and end dates. These continuous periods are available in a disaggregated form, most often in annual breakdowns before 2012 and in monthly breakdowns from 2012 onwards.

Considering the data tables presented above, it can be seen that these data are not yet suitable for research purposes in their raw form, as they were basically compiled to assist the execution of administrative, public tasks. Preparing and cleaning these data is a long, time-consuming process, the following is an overview of the main steps (for minor corrections, see Appendix: Further steps in data cleaning). The advantage of this process is that the cleaned database can serve as a basis for future research projects.

3.1 DATA PREPARATION

In addition to linking data tables and making routine, simple technical changes (e.g. changing the type of variables, discarding some variables, deleting duplicate observations), further specific adjustments are required. The aim was to create a database that could be a useful starting point for research with a primary focus on labour flows but also for research on other labour market topics, without having to invest a lot of effort.

In the contribution payment data, periods of employment are broken down, usually on an annual or monthly basis, so the length of employment per observation is not equal to the length of time spent in a job. We do not have direct data on how long someone was working in a job, but it can be approximated on the basis of the fragmented job segments. For this purpose, the time spent in a job was considered continuous if there had been a break of no more than 1 month between periods of work history. From the raw data, we obtained the first and last day of work at a workplace, from which we calculated the actual length of time spent in a job, which provides valuable information and an opportunity for filtering.

It is typical of administrative data to refer to continuous periods. The data used here are no exception, and in the case of contribution payment data, these periods may even overlap in time for several reasons. Contributors may work at several workplaces at the same time, have several jobs, take on seasonal work or run a business in addition to their full-time job, or may receive benefits on top of their earned income.

For discretisation (moving from a continuous period to a specific date), the 15th day of each month was chosen as the reference date. Observations were kept where the period delimited by the start and the end dates of employment included the reference date. This also means that employment periods of less than one month are less likely to be included in the data examined (only if they fell on that week or day). A typical such form of employment is simplified employment (or, formerly, employment with a casual work register).

Since we created a monthly panel database, we multiplied the observations where employment spanned several months. For the monthly frequency, an observation was entered for the following month if the start date of employment was later than the 15th day of that month, or for the previous month if it ended earlier than the 15th day.

Many analyses, including the study of labour flows, require that a person is only included once at a given point in time. Among the parallel sections, primary employment can be selected by contributor and by month according to several criteria. Similarly to other studies (e.g. Dauth and Eppelsheimer (2020)), we chose the size of income to be our selection criteria, i.e. we kept the job that provided the main source of income for the individual. In the case of identicalness, the variable previously created, i.e. the length of time spent in employment was used as a secondary criterion. We get similar results for the flow indicators if income and length are reversed during prioritisation. However, this may lead to the inclusion of jobs that yield little or zero income.

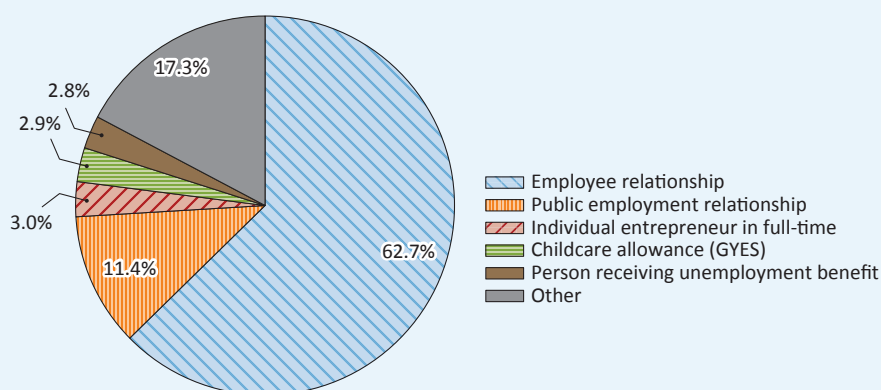
For the month of hire and separation, it is important for contributors' work history – between the first entry and the last exit – to be complete. For the months or even years where there were gaps in individual work histories, we filled them artificially with observations. For these observations, we simply assumed that the individuals were not employed in the missing periods, except when a worker reappeared at their previous employer after an absence of up to 1 year, these workers were counted as employed. For that reason, there may be gaps in the reported legal relationships. Moreover, it is possible that some of the missing persons worked in the shadow economy during this period, but we have no information available on this.

At this stage of data cleaning, we also created the age variable, using the individual's year and month of birth to calculate their age in the given month. Through the steps described above, we got a cleaned database from which it was then possible to determine labour flows on a monthly frequency. In this cleaned database, the unit of observation is an individual at a given point in time (the 15th day of each month within their work history) whose sex, residence, age, and employment status is known. When they worked or paid contributions for other reasons, we also know the exact type of employment, its start and end dates, the anonymous identifier of the employer/payer, the amount of income received and, for most types of employment, the occupation category (FEOR).

3.2 CALCULATION OF LABOUR FLOWS

A key determinant of labour flows is which contributor is included in the database as employed and which one is not. The administrative classification lists more than 100 different legal relationships of which 5 account for 82.7 per cent of the observations (Chart 1).

Chart 1
Most common contributor relationships

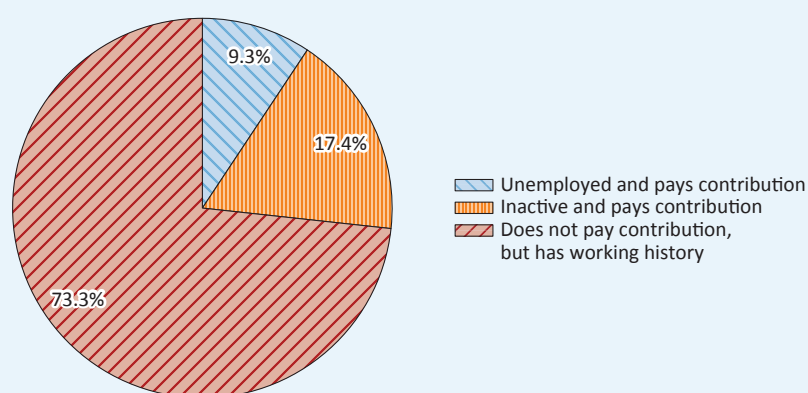


Source: Authors' calculations based on HST data.

Elek et al. (2009) developed an elaborate approach to reconcile the definition of employed persons in the Labour Force Survey of the Hungarian Central Statistical Office (HCSO) and the insurance statuses reported by the Treasury. Based on this, we categorised the status codes and created a new dummy variable for employment status (see the Appendix for a more detailed categorisation table). According to the new LFS methodology, childcare benefit recipients are already counted as employed, but as they are permanently absent from their workplace and receive transfer income from the state, they are included as non-employed (inactive) in our analysis.

However, due to the lack of sufficient information, no further distinction is made between unemployed and inactive status. We can only identify the unemployed and the inactive among the contributors in the database, but the majority of the inactive are not contributors. In addition, almost half of the unemployed registered (47.9 per cent on average between 2010 and 2021) did not receive any benefits. Our supplemented work histories also show that a higher proportion of the unemployed and the inactive do not receive any benefit (that is subject to contribution payment) (Chart 2).

Chart 2
Distribution of the non-employed in the supplemented work histories



Source: Authors' calculations based on HST data.

Based on the 2 labour market statuses (employed and non-employed), we distinguish 3 different types of labour flows: hire, separation and job-to-job transition. Labour flows are determined on a monthly frequency.

There is no change of status when switching to another job, as labour “flows” from employment to employment. In this case, an employee who worked in another job in the previous month now works in a new job in the current month. As the database contains monthly data, it is critical to only record a job-to-job transition when an individual gets hired within 1 month. If the period of non-employment were longer than this, job-to-job flow would also, in part, cover those who first exit and then re-enter employment within a short period of time. This would contravene the equation that change in employment equals the difference between inflows and outflows.

On entry (hire), labour flows from non-employment to employment. This covers people who were not employed in the previous month and are hired in the current month, including newcomers to the labour market (and the database).

On exit (separation), labour flows from employment to non-employment. Here, an individual employed in the previous month is no longer employed in the current month. As the reason for the termination of employment is not indicated in the database, we do not know if the employee quit or was dismissed by the employer or if termination took place by mutual agreement. This type also includes those (e.g. retired) who exit the labour market (and the database) for good.

By their nature, administrative data may also contain “false flows” that need to be filtered out. At an individual level, the workplace ID usually changes because the employee moves to another job; however, this may not always be the case. The workplace ID may change on its own, for reasons of company reorganisation or for other administrative reasons. Hire and separation can be accurately determined on the basis of employment status, as long as the scope of contributors is

uniform. However, in the period under review, the rules for the payment of contributions were amended several times (Act CXXII of 2019, formerly, Act LXXX of 1997). In these cases, different rules were applied to lessen the distortion in the flows (Table 2).

Table 2**Rules to exclude “false flows”**

Case	Period	Assumption
Clusters of job-to-job transition in firms with at least 10 employees	2002-2021	It is not a job-to-job change if at least 50 employees move from a predecessor to the successor, or at least 80 per cent of a predecessor's employees move to the successor, or at least 80 per cent of a successor's employees transfer from the predecessor simultaneously
Job-to-job transitions in extremely short spells of employment	2002-2021	Not a job-to-job change
Job-to-job transitions within the public sector	January 2017	Not a job-to-job change
Job-to-job flows in self-employment	August 2019	Not a job-to-job change
Agricultural producers become contributors	January 2007	Not a hire
Employed pensioners become contributors	January 2007, April 2007	It is not hire if a woman aged 57 or over or a man aged 60 or over enters employment
Employed pensioners are exempt from paying contributions	January 2019	It is not separation if a woman aged 59 or over or a man aged 64 or over leaves employment
	July 2020, January 2021	It is not separation if a woman aged 62 or over or a man aged 65 or over leaves employment

Source: compiled by the authors.

The change of company identifiers in administrative data is a well-known phenomenon, its treatment has been addressed in several studies (Benedetto et al. (2007), Hethy-Maier and Schmieder (2013), Bárdits et al. (2023)). If many people flow between companies simultaneously in a short period of time, this may be indirect evidence that there is some kind of transformation going on in the companies concerned (depending on the type, there may be one or more predecessors/successors). Following Benedetto et al. (2007), we set both absolute and relative thresholds for what counts as a lot.

When job-to-job transitions are clustered by pairs of firms, flows of 50 or more employees are extremely rare. They are assumed not to reflect actual flows, so they are filtered out from job-to-job transitions. We did the same if at least 80 per cent of a predecessor's staff was transferred to the successor(s), or vice versa, if at least 80 per cent of a successor's staff came from the predecessor(s) at the same time.

In January 2017 within budgetary institutions, in August 2019 in self-employment, the transitions take an unusually high value regardless of controlling for cluster flows. At a smaller extent, they can be explained by state reorganizations, but based on its magnitude, it could be mainly due to other, unknown reasons. For these specific months, job-to-job transitions are excluded.

In addition, there are certain types of employment (e.g. simplified employment) where workers typically work for 1 or a few days at most, often on a temporary basis, for different employers. These transitions were ignored for the whole period.

Primary producers and employed pensioners were not required to pay contributions before 2007. Hence, the surge in the number of primary producers in January 2007 and the surge in the number of employed pensioners in January and April 2007 are not considered an entry to employment.

From 2019, pensioners in employment have been exempt from paying contributions, while in July 2020, this was extended to all employed pensioners. For these months and for January 2021, the exit of pension-age people from employment was not taken into account.

We do not have reliable data on pensioners, so we filtered by age and by sex because women can retire earlier. The limits were decided on the basis of the data, but deviation from the average age of retirement was less than 1 year on average.

Since our database is administrative, it does not include undeclared work. Thus, shifts from legal employment to undeclared work are counted as movement to non-employment (inactivity), i.e. as separation. In the reverse situation, it is identified as a flow from non-employment (inactivity) to employment, i.e. as hire. Obviously, the transitions within undeclared employment cannot be seen at all. Without undeclared work, the job-to-job flow rate is underestimated relative to the actual rate, while the hire and separation rates are overestimated. Filep-Mosberger and Reiff (2022) estimate undeclared employment to be between 7 and 12 per cent.

4 Flows at the economy-wide level

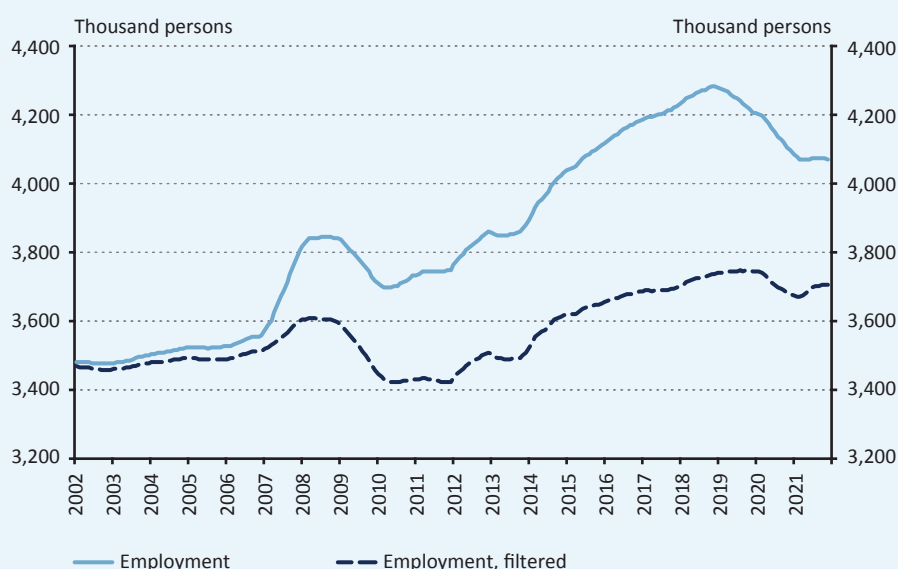
To reduce monthly seasonality and noise in the time series, flow trends are plotted with a 12-month backward moving average. It is also common in the literature to smooth the flow time series using a moving average (e.g. Ball et al. (2020)) or the HP filter (e.g. Nakamura et al. (2019)). (Noisier, unsmoothed figures are also shown in the Appendix.) It is worth noting that on the exit side, the last available year (2021) is more uncertain, and for those exiting permanently, there may be missing observations that are compensated by ex-post administration by the data managers.

Employers who are required to report data may supply contributions data with more or less delay. Comparing the data received from the Treasury at different points in time, the number of subsequently registered contributors and employed persons is in the tens of thousands. Previous studies (Elek et al. (2008), Elek et al. (2009)) cited similar experiences. The closer in time we are, the higher the rate of ex-post notification. In general, this does not affect the results but may produce a stronger bias in separations in the final year.

Based on the number of newcomers to the database, the number of contributors has been stable since 2001. To use the moving average method, one more year of data is needed, thus, labour flows can be plotted reliably over a 20-year period, between 2002 and 2021. Before considering aggregate flow rates, we first look at how the denominator (persons employed) and numerator (movers) evolve.

The number of employees paying contributions – including primary producers and employed pensioners – exceeded 3.8 million in 2008. Employment shrank by more than 150,000 persons as a result of the financial crisis. In line with the increasingly favourable economic climate, employment also expanded dynamically, rising to over 4.2 million in 2018 (Chart 3).

Chart 3
Number of employees paying contributions (12-month moving average)



Source: Authors' calculations based on HST data.

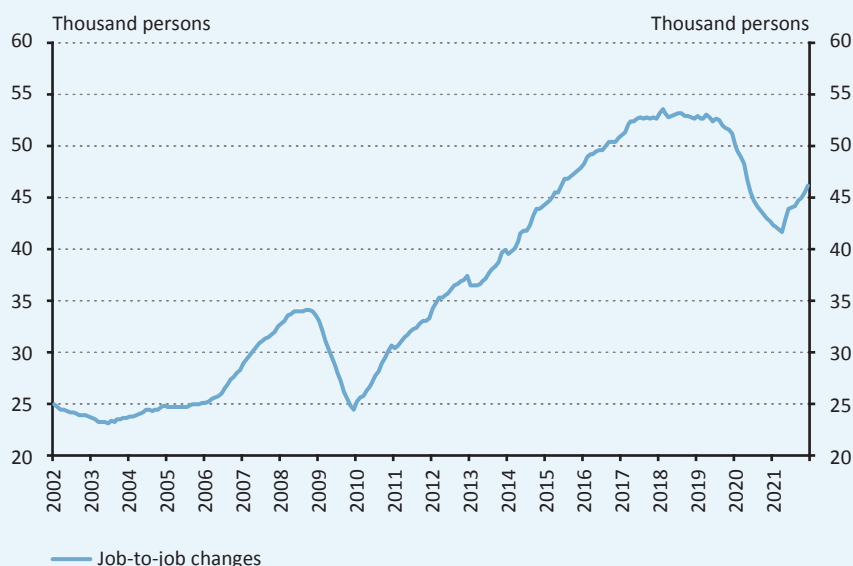
Note: Filtered employment includes men under 60 and women under 57.

Omitting older workers gives a more accurate picture of the dynamics in 2019–2020, as employed pensioners were gradually exempted from paying contributions and are therefore excluded from the scope of observation. The number of employed pensioners actually increased, with more than 100,000 working in 2019 and 130,000 in 2021 (HCSO, 2024).

Although much of the labour market proved to be more resilient during the coronavirus crisis than in the previous crisis, employment in 2020 was negatively affected. During the spring lockdowns, workers on daily wages (e.g. in simplified employment) were more likely than average to be out of work for short durations, but due to discretisation, they are less likely to be included in our cleaned database.

As with employment, the number of people changing jobs is highly procyclical, i.e. it varied with the economic cycle, rising in good economic times and falling during crises. There is a significant difference in the rate of job-to-job flows between 2000 and 2010. Contribution data show that between 2002 and 2009, the job-to-job rate ranged between 20 and 35 thousand, but after the financial crisis, it rose dynamically, reaching nearly 55 thousand between 2017 and 2019 (Chart 4). The trend in job-to-job transition reversed already in 2019, before the coronavirus crisis, clearly reflecting the cyclical state of the labour market.

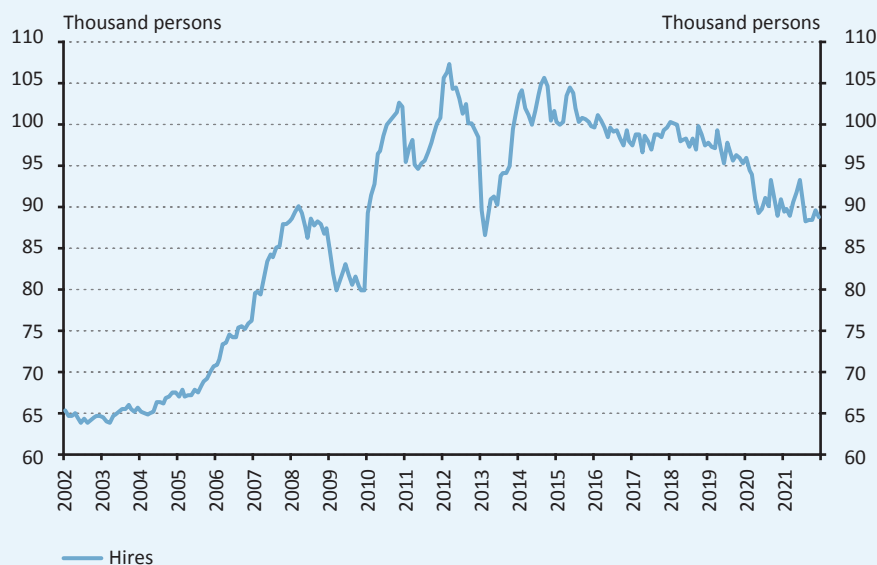
Chart 4
Number of job-to-job changes (12-month moving average)



Source: Authors' calculations based on HST data.

As opposed to job change, hire is less sensitive to economic cycles, showing a subdued procyclicality with a minor reduction in the number of those moving from non-employment to employment in years of recession (Chart 5). Apart from the remaining breaks in the time series, there is an upward trend until 2014, which may have been due to the tightening of the conditions for retirement (old age, disability) and the shortening of the unemployment benefit period.

Chart 5
Number of hires (12-month moving average)

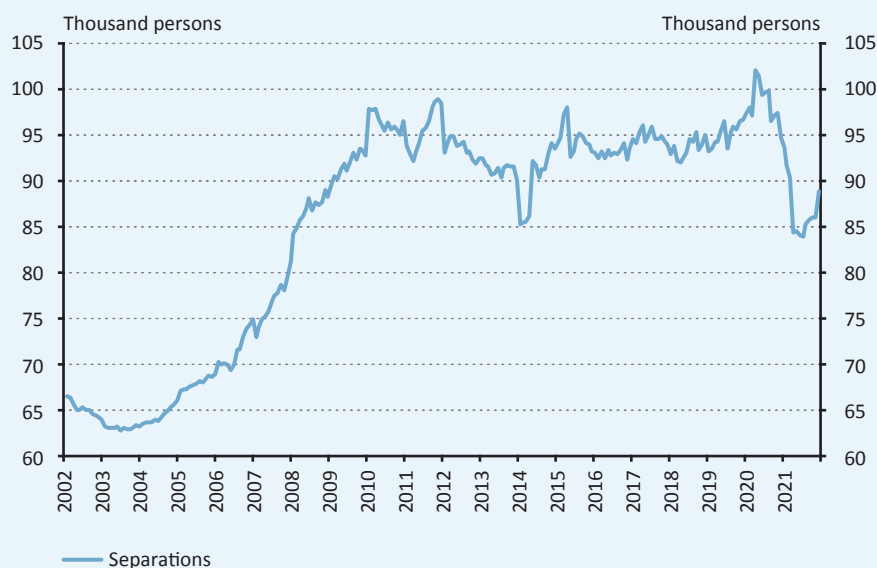


Source: Authors' calculations based on HST data.

Increasing demand for labour led to a steady decline in the available labour supply and a tightening of the labour market, with companies having less and less chance to find workers who had not worked before they were hired. The number of hires continued to fall in the first half of 2020 as a result of the coronavirus crisis, but the longer-term trend of decline persisted.

Exits from employment appear to be somewhat countercyclical, on top of the trend, the financial crisis also had an upward effect, in contrast to the highly procyclical job-to-job flows and the moderately procyclical hiring. In the 2010s, the number of separations ranged between 90 and 100 thousand until the coronavirus crisis (Chart 6). The increase in 2020 remained very modest relative to the financial crisis, with companies retaining most of their workforce, adjusting in terms of intensity instead (hours worked, unpaid leave). After a moderate increase due to the coronavirus crisis, the number of leavers fell.

Chart 6
Number of separations (12-month moving average)



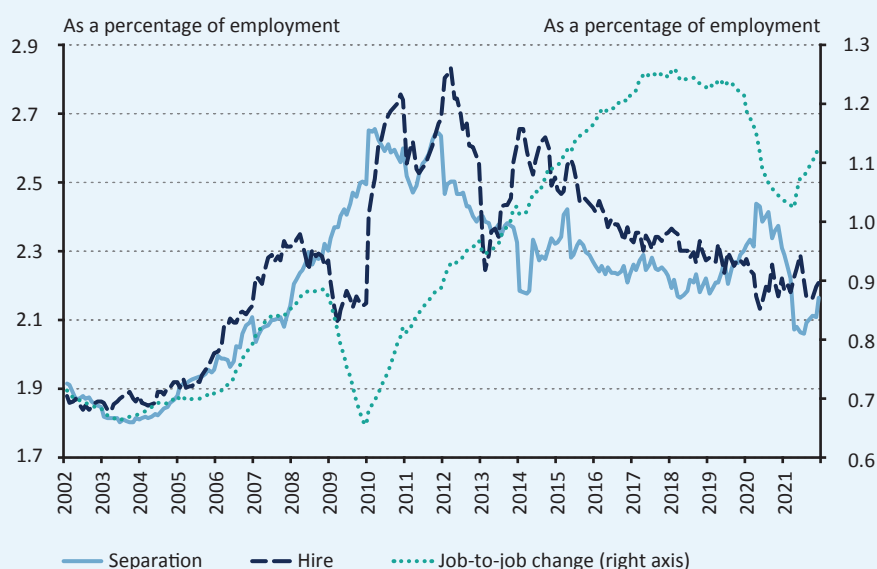
Source: Authors' calculations based on HST data.

Other empirical (see, for example, Bachmann (2005), Schaffner (2011), Karagedikli (2018)) and theoretical (Shimer, 2005) studies found the job-to-job rate to be procyclical. By contrast, flows between employment and non-employment are less responsive to business cycles than job-to-job transition (Hyatt et al. (2014)), which has several possible explanations.

International research suggests that the cyclical nature of labour flows may be heterogeneous across countries. Berson et al. (2020) concluded that job-to-job flows in the less mobile French and Italian labour markets were less cyclical than in the United States. Elsby et al. (2013) found that in some non-Anglo-Saxon economies, it was difficult to distinguish between trends and cyclical processes in relation to those entering and leaving unemployment.

Examining labour flows as a share of the employed population gives a picture of the evolution of flows over time in Hungary that is similar to the findings in earlier literature. The job-to-job flow rate appears to be highly procyclical, with cyclical effects being more pronounced during both the financial crisis and the coronavirus crisis. Although the separation rate increased and the hire rate decreased in 2020 as economic output declined, longer-term trends are more striking for these two rates (Chart 7).

Chart 7
Labour flow rates in the national economy (12-month moving average)



Source: Authors' calculations based on HST data.

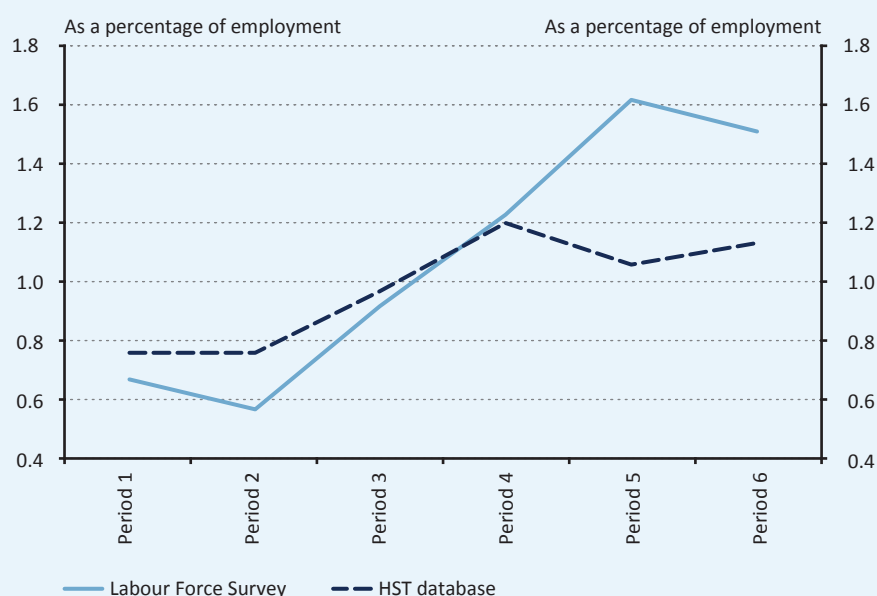
Another factor that may contribute to the moderate procyclicality and countercyclicality of hire and separation, respectively, in our case is that within non-employment, it is not really possible to separate the unemployed from the inactive. The cyclical characteristics may differ depending on whether the labour flow is associated with unemployment or inactivity, for example, the transition to unemployment may be countercyclical, while the transition to inactivity may be acyclical (Garda (2016)). The Hungarian job-to-job flow rate was calculated to range between 0.65 and 1.26 per cent. This rate varies from study to study (see Table 1 for more details), depending not only on the country and the methodology, but also on the frequency of the data. Our results are closest in magnitude to those estimated by Bachmann (2005) who, based on a sample of German administrative data and also on a monthly frequency, found that the job-to-job rate in the active population averaged 0.82 per cent between 1980 and 2000.

For Hungary, the most recent available calculation of the job-to-job rate comes from the LFS, which already includes the period of the coronavirus. According to these data, the job-to-job rate in the employed population ranged between 0.57 and 1.62 per cent between 2003 and 2022 (Varga and Csillag (2023)). Despite the different data sources, the order of magnitude is similar, but the gap between the rates widens by 2020–2021 (see Chart 8). While the LFS data indicate a massive increase in the job-to-job rate during the first period of the crisis, the HST data show a minor decrease.

One reason for the difference may be that the LFS data include undeclared employment, whereas the HST data do not. Thus, if someone takes on undeclared work, it will be recorded as job-to-job transition in the LFS data and as separation in the HST data. It is worth noting that according to the HST data, the number (and proportion) of people leaving employment increased in spring 2020. Some of the dismissed employees may have appeared in the LFS data as job changers.

Another possible explanation is that the crisis hit those working in simplified employment harder, and they experienced higher rates of short-term unemployment (Kónya and Krekó, 2021); however, they are not considered in our study in relation to job-to-job flows.

Chart 8
Job-to-job rates calculated from the Labour Force Survey and the HST database

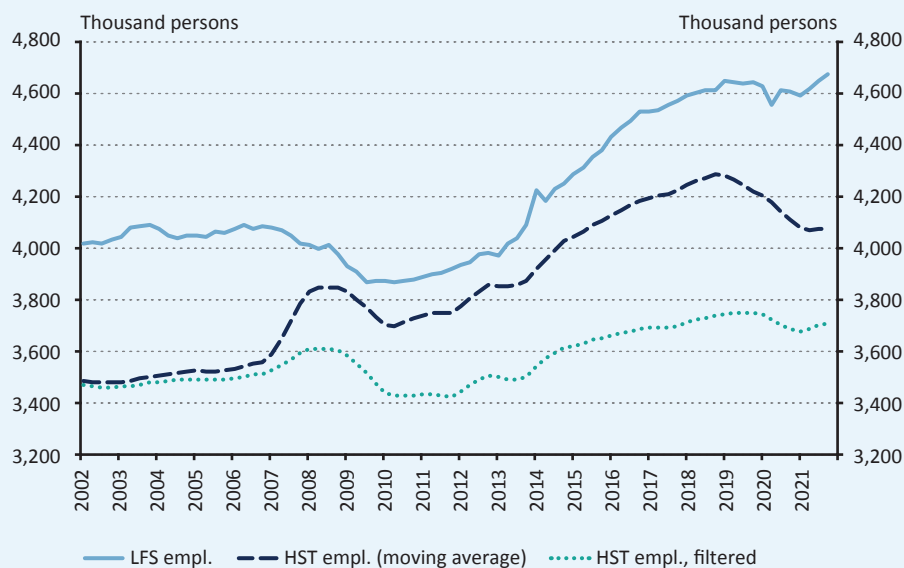


Note: Period 1: from 2003 Q1 to 2008 Q1 (the period of slowing growth prior to the financial crisis). Period 2: the period of the 2008 financial crisis (from 2008 Q2 to 2010 Q4). Period 3: from 2011 Q1 to 2014 Q1. Period 4: from 2014 Q2 to 2019 Q4 (growth period). Period 5: the first period of the coronavirus crisis (from 2020 Q1 to 2021 Q1). Period 6: from 2021 Q2 to 2022 Q4 (in the case of HST data, until the end of 2021).

Source: LFS data series and the schedule of periods: Varga – Csillag (2023), HST database: authors' calculations.

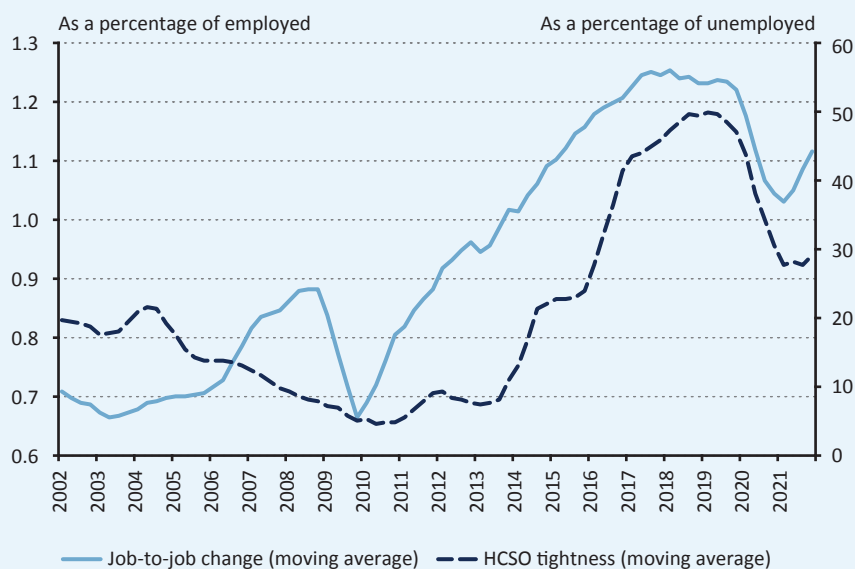
4.1 COMPARISON OF THE HST DATABASE WITH OTHER DATA SOURCES

The number of the employed as per the HST database is lower than the number of employed persons in the HCSO Labour Force Survey (LFS), but they have similar dynamics (Chart 9). The main reason for the difference in numbers is that the LFS includes undeclared workers and the HST database does not. For more details on the comparison of the two datasets and the pertaining estimation of undeclared employment, see Filep-Mosberger and Reiff (2022). The differences in the dynamics are mainly explained by changes in legislation (see Chapter 3.2), i.e. the scope of persons subject to pension contributions changes from time to time. The number of HST employees started to decline in 2020 Q1 as a result of the lockdown. The unfiltered HST database shows a decrease already in 2018; however, this is due to the fact that pensioners were not required to pay contributions and are therefore excluded from the database. If we filter out those who are about to retire and pensioners, we see similar dynamics during the coronavirus crisis as in the LFS time series.

Chart 9**Number of the employed based on the Hungarian State Treasury (HST) and the Labour Force Survey (LFS) of the HCSO**

Note: Filtered employment includes men under 60 and women under 57.

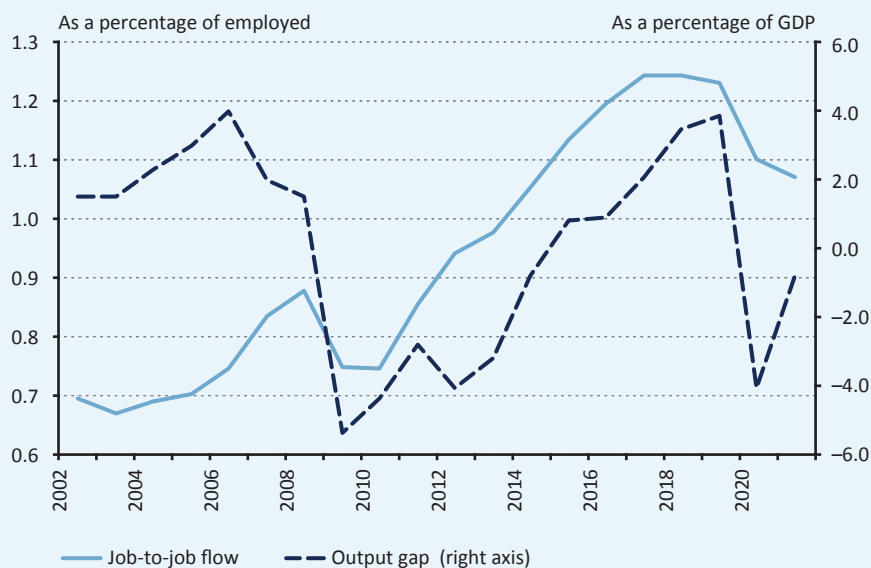
Source: HST, HCSO, MNB calculation.

Chart 10**Labour market tightness and the job-to-job rate**

Source: HST, HCSO, MNB calculation.

One measure of the cyclical state of the labour market is labour market tightness, i.e. the ratio of job vacancies to the unemployed. When labour market tightness increases, it causes wages to go up (see Szabó (2019)). The data suggest that a rise in the job-to-job rate predicts an increase in tightness (Chart 10). In other words, the greater the labour shortage in the economy, the more often people change jobs. A tight labour market is characterised by high wage dynamics, which leads workers to change jobs more often because they can bargain for higher wages in the new job.

Chart 11
Job-to-job flow rate and the output gap



Source: HST, AMECO, MNB calculation.

The cyclical state of the economy is also characterised by an output gap which is the difference between the GDP trend and the current GDP. This can also be interpreted as capacity utilisation, i.e. if the output gap is negative, the economy is characterised by unused capacity. If the output gap is positive, output exceeds its potential level due to high demand, and the economy becomes overheated (for more on this topic, see e.g. Rácz (2012)). The dynamics of labour flows follows well the change in the output gap (Chart 11), providing further evidence that the job-to-job rate is procyclical.

In this section, employment numbers and the cyclical state of flows were put in a larger context, accompanied by a look at other statistics and indicators. In the next chapter, we will continue with a more detailed analysis of flows. As with the aggregate rates, the detailed findings also reflect the technical and administrative effects of the database, which have been thoroughly discussed above, and will therefore not be repeated.

5 Detailed analysis of flows

The database also allows us to analyse labour flows by individual characteristics (residence, sex, age, occupation) and by company size. Flows have an exit (from where they flow) and an entry (to where they flow) side. As a rule, we looked at the criteria based on the entry side; however, this was not always possible. The occupation code and the company size are only available in the case of employment, so when examining separation, we applied exit criteria. In all cases, the denominator is the number of the persons employed in the given group.

5.1 FLOWS ACCORDING TO PLACE OF RESIDENCE

Each contributor is assigned a single address at the district level, which shows the current permanent address, so previous changes of residence are not tracked. However, as an approximation, it is useful to see how the spatial pattern of flows evolved over the years. The district-level flows are shown at 5-year intervals (2004, 2009, 2014, 2019), but the Appendix contains maps for all years.

There are 174 districts in Hungary plus the districts of the capital city, these are equivalent administrative territorial units. To make the maps more transparent, the districts of Budapest have been merged, so flows have been calculated for a total of 175 different territorial units. 1.1 per cent of observations have missing addresses and are thus not included in this analysis. According to the Hungarian State Treasury, the excluded individuals do not have a permanent address in Hungary and are mostly foreigners, not Hungarians without a permanent address (Filep-Mosberger and Reiff, 2022).

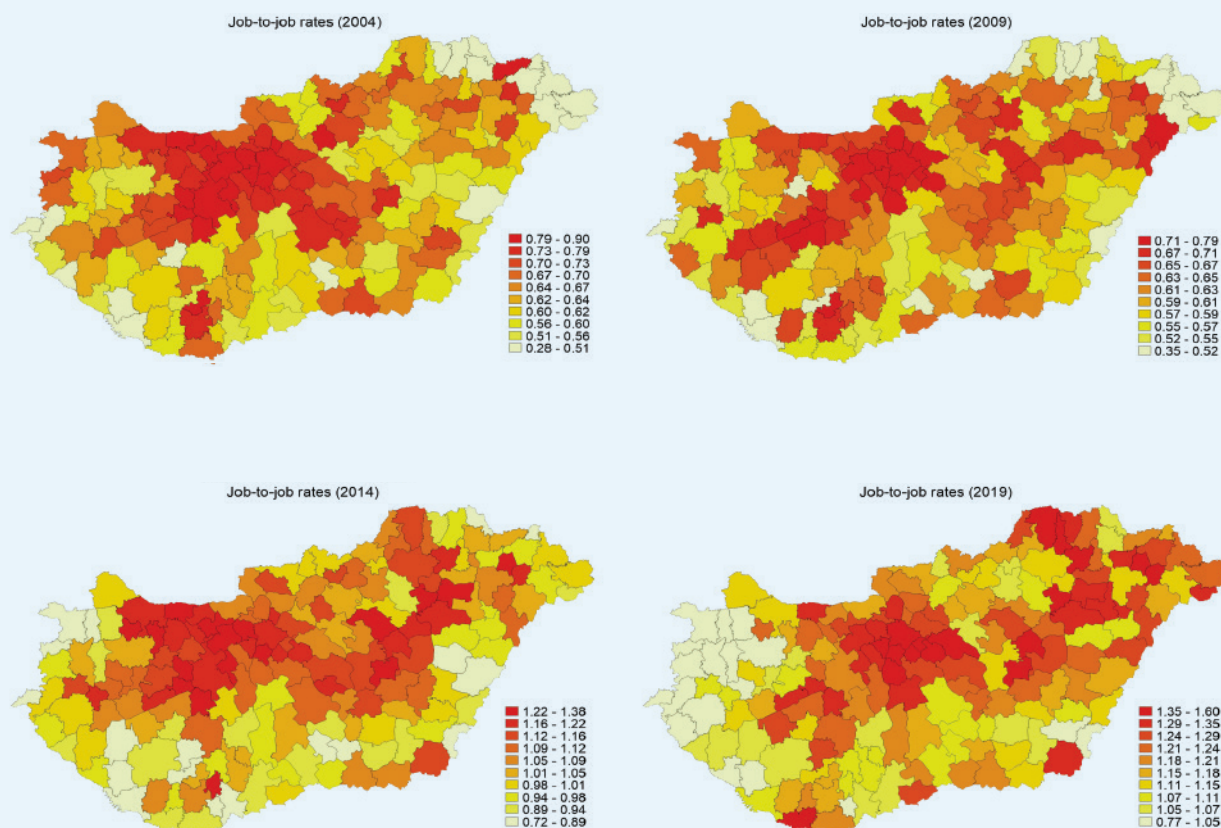
The job-to-job rate shows a variable pattern both spatially and over time. Comparing the districts over time, all districts saw an increase in the job-to-job rate in the 2010s, in line with national trends.

However, it is not only the absolute job-to-job rate per district that changed, but also the relative position of the districts. In the 2000s, the proportion of people switching was higher mainly in the more developed areas, in the districts of Central and Western Transdanubia and Central Hungary. However, this changed around the western border with the opening of the Austrian labour market. Since 2011, with the boom in foreign employment in Austria, the share on the western border edges gradually declined (by definition, the database can only be used to calculate intra-border transitions). However, the job-to-job flow rate in Central Hungary remained high. In addition, in the 2010s, areas with higher labour reserves and higher public worker share (see Szabó (2022) for graphs) also experienced higher rates of job-to-job flows compared with the more developed areas (Chart 12).

As opposed to the job-to-job rate, the spatial pattern for both hire and separation remained stable over time. Both rates are negatively correlated with the level of economic development and employment. Where GDP per capita and employment rates are higher, the hire and separation rates are lower. Accordingly, areas with lower level of economic development and employment, such as the South Transdanubian districts and the districts close to the eastern borders, have higher hire and separation rates (Chart 14).

Since district-level GDP data are not available, we approximate the development level of districts using the so-called complex indicator. The complex indicator standardises and averages more than 20 economic and social indicators. The indicators include the local unemployment rate, average housing price, life expectancy (for details, see Government Decree No 290/2014). The higher the value of the indicator, the more developed a district is (Chart 13). If we compare the spatial rates of hire and separation with the complex indicator, we see that both indicators are higher in the less developed districts. This is in line with previous findings (see Szabó (2022)) that low-skilled people change jobs more often and stay in a job for a shorter time.

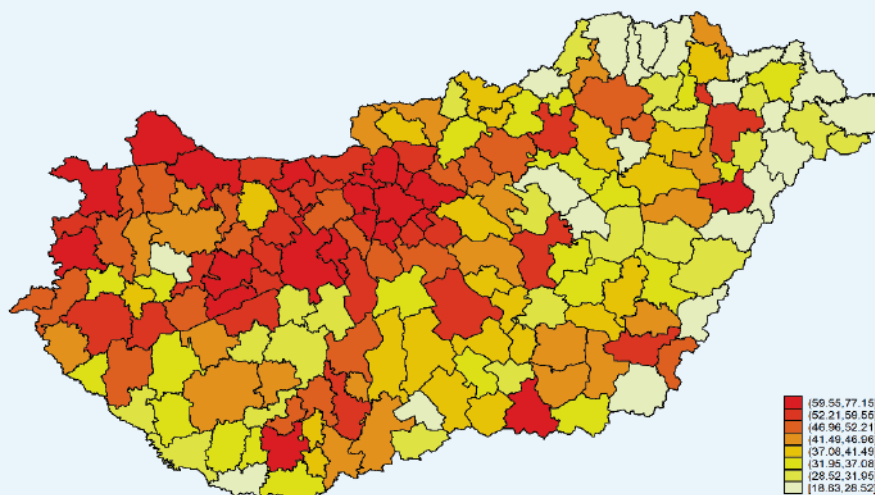
Chart 12
Job-to-job rates by district (2004, 2009, 2014, 2019)



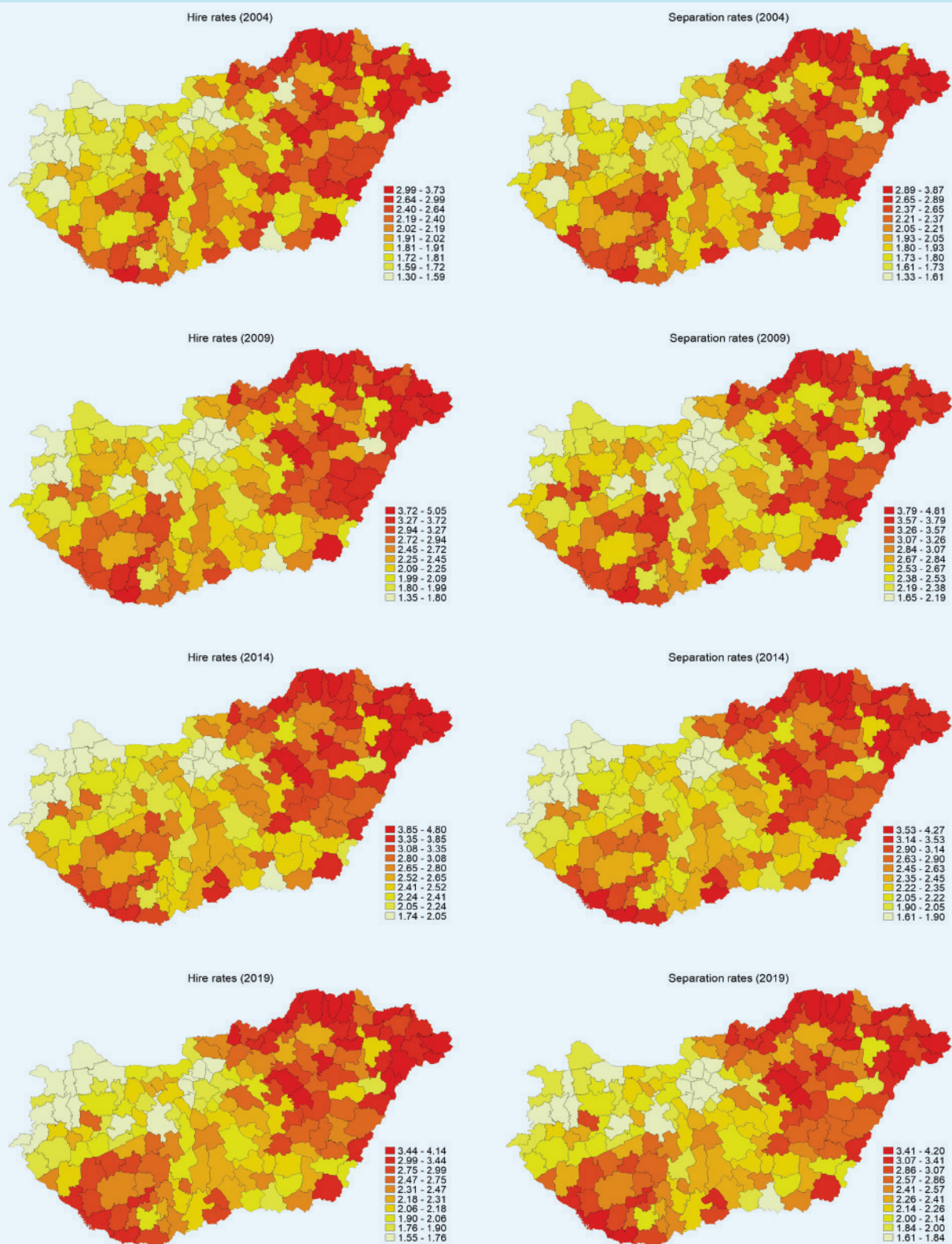
Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

Chart 13
Size of the complex indicator by district



Source: Government Decree 290/2014.

Chart 14**Hire rates and separation rates by district (2004, 2009, 2014, 2019)**

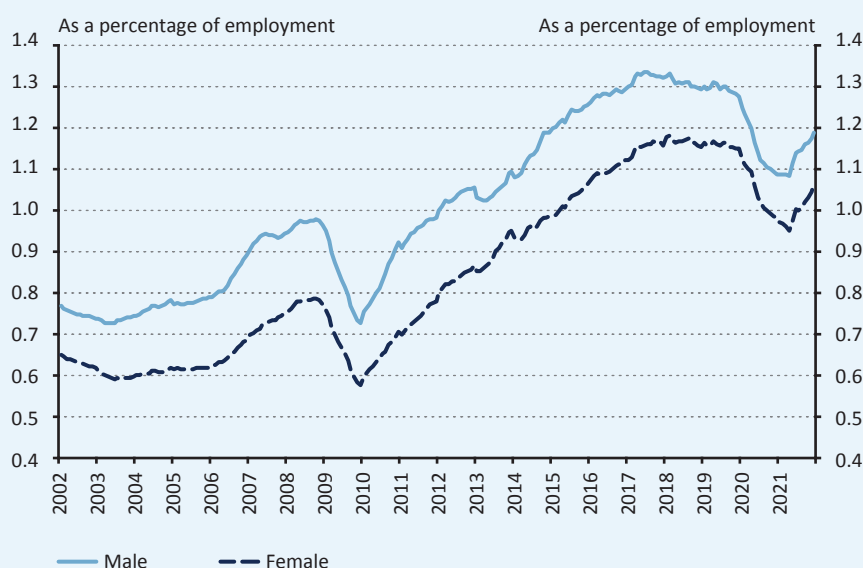
Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

5.2 FLOWS ACCORDING TO GENDER

When looking at job-to-job transitions by sex, the rates show a similar pattern, with basically no difference in terms of cyclical patterns, as both men and women switch jobs procyclically. The difference is at the level of rates, with men changing jobs at a higher rate than women (Chart 15). Bachmann (2005) also found that in Germany, men changed jobs at a higher rate than women. In Türkiye, a similar pattern of job-to-job transition by sex is observed (Akgündüz et al., 2019).

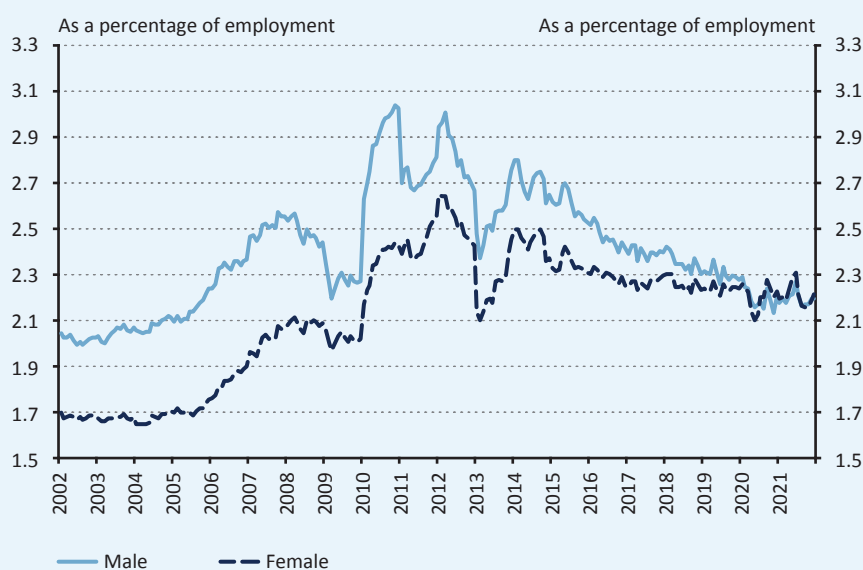
Chart 15
Job-to-job rates by sex (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

The hire rate (from inactivity or unemployment) is also higher for men. The hire rate for women is lower over almost the entire period, but the gap narrows from the 2010s and approximates that of men from 2020. However, rates vary similarly over time for both sexes between 2002 and 2021 (Chart 16).

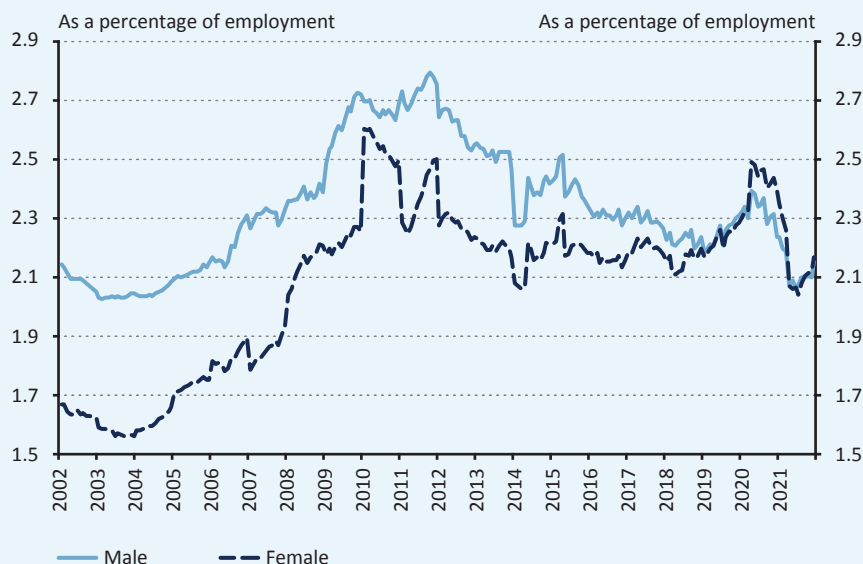
Chart 16
Hire rates by sex (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

The separation rate is higher for men, as in the case of other types of flow. The trend over time is similar by sex, with separation rates mostly rising until the early 2010s, and then embarking on a downward trend, checked by the coronavirus crisis (Chart 17). As with hire, the gender gap gradually disappears, with a somewhat higher separation rate for women in 2020.

Chart 17
Separation rates by sex (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

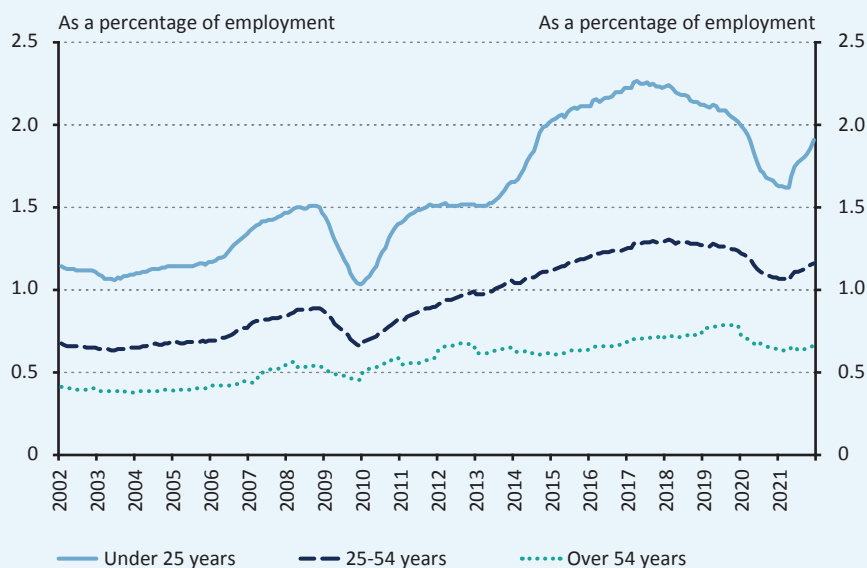
5.3 FLOWS ACCORDING TO AGE GROUPS

We divided contributors by age into 3 age groups: under 25, 25–54 and over 54. Flow rates were calculated for these age groups.

The youngest age group, under 25, is the most likely to change jobs, while those over 54 are the least mobile. So as age increases, the likelihood of job-to-job transition decreases, in which generational differences may also play a role. In times of recession, companies tend to retain well-qualified, experienced workers, so young people's chances of moving to a new job dropped the most as a result of economic downturns (Chart 18). The accumulation of job-specific skills may also be behind this phenomenon (Pissarides, 1994).

International literature suggests a similar pattern of job-to-job rates. It has been established also for other countries that young people are the most mobile and most likely to change jobs, with a steady decline in job-to-job flow rates as age increases (for Germany, see e.g. Bachmann (2005), for the United States, Fallick and Fleischman (2004), for Türkiye, Akgündüz et al. (2019)).

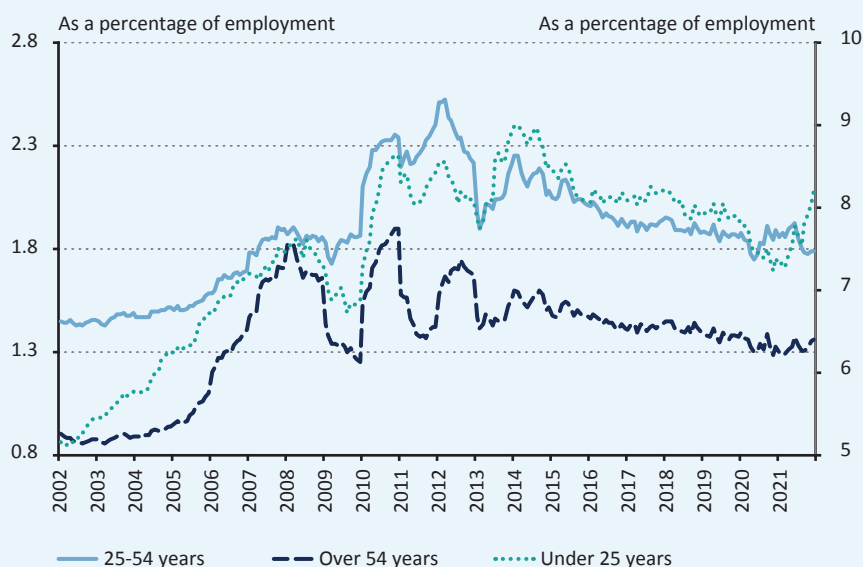
Chart 18
Job-to-job rates by age group (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

The hire rate for people under 25 years of age is significantly higher than for other age groups because of career starters (Chart 19). The hire rate of young people rose from 5 to 9 per cent between 2003 and 2014 before declining in accord with the national trend until 2020. Young people's employment is often seasonal (see Appendix, Chart 44), with many starting work after the end of the school year, in the third quarter, in July in particular.

Chart 19
Hire rates by age group (12-month moving average)

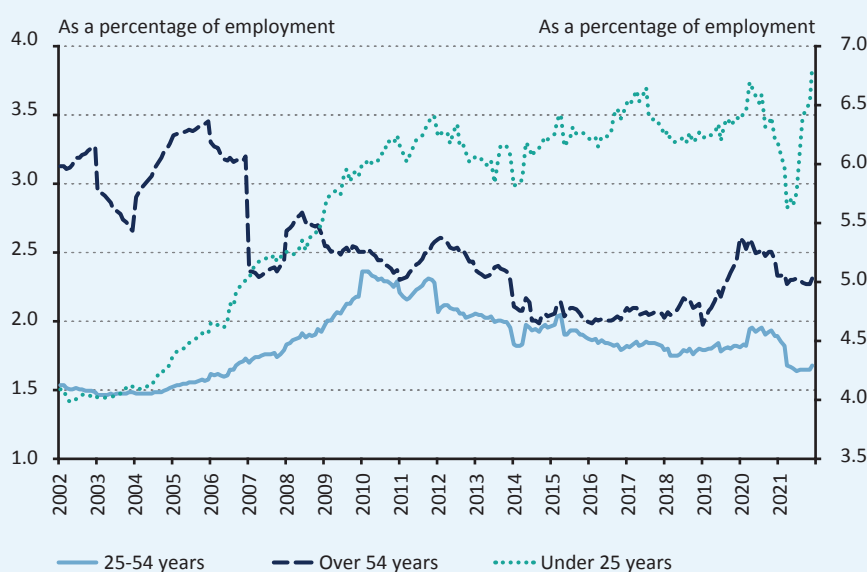


Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

Separation rates are also the highest among young people, as are inflows to employment (Chart 20). Because of the lockdowns prompted by the coronavirus, outflows from employment rose for all age groups for a short while. Between 2002 and 2019, the separation rate in the over-54 age group showed a downward trend, while the 25–54 and under-25 age groups saw an upward trend in the 2000s, with increasing redundancies from 2009 onwards due to the financial crisis. After 2010, the separation rate of the 25–54-year-olds started to decline, while the rate for those under 25 was around 6 per cent.

The seasonal employment of young people is also reflected in the separation rate, with more young people leaving their jobs in the third quarter, most often by September, before the start of the school year (see Appendix, Chart 45). It is a challenge to find a stable job as a career starter, as suggested by other indicators as well: the unemployment rate is the highest in the youngest age group (for a more detailed analysis of the situation of young workers, see Balázs and Erdélyi (2020)).

Chart 20
Separation rates by age group (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

5.4 FLOWS ACCORDING TO OCCUPATION CATEGORIES

Occupations are identified by a 4-digit occupational code (from 2011, FEOR-08, previously FEOR-93) in the database. Occupational codes are only available for contributors who have worked, but even in such cases, they are not always known for all employment relationships. In the work history data, the occupation code is missing for 18.5 per cent of the observations. For the purpose of categorisation, the first digit of the code, i.e. the main occupation categories were used, separating white-collar and blue-collar occupations.

The main categories for white-collar jobs are the following:

- Managers (of business organisations, public administration, interest organisations, and legislators) (1),
- Professionals (occupations requiring the independent use of higher education qualifications) (2),
- Technicians and associate professionals (other occupations requiring higher or secondary education) (3),
- Office and management (customer services) occupations (4).

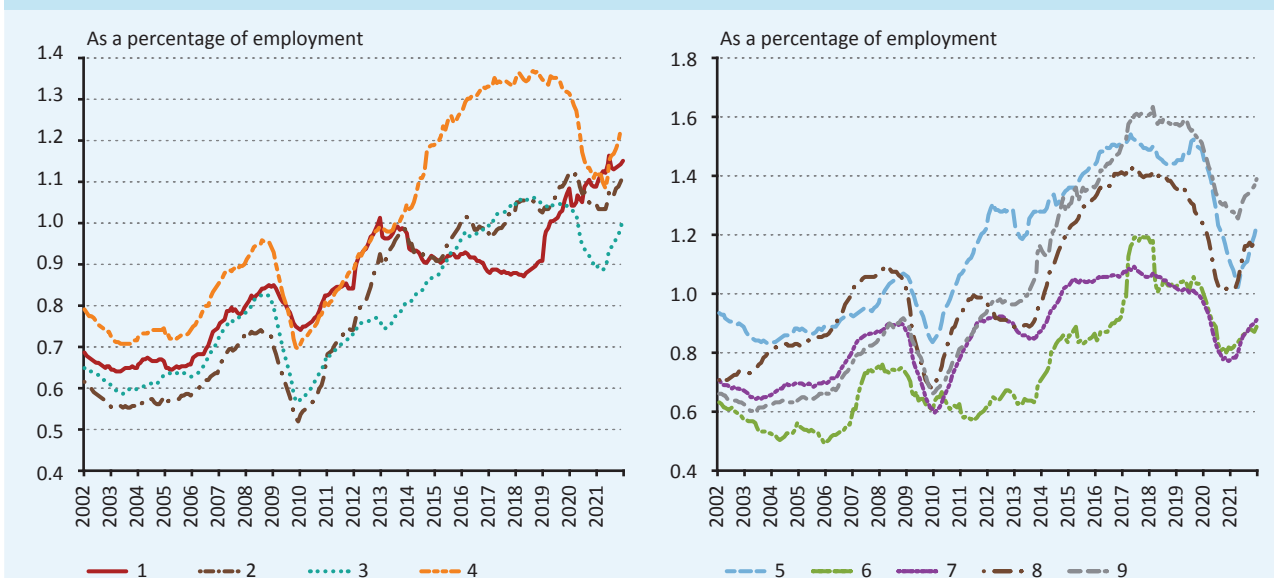
The main categories for blue-collar jobs are the following:

- Commercial and services occupations (5),
- Agricultural and forestry occupations (6),
- Industry and construction industry occupations (7),
- Machine operators, assembly workers, drivers of vehicles (8),
- (Elementary) occupations not requiring qualifications (9).

Among white-collar occupations, the job-to-job flow rate for managers (1) differed from the other white-collar categories (Chart 21). After 2012, the job-to-job rate of managers declined for most of the economic cycle, and then rose from 2019 onwards, even amid the uncertainty caused by the crisis. For other white-collar workers, job-to-job transition was more procyclical: rates increased from 2013 and decreased in 2020, especially for office and management occupations (4). Over the whole time horizon, it is mainly lower skilled office and management workers who are most likely to change jobs.

In the blue-collar categories, agricultural workers (6) are moderately exposed to business cycle fluctuations, and they have the lowest job-to-job rates in general. The other blue-collar categories saw an increase in job-to-job transitions after the financial crisis, then around 2017, the rate turned into a decline. The biggest drop in job-to-job during the crisis was experienced by those working in commercial and services occupations (5).

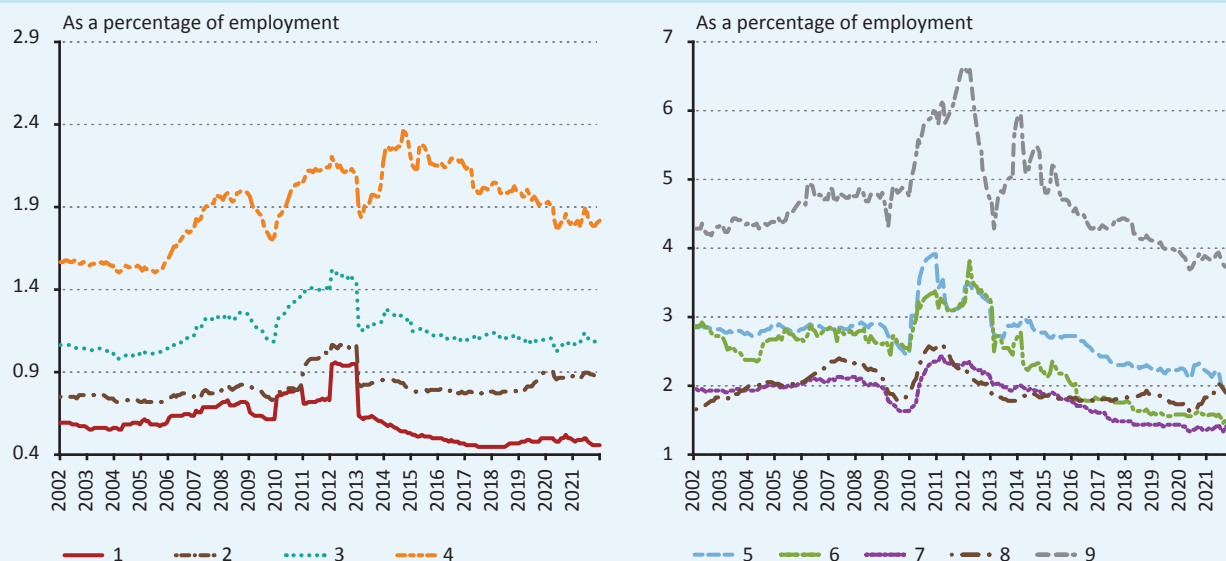
Chart 21
Job-to-job rates by main occupation category (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

The hire rate declines in several occupation categories during the financial crisis, but there is no significant shift in the rate from previous levels under the coronavirus crisis (Chart 22). Historical rates of hire depend broadly on the level of skill required for an occupation: lower-skilled occupations have a higher rate of labour flows. Accordingly, the hire rate was the highest in the white-collar categories for office and management occupations (4), while in the blue-collar categories, elementary occupations (9) recorded the highest rate over the whole period.

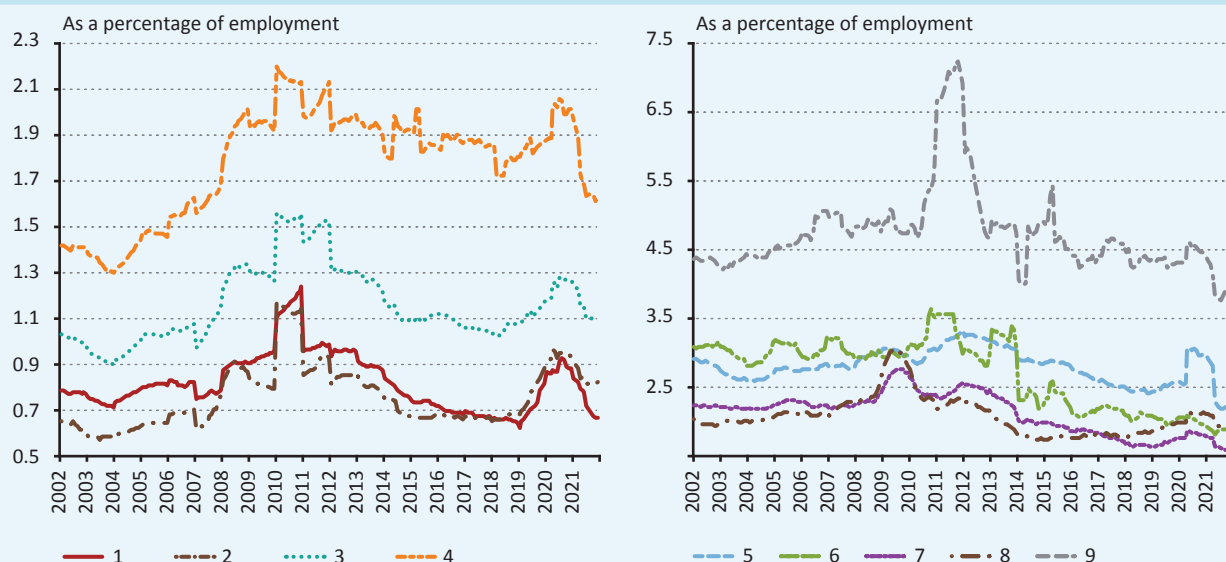
Chart 22
Hire rates by main occupation category (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

In terms of outflows from employment, highly qualified workers with higher education (2) seem to have the most stable jobs among the white-collar workforce (Chart 23). Similarly to hire, office and management occupations (4) saw the highest separation rate within the white-collar categories. The jobs of generally lower skilled blue-collar workers are less stable, especially in occupations not requiring qualifications (9). In this category, the separation rate is significantly higher in the 20 years under review.

Chart 23
Separation rates by main occupation category (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

Using German data, Bachmann (2005) also found that people with higher qualifications quit their jobs at lower rates than those with lower qualifications. Although the HST database does not include educational attainment, the occupational codes may offer an approximate picture of qualifications.

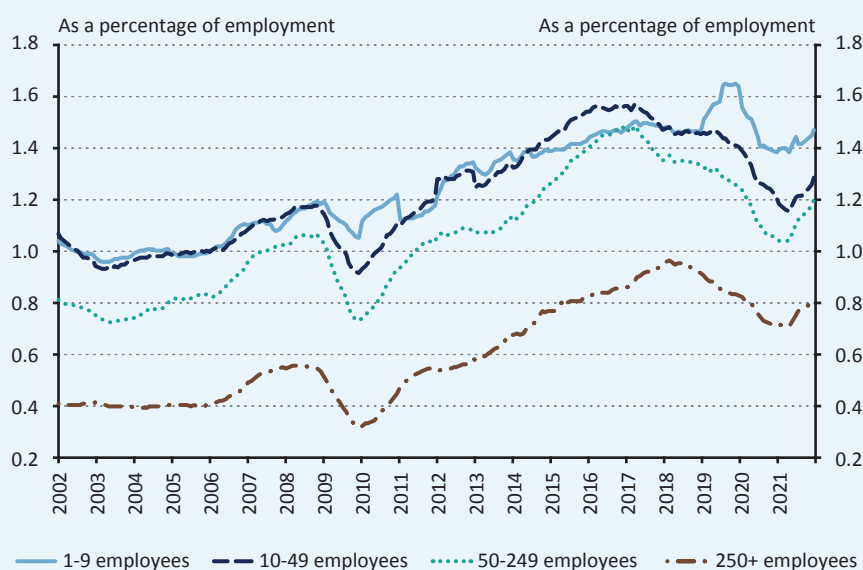
5.5 FLOWS BY FIRM SIZE

Based on the number of employees, we divided the companies into 4 size categories to determine the flow rates by company size:

- microenterprises (1–9 persons),
- small enterprises (10–49 persons),
- medium-sized enterprises (50–249 persons),
- and large enterprises (250 people or more).

Looking at the job-to-job rate by firm size, large companies have the lowest turnover (Chart 24). In ascending order, this category is followed by medium-sized enterprises, with no significant difference between them and the rest of the categories. Job-to-job rates changed in a pro-cyclical manner regardless of company size. In addition, similarly to large companies, the job-to-job rates of small and medium-sized enterprises increased more markedly between 2013 and 2017 in line with the economic cycle, while microenterprises recorded a smaller increase in their job-to-job flow rates.

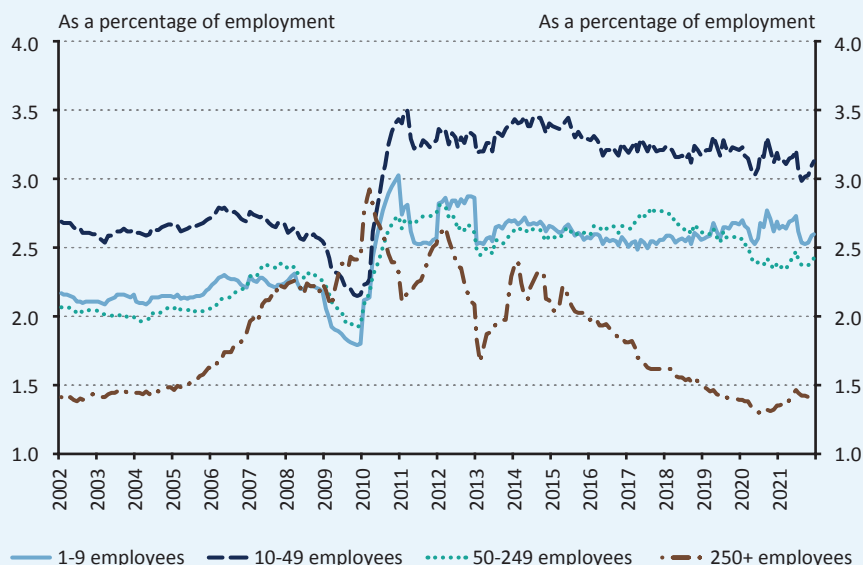
Chart 24
Job-to-job rates by firm size category (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

For most of the period under review (2002–2007 and 2011–2021), large companies had the lowest number of hires relative to company headcount, while small enterprises had the highest (Chart 25). Since 2014, hiring rates were virtually stagnant in most size categories, while the hire rate of large firms went through a markedly larger decline, normalising at a lower level following the coronavirus crisis.

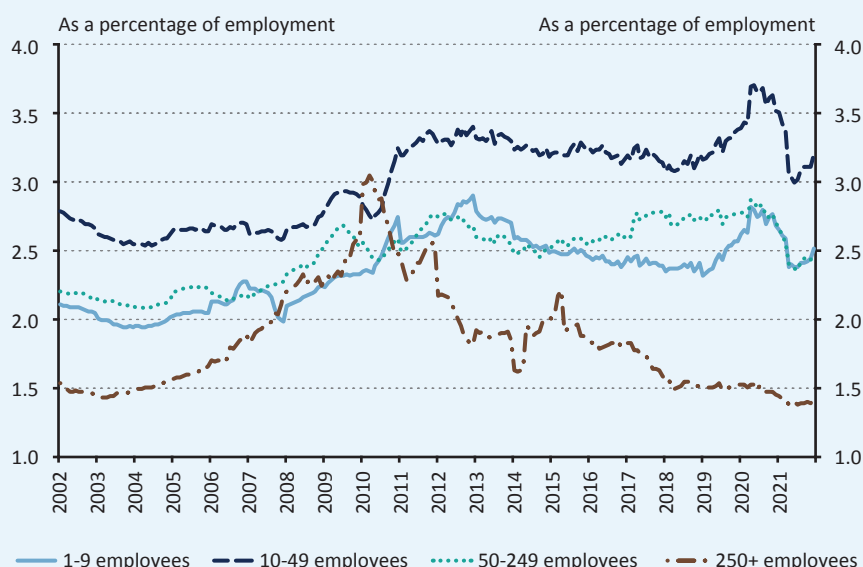
Chart 25
Hire rates by firm size category (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

Separation rates show similar dynamics over time for most of the size categories, but the rates of the largest companies took a different path. The separation rate of companies with more than 250 employees had already been on the rise in the years preceding the financial crisis, and this size category had one of the highest separation rates in 2010 (Chart 26). Decline is also substantially larger in the 2010s, with a steadily widening gap between large companies and the other categories. The separation rate grew the most in the small and microenterprises sector in 2020, during the coronavirus crisis.

Chart 26
Separation rates by firm size category (12-month moving average)



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

5.6 FLOWS BETWEEN FIRM SIZE CATEGORIES

It is worth looking at how flows between firm size categories evolve. In general, they are typically cyclical. In terms of numbers, intra-category transition is the most significant, with the exception of medium-sized companies: the majority of their labour flows to large companies. More workers move to larger firms than to smaller ones.

For microenterprises (1–9 persons), intra-category flows show no cyclicality (Chart 27). Until 2013, a considerable expansion could be seen, with a moderate fall during the financial crisis. Nonetheless, there was a gradual decline since 2013. The flow to other size categories is half to one third of the flow to microenterprises.

Labour flows from small companies (10–49 persons) follow the cyclical fluctuations of the economy for all firm size categories (Chart 28). Intra-category labour flows range from 1,500 to 3,500 persons, while the other categories have a lower flow of 500 to 1,000.

In the case of medium-sized companies (50–249 employees), most of the workforce moves to large companies (Chart 29). This ranges from 1,000 to 3,600 people. This is followed by intra-category transitions, then flows to small and microenterprises. All intra-category flows are cyclical.

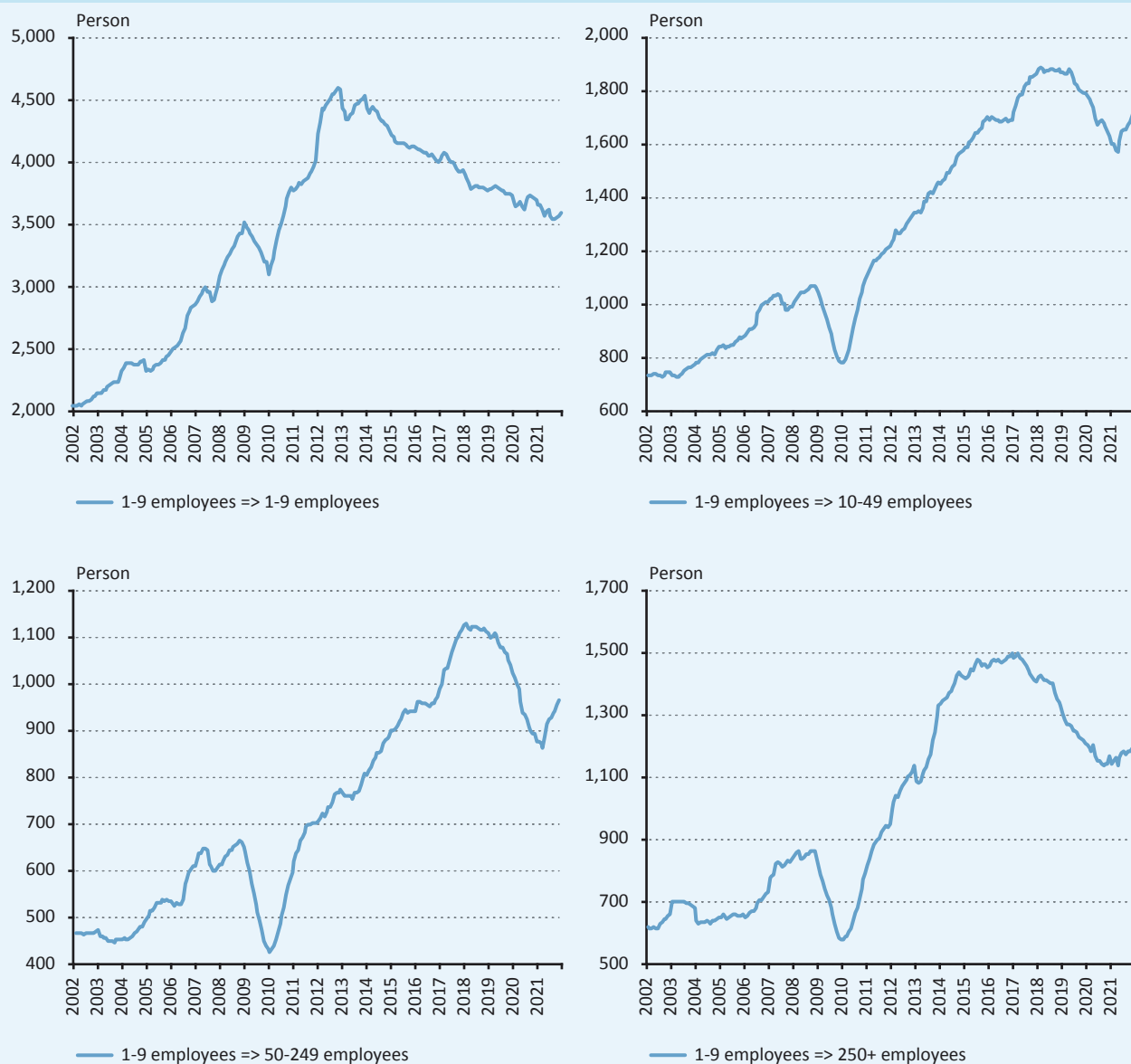
The intra-category flows of employees working for large companies (over 250 employees) is the largest of all flows by firm size, with a magnitude of 3,000 to 9,000 employees (Chart 30). Still looking at intra-category transitions, this is followed by flows to medium, and then small and, finally, microenterprises. The pattern of flows to microenterprises is somewhat different from the others, but cyclicality can be observed.

Averaging over the whole period and comparing the flows between firm size categories (Table 3), we see that in terms of numbers, most of the workers move from large companies to large companies. The flow from small firms to small firms comes second. If we examine Table 3 focusing on receiving company size, companies with 10–49 employees hire roughly equally from all firm size categories. For companies with 50–249 employees and companies with more than 250 employees, the number increases with the size of the sending company.

Table 3
Average flows between firm size categories

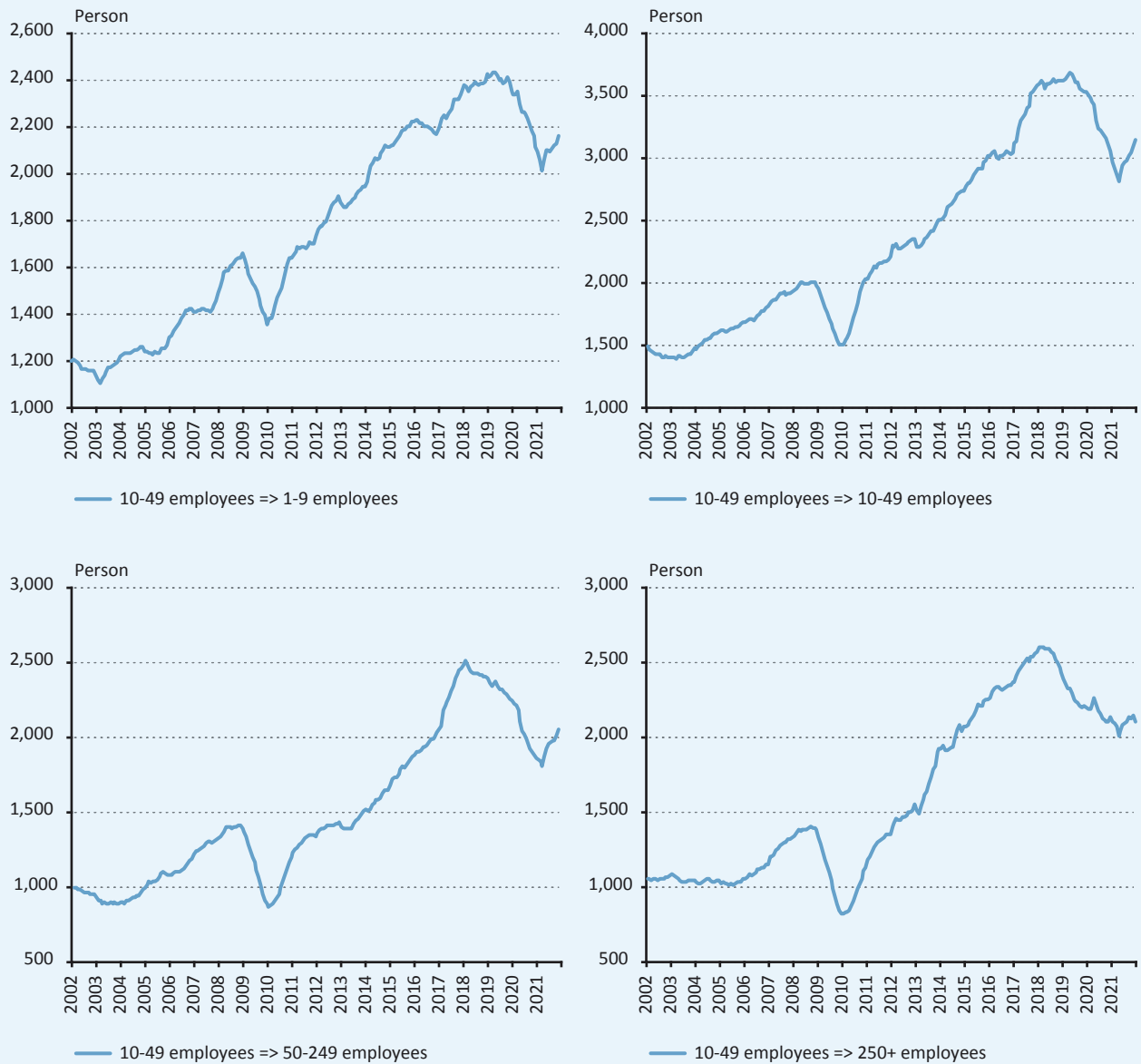
		Receiver				
		1-9 employees	10-49 employees	50-249 employees	250+ employees	Total
Sender	1-9 employees	3488	1304	756	1025	6573
	10-49 employees	1798	2411	1548	1650	7406
	50-249 employees	917	1687	1885	2220	6710
	250+ employees	1361	1849	2350	5094	10654
	Total	7564	7252	6538	9990	31344

Note: Average flows between 2002 and 2021. The bars in the cells are proportional to the numbers in the cells.

Chart 27**Job-to-job changes from microenterprises**

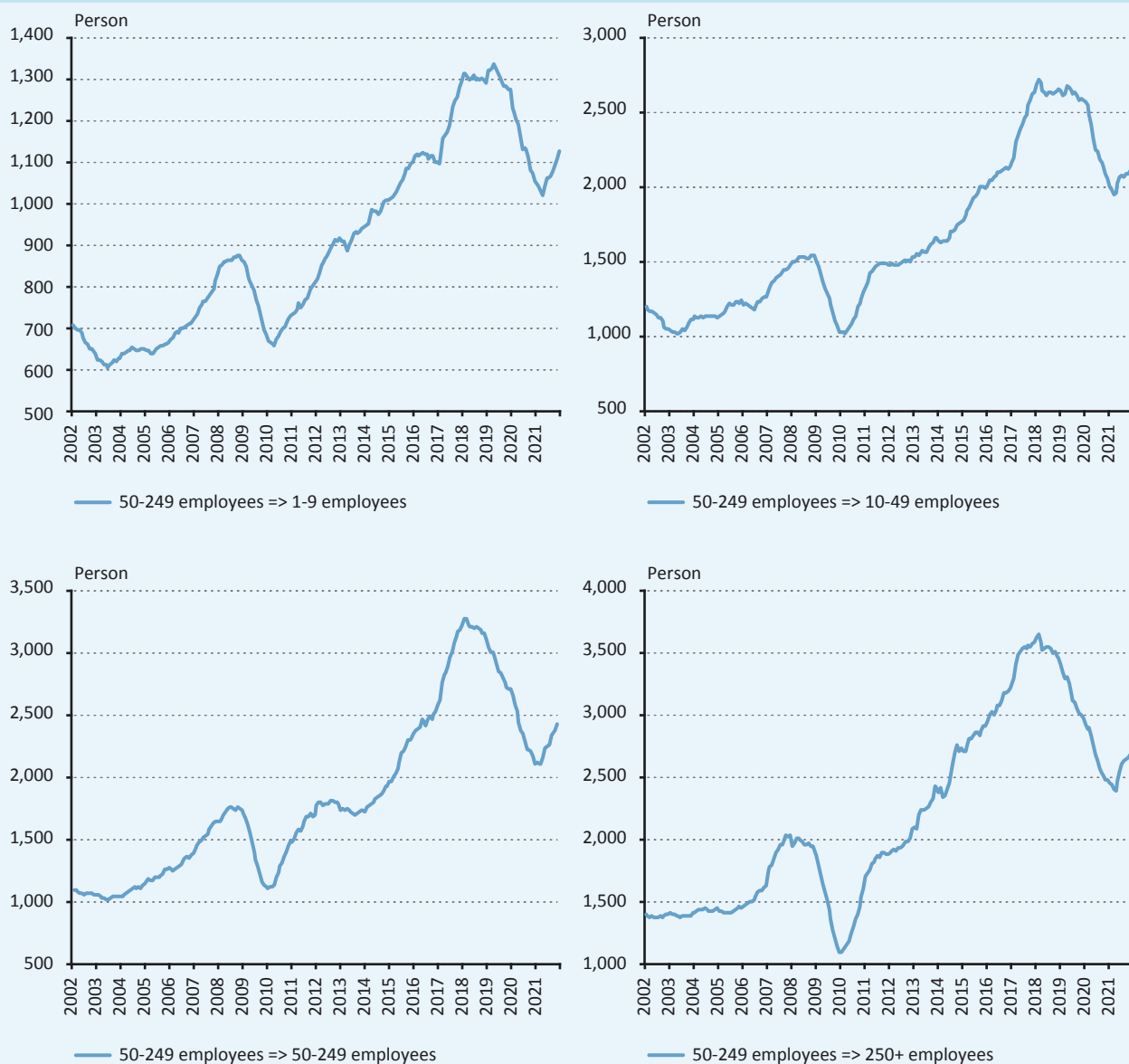
Source: Authors' calculations based on HST data.

Chart 28
Job-to-job changes from small enterprises



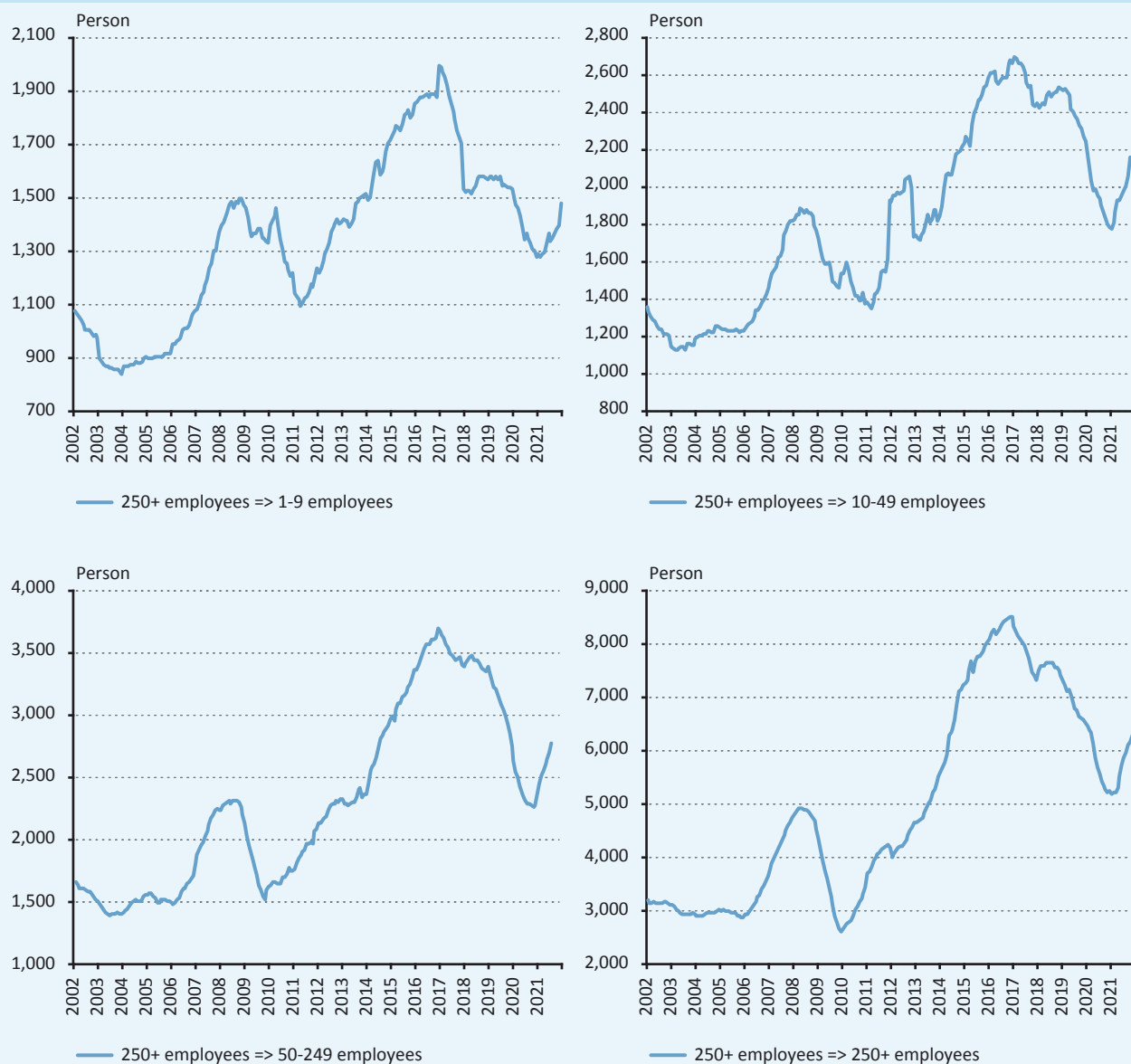
Source: Authors' calculations based on HST data.

Chart 29
Job-to-job changes from medium-sized enterprises



Source: Authors' calculations based on HST data.

Chart 30
Job-to-job changes from large enterprises



Source: Authors' calculations based on HST data.

6 Summary

In this study, we calculated labour flow rates for the period 2002–2021 using the comprehensive, anonymous database of the Hungarian State Treasury. For these labour flows, we distinguished between job-to-job flows and hires and separation.

The database includes all those who have paid pension contributions in Hungary. Moreover, for each contributor, it contains all employment relationships that are subject to contribution payment, hence, it may include several concurrent employment relationships for the same individual. For the same period, only one employment per individual was selected, that which provided the highest income of the simultaneous ones. Where there were two jobs with the same income, the one with the longer duration was used in our analysis. In addition, labour flow rates are distorted by company reorganisations and legislative changes. These had to be filtered out from the data.

After filtering, we got labour flow rates that are more reflective of actual flows. These suggest that job-to-job flow rates are procyclical, while hire and separation rates are less dependent on the cyclical state of the economy.

Labour flows are heterogeneous when examined according to different criteria. Geographically, hire and separation rates show an inverse correlation with the level of development. Men have a higher job-to-job rate than women. Young people are more likely to change jobs than older workers, while by firm size, those working for large companies are the least likely to move to another job. The higher the level of qualification required for a job, the lower the job-to-job rate.

There are several questions that might naturally arise not addressed in this study, but its scope did not allow any further exploration. Such is, for example, the description of occupation changers, a more in-depth presentation of job changers (e.g. by sector or broken down by age for the flows to the different firm size categories). Furthermore, it is possible to investigate the characteristics of job changers using other methods than descriptive statistics (e.g. regression analysis). Another interesting line of research could be to examine whether job-to-job trends help predict wage developments in Hungary, as has been shown for several countries.

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Appendix

FURTHER STEPS IN DATA CLEANING

For some observations, the end date in the contribution data was earlier than the start date, these were swapped assuming that they had been entered in the wrong order (a very rare occurrence in the database, only for 7 observations). For 2005, the legal status (employment classification) code shows separately the service charge (FD), and for 2006–2011, the simplified contributions to public dues (EKHO). These additional comments have been removed.

In addition, a single income variable was created from the maximum of the income on which pension contributions are calculated (jovedelem_1) and the income on which pension insurance contributions are calculated (jovedelem_2), and the original income variables were discarded. Very rarely, but for some observations, even this merger yielded negative values (due to errors or payroll corrections), so these were adjusted to 0. In some cases, some payments were included for more than one observation despite all the other job characteristics (employer, start and end of period, etc.) remaining the same, hence, these series were merged. The mergers affected around 3 per cent of the observations relative to the raw data.

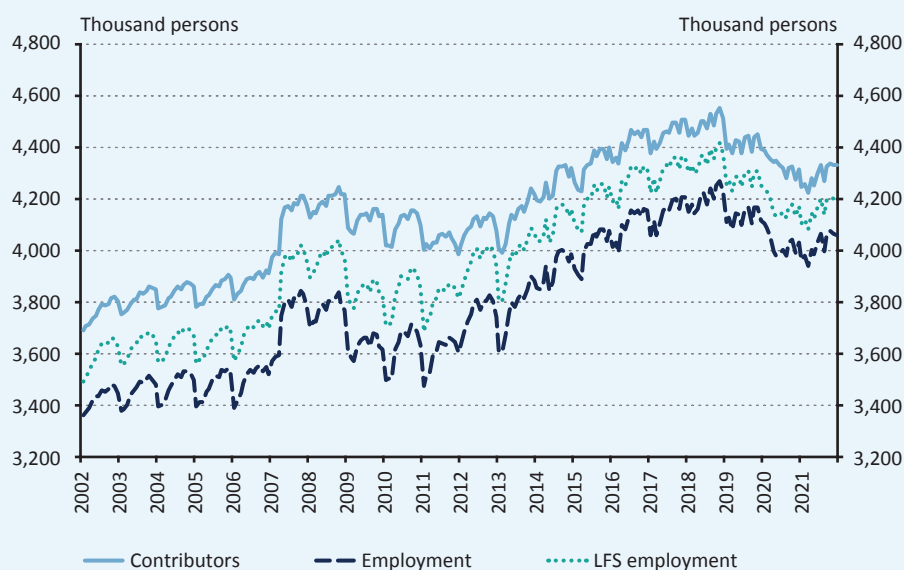
Table 4
Categorisation of insurance relationships by employment status

Name of insurance relationship	Employment status
Employee	Employed
Sole entrepreneur not engaged in an ancillary activity	Employed
Public worker	Employed
Partnership member not engaged in an ancillary activity	Employed
Agency contract OR other legal agreement to work	Employed
Full-time small-scale taxpayer	Employed
Public employment	Employed
Public servant, employment as a full-time mayor	Employed
Professional or contracted member of the armed forces, volunteer reserve soldier	Employed
Other (86 other relationships)	Employed
Unemployment benefit recipient	Non-employed
Recipient of tax-free unemployment benefit	Non-employed
Rehabilitation allowance recipient	Non-employed
Rehabilitation benefit or unemployment allowance recipient	Non-employed
Agreement for the purchase of time spent in work	Non-employed
Childcare benefit	Non-employed
Childrearing support	Non-employed
Childcare allowance	Non-employed
Care benefit	Non-employed
Carry-over severance pay	Non-employed
Cash benefits after the termination of insurance	Non-employed
Home nursing allowance for children	Non-employed

Source: Authors' categorisation based on Elek et al. (2009). Note: Of the many employment relationships, we have highlighted the most common by name.

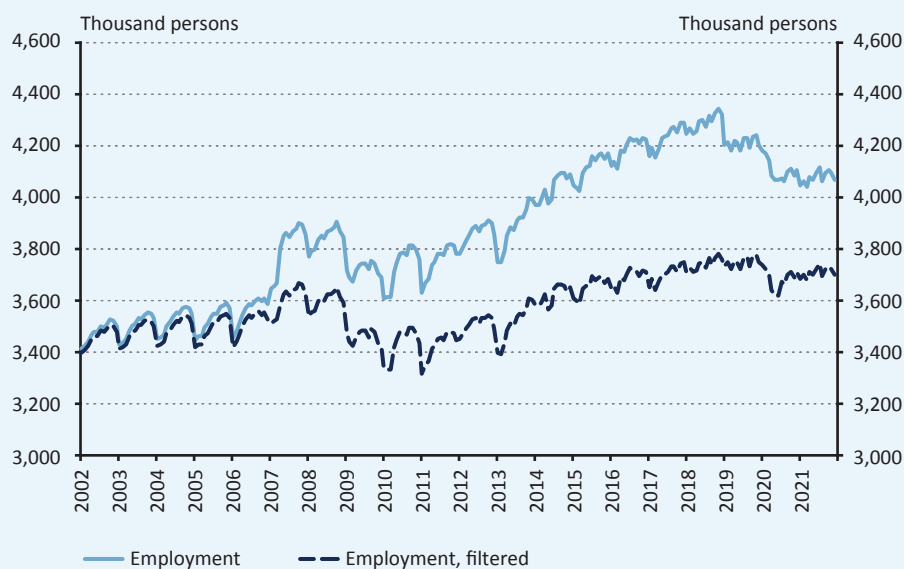
SUPPLEMENTARY CHARTS

Chart 31
Number of contributors and the employed



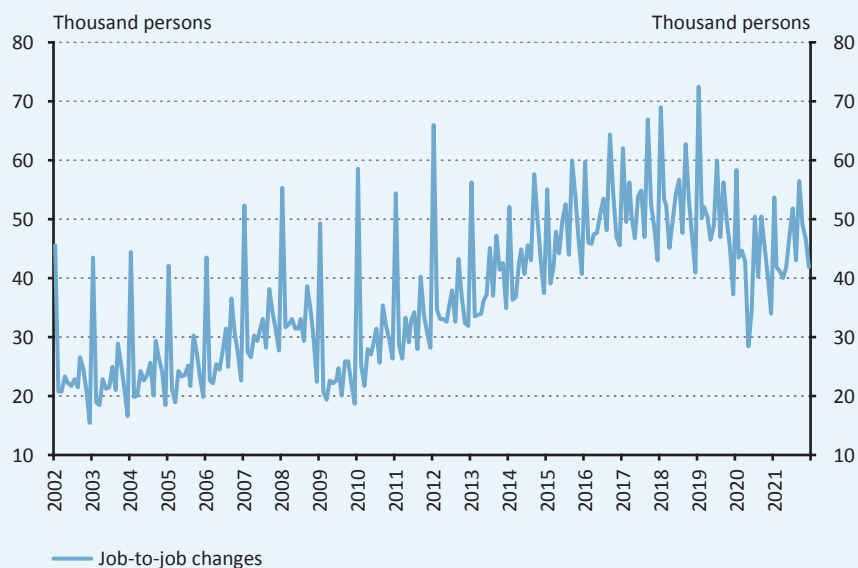
Source: Authors' calculations based on HST data. Note: LFS (Labour Force Survey) employment also includes childcare benefit/allowance recipients.

Chart 32
Number of the employed



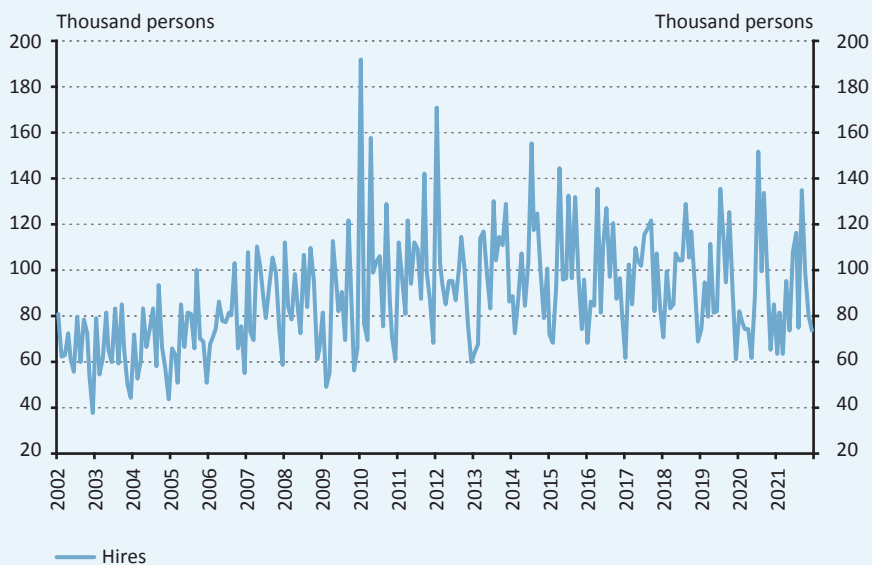
Source: Authors' calculations based on HST data. Note: Filtered employment includes men under 60 and women under 57.

Chart 33
Number of job-to-job changes



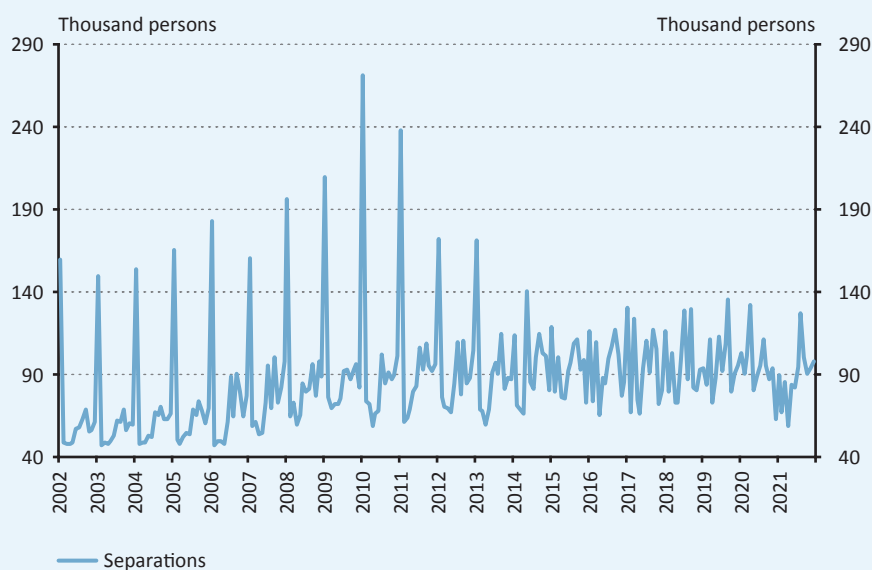
Source: Authors' calculations based on HST data.

Chart 34
Number of hires



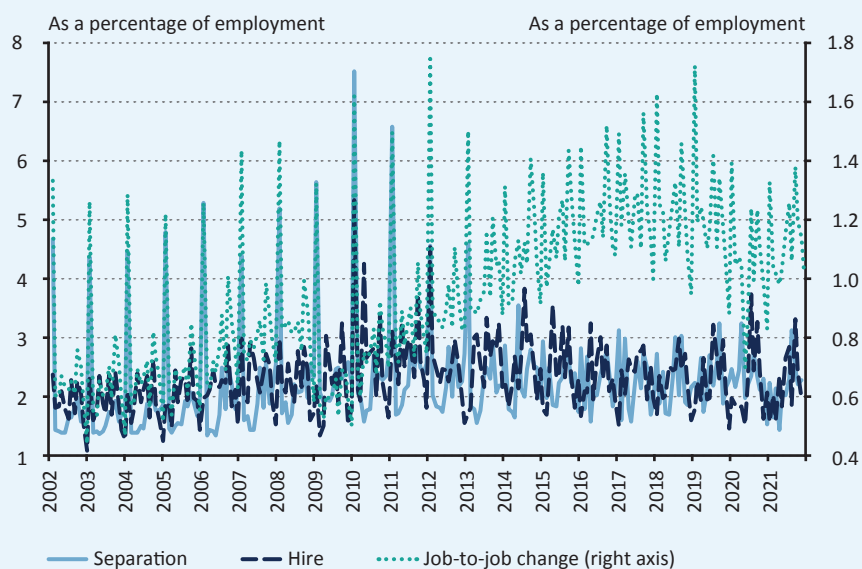
Source: Authors' calculations based on HST data.

Chart 35
Number of separations



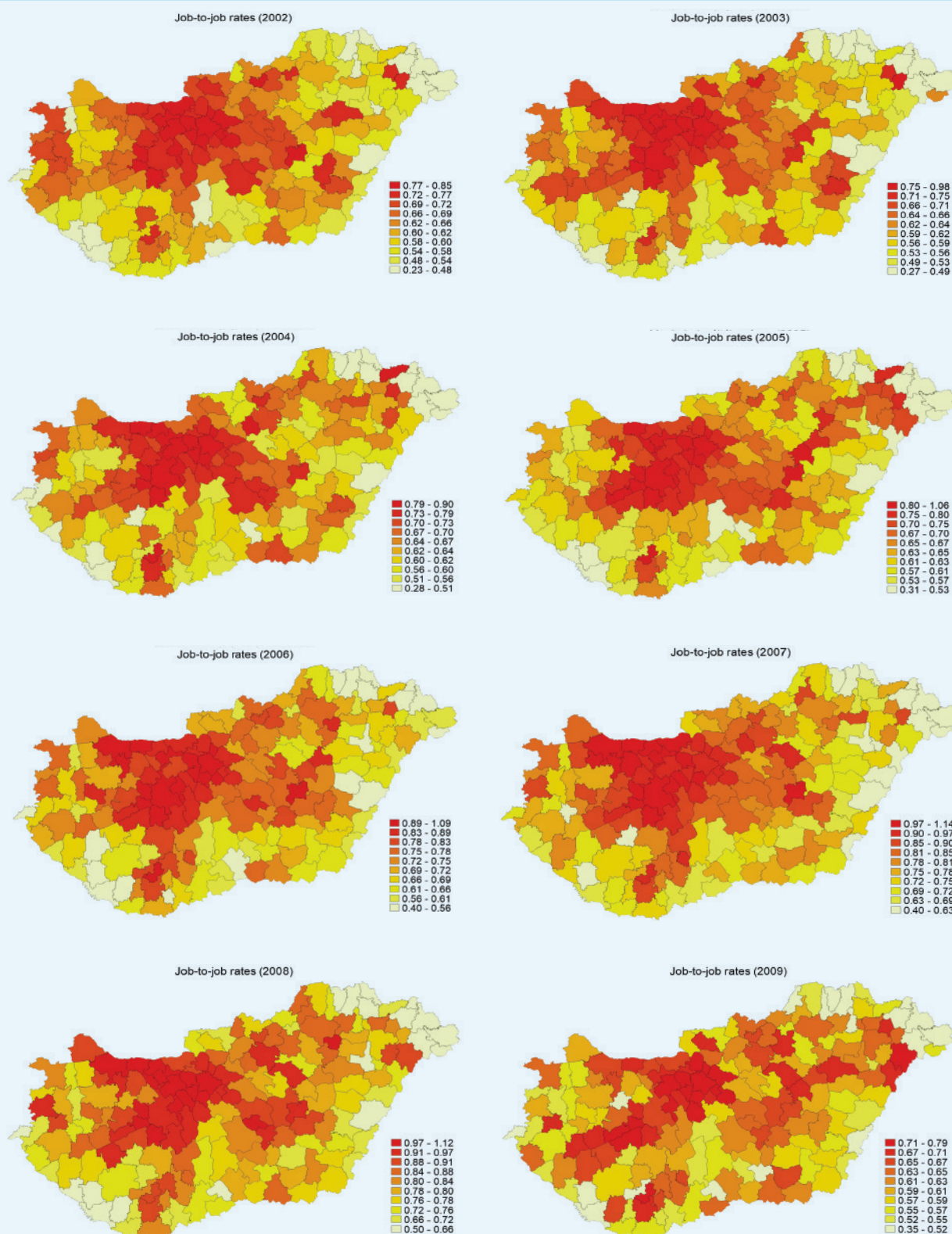
Source: Authors' calculations based on HST data.

Chart 36
Labour flow rates in the national economy



Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

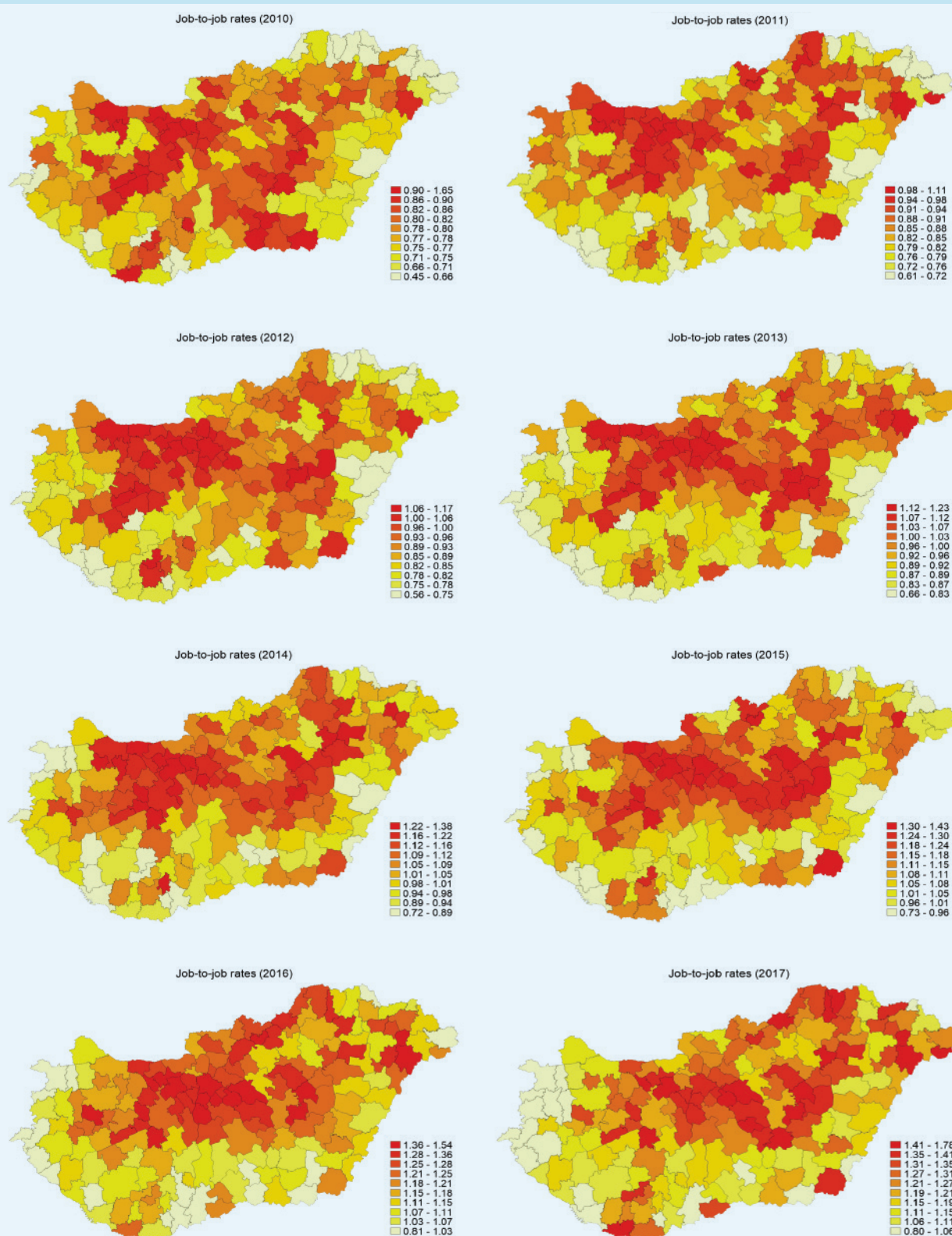
Chart 37
Job-to-job rates by district (2002–2021)



Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

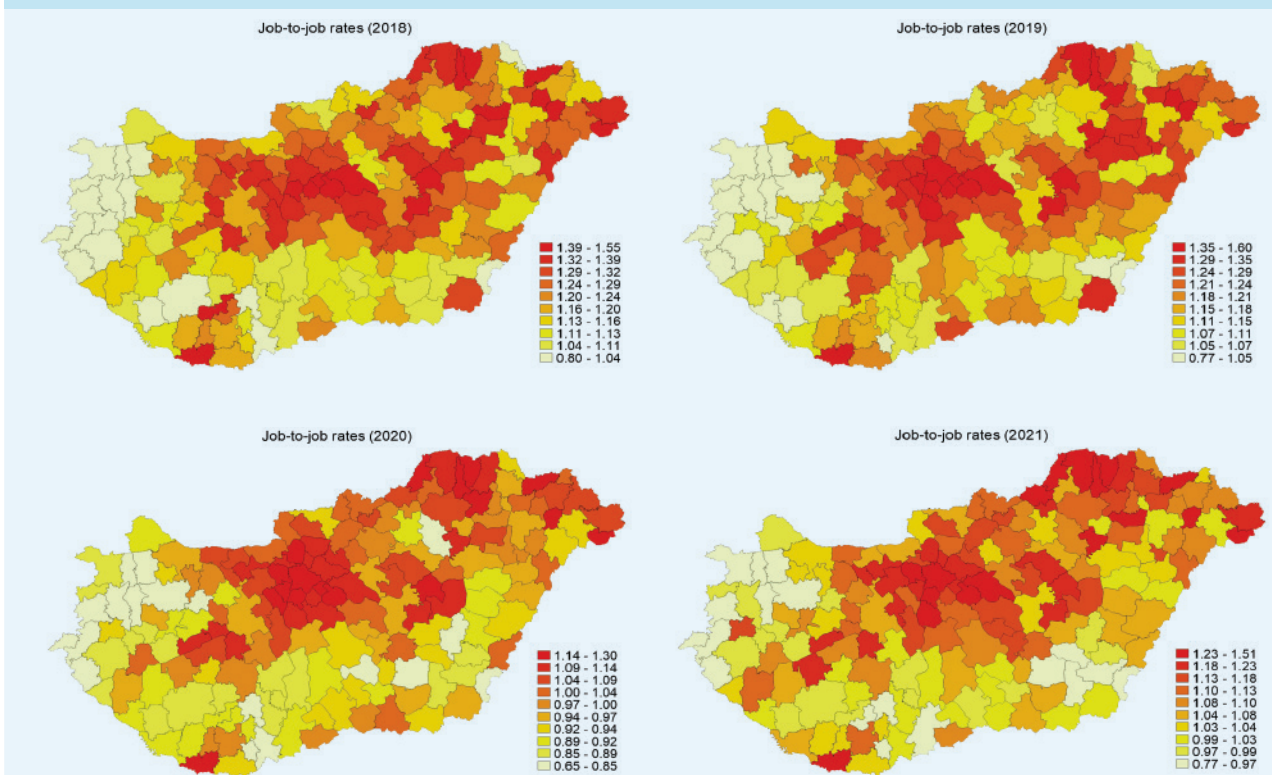
Chart 37
Job-to-job rates by district (2002–2021)



Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

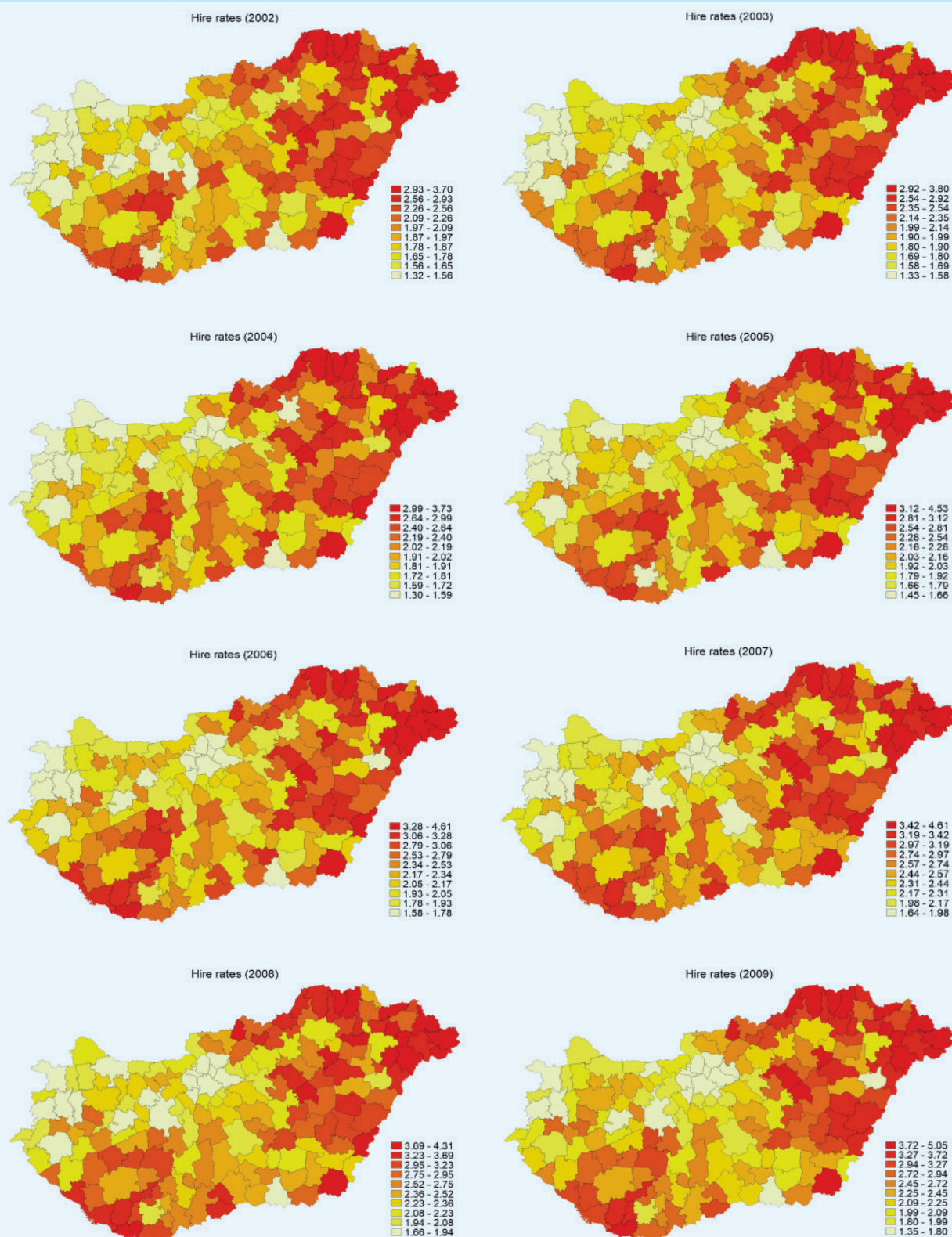
Chart 37
Job-to-job rates by district (2002–2021)



Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

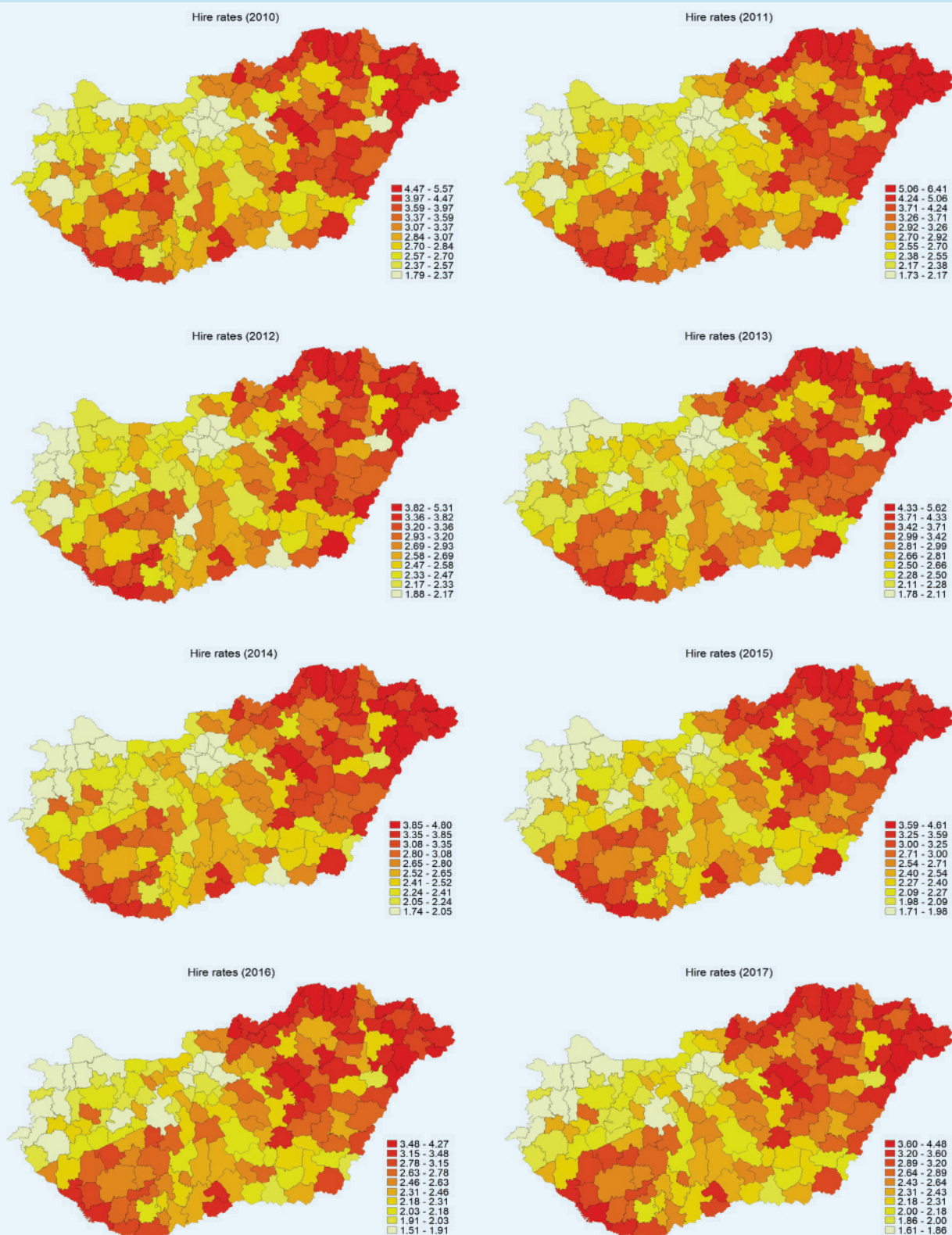
Chart 38
Hire rates by district (2002–2021)



Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

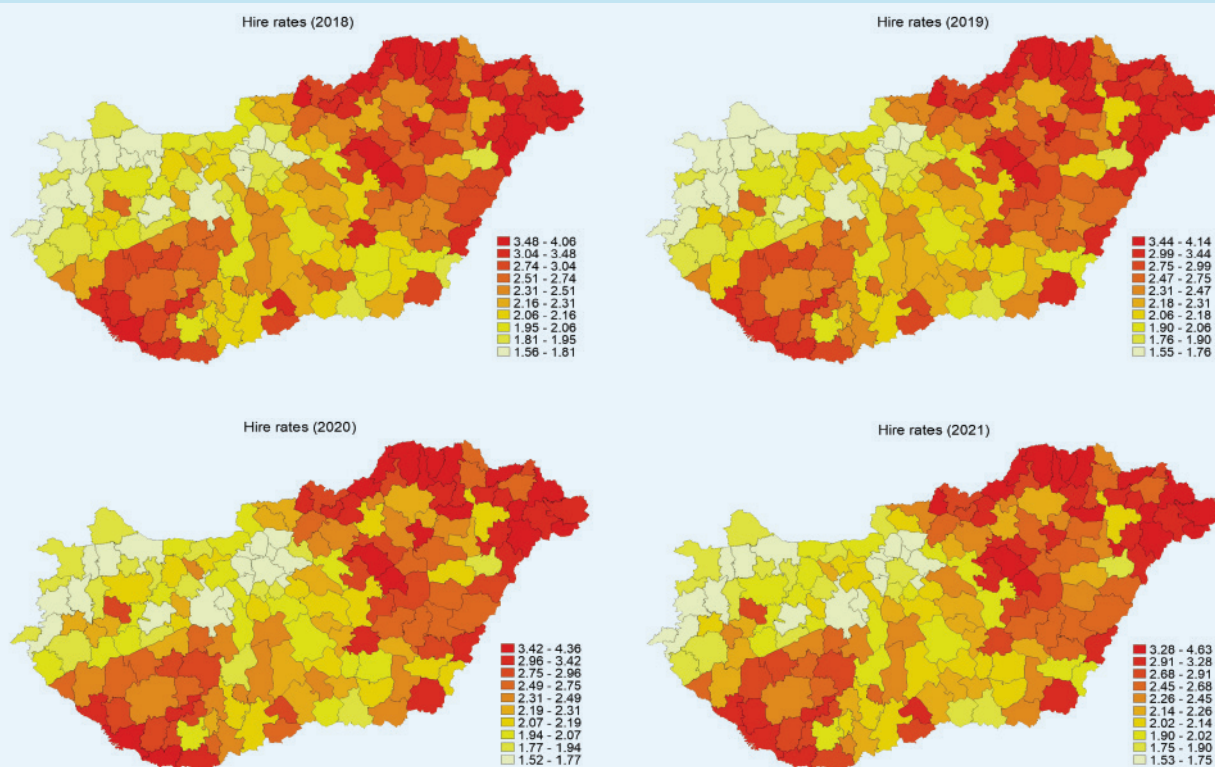
Chart 38
Hire rates by district (2002–2021)



Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

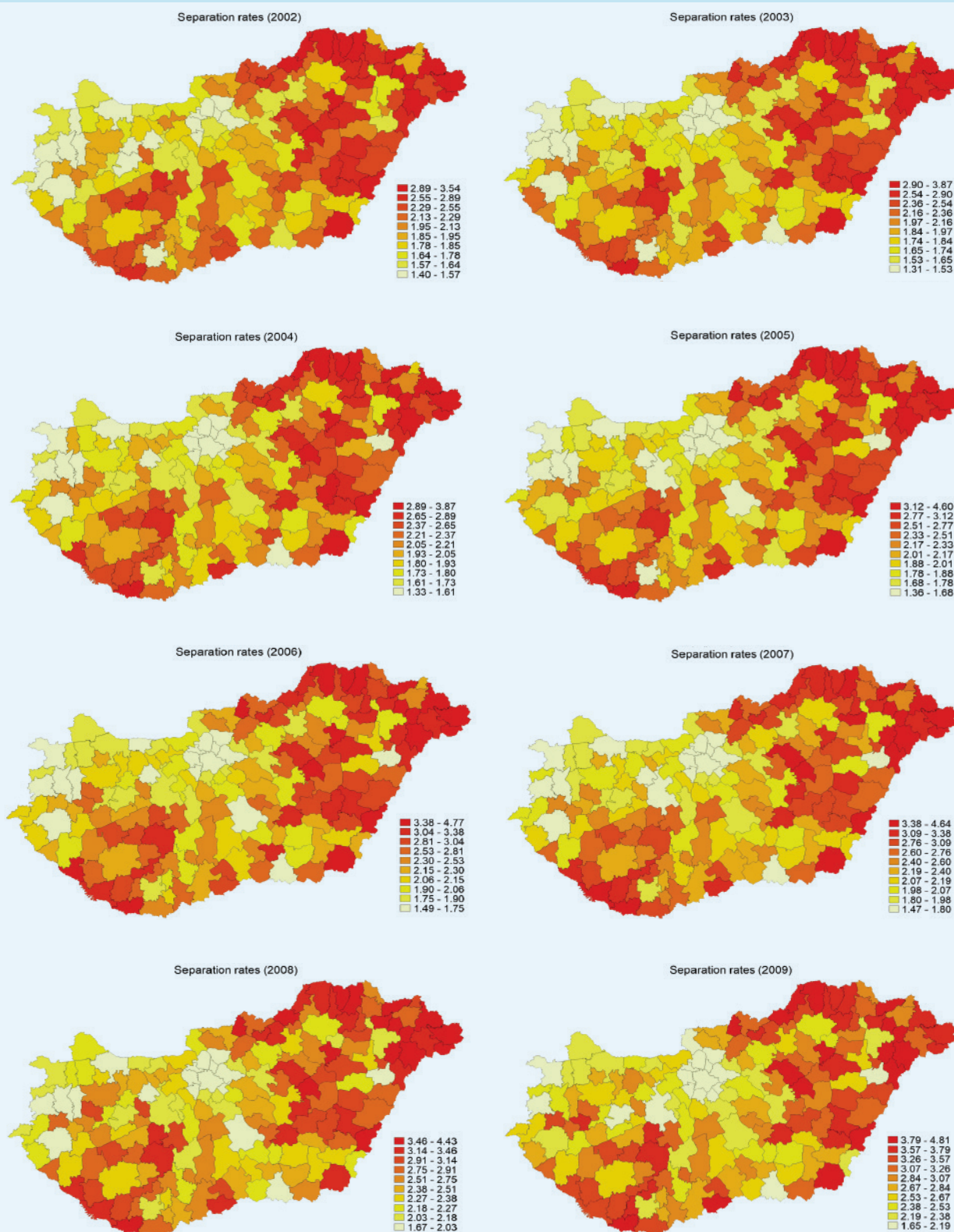
Chart 38
Hire rates by district (2002–2021)



Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

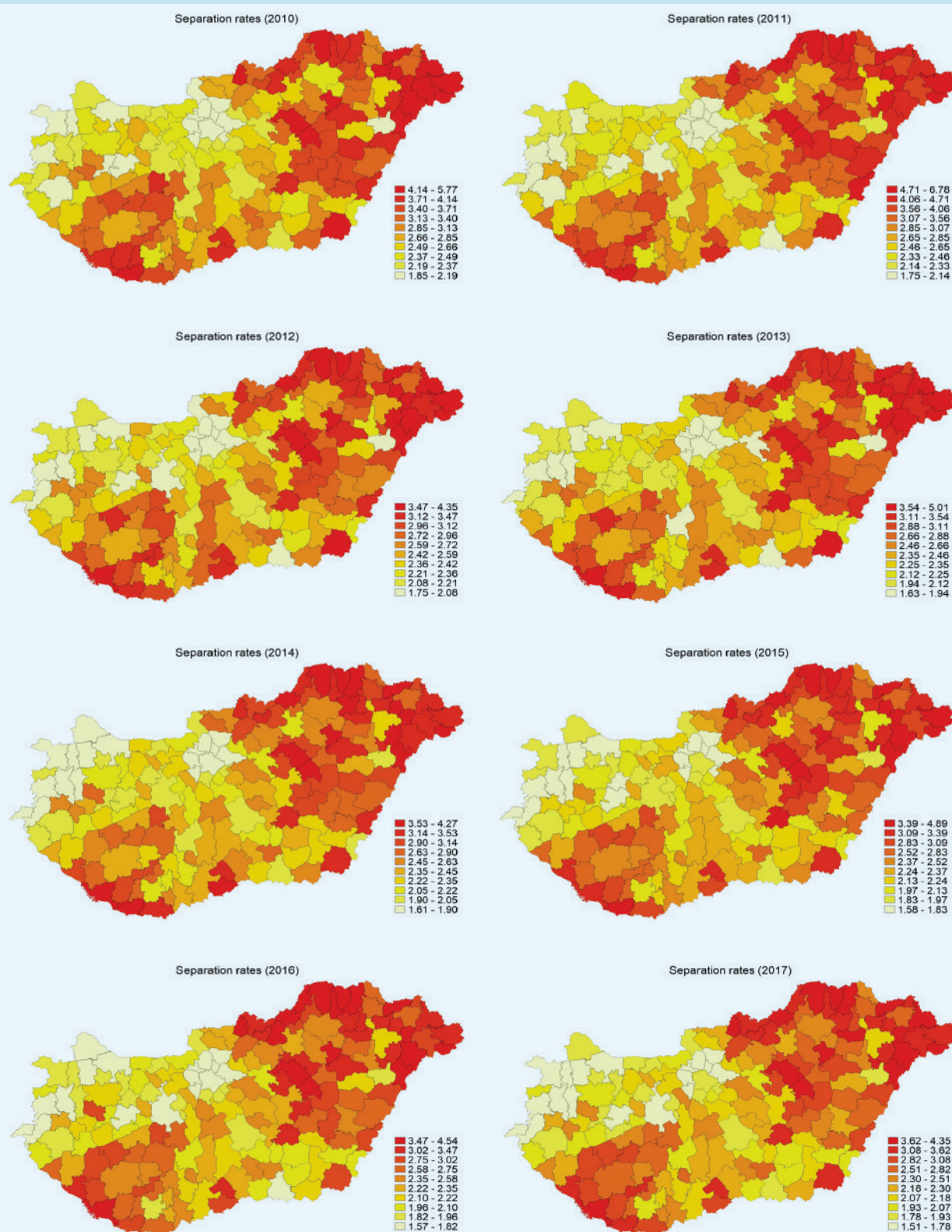
Chart 39
Separation rates by district (2002–2021)



Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

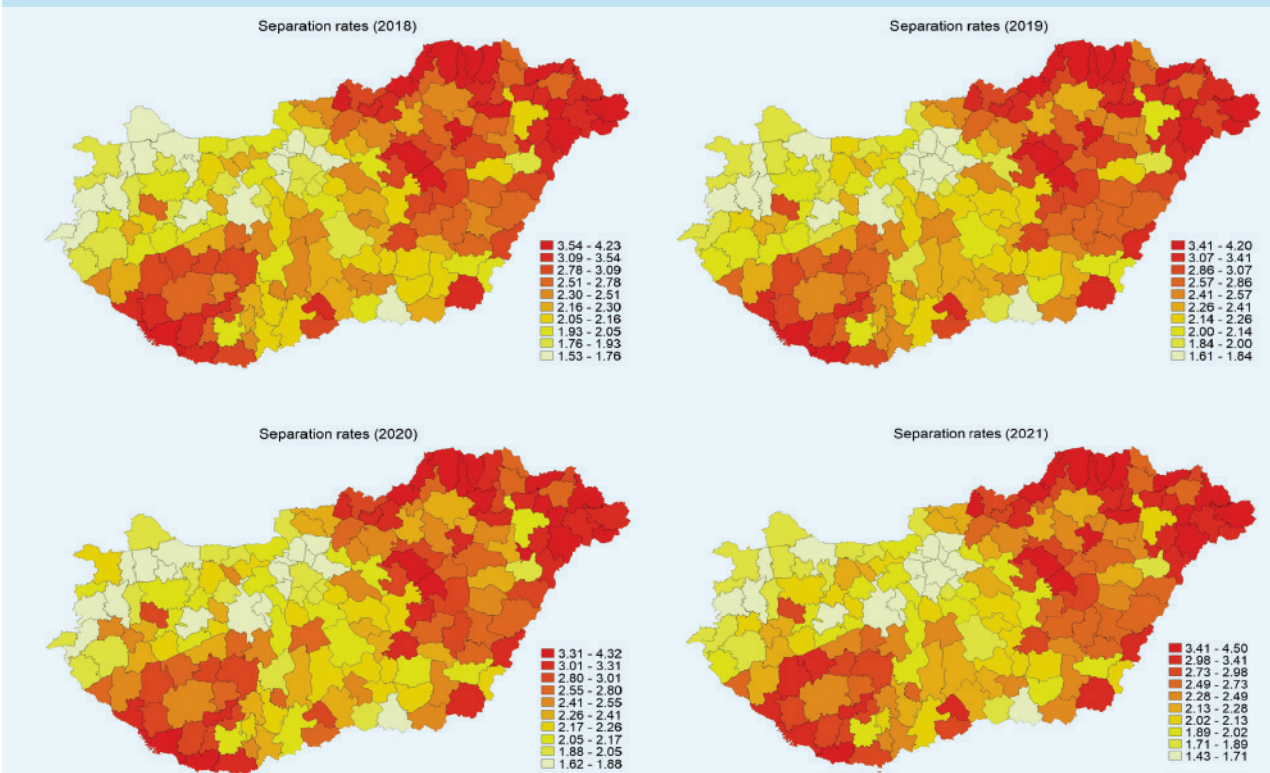
Chart 39
Separation rates by district (2002–2021)



Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

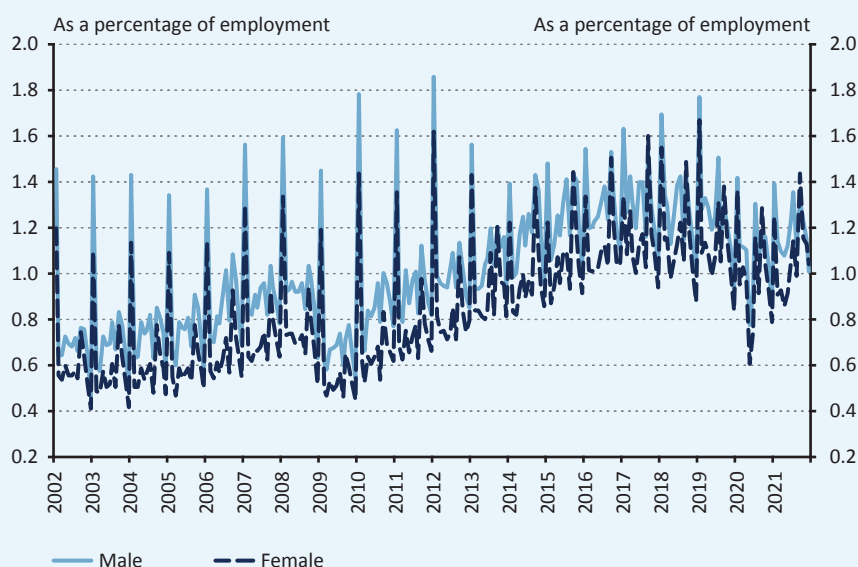
Chart 39
Separation rates by district (2002–2021)



Source: Authors' calculations based on HST data.

Note: As a percentage of employment.

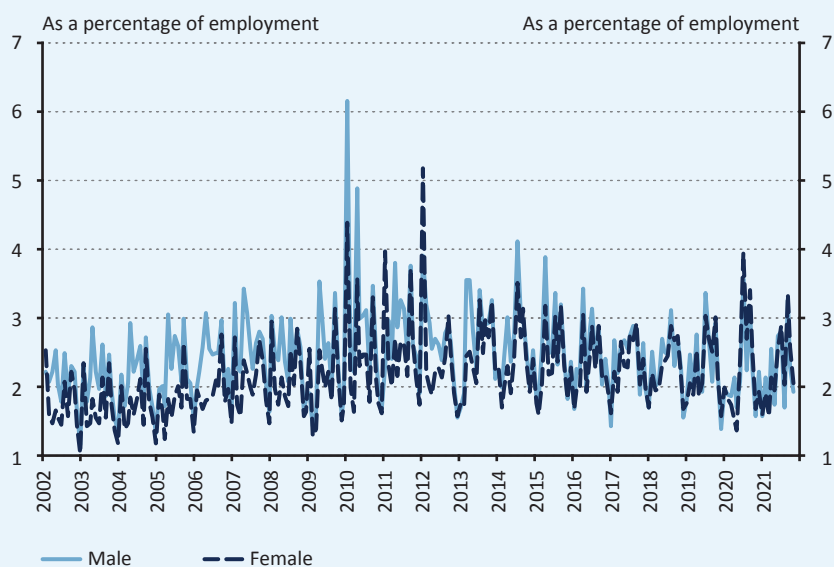
Chart 40
Job-to-job rates by sex



Source: Authors' calculations based on HST data.

Note: As a percentage of employment in the group concerned.

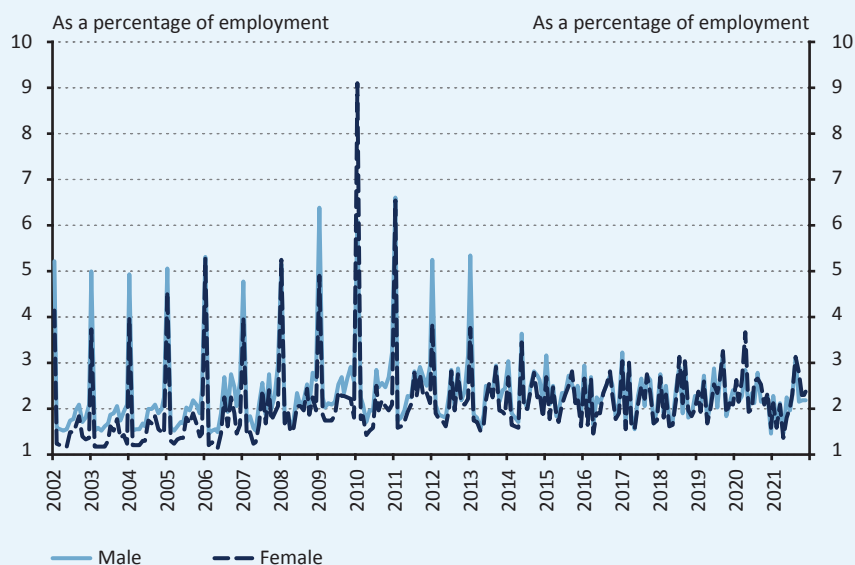
Chart 41
Hire rates by sex



Source: Authors' calculations based on HST data.

Note: As a percentage of employment in the group concerned.

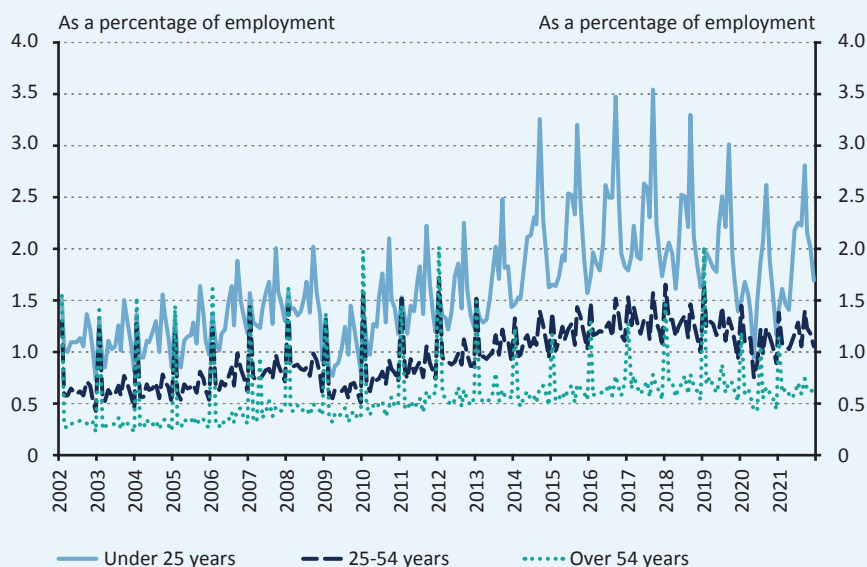
Chart 42
Separation rates by sex



Source: Authors' calculations based on HST data.

Note: As a percentage of employment in the group concerned.

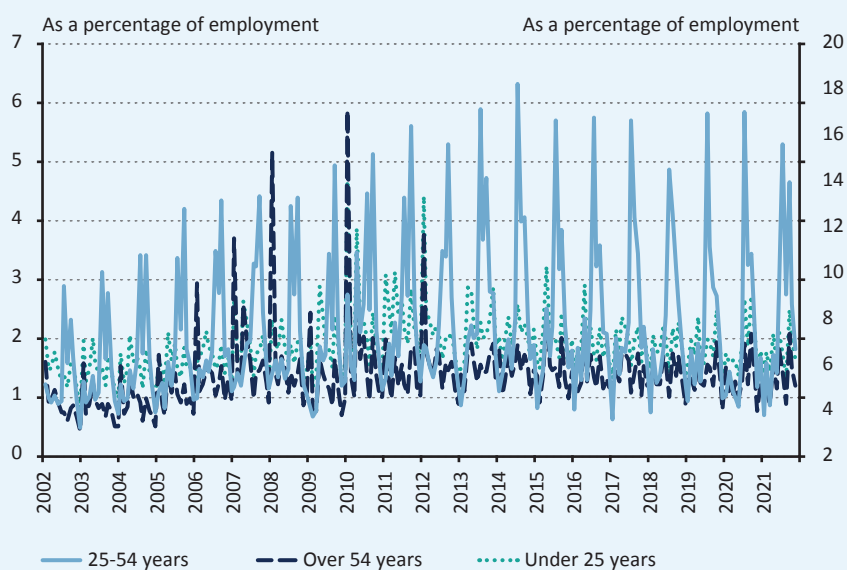
Chart 43
Job-to-job rates by age group



Source: Authors' calculations based on HST data.

Note: As a percentage of employment in the group concerned.

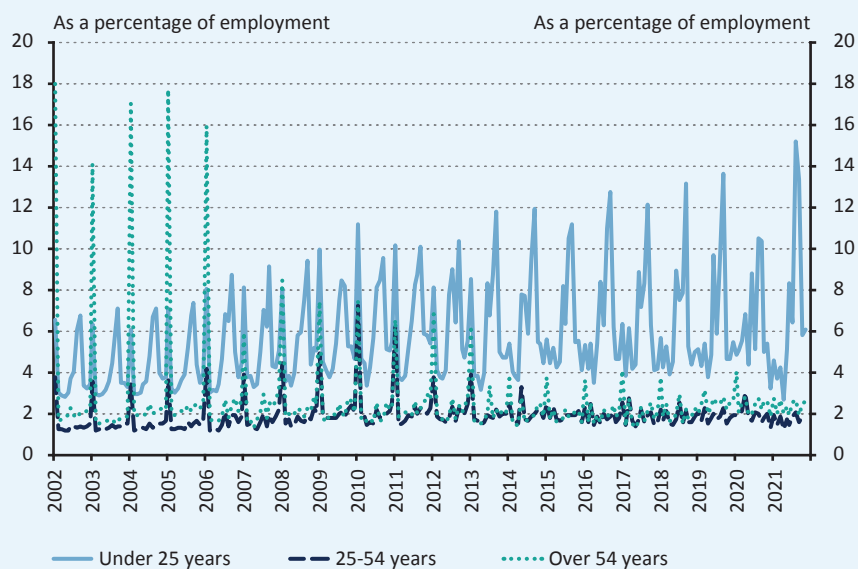
Chart 44
Hire rates by age group



Source: Authors' calculations based on HST data.

Note: As a percentage of employment in the group concerned.

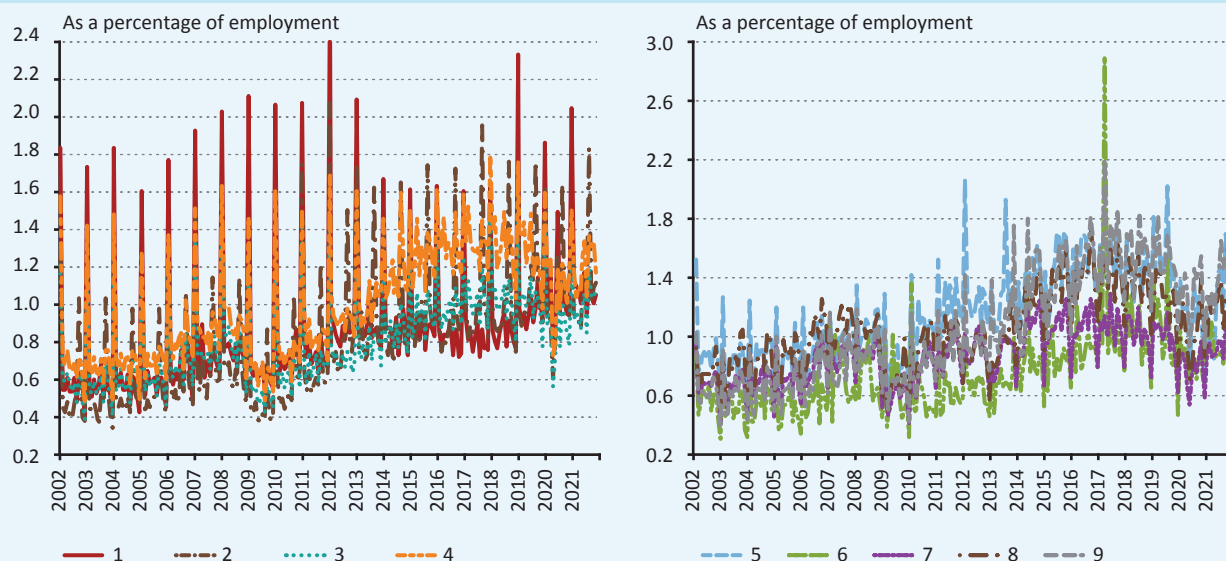
Chart 45
Separation rates by age group



Source: Authors' calculations based on HST data.

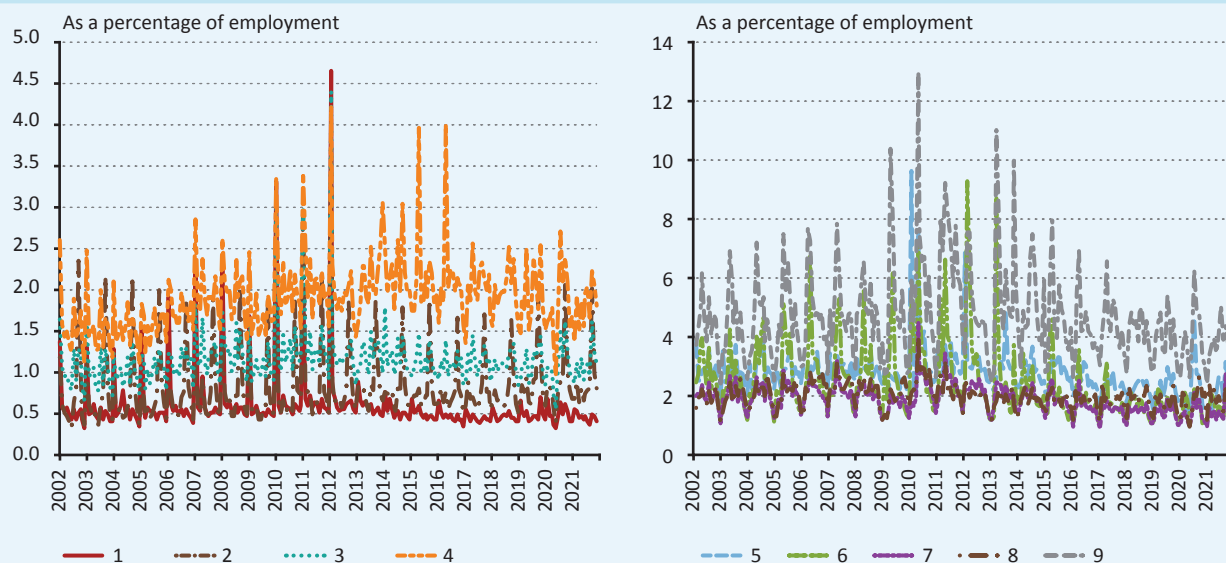
Note: As a percentage of employment in the group concerned.

Chart 46
Job-to-job rates by main occupation category



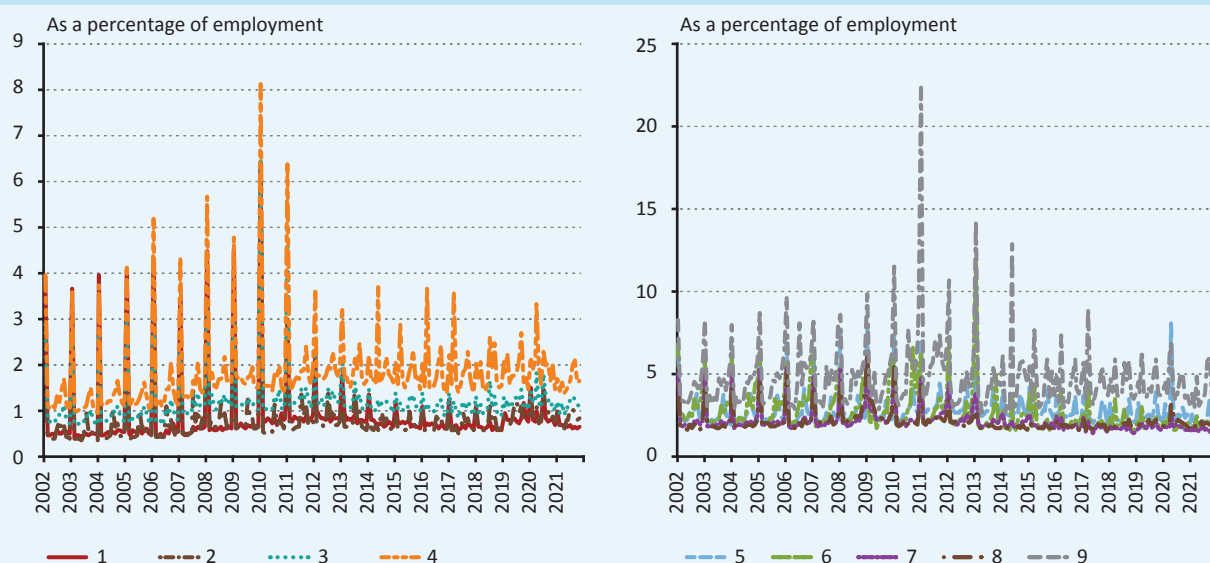
Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

Chapter 47
Hire rates by main occupation category



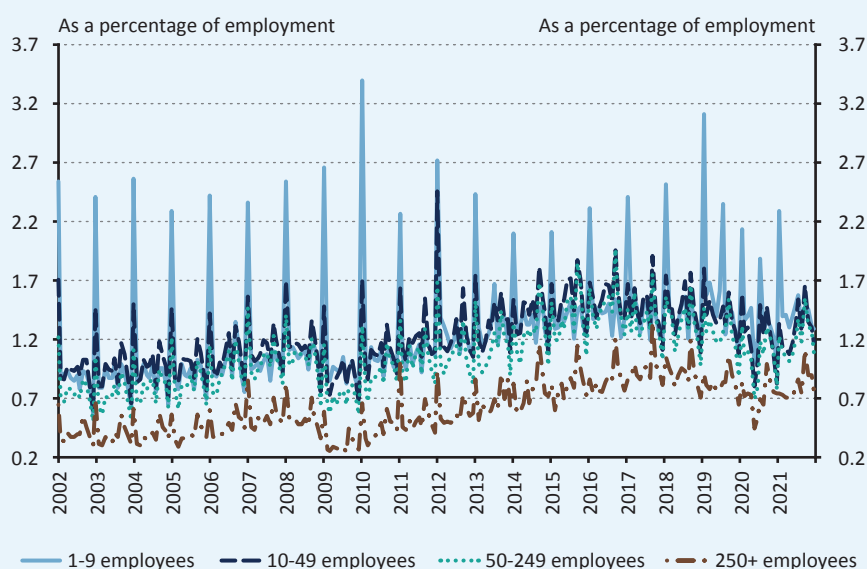
Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

Chart 48
Separation rates by main occupation category



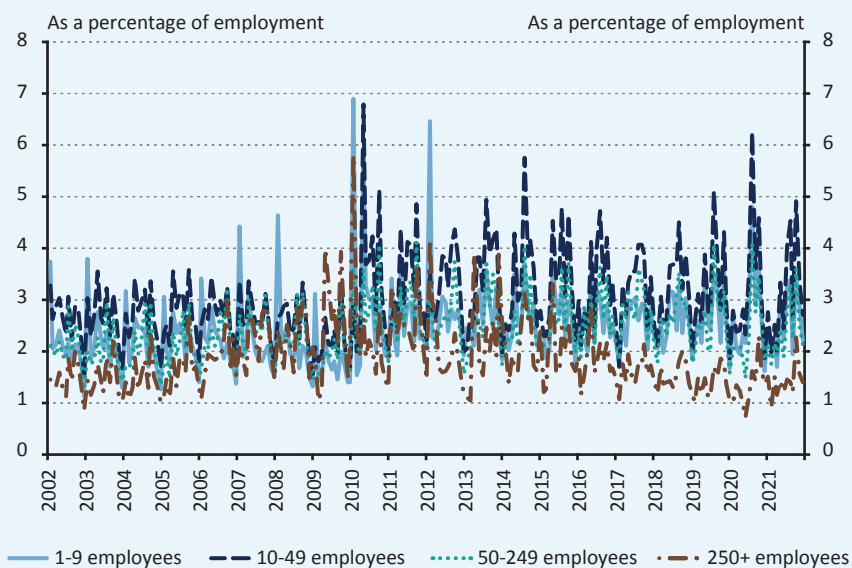
Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

Chart 49
Job-to-job rates by firm size category



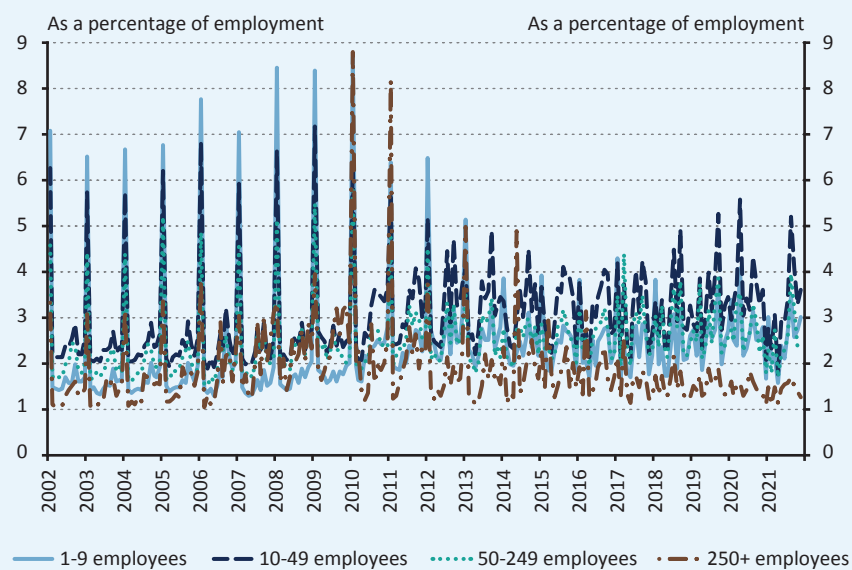
Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

Chart 50
Hire rates by firm size category



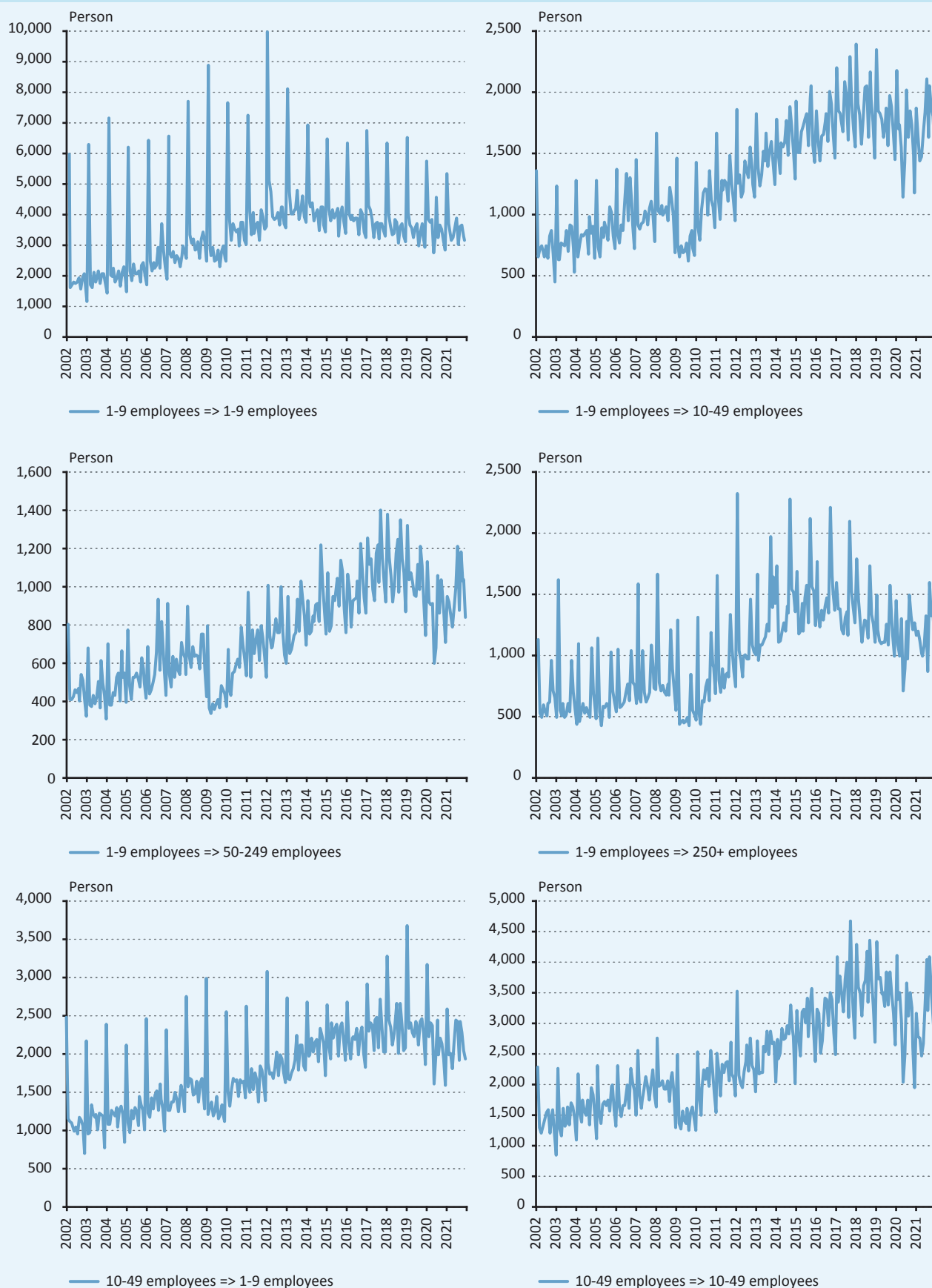
Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

Chart 51
Separation rates by firm size category

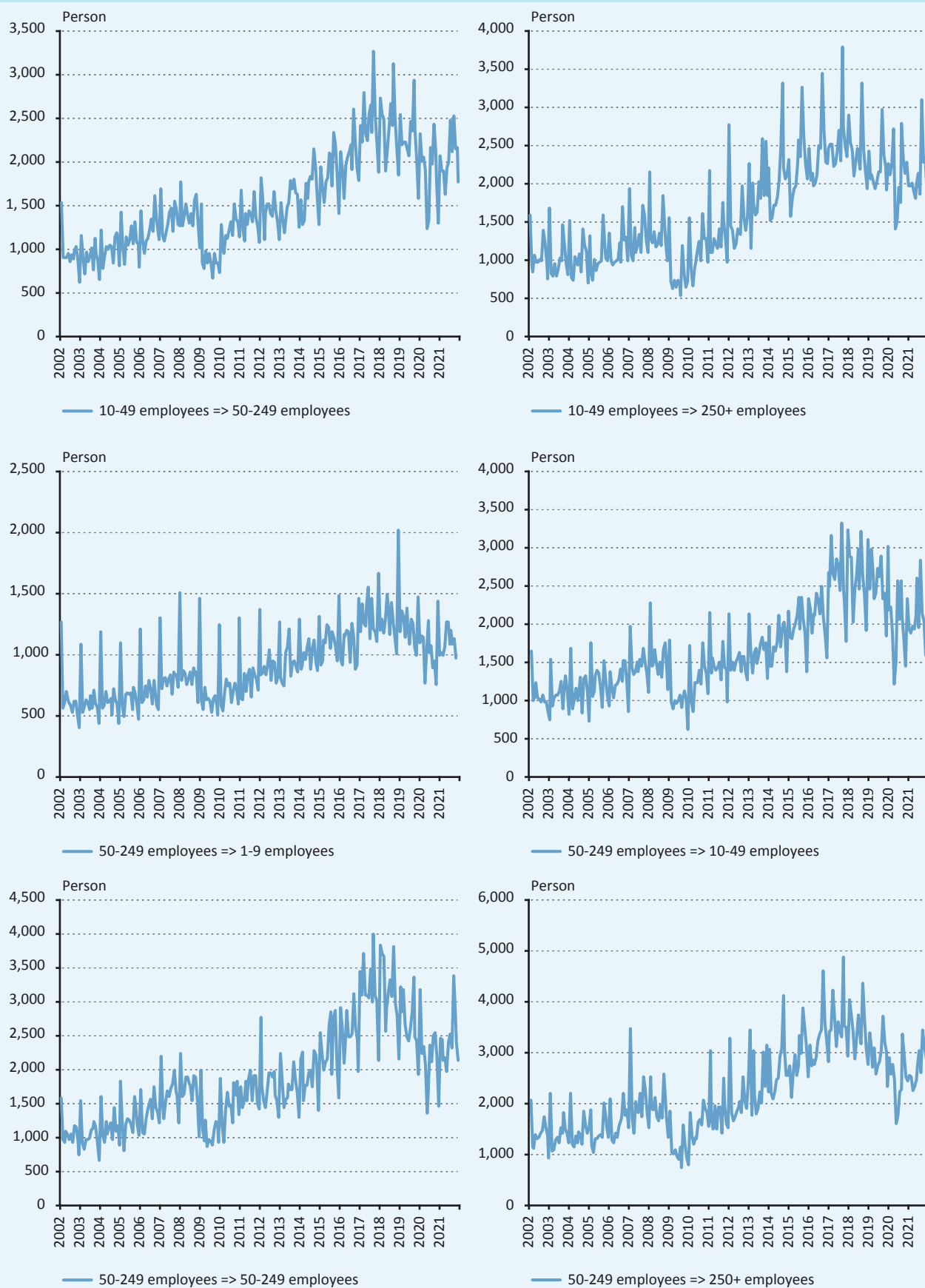


Source: Authors' calculations based on HST data. Note: As a percentage of employment in the group concerned.

Chart 52
Job-to-job flow rates between size categories

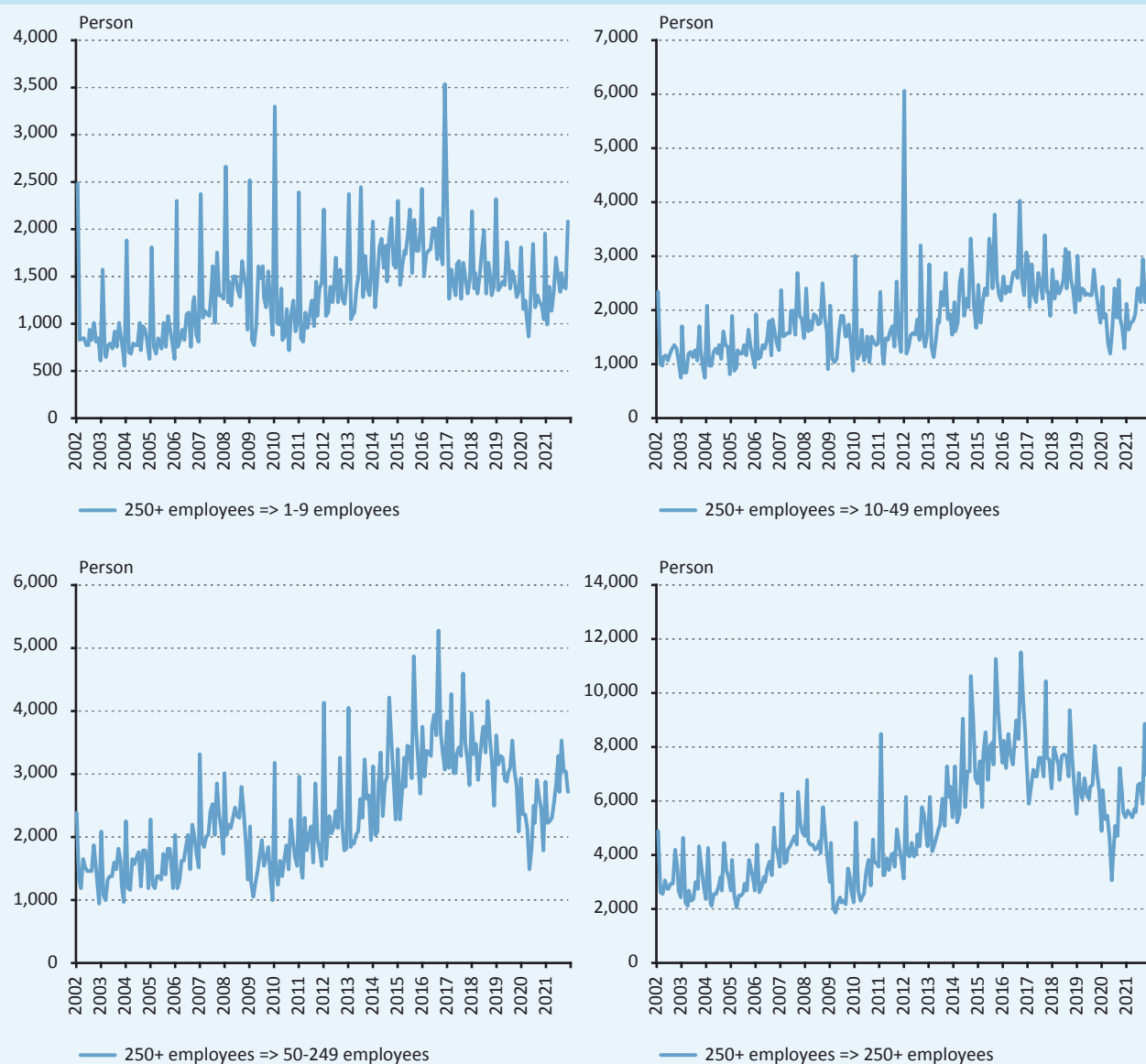


Source: Authors' calculations based on HST data.

Chart 52**Job-to-job flow rates between size categories**

Source: Authors' calculations based on HST data.

Chart 52
Job-to-job flow rates between size categories



Source: Authors' calculations based on HST data.

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