

Labor Turnover and Bank Risk

Lars Norden^{a,b,*}, Bernardus Van Doornik^{c,d}, Weichao Wang^a

^a *Brazilian School of Public and Business Administration, Getulio Vargas Foundation, Brazil*

^b *EPGE Brazilian School of Economics and Finance, Getulio Vargas Foundation, Brazil*

^c *Central Bank of Brazil, Brazil*

^d *Bank for International Settlements*

Abstract

We investigate whether labor turnover affects bank risk and performance in commercial lending using monthly matched employer-employee data from Brazil during 2003-2019. Banks with higher labor turnover show lower loan loss reserves and higher loan growth paired with lower profitability. We address identification issues with local peer-group labor turnover as instrument and in placebo tests. Our findings are consistent with labor turnover deteriorating a bank's institutional memory and soft information production, promoting a risk culture characterized by high growth in transactions lending and short-termism. The evidence points at a critical channel through which labor markets affect bank risk and performance.

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* The authors thank Klenio Barbosa, Rafael Goldszmidt, Felipe Iachan and Gregory F. Udell for helpful comments. Corresponding author: Lars Norden, Brazilian School of Public and Business Administration, Getulio Vargas Foundation, Rua Jornalista Orlando Dantas 30, 22231-010 Rio de Janeiro, RJ, Brazil. Phone: +55 21 3083 2431. E-mail (Lars Norden): lars.norden@fgv.br.

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1. Introduction

Economic activity heavily depends on the labor force. Physical labor has been progressively replaced by automatized production processes since the industrial revolution, but intellectual work related to the production and processing of complex information remains a key domain of people, even more so in the modern information economy. One particularly relevant example is bank lending to firms, which relies on information and people. Banks' main role – reduce asymmetric information to allocate capital efficiently – is performed through decentralized information production by loan officers. These bank employees produce hard and soft information about borrower risk and manage the bank-borrower relationships. Soft information is difficult to produce, interpret and store because of the institutional and market frictions (e.g., Berger and Udell, 2004; DeLong and DeYoung, 2007; Hertzberg, Liberti and Paravasini, 2010; Bouwman and Malmendier, 2015; Liberti and Petersen, 2019). Surprisingly, the literature has not directly investigated the effects of labor disruptions on bank information production and their consequences for risk and performance. This issue is especially relevant, because banks are – unlike many other industries – of systemic importance. If banks do not perform their main role well, take excessive risks and ultimately fail, the rest of the economy will suffer negative real effects very quickly.

In this paper, we investigate whether labor turnover affects bank risk and performance in commercial lending. We base our analysis on a novel and unique dataset that contains monthly employer-employee data from Brazilian banks at the municipality level during the period from January 2003 to December 2019. Our main hypothesis is that labor turnover deteriorates a bank's institutional memory and thereby imposes unfavorable effects on its risk buffer, loan growth and profitability. We base this hypothesis on three potential effects. First, labor turnover may unfavorably affect a bank's soft information production, learning about local borrowers and relationship lending. Second, labor turnover may lead to an atrophy of expertise and

experience of bank employees over time through hiring junior officers and firing senior ones. Third, next to the distortions of labor turnover on soft information production and expertise in the short term, labor turnover may adversely influence a bank's inherent risk culture in the long term.

We consider a broad set of labor turnover measures based on the hiring, resignation, dismissal and transfer decisions for bank employees. Note that labor turnover, defined as the sum of hired and fired employees relative to the total of employees, differs from employment growth. For example, a bank may hire 20% new employees and fire 20% of its existing employees, showing a turnover of 40% and employment growth of 0%. In other words, labor turnover captures differential effects of hiring, firing or both because of the underlying qualitative changes in a bank's labor force (even if the net quantitative change is zero) that may have disruptive effects on information production. In our baseline analysis, we examine whether labor turnover affects a bank's credit risk buffer, loan growth and profitability at the bank-municipality level.

We employ several strategies to ensure that these effects are well identified, thereby mitigating potential concerns about endogeneity related to reverse causality, omitted variable bias and measurement error. We deal with these issues in a multivariate panel data analysis, a local sectorial peer-group based instrumental variable (IV) regression analysis, placebo tests and further checks. In the IV analysis, we use the peer-group labor turnover of local sectors – excluding the specific banks – as instruments for bank labor turnover. The peer-group labor turnover should be positively correlated with bank labor turnover due to their shared local labor market dynamics but uncorrelated with an individual bank's financial conditions. We also conduct placebo tests using the labor turnover of employees in job positions of non-financial services within banks as placebos to check whether our results are driven by unobserved shocks or random confounders within banks.

Moreover, we isolate the labor turnover of transferred employees within banks since within-bank employee transfers should not be endogenously related to bank's own financial conditions in economic booms and busts as they do not affect the overall payroll costs. Finally, we examine the labor turnover of the subgroups of bank employees, such as bank loan officers, newly hired junior employees, and bank employees hired and transferred across different municipalities, to further examine the differential effects on bank risk and performance in commercial lending.

We find the following main results. First, labor turnover has significantly unfavorable effects on bank risk and performance in commercial lending. Higher labor turnover leads to lower risk buffers in loan loss reserves and higher loan growth paired with lower profitability in return on assets for banks in the short and long term. These unfavorable effects are mainly driven by the labor turnover of newly hired and transferred bank employees. Second, the IV analysis using the peer-group labor turnover of local sectors as instruments for bank labor turnover confirms these results. The placebo tests show that our results are not driven by unobserved local contemporaneous shocks or random temporal labor confounders within banks. Third, the unfavorable effects of labor turnover are smaller for bank-internal employee transfers and larger for bank loan officers, junior employees and bank employees hired and transferred from different municipalities.

In the further empirical checks, we provide evidence on the underlying mechanisms through which labor turnover impacts bank risk and performance in commercial lending. First, banks that display high labor turnover lend more to non-investment grade rated borrowers and make more corporate and agriculture loans. Second, banks with larger employee age and salary differentials due to labor turnover show stronger unfavorable effects on risk and performance. Third, we examine the heterogeneous effects of bank ownership, bank size and local bank competition. State-owned banks with higher labor turnover have larger unfavorable effects on

the risk buffer, loan growth and profitability than privately owned banks. Small banks with high labor turnover have larger unfavorable effects on the risk buffer and loan growth than large banks. Banks with high labor turnover in municipalities with high local bank competition show smaller unfavorable effects on bank risk buffer, loan growth and profitability than banks in municipalities with low local bank competition. This result suggests that local bank competition has a disciplining effect on bank risk-taking.

This paper contributes to three strands of the literatures on banking, finance and labor. First, this paper contributes to the studies on the information production and learning in bank lending. Theoretical work has shown how banks make lending decisions using soft information on borrower risk (Rajan, 1992; Mullainathan, 2002; Stein, 2002). Empirical work has documented that soft information improves loan contracting and serves as basis for relationship lending (e.g., Diamond, 1991; Petersen and Rajan, 1994; Berger and Udell, 1995; Boot, 2000; Uchida, Udell, Yamori, 2012; Kysucky and Norden, 2016). Bank loan officers play a critical role in soft information production. There is also evidence that loan officers significantly influence on the design and performance of syndicated loans to large firms (e.g., Bushman, Gao, Martin and Pacelli, 2021; Herpfer, 2021). Nevertheless, institutional frictions and incentives influence a loan officer's ability to produce and process soft information (e.g., Stein, 2002; Berger and Udell, 2002, 2004; DeLong and DeYoung, 2007; Alessandrini, Presbitero and Zazzaro, 2009; Liberti and Mian, 2009; Liberti, Hertzberg and Paravasini, 2010; Bouwman and Malmendier, 2015; Liberti and Petersen, 2019). Berger and Udell (2004) show that the deterioration of bank ability to recognize potential loan problems as time passes since last loan default leads to an easing of credit standards. They attribute this deteriorated "institutional memory" to the inexperience and skill atrophy of loan officers to differentiate low-quality from high-quality borrowers. Bouwman and Malmendier (2015) document that the experience of past macro-economic and bank-specific shocks affects bank's capital and risk-taking. Our paper provides

novel and direct evidence indicating that labor turnover disrupts banks' information production, resulting in adverse effects on risk and performance in commercial lending.

Second, our study contributes to research on bank risk-taking and risk culture. Theoretical literature on corporate culture in economics is reviewed in a thorough survey by Hermalin (2001). Stulz (2016) provides a comprehensive review on how governance, culture, and risk management affect risk-taking in banks. Song and Thakor (2019) formalize bank culture as an institutional behavior that affects growth and safety and makes it possible to improve on outcomes beyond incentive contracting. Empirical studies document the determinants of risk-taking and the persistence of risk culture of banks (e.g., Foos, Norden and Weber, 2010; Fahlenbrach, Prilmeier and Stulz, 2012, 2018; Cheng, Hong and Scheinkman, 2015; Pacelli, 2019; Bertay and Uras, 2020; Bui, Chen, Hsu and Lin, 2020). Pacelli (2019) demonstrates that the corporate risk culture of financial institutions is associated with less accurate forecasts and less informative reports of financial analysts. Bui, Chen, Hsu and Lin (2020) find that unionized banks have lower loan default probabilities and tail risk in stock returns, suggesting that labor preferences shape the risk culture of banks. Gao, Kleiner and Pacelli (2020) find that downgrades and defaults are positively associated with turnover of bank mid-level employee. Labor turnover may also have adverse consequences on bank short-term risk-taking and long-term risk culture in terms of risk awareness, risk taking and risk management. Our paper sheds light on whether and how labor turnover impacts bank's short-term risk-taking and also shapes its innate long-term risk culture in commercial lending. Previous studies largely focus on the role of top executives and board members in mitigating firm risk-taking (e.g., Fahlenbrach and Stulz, 2011; Ellul and Yerramilli, 2013; Cheng, Raina and Xiong, 2014). Departing from these studies, we focus on the decentralized bank labor force at the municipality level that is directly involved in daily lending and show how their turnover affects bank risk and performance.

Third, we contribute to research on labor mobility, industry-specific labor dynamics and

the consequences of labor decisions such as hiring, firing and transfers within firms. Theoretical research has shown how search and matching frictions in the labor market affects the performance, productivity and salary of workers (e.g., Malcomson, 1984; Arnott and Stiglitz, 1985; Moscarini and Postel-Vinay, 2013). Bond and Glode (2014) theoretically show that banks hire more employees in financial booms but the misbehavior of employees also increases due to the competitive labor forces. Empirical research has also documented that labor mobility and the job ladder significantly impact workers' human capital, productivity and income dynamics over economic cycles (e.g., Tate and Yang, 2015; Haltiwanger, Hyatt and McEntarfer, 2018; Jung and Kuhn, 2019). Bradley, Choi and Clarke (2011) and Gao, Wang and Yu (2021) document that the migration of high-performing investment bankers imposes significant effects on the market share of the gaining and losing banks in Merger & Acquisition (M&A) deals. Drexler and Schoar (2014) document adverse effects on information production and lending when loan officers are unexpectedly fired or on leave. Hertzberg, Liberti and Paravisini (2010) show that loan officer rotation improves information production and internal reporting of borrower credit risk. Chernykh and Mityakov (2022) show that firms hiring ex-bankers display higher asset growth and easier access to bank loans, indicating a beneficial impact of human capital through labor transfer from banks to nonfinancial firms. We extend and complement this literature by providing direct evidence on the differential effects of hiring, resignation, dismissals and transfers of bank employees. Our study shows how labor mobility within and between banks affects risk and performance in the industry.

The remainder of this paper is organized as follows. Section 2 describes the theoretical background and develops hypotheses. Section 3 outlines the data and our empirical strategy. Section 4 presents the main results on the effects of labor turnover on bank risk and performance. Section 5 reports findings of further empirical checks. Section 6 concludes.

2. Theoretical background and hypotheses

Bank lending significantly bases on and benefits from information (e.g., Petersen and Rajan, 1994; Kysucky and Norden, 2016), and information production and learning largely rely on bank employees (e.g., Berger and Udell, 2004; Uchida, Udell and Yamori, 2012). Prior research documents the importance of the “institutional memory” of past bad loan experience in bank capital and risk-taking (e.g., Mullainathan, 2002; Berger and Udell, 2004; Bouwman and Malmendier, 2015). In light of these research, we further extend and refer to the “institutional memory” in this paper as the dynamic repository for the accumulation and processing of information, financial expertise and experience, and risk culture in terms of risk awareness, risk taking and risk management within banks over time in bank lending. In our concept, the “institutional memory” of banks is more based on soft information (e.g., character and reliability) than hard information (e.g., credit scores and tax returns), and is decentralized at the bank employee level, in which is likely to be affected by labor disruptions.

Based on this notion, we attribute three theoretical dimensions to bank’s “institutional memory” through which labor turnover may impact bank risk and performance in commercial lending. First, labor turnover may impede bank’s ability to produce and learn soft information of borrowers and maintain lending relationships with good-quality customers. Consequently, loan officers may underestimate underlying credit risks, grant excessive credit amount and underprice loans contracted, which result in riskier and less profitable bank loan portfolios. Second, labor turnover may cause the loss and atrophy of financial expertise and experience of bank employees over time within banks through hiring junior officers and firing senior ones (e.g., Berger and Udell, 2004; Gao, Wang and Yu, 2021), which may decrease loan officers capability of establishing sufficient risk buffers and offering relationship lending while balancing loan growth and profitability. These distortions on banks’ soft information and financial expertise jointly contributes to a deteriorated “institutional memory” of banks in the

short term. Furthermore, the quality of financial service activities of employees can shape the risk culture of financial institutions (Pacelli, 2019), and the intensified competition induced by labor turnover can incentivize bank employees to engage in more high-risk operations with excessive credit supply (Seltzer and Frank, 2007). Finally, this deteriorated short-term institutional memory induced by labor turnover may thus further shape bank's innate long-term risk culture of strong risk-taking, high growth in transactions (but not relationship) lending and short-termism. We therefore propose our "institutional memory" hypothesis as follows:

Hypothesis 1. Labor turnover has unfavorable effects on bank risk and performance in commercial lending. Higher labor turnover leads to lower risk buffers in loan loss reserves (**H1a**), higher loan growth (**H1b**) and lower profitability (**H1c**).

Based on our "institutional memory" hypothesis, labor transfer within same banks has fewer disruptions on the soft information and financial expertise of bank employees than hiring, resignation and dismissal (Hertzberg, Liberti and Paravisini, 2010; Drexler and Schoar, 2014), which should cause smaller unfavorable effects on bank risk-taking. We therefore hypothesize:

Hypothesis 2. The unfavorable effects of labor turnover are smaller for transfers of employees within the same banks.

Differentiating the impacts of bank employee subgroups on the decentralized institutional memory of banks, bank loan officers should play a more vital role in soft information production and learning (Bushman, Gao, Martin and Pacelli, 2021) than other employees, such as financial consultants and branch managers. Second, junior bank employees who are first-time employed should introduce more disruptions in soft information production and learning, maintain fewer lending relationships and have lower level of financial expertise and experience than senior ones. Finally, bank labor flow across localities should cause more losses in the soft information and lending relationships of local borrowers for banks than flow within same localities, as the geographical disruption. We therefore hypothesize:

Hypothesis 3. The unfavorable effects of labor turnover are larger for loan officers than non-loan officers (**H3a**), junior employees than senior employees (**H3b**) and employees across different municipalities than within same municipalities (**H3c**).

3. Data

3.1. Data and variables

We base our study on a unique dataset that we assemble by merging data from several sources.¹ First, we gather individual employee information from the Annual Social Information Report (*Relação Anual de Informações Sociais*, or *RAIS*) data in Brazil. The RAIS data contains administrative employer-employee level records from a mandatory survey filled annually by all registered firms, independent of legal form or firm size, in Brazil. For each record, the RAIS data contains the employer identifier (*Cadastro Nacional da Pessoa Jurídica*, or *CNPJ*), employee identifier (*Cadastro de Pessoas Físicas*, or *CPF*), start and end date of the employment, work location, occupation type, salary and employee characteristics, e.g., employee age and education level, which allows us to track the bank employer-employee relationships over time.

We define several labor turnover measures based on bank's employee hiring, resignation, dismissal and transfer decisions in our main analyses. One may concern that underperformance of banks and credit defaults could cause the labor outflow from banks (e.g., Gao, Kleiner and Pacelli, 2020). To help mitigate this endogeneity concern, we focus on the labor turnover of hired and transferred employees since the frequent labor hiring and transfer are not likely to be driven by banks' own worsening risk-taking situations and financial performance in economic downturns. We employ the variable *Turnover hire* as our main measure for labor turnover,

¹ RAIS individual-level data is confidential and administered by the Brazilian Ministry of Economy (*Ministério da Economia do Brasil*). ESTBAN and COSIF bank financial data are publicly available from the Central Bank of Brazil (BCB). The codes of our analysis for statistical software to replicate our results is available from the corresponding author on reasonable request.

which is calculated by the number of newly hired and within-bank transferred employees over the total number of employees. In addition, we consider the labor turnover measures of *Turnover fire* for newly resigned and dismissed employees and *Turnover total* for the sum of newly hired, resigned, dismissed and transferred employees as complementary measures. We restrict our labor turnover measures to include only the bank employees in job positions of financial services, such as bank loan officers, financial consultants, financial analysts, financial operation officers and branch managers. We exclude the top-level bank managers, directors and board members to focus on the bank employees at lower tiers who are directly involved into the decentralized soft information production of banks in commercial lending at the bank-municipality level.² Figure 1 shows a heatmap of the bank labor turnover measures across municipalities in Brazil during 2003-2019.

(Insert Figure 1 here)

We match the RAIS data with the Monthly Banking Statistics per Municipality (*Estatística Bancária Mensal por município*, or *ESTBAN*) data that contain the monthly balance sheet information of all commercial banks in Brazil in all municipalities they have branch operations from the Central Bank of Brazil (*Banco Central do Brasil*, or *BCB*). This novel and unique matched bank employer-employee dataset is at the bank-municipality level with the monthly frequency during the sample period of January 2003 to December 2019. Our final sample contains 830,998 bank-municipality-month observations. Focusing on bank risk and

² We identify job positions based on the Brazilian Occupation Classification Code (*Classificação Brasileira de Ocupações*, or *CBO*). We restrict our employee sample to bank loan officers (e.g., “3532-Técnico de operações e serviços bancários” in *CBO*), financial service officers (e.g., “4132-Escriturários de serviços bancários” in *CBO*), financial analysts and consultants (e.g., “2525-Profissionais de administração econômico-financeira” and “2532-Profissionais de comercialização e consultoria de serviços bancários” in *CBO*) and bank operation officers and managers (e.g., “1417-Gerentes de operações de serviços em instituição de intermediação financeira” in *CBO*). We exclude top-level bank managers and directors (e.g., “1227- Diretores de operações de serviços em instituição de intermediação financeira” and “1231- Diretores administrativos e financeiros” in *CBO*).

performance in commercial lending, we examine the *Loan loss reserve ratio* as the measure of banks' credit risk buffer, which is defined as the amount of loan loss reserves over total assets. A lower value of *Loan loss reserve ratio* indicates that a bank possesses a lower credit risk buffer to absorb loan losses, which makes a bank more vulnerable to credit defaults and hence riskier. We further consider *Loan growth* as an indicator of bank risk-taking, which is the monthly loan growth rate of customer loans. Previous studies show that banks with high abnormal loan growth ease their credit standards, grant loans to de novo or elsewhere rejected borrowers and thus become riskier and less profitable (e.g., Jiménez and Saurina, 2006; Foos, Norden and Weber, 2010; Fahlenbrach, Prilmeier and Stulz, 2012). Lastly, we examine the *Return on assets* as a measure of bank profitability in the short and long run, which is calculated as the ratio of bank gross profits over total assets in the current month or as its moving average over 12 months forward.

To mitigate the possible omissible variable bias, we include three sets of time-variant control variables in our regression analysis, regarding bank labor characteristics, financial characteristics and local socio-economic characteristics. First, we include a vector of labor characteristics at the bank-municipality level. Financial expertise, experience and management skills can significantly affect bank risk-taking (e.g., Minton, Taillard and Williamson, 2014; Gilani, Keasey and Vallascas, 2021). Thus, we control for the average age in years as *Average age*, the average nominal monthly salary as *Average salary* and the ratio of employees who complete higher education as *Education* to account for the financial expertise and experience of local bank employees. More importantly, we control for the average employment length of local bank employees as *Length total* and the average employment length in months of newly resigned and dismissed employees as *Length fire*. These variables aim to jointly account for the temporal deterioration in the ability of bank employees to screen, structure and monitor loans, since these loan officer's activities are influenced by the time since last loan bust or bad

experience of problem loans (e.g., Berger and Udell, 2004; Malmendier, 2021). We control for the local bank employment scale with $\text{Log}(\text{Employment})$ to account for the differences in labor force and competition across banks and municipalities. Second, we include a vector of bank financial characteristics at the bank-municipality level. We control for the natural logarithm of bank total book assets as Size , loans over assets ratio as Loans over assets , deposits over assets ratio as $\text{Deposits over assets}$, and cash and cash equivalents holding over assets ratio as Liquidity to account for the bank lending and funding disruptions in risk-taking. Finally, we include a vector of local socio-economic characteristics at the municipality and state level. We control for the bank deposit market concentration measure as a Herfindahl-Hirschman Index, HHI deposit , to account for local bank competitiveness and concentration. We further collect data from the Brazilian Institute of Geography and Statistics (IBGE) and the Institute of Applied Economics Research (IPEA) to control for local GDP per capita as $\text{Log}(\text{GDP per capita})$, the local population as $\text{Log}(\text{Population})$ to account for the local labor supply scale, the local government revenue as $\text{Log}(\text{Total revenue})$ to account for the local government income and fiscal spending, and the local retail sales index as $\text{Retail sales index}$ to account for local customer spending and economic outputs.

3.2. Summary statistics

Table 1 presents the summary statistics of the variables used in this study during the sample period of January 2003 to December 2019. Our bank-municipality level sample contains 830,998 bank-municipality-month observations, in which banks exhibit on average book assets of R\$ 93.3 million per municipality, a $\text{Loan loss reserve ratio}$ of 1.158%, and Loan growth of 2.412% and Return on assets of 1.523%. Concerning our labor monthly turnover measures, banks have a Turnover hire ratio of 0.009, Turnover fire ratio of 0.004, and combined Turnover total ratio of 0.013 on average per municipality. The definitions and according data sources of

all variables used in this study can be found in Appendix A.

(Insert Table 1 here)

3.3. Empirical strategy

We perform multivariate panel data regression analysis to empirically study the impact of labor turnover on bank risk and performance in commercial lending. In our baseline analysis, we investigate whether the labor turnover measures *Turnover hire*, *Turnover fire* and *Turnover total* affect a bank's *Loan loss reserve ratio*, *Loan growth* and *Return on assets*, respectively. We estimate the following baseline model at the bank-municipality level using the matched RAIS and ESTBAN data:

$$Y_{i,m,t} = \beta_0 + \beta_1 Labor\ turnover_{i,m,t-1} + \gamma Z_{i,m,t-1} + v_i + \theta_m + \varphi_t + \varepsilon_{i,m,t} \quad (1)$$

where i indexes a bank, m indexes a municipality and t indexes a time unit of year-month; $Y_{i,m,t} \in \{Loan\ loss\ reserve\ ratio, Loan\ growth, Return\ on\ assets\}$ for bank i within municipality m during year-month t ; $Labor\ turnover_{i,m,t-1}$ equals one of our labor turnover measures lagged by one year-month. We saturate the model with $Z_{i,m,t-1}$ that is a vector of time-variant control variables lagged by one year-month, including the bank labor characteristics, financial characteristics and local socio-economic features as defined in Appendix A. We take the one-month lag for the labor turnover measures and control variables to avoid simultaneity in the model. We also re-estimate our model using various lagged values and lagged moving averages of our labor turnover measures over several time periods to further examine their short-term and long-term effects on bank risk-taking. v_i are bank fixed effects accounting for unobserved time-invariant bank fundamentals. θ_m are municipality fixed effects accounting for unobserved

time-invariant local features. φ_t are year-month time fixed effects accounting for the aggregate temporal dynamics in bank labor and financials such as the seasonality in labor supply and credit demand, and aggregate economic cycles. $\varepsilon_{i,m,t}$ is the error term. Standard errors are robust and clustered at the bank-municipality level to allow for the serial correlation within bank-municipality groups over time. β_1 is the coefficient of interest in Equation (1).

4. Main results

4.1. Labor turnover and bank risk at the bank-municipality level

We conduct our baseline analysis to examine the impact of labor turnover on bank risk and performance in commercial lending at the bank-municipality level using the monthly matched bank employer-employee data from January 2003 to December 2019. Table 2 reports the results.³

(Insert Table 2 here)

We find significant and consistent evidence showing that our main labor turnover measure *Turnover hire* has a negative effect on the *Loan loss reserve ratio* and the short- and long-term *Return on assets* and a positive effect on *Loan growth*, taking into account all the control variables and fixed effects. The effects of *Turnover total* are also highly significant and fully consistent with our main measure. We note that the effects of *Turnover fire* are different. The coefficients show the opposite signs on the *Loan loss reserve ratio* and *Loan growth* (compared to *Turnover hire* and *Turnover total*) and are not statistically significant for the regressions for

³ We report the results of our univariate analysis of t-tests and non-parametric Wilcoxon rank sum tests for our main bank dependent variables between the high and low labor turnover group in Online Appendix Table A1 and yield consistent results with our baseline analysis results. We also note that our baseline results are consistent across the sub-periods of our sample period of 2003-2019, including the period of the 2008 Global Financial Crisis.

Return on assets. We examine this finding in more detail in the next section of instrumental variable analysis.

Furthermore, we examine the long-term impact of labor turnover on bank risk and performance in commercial lending using the 6-month moving average, 6-month lagged, 12-month lagged and 18-month lagged variables of *Turnover hire*, *Turnover fire* and *Turnover total* as the labor turnover measures. Online Appendix Table A2 reports the results. These results remain significant and consistent with our baseline results, which indicates that the impact of labor turnover persists over longer time horizons.

Our findings suggest that banks with higher labor turnover establish lower risk buffers in loan loss reserves and display higher loan growth paired with lower profitability, over both the short-term and long-term time periods. These results corroborate our Hypothesis 1 that labor turnover has unfavorable effects on bank risk and performance in commercial lending.

4.2. Instrumental variable analysis

One important concern for our study is that there may exist simultaneous effects between labor turnover, bank financials and other unobserved factors. To address this endogeneity concern, we conduct an instrumental variable (IV) analysis, in which we use the local peer-group labor turnover as instruments for bank labor turnover. Peer characteristics at the industry, state or municipality level have been widely used as instruments for potentially endogenous individual characteristics in the literature (e.g., Demirgüç-Kunt and Detragiache, 2002; Laeven and Levine, 2009; Ferrell, Liang and Renneboog, 2016; Liu, Norden and Spargoli, 2020). We define *Peer turnover hire*, *Peer turnover fire* and *Peer turnover total* as the weighted peer-group labor turnover measures of all local sectors at the municipality level but excluding the specific bank observed to instrument *Turnover hire*, *Turnover fire* and *Turnover total* respectively. These local peer-group labor turnover measures should be positively correlated

with individual bank labor turnover due to their shared local labor market dynamics but theoretically uncorrelated with bank risk since the labor force of peer firms is not involved in the commercial lending of these banks.

(Insert Table 3 here)

We employ a two-stage least squares (2SLS) regression approach for the IV analysis. In the first stage, we regress our bank labor turnover measures on the according local peer-group labor turnover measures with all controls and fixed effects. Panel A of Table 3 reports the results. We find that *Peer turnover hire*, *Peer turnover fire* and *Peer turnover total* are positively and significantly correlated with *Turnover hire*, *Turnover fire* and *Turnover total* respectively. The IV diagnosis statistics indicate the instruments are econometrically valid and not weak.

In the second stage, we substitute our bank labor turnover measures with the instrumented ones and re-estimate our results. Panel B of Table 3 reports the results.⁴ We find significant and consistent results with our baseline results for *Turnover hire* and *Turnover total*, confirming that labor turnover has unfavorable effects on bank risk and performance in commercial lending. We note that the estimated coefficients in the IV analysis are higher than the ones in Table 2. This is plausible if there are strong local average treatment effects (LATE), as discussed by Jiang (2017). Interestingly, the IV results for *Turnover fire* are different from the baseline results in Table 2, suggesting that the previous coefficients on this variable were biased and therefore inconsistent with the other two measures. In the IV analysis, we now find that *Turnover fire* has unfavorable effects on bank risk, consistent with *Turnover hire* and *Turnover total*. Moreover, with regard to the economic significance, a one standard deviation increase in

⁴ We also employ the same instrument variables of the local peer-group labor turnover with similar magnitudes to local banks' labor turnover measures by excluding the small local peer firms as they have relatively high labor turnover in the IV analysis. We obtain qualitatively consistent results to the ones reported in Table 3 which are available upon request.

Turnover total corresponds to a 9 percent decrease of the mean of *Loan loss reserve ratio*, 30 percent increase of the mean of *Loan growth*, 20 percent decrease of the mean of short-term *Return on assets*, and 18 percent decrease of the mean of long-term 12-month forward moving average *Return on assets*, as shown in Panel B of Table 3.

4.3. Placebo tests

We further conduct placebo tests, in which we use the labor turnover measures of the bank employees in job positions of non-financial services within the same banks as placebos. These placebo labor turnover measures should not be correlated with bank risk-taking since the bank employees in job positions of non-financial services, such as security guards and maintenance workers, are not involved in commercial lending. Table 4 reports the results. We find no significant results for the placebo labor turnover measures. The placebo test results indicate our baseline results are not driven by unobserved local contemporaneous shocks or random temporal labor confounders within banks over time.

(Insert Table 4 here)

4.4. Transferred, resigned and dismissed employees

We decompose our labor turnover measures to further examine the effects of the labor turnover of transferred, resigned and dismissed employees on bank risk and performance in commercial lending using our baseline model. Table 5 reports the results. First, we find the labor turnover of within-bank transferred employees has smaller unfavorable effects on bank loan growth and profitability in terms of economic significance than the labor turnover of newly hired employees as shown in Panel A. This finding is consistent with our Hypothesis 2 and suggests that employee transfer within banks has fewer disruptions in bank's institutional

memory in commercial lending. Second, we find the labor turnover of resigned and dismissed employees have largely insignificant effects on bank risk risk as shown in Panel B, which is consistent with our baseline and IV analysis results. Nevertheless, we find the magnitudes of the coefficients estimated of *Turnover dismiss* are substantially larger than the coefficients of *Turnover resign* for bank *Loan loss reserve ratio* and *Loan growth*. This finding suggests dismissed employees indeed have more disruptions in bank risk-taking than resigned ones, which is particularly important for Brazil, since the Brazilian workers prefer dismissal more for severance pay packages to voluntary resignation due to the labor law in Brazil.

(Insert Table 5 here)

4.5. Subgroups of bank employees

We further examine the effects of the labor turnover of the subgroups of bank employees on bank risk and performance in commercial lending. Table 6 reports the results. First, we find that the labor turnover of bank loan officers has larger unfavorable effects on bank risk-taking than the labor turnover of bank employees in other job positions of financial services as shown in Panel A. This result is consistent with loan officers being primarily responsible for soft information production and learning in the decentralized institutional memory of banks, consistent with our Hypothesis 3a. Second, we find the labor turnover of newly hired junior employees who are first-time employed by banks has larger unfavorable effects on bank risk-taking than the labor turnover of newly hired senior employees who are recruited from other banks or institutions as shown in Panel B. This result is consistent with hiring senior employees having fewer disruptions in bank soft information and lending relationships, and smaller losses in financial expertise and experience of bank employees for the institutional memory of banks than hiring junior ones, in line with our Hypothesis 3b. Third, we find that the labor turnover

of hired and transferred employees within same municipalities has smaller unfavorable effects on bank loan growth and profitability than the labor turnover of hired and transferred employees across different municipalities as shown in Panel C. This result is consistent with hiring employees within same municipalities helping banks lose less soft information of local borrowers and maintain more lending relationships with local customers than hiring employees from different municipalities, which is consistent with our Hypothesis 3c.

(Insert Table 6 here)

5. Further empirical checks

5.1. Bank-level analysis and easing of credit standards

We now investigate the impact of labor turnover on bank risk and performance at the bank level to complement the previous analyses at the bank-municipality level. We match our RAIS data with the National Financial Institution Accounting Chart (*Plano Contábil das Instituições do Sistema Financeiro Nacional*, or *COSIF*) data from BCB at the bank level which saturates our bank-level data with the information on credit ratings of bank loans granted. We then re-estimate our baseline model at the bank level using the new matched RAIS and COSIF data. Panel A of Table 7 reports the results. We obtain consistent bank-level results with our baseline bank-municipality level results.⁵

More importantly, we also examine whether labor turnover affects the loan growth to borrowers with credit ratings of AA, A, B, C, D, E, F, G and H, taking advantage of the rich COSIF bank financial data at the bank level. This analysis was not possible at the bank-municipality level because loans are not reported separately by rating. Panel B of Table 7

⁵ We further show that our bank-level results are consistent using the labor turnover measures over varying time periods at the bank level in Online Appendix Table A3, and also upheld in the IV analysis and placebo tests at the bank level in Online Appendix Table A4.

reports the results. We find while our labor turnover measures *Turnover hire* and *Turnover total* are positively associated with *Loan growth* across models, the magnitudes of their coefficients for the customer loans with credit ratings of B, C to D and E to H are much larger than their coefficients for the customer loans with credit ratings of A. Our results indicate that banks with higher labor turnover exhibit weaker credit standards by lending more to high-risk new borrowers and having existing borrowers whose ratings deteriorated over time in their credit portfolio. These effects can be explained with the labor turnover-induced impairment of screening and monitoring in commercial lending.

(Insert Table 7 here)

5.2. Corporate loans, agriculture loans and mortgage loans

We further study the impact of labor turnover on the loan growth rates of bank corporate loans (i.e., loans to businesses in a broad sense; except agricultural firms), agriculture loans and mortgage loans using our baseline model at the bank-municipality level. Table 8 reports the results. We find while our main labor turnover measures *Turnover hire* and *Turnover total* are positively associated with *Loan growth* across loan categories, their coefficients for bank corporate and agriculture loans are much larger than their coefficients for mortgage loans. Our results suggest that labor turnover has larger effects on bank corporate and agriculture loans that are sensitive to soft information of local borrowers, since around 99.1% of Brazilian firms are micro or small businesses who heavily rely on soft information to acquire bank loans, than highly standardized mortgage loans which rely more on hard information.

(Insert Table 8 here)

5.3. Age and salary differences due to hiring and firing

The loss and atrophy of financial expertise and experience of bank employees as time passes can impose a “brain drain” effect on bank’s institutional memory (Berger and Udell, 2004; Malmendier, 2021), which may further amplify the unfavorable effects of labor turnover on bank risk and performance in commercial lending. To test our hypothesis, we use the differentials in the average age as ΔAge and the average monthly salary as $\Delta Salary$ between newly hired, resigned and dismissed bank employees to proxy the loss and atrophy of financial expertise and experience through labor turnover over time. A higher value of ΔAge and $\Delta Salary$ indicates a greater extent of disruptions in the financial expertise and experience of bank employees resulting from bank employee hiring, resignation and dismissal over time. We interact ΔAge and $\Delta Salary$ with our labor turnover measures respectively as the main explanatory variables and estimate the following model at the bank-municipality level:

$$Y_{i,m,t} = \beta_0 + \beta_1 Labor\ turnover_{i,m,t-1} \times D_{i,m,t-1} + \beta_2 Labor\ turnover_{i,m,t-1} \quad (2) \\ + \beta_3 D_{i,m,t-1} + \gamma Z_{i,m,t-1} + v_i + \theta_m + \varphi_t + \varepsilon_{i,m,t}$$

where $D_{i,m,t-1} \in \{\Delta Age, \Delta Salary\}$. All other variables are the same as defined before. β_1 is the coefficient of interest in Equation (2). Table 9 reports the results. We find banks with higher differentials in the average age and salary between newly hired, resigned and dismissed employees also have larger unfavorable effects of labor turnover on bank risk and performance in commercial lending. These findings are consistent with our “institutional memory” hypothesis and suggest that the loss and atrophy of financial expertise and experience over time contribute to the deterioration of banks’ institutional memory induced by labor turnover.

(Insert Table 9 here)

5.4. Bank ownership, bank size and local bank competition

We further examine the potential heterogeneous effects of bank ownership, bank size and local bank competition on the unfavorable impacts of labor turnover on bank risk and performance in commercial lending. First, we focus on bank ownership since state-owned banks grant more credits to small and medium firms, offer more relationship lending and rely more on soft information production and learning in commercial lending than privately owned banks. We use *State-owned* to indicate the state-owned banks in Brazil. Second, we look at bank size since small banks tend to offer more relationship lending to informationally opaque borrowers while large banks may be less inclined to make such loans due to their organizational disadvantages at handling soft information which cannot be easily communicated to and verified by bank management (Berger, Miller, Petersen, Rajan and Stein, 2005). We use *Small bank* to indicate the banks below the sample median of bank total book assets. Third, we switch to look at local bank competition and use the number of bank branches per local population to measure the local bank competition at the municipality level. *High competition* indicates banks are located in municipalities above the median of local bank competition measure. While competition creates incentives for risk-taking, local market discipline can be more effective in curbing banks' risk appetites in high-competition localities (Nier and Baumann, 2006). We interact *State-owned*, *Small bank* and *High competition* with our labor turnover measures respectively as the main explanatory variables and estimate the following model at the bank-municipality level:

$$Y_{i,m,t} = \beta_0 + \beta_1 Labor\ turnover_{i,m,t-1} \times X_{i,m,t-1} + \beta_2 Labor\ turnover_{i,m,t-1} \quad (3) \\ + \beta_3 X_{i,m,t-1} + \gamma Z_{i,m,t-1} + v_i + \theta_m + \varphi_t + \varepsilon_{i,m,t}$$

where $X_{i,m,t-1} \in \{State-owned, Small\ bank, High\ competition\}$. All other variables are the same as defined before. β_1 is the coefficient of interest in Equation (3). Table 10 reports the results. First, we find state-owned banks with higher labor turnover have larger unfavorable effects on bank risk and performance in commercial lending than privately owned banks as shown in Panel A. This result is consistent with state-owned banks being more sensitive to the disruptions in soft information and lending relationships of borrowers caused by labor turnover. Or, put differently, privately owned banks are more efficient in dealing with the disruptions due to labor turnover than state-owned banks. Second, we find small banks with higher labor turnover reserve fewer risk buffers and have higher loan growth. Nevertheless, they also have higher profitability in the short and long term, which are driven by the labor turnover of resigned and dismissed employees, as shown in Panel B. This result suggests that small banks are more capable of engaging in more high-risk, high-return investments with excessive credit growth by creating a more competitive work environment through dismissing underperforming employees than large banks. Third, we find banks with higher labor turnover located in municipalities with higher bank competition have smaller unfavorable effects on bank risk and performance in commercial lending than banks located in municipalities with lower bank competition, as shown in Panel C. This result suggests that the local banking markets have a disciplining effect on banks' excessive risk-taking induced by labor turnover in high-competition municipalities through local labor and credit markets.

(Insert Table 10 here)

6. Conclusion

In this paper, we investigate whether labor turnover affects bank risk and performance in commercial lending. We base our analysis on a novel and unique dataset that contains matched

monthly employer-employee data from Brazilian banks during January 2003 to December 2019, controlling for the bank labor, financial and local characteristics and fixed effects at several dimensions.

We have several important findings. First, we find that banks with higher turnover have lower risk buffers and higher loan growth paired with lower profitability both in the short and long term. We confirm our results using local peer-group labor turnover as instrumental variable and in placebo tests. Second, these unfavorable effects are smaller for the labor turnover of employee transfers within banks, and larger for loan officers, junior employees and employees hired and transferred from different municipalities. Third, banks with higher labor turnover ease their credit standards as they lend more to high-risk new borrowers and also engage more in corporate and agriculture lending than in mortgage lending. Fourth, we document significant amplification effects of employee age and salary differences due to labor turnover on bank risk-taking. Finally, we find heterogeneous effects of bank ownership, bank size and local bank competition on the impact of labor turnover on bank risk and performance. Our findings are consistent with our hypothesis that labor turnover deteriorates bank's short-term institutional memory and compromise soft information production, financial expertise and experience. This deteriorated institutional memory shapes a bank risk culture characterized by high growth in transactions lending and short-termism.

This study provide novel, comprehensive and consistent evidence on the impact of labor turnover on bank risk and performance through the "institutional memory" channel. We take banks as one particularly relevant example, but it is likely that this channel exists also for firms in other industries where information production, learning and experience are critical. Financial institutions, regulators and policy makers should take our findings on labor turnover and bank risk and performance into account when monitoring financial stability and making decisions and rules that influence labor market outcomes.

Appendix A: Variable definitions

This table presents the definitions and data sources of the variables used in this study.

Variable name	Definition	Source
Dependent variables		
<i>Loan loss reserve ratio (%)</i>	Ratio of bank loan loss reserves over total book assets in percentage in a given bank and locality at month t.	ESTBAN, COSIF
<i>Loan growth (%)</i>	Loan growth rate in bank total loans over year-months in percentage in a given bank and locality.	ESTBAN, COSIF
<i>Return on assets (%)</i>	Ratio of bank gross income over total book assets in percentage in a given bank and locality.	ESTBAN, COSIF
<i>Return on assets (% 12-month)</i>	12-month forward moving average of bank return on assets ratio in percentage in a given bank and locality.	ESTBAN, COSIF
Labor turnover variables		
<i>Turnover hire</i>	Ratio of newly hired employees and transferred employees within banks scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover fire</i>	Ratio of newly resigned and dismissed employees scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover total</i>	Ratio of the sum of newly hired, resigned, dismissed and within-bank transferred employees scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover transfer</i>	Ratio of transferred bank employees within banks scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover non-transfer</i>	Ratio of newly hired bank employees (without bank-internal transfers) scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover resign</i>	Ratio of voluntarily resigned bank employees scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover dismiss</i>	Ratio of dismissed bank employees scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover junior</i>	Ratio of newly hired novice bank employees who are first-time employed by banks scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover senior</i>	Ratio of hired and transferred experienced bank employees scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover LO</i>	Ratio of hired, resigned, dismissed and transferred bank loan officers scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover non-LO</i>	Ratio of newly hired, resigned, dismissed and transferred bank employees in job positions of financial services besides loan officers scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover same-city</i>	Ratio of newly hired and transferred bank employees from same municipalities scaled by total bank employment in a given bank and locality.	RAIS
<i>Turnover different-city</i>	Ratio of newly hired and transferred bank employees from different municipalities scaled by total bank employment in a given bank and locality.	RAIS
Control variables		
Labor controls:		
<i>Average age</i>	Average employee age in years in a given bank and locality.	RAIS
<i>Average salary</i>	Average employee monthly salary in 1,000 Brazilian reais in a given bank and locality.	RAIS
<i>Length total</i>	Average employment length of all employees in months in a given bank and locality.	RAIS

<i>Length fire</i>	Average employment length of resigned and dismissed employees in months in a given bank and locality.	RAIS
<i>Education</i>	Ratio of number of employees who complete higher education over total number of employees in a given bank and locality.	RAIS
<i>Log(Employment)</i>	Natural logarithm of bank employment scale as total number of employees in a given bank and locality.	RAIS
Bank controls:		
<i>Size</i>	Natural logarithm of bank total book assets in a given bank and locality.	ESTBAN, COSIF
<i>Loans over assets</i>	Ratio of bank total loans over total book assets in percentage in a given bank and locality.	ESTBAN, COSIF
<i>Deposits over assets</i>	Ratio of bank total deposits over book assets in a given bank and locality.	ESTBAN, COSIF
<i>Liquidity</i>	Ratio of bank cash and cash equivalents holding over total book assets in a given bank and locality.	ESTBAN, COSIF
Local controls:		
<i>HHI deposit</i>	Customer deposit market concentration measure calculated as a Herfindahl-Hirschman Index at the municipality level.	ESTBAN
<i>Log(GDP per capita)</i>	Natural logarithm of GDP per capita at the municipality level.	IBGE
<i>Log(Population)</i>	Natural logarithm of population at the municipality level.	IBGE
<i>Log(Total revenue)</i>	Natural logarithm of total government revenue at the municipality level.	IBGE, IPEA
<i>Retail sales index</i>	Seasonally-adjusted retail sales index with a base value of 100 in 2014 in Brazil at the state level.	IBGE, IPEA

Instrumental variables

<i>Peer turnover hire</i>	Weighted average ratio of newly hired and transferred firm employees of all local sectors excluding the specific bank scaled by total employment in a given locality.	RAIS
<i>Peer turnover fire</i>	Weighted average ratio of newly resigned and dismissed firm employees of all local sectors excluding the specific bank scaled by total employment in a given locality.	RAIS
<i>Peer turnover total</i>	Weighted average ratio of the sum of hired, resigned, dismissed and transferred firm employees of all sectors excluding the specific bank scaled by total employment in a given locality.	RAIS

Other variables

<i>ΔAge</i>	Differential between the average age of newly resigned and dismissed employees minus the age of newly hired employees in years in a given bank and locality.	RAIS
<i>ΔSalary</i>	Differential between the per-capital nominal monthly salary of newly resigned and dismissed employees minus the per-capita nominal contracted monthly salary of newly hired employees in 1,000 Brazilian reais in a given bank and locality.	RAIS
<i>State-owned</i>	Indicator variable that equals 1 for state-owned banks and 0 for privately owned banks in Brazil.	BCB
<i>Small bank</i>	Indicator variable that equals 1 if the bank's total book assets is below the sample median of total book assets.	ESTBAN
<i>High competition</i>	Indicator variable that equals 1 if the ratio of local bank branches per population is above the sample median.	ESTBAN

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Figure 1: Labor turnover of banks by municipality in Brazil during 2003-2019

This figure shows the scale of the average labor turnover of banks per municipality in Brazil during the sample period of 2003-2019 using *Turnover hire*, *Turnover fire* and *Turnover total* as the labor turnover measure respectively. We group the value of our labor turnover measures into 5 groups: $[0, 0.005)$, $[0.005, 0.01)$, $[0.01, 0.025)$, $[0.025, 0.03]$, and $(0.03, 1]$.

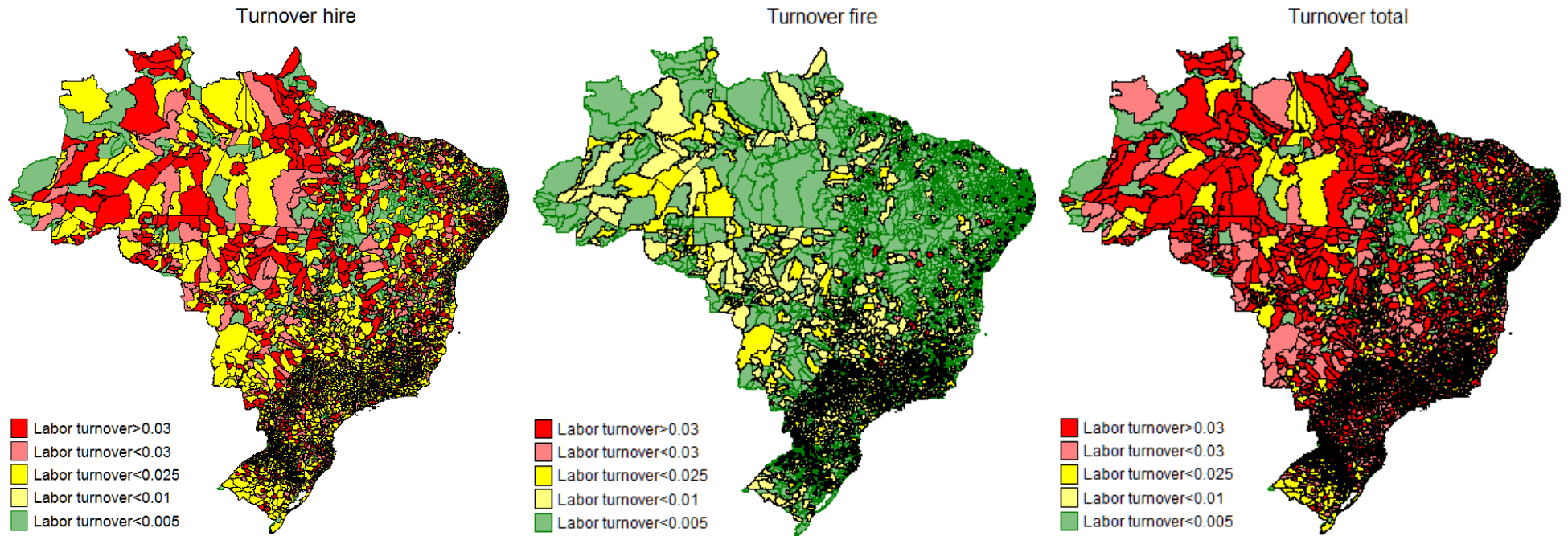


Table 1: Summary statistics

This table presents the summary statistics for the variables used in this study at the bank municipality level. We winsorize *Loan growth* and *Return on assets* at the 1st and 99th percentile to account for outliers. *Loan loss reserve ratio*, *Loan growth* and *Return on assets* are denoted in percentage. The sample period spans from Jan 2003 to Dec 2019. Std. Dev. is the standard deviation. P5 and P95 are the variable values at the 5th and 95th percentile, respectively. Number of obs. is the number of observations. Details on variable definitions and according data sources are shown in Appendix A.

Variable	Mean	Median	Std. Dev.	P5	P95	Number of obs.
Dependent variables						
<i>Loan loss reserve ratio (%)</i>	1.158	0.858	1.220	0.007	3.199	830,998
<i>Loan growth (%)</i>	2.412	1.003	10.877	-7.040	13.670	830,998
<i>Return on assets (%)</i>	1.523	0.710	2.247	-0.321	6.450	830,998
<i>Return on assets (% , 12-month)</i>	1.524	0.804	1.918	-0.253	5.650	830,998
Labor turnover variables						
<i>Turnover hire</i>	0.009	0	0.044	0	0.057	830,998
<i>Turnover fire</i>	0.004	0	0.026	0	0.017	830,998
<i>Turnover total</i>	0.013	0	0.051	0	0.083	830,998
<i>Turnover transfer</i>	0.005	0	0.038	0	0.013	830,998
<i>Turnover non-transfer</i>	0.004	0	0.021	0	0.018	830,998
<i>Turnover resign</i>	0.001	0	0.012	0	0	830,998
<i>Turnover dismiss</i>	0.003	0	0.023	0	0.003	830,998
<i>Turnover junior</i>	0.002	0	0.016	0	0.091	830,998
<i>Turnover senior</i>	0.007	0	0.041	0	0.030	830,998
<i>Turnover LO</i>	0.007	0	0.031	0	0.047	830,998
<i>Turnover non-LO</i>	0.006	0	0.037	0	0.026	830,998
<i>Turnover same-city</i>	0.005	0	0.033	0	0.026	830,998
<i>Turnover different-city</i>	0.004	0	0.026	0	0.004	830,998
Control variables						
Labor controls:						
<i>Average age</i>	39.340	39.073	4.720	32.364	47.750	830,998
<i>Average salary</i>	5.697	5.446	2.285	2.782	9.512	830,998
<i>Length total</i>	122.694	121.940	65.416	24.583	236.871	830,998
<i>Length fire</i>	141.430	111.667	120.922	0.700	362.743	830,998
<i>Education</i>	0.734	0.759	0.218	0.333	1.000	830,998
<i>Log(Employment)</i>	2.594	2.367	1.218	1.099	4.963	830,998
Bank controls:						
<i>Size</i>	11.444	11.321	2.052	8.432	14.954	830,998
<i>Loans over assets</i>	0.258	0.241	0.148	0.055	0.508	830,998
<i>Deposits over assets</i>	0.288	0.256	0.415	0.017	0.650	830,998
<i>Liquidity</i>	0.015	0.006	0.024	0.001	0.062	830,998
Local controls:						
<i>HHI deposit</i>	0.033	0.028	0.020	0.015	0.084	830,998
<i>Log(GDP per capita)</i>	9.756	9.755	0.732	8.598	10.922	830,998
<i>Log(Population)</i>	4.137	3.907	1.573	1.927	7.256	830,998
<i>Log(Total revenue)</i>	5.169	4.884	1.593	3.058	8.819	830,998
<i>Retail sales index</i>	79.175	83.800	18.511	48.000	101.100	830,998
Instrumental variables						
<i>Peer turnover hire</i>	0.139	0.136	0.090	0	0.278	830,998
<i>Peer turnover fire</i>	0.105	0.106	0.076	0	0.223	830,998
<i>Peer turnover total</i>	0.244	0.249	0.142	0	0.468	830,998

Other variables

<i>ΔAge</i>	7.548	6.236	10.731	-8.667	26.000	830,998
<i>ΔSalary</i>	2.466	1.450	4.063	-2.201	9.732	830,998
<i>State-owned</i>	0.347	0	0.476	0	1	830,998
<i>Small bank</i>	0.499	0.500	0.500	0	1	830,998
<i>High competition</i>	0.499	0	0.500	0	1	830,998

Table 2: Labor turnover, bank risk and performance at the bank-municipality level

This table reports the baseline regression results for the effects of bank labor turnover on bank risk and performance in commercial lending at the bank-municipality level (within municipalities across banks). *Turnover hire*, *Turnover fire*, *Turnover total* and all control variables are lagged by one month. Bank FE, Municipality FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (% 12-month)</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire</i>	-0.631*** (0.037)			6.217*** (0.497)			-0.624*** (0.046)			-0.320*** (0.040)		
<i>Turnover fire</i>		0.254*** (0.052)			-3.124*** (0.488)			-0.003 (0.065)			-0.007 (0.049)	
<i>Turnover total</i>			-0.395*** (0.031)			3.724*** (0.387)			-0.456*** (0.038)			-0.235*** (0.033)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.453	0.152	0.152	0.152	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Table 3: Instrumental variable analysis

This table reports the results of instrumental variable (IV) analysis for the effects of bank labor turnover on bank risk and performance in commercial lending using the weighted local peer-group labor turnovers at the bank-municipality level (within municipalities across banks). Panel A reports the first stage results and the IV diagnosis statistics for the validity of the instrumental variables. Panel B reports the final stage results. Bank FE, Municipality FE and Time FE are the fixed effects. *Peer turnover hire*, *Peer turnover fire*, *Peer turnover total* and all control variables are lagged by one month. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: First stage results at the bank-municipality level						
Dependent variable	<i>Turnover hire</i>		<i>Turnover fire</i>		<i>Turnover total</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Peer turnover hire</i>	0.020*** (0.001)	0.025*** (0.001)				
<i>Peer turnover fire</i>			0.008*** (0.0005)	0.013*** (0.0008)		
<i>Peer turnover total</i>					0.010*** (0.001)	0.019*** (0.001)
Labor controls	No	Yes	No	Yes	No	Yes
Bank controls	No	Yes	No	Yes	No	Yes
Local controls	No	Yes	No	Yes	No	Yes
Bank FE	No	Yes	No	Yes	No	Yes
Municipality FE	No	Yes	No	Yes	No	Yes
Time FE	No	Yes	No	Yes	No	Yes
Adjusted R-squared	0.002	0.073	0.001	0.024	0.001	0.065
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998
IV diagnosis statistics:						
Weak identification test						
Cragg-Donald Wald F statistic	289.576		666.834		1043.550	

Panel B: Final stage results at the bank-municipality level												
Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (%), 12-month</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>IV-Turnover hire</i>	-1.728**			7.734**			-3.542***			-3.500***		
	(0.741)			(3.129)			(0.997)			(0.811)		
<i>IV-Turnover fire</i>		-2.817			33.902*			-14.344***			-11.641***	
		(2.167)			(17.857)			(2.991)			(2.406)	
<i>IV-Turnover total</i>			-2.045**			14.190**			-6.219***			-5.547***
			(0.999)			(7.298)			(1.293)			(1.121)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.453	0.152	0.152	0.152	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Table 4: Placebo tests

This table reports the results of the placebo tests using the labor turnover of bank employees in job positions of non-financial services within banks at the bank-municipality level (within municipalities across banks). Bank FE, Municipality FE and Time FE are the fixed effects. *Placebo-Turnover hire*, *Placebo-Turnover fire*, *Placebo-Turnover total* and all control variables are lagged by one month. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (% 12-month)</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Placebo-Turnover hire</i>	-0.009 (0.008)			0.153 (0.086)			-0.016 (0.012)			-0.010 (0.008)		
<i>Placebo-Turnover fire</i>		0.019 (0.011)			0.011 (0.013)			0.009 (0.017)			-0.002 (0.008)	
<i>Placebo-Turnover total</i>			0.0001 (0.007)			0.103 (0.072)			-0.014 (0.010)			0.745 (0.490)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.453	0.152	0.152	0.152	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Table 5: Bank labor turnover of transferred, resigned and dismissed employees

This table reports the regression results for the effects of the bank labor turnover of transferred, resigned and dismissed employees within banks on bank risk and performance in commercial lending at the bank-municipality level (within municipalities across banks). Panel A reports the results for the labor turnover of transferred employees within banks. Panel B reports the results for the labor turnover of resigned and dismissed employees within banks. *Turnover transfer*, *Turnover non-transfer*, *Turnover resign*, *Turnover dismiss* and all control variables are lagged by one month. Bank FE, Municipality FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Results for the labor turnover of transferred bank employees								
Dependent variable	<i>Loan loss reserve ratio (%)</i>		<i>Loan growth (%)</i>		<i>Return on assets (%)</i>		<i>Return on assets (% 12-month)</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Turnover transfer</i>	-0.634*** (0.036)		4.433*** (0.531)		-0.508*** (0.052)		-0.175*** (0.046)	
<i>Turnover non-transfer</i>		-0.624*** (0.109)		12.081*** (1.193)		-1.006*** (0.010)		-0.796*** (0.083)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.152	0.152	0.704	0.704	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998
Panel B: Results for the labor turnover of resigned and dismissed bank employees								
Dependent variable	<i>Loan loss reserve ratio (%)</i>		<i>Loan growth (%)</i>		<i>Return on assets (%)</i>		<i>Return on assets (% 12-month)</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Turnover resign</i>	0.021 (0.091)		-2.732*** (0.949)		-0.140 (0.121)		-0.023 (0.089)	
<i>Turnover dismiss</i>		0.319*** (0.061)		-3.234*** (0.566)		0.034 (0.074)		-0.004 (0.054)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.152	0.152	0.704	0.704	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Table 6: Labor turnover of bank employee subgroups

This table reports the regression results for the effects of the bank labor turnover of loan officers and non-loan officers, junior and experienced senior bank employees, and employees within same and across different municipalities on bank risk and performance in commercial lending. Panel A reports the results for the labor turnover of loan officers and non-loan officers. Panel B reports the results for the labor turnover of junior and senior bank employees. Panel C reports the results for bank labor turnover of bank employees within same and across different municipalities. *Turnover LO*, *Turnover non-LO*, *Turnover junior*, *Turnover senior*, *Turnover same-city*, *Turnover different-city* and all control variables are lagged by one month. Bank FE, Municipality FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Results for labor turnover of loan officers and non-loan officers								
Dependent variable	<i>Loan loss reserve ratio (%)</i>		<i>Loan growth (%)</i>		<i>Return on assets (%)</i>		<i>Return on assets (% 12-month)</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Turnover LO</i>	-0.492***		7.469***		-0.594***		-0.503***	
	(0.060)		(0.742)		(0.065)		(0.057)	
<i>Turnover non-LO</i>		-0.406***		1.783***		-0.449***		0.090**
		(0.038)		(0.453)		(0.051)		(0.043)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.152	0.152	0.704	0.704	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Panel B: Results for labor turnover of junior and senior bank employees								
Dependent variable	<i>Loan loss reserve ratio (%)</i>		<i>Loan growth (%)</i>		<i>Return on assets (%)</i>		<i>Return on assets (% 12-month)</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Turnover junior</i>	-0.703***		13.854***		-1.270***		-0.991***	
	(0.160)		(1.339)		(0.106)		(0.082)	
<i>Turnover senior</i>		-0.617***		4.906***		-0.512***		-0.204***
		(0.036)		(0.535)		(0.049)		(0.043)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.152	0.152	0.704	0.704	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Panel C: Results for labor turnover of bank employees within and across different municipalities								
Dependent variable	<i>Loan loss reserve ratio (%)</i>		<i>Loan growth (%)</i>		<i>Return on assets (%)</i>		<i>Return on assets (% 12-month)</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Turnover same-city</i>	-0.796***		5.953***		-0.206***		0.134***	
	(0.052)		(0.567)		(0.052)		(0.046)	
<i>Turnover different-city</i>		-0.482***		7.595***		-1.351***		-1.054***
		(0.054)		(0.971)		(0.079)		(0.065)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.152	0.152	0.704	0.704	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Table 7: Labor turnover and easing of credit standards at the bank level

This table reports the regression results for the effects of bank labor turnover on bank risk-taking and easing of credit standards at the bank level (within banks across municipalities). Panel A reports the results for bank risk and performance in commercial lending at the bank level. Panel B reports the results for loan growth rates of bank customer loans with different credit ratings at the bank level. *Turnover hire*, *Turnover fire*, *Turnover total* and all control variables are lagged by one month. Bank FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Results for bank risk and performance at the bank level												
Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (%), 12-month</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire</i>	-0.268* (0.159)			13.369*** (4.018)			-0.021 (0.063)			-0.033 (0.064)		
<i>Turnover fire</i>		1.153** (0.495)			-11.735*** (4.051)			-0.227* (0.136)			-0.243* (0.136)	
<i>Turnover total</i>			0.191 (0.173)			5.334* (3.073)			-0.088* (0.049)			-0.101** (0.050)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.553	0.554	0.553	0.056	0.055	0.055	0.345	0.345	0.345	0.401	0.401	0.401
Number of obs.	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223

Panel B: Results for loan growth rates of bank loans with different credit ratings at the bank level												
Dependent variable	<i>Loan growth (%), Rating AA-A)</i>			<i>Loan growth (%), Rating B)</i>			<i>Loan growth (%), Rating C-D)</i>			<i>Loan growth (%), Rating E-H)</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire</i>	8.513**			41.629*			16.483*			8.503*		
	(3.718)			(24.929)			(9.643)			(4.322)		
<i>Turnover fire</i>		-4.143			-25.727			-31.005***			4.797	
		(5.760)			(24.689)			(11.006)			(5.578)	
<i>Turnover total</i>			4.478			20.120			1.184			7.375*
			(2.932)			(24.936)			(7.174)			(4.168)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.179	0.179	0.179	0.076	0.076	0.076	0.179	0.179	0.178	0.192	0.192	0.192
Number of obs.	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223

Table 8: Bank labor turnover and loan growth

This table reports the results for the effects of bank labor turnover on the loan growth rates of bank corporate loans, agriculture loans and mortgage loans granted at the bank-municipality level. *Turnover hire*, *Turnover fire*, *Turnover total* and all control variables are lagged by one month. Bank FE, Municipality FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Dependent variable	<i>Corporate loan growth (%)</i>			<i>Agriculture loan growth (%)</i>			<i>Mortgage loan growth (%)</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Turnover hire</i>	2.224*** (0.132)			1.698** (0.790)			0.365*** (0.025)		
<i>Turnover fire</i>		-2.371*** (0.207)			1.544 (1.364)			-0.097*** (0.030)	
<i>Turnover total</i>			1.008*** (0.110)			1.638** (0.723)			0.241*** (0.020)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.125	0.125	0.125	0.352	0.352	0.352	0.487	0.487	0.487
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Table 9: Effects of age and salary differentials due to hiring and firing

This table reports the regression results for the effects of the differentials in average age and average salary between newly hired and newly resigned and dismissed employees on bank risk and performance in commercial lending at the bank-municipality level (within municipalities across banks). Panel A reports the results for the effects of employee age differentials. Panel B reports the results for the effects of employee salary differentials. *Turnover hire*, *Turnover fire*, *Turnover total*, Δ Age, Δ Salary and all control variables are lagged by one month. Bank FE, Municipality FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Effects of employee age differential and labor turnover on bank risk and performance												
Dependent variable	Loan loss reserve ratio (%)			Loan growth (%)			Return on assets (%)			Return on assets (%), 12-month		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire</i> × Δ Age	-0.005 (0.006)			0.128*** (0.042)			-0.024*** (0.004)			-0.019*** (0.004)		
<i>Turnover fire</i> × Δ Age		-0.007* (0.004)			0.097** (0.038)			0.016*** (0.005)			-0.0008 (0.004)	
<i>Turnover total</i> × Δ Age			-0.001 (0.004)			0.046 (0.031)			-0.007*** (0.003)			-0.011*** (0.003)
<i>Turnover hire</i>	-0.620*** (0.034)			5.948*** (0.504)			-0.568*** (0.046)			-0.274*** (0.040)		
<i>Turnover fire</i>		0.301 (0.064)			-3.765*** (0.612)			-0.113 (0.076)			-0.006 (0.062)	
<i>Turnover total</i>			-0.398*** (0.030)			3.576*** (0.411)			-0.431*** (0.039)			-0.197*** (0.035)
Δ Age	0.0006 (0.0005)	0.0006 (0.0005)	0.0005 (0.0005)	0.004* (0.003)	0.005* (0.003)	0.005* (0.003)	0.002*** (0.0006)	0.002*** (0.0006)	0.002*** (0.0006)	0.003*** (0.0006)	0.003*** (0.0006)	0.003*** (0.0006)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.453	0.152	0.152	0.152	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Panel B: Effects of employee salary differential and labor turnover on bank risk and performance												
Dependent variable	Loan loss reserve ratio (%)			Loan growth (%)			Return on assets (%)			Return on assets (%), 12-month		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)

<i>Turnover hire</i> × Δ Salary	-0.034*** (0.008)			0.333*** (0.116)			-0.001 (0.011)		0.001 (0.009)			
<i>Turnover fire</i> × Δ Salary		-0.015 (0.010)			0.108 (0.076)			-0.049*** (0.010)			-0.080*** (0.009)	
<i>Turnover total</i> × Δ Salary			-0.024*** (0.006)			0.217*** (0.081)			-0.014** (0.007)			-0.024*** (0.007)
<i>Turnover hire</i>	-0.554*** (0.037)			5.496*** (0.512)			-0.626*** (0.049)			-0.328*** (0.042)		
<i>Turnover fire</i>		0.298*** (0.052)			-3.439*** (0.534)			0.115 (0.073)			0.186*** (0.055)	
<i>Turnover total</i>			-0.336*** (0.031)			3.210*** (0.403)			-0.428*** (0.041)			-0.187*** (0.035)
Δ Salary	-0.007*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	0.035*** (0.009)	0.041*** (0.009)	0.036*** (0.009)	0.004** (0.002)	0.004** (0.002)	0.005*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.454	0.453	0.453	0.152	0.152	0.152	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Table 10: Heterogeneous effects of bank ownership, size and local competition

This table reports the regression results for the heterogeneous effects of bank ownership, bank size and local bank competition on the relationship between labor turnover and bank risk and performance in commercial lending at the bank-municipality level (within municipalities across banks). Panel A reports the results for state-owned and privately owned banks. Panel B reports the results for small and large banks. Panel C reports the results for municipalities with high and low local bank competition. *Turnover hire*, *Turnover fire*, *Turnover total* and all control variables are lagged by one month. The single terms of *Turnover hire*, *Turnover fire*, *Turnover total*, *State-owned*, *Small bank* and *High competition* are omitted for simplicity. Bank FE, Municipality FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Results for the heterogeneous effects of bank ownership												
Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (%), 12-month</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire</i> × <i>State-owned</i>	-0.292** (0.148)			16.338*** (1.761)			-1.468*** (0.133)			-1.832*** (0.114)		
<i>Turnover fire</i> × <i>State-owned</i>		-0.426*** (0.149)			4.013*** (1.579)			-0.310* (0.185)			-2.230 (0.156)	
<i>Turnover total</i> × <i>State-owned</i>			-0.419*** (0.126)			15.147*** (1.518)			-1.325*** (0.114)			-1.569*** (0.099)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.453	0.153	0.152	0.152	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Panel B: Results for the heterogeneous effects of bank size												
Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (%), 12-month</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire</i> × <i>Small bank</i>	-0.726*** (0.072)			4.916*** (0.915)			0.023 (0.094)			0.135 (0.084)		
<i>Turnover fire</i> × <i>Small bank</i>		-0.808*** (0.130)			2.545** (1.189)			0.750*** (0.137)			0.284*** (0.107)	
<i>Turnover total</i> × <i>Small bank</i>			-0.755*** (0.065)			4.423*** (0.760)			0.199** (0.079)			0.167*** (0.072)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.454	0.453	0.453	0.152	0.152	0.152	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Panel D: Results for the heterogeneous effects of local bank competition

Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (%), 12-month</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire</i> × <i>High competition</i>	0.477*** (0.076)			-3.442*** (1.009)			0.383*** (0.092)			0.295*** (0.085)		
<i>Turnover fire</i> × <i>High competition</i>		-0.121 (0.108)			-1.244 (1.082)			0.009 (0.145)			0.104 (0.115)	
<i>Turnover total</i> × <i>High competition</i>			0.402*** (0.064)			-3.638*** (0.830)			0.340*** (0.079)			0.271*** (0.074)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.453	0.152	0.152	0.152	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Online Appendix Table A1: Univariate analysis

This table reports the univariate analysis results of t-tests and non-parametric Wilcoxon rank sum tests between the high and low labor turnover group. Panel A presents the group means of *Loan loss reserve ratio*, *Loan growth* and *Return on assets*, and results of t-tests between the high and low labor turnover group at the bank-municipality level. Panel B presents the group medians and results of Wilcoxon rank sum tests at the bank-municipality level. Details on variable definitions and according data sources are shown in Appendix A. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent level, respectively.

Panel A: T-test results at the bank-municipality level				
Group statistics	<i>Loan loss reserve ratio (%)</i> (1)	<i>Loan growth (%)</i> (2)	<i>Return on assets (%)</i> (3)	<i>Return on assets (%, 12-month)</i> (5)
High turnover (hire) group mean	1.154	2.991	1.072	1.062
Low turnover (hire) group mean	1.184	2.338	1.581	1.583
Difference between groups (High-Low)	-0.030***	0.653***	-0.509***	-0.521***
P-value of difference	<0.01	<0.01	<0.01	<0.01
High turnover (fire) group mean	1.168	2.372	1.272	1.217
Low turnover (fire) group mean	1.033	2.415	1.545	1.550
Difference between groups (High-Low)	0.135***	-0.043	-0.273***	-0.333***
P-value of difference	<0.01	0.338	<0.01	<0.01
High turnover (total) group mean	1.155	2.655	1.182	1.518
Low turnover (total) group mean	1.171	2.369	1.584	1.589
Difference between groups (High-Low)	-0.016***	0.286***	-0.402***	-0.431***
P-value of difference	<0.01	<0.01	<0.01	<0.01
Panel B: Wilcoxon rank sum tests at the bank-municipality level				
Group statistics	<i>Loan loss reserve ratio (%)</i> (1)	<i>Loan growth (%)</i> (2)	<i>Return on assets (%)</i> (3)	<i>Return on assets (%, 12-month)</i> (4)
High turnover (hire) group median	0.907	1.026	0.507	0.615
Low turnover (hire) group median	0.853	1.001	0.738	0.833
Difference between groups (High-Low)	0.054	0.025	-0.231***	-0.218
P-value of difference	0.276	0.778	<0.01	<0.01
High turnover (fire) group median	0.688	0.737	0.542	0.591
Low turnover (fire) group median	0.869	1.026	0.723	0.822
Difference between groups (High-Low)	-0.181***	-0.289***	-0.181***	-0.231
P-value of difference	<0.01	<0.01	<0.01	<0.01
High turnover (total) group median	0.887	0.910	0.557	0.645
Low turnover (total) group median	0.854	1.019	0.739	0.836
Difference between groups (High-Low)	0.033***	-0.109***	-0.182***	-0.191
P-value of difference	<0.01	<0.01	<0.01	<0.01

Online Appendix Table A2: Labor turnover variables over different time periods

This table reports the regression results for the effects of bank labor turnover on bank risk and performance in commercial lending using labor turnover variables over varying time periods at the bank-municipality level (within municipalities across banks). Panel A reports the results with 6-month backward moving labor turnover variables. Panel B reports the results with labor turnover variables at $t-6$ (6 months lagged). Panel C reports the results with labor turnover variables at $t-12$ (12 months lagged). Panel D reports the results with labor turnover variables at $t-18$ (18 months lagged). *Turnover hire*, *Turnover fire*, *Turnover total* and all control variables are lagged by one month. Bank FE, Municipality FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Baseline results with 6-month backward moving average labor turnover												
Dependent variable	Loan loss reserve ratio (%)			Loan growth (%)			Return on assets (%)			Return on assets (% 12-month)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire (6mo)</i>	-2.313*** (0.134)			24.929*** (1.424)			-1.738*** (0.139)			-0.674*** (0.146)		
<i>Turnover fire (6mo)</i>		1.645*** (0.299)			-12.694*** (1.686)			0.280 (0.273)			0.558** (0.268)	
<i>Turnover total (6mo)</i>			-1.627*** (9.120)			18.281*** (1.237)			-1.366*** (0.123)			-0.462*** (0.129)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.455	0.453	0.454	0.155	0.152	0.154	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Panel B: Baseline results with labor turnover at $t-6$ (6 months lagged)												
Dependent variable	Loan loss reserve ratio (%)			Loan growth (%)			Return on assets (%)			Return on assets (% 12-month)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire (t-6)</i>	-0.622*** (0.052)			9.690*** (0.675)			-0.596*** (0.066)			-0.600*** (0.053)		
<i>Turnover fire (t-6)</i>		0.370*** (0.088)			-2.053*** (0.526)			-0.115 (0.072)			0.157*** (0.060)	
<i>Turnover total (t-6)</i>			-0.389*** (0.046)			6.905*** (0.555)			-0.480*** (0.054)			-0.421*** (0.044)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.453	0.153	0.152	0.153	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Panel C: Baseline results with labor turnover at $t-12$ (12 months lagged)

Dependent variable	Loan loss reserve ratio (%)			Loan growth (%)			Return on assets (%)			Return on assets (%), 12-month		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire (t-12)</i>	-0.684*** (0.055)			9.218*** (0.611)			-0.627*** (0.073)			-0.912*** (0.059)		
<i>Turnover fire (t-12)</i>		0.272*** (0.101)			-1.771*** (0.509)			-0.076 (0.080)			0.146* (0.073)	
<i>Turnover total (t-12)</i>			-0.489*** (0.049)			6.850*** (0.514)			-0.507*** (0.061)			-0.684*** (0.050)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.454	0.453	0.453	0.153	0.152	0.153	0.704	0.704	0.704	0.812	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Panel D: Baseline results with labor turnover at $t-18$ (18 months lagged)

Dependent variable	Loan loss reserve ratio (%)			Loan growth (%)			Return on assets (%)			Return on assets (%), 12-month		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire (t-18)</i>	-0.463*** (0.068)			7.747*** (0.547)			-0.692*** (0.074)			-1.095*** (0.061)		
<i>Turnover fire (t-18)</i>		0.218** (0.103)			-1.924*** (0.536)			-0.136 (0.095)			0.076 (0.084)	
<i>Turnover total (t-18)</i>			-0.329*** (0.058)			5.827*** (0.484)			-0.578*** (0.063)			-0.860*** (0.052)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.453	0.453	0.453	0.152	0.152	0.153	0.704	0.704	0.704	0.813	0.812	0.812
Number of obs.	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998	830,998

Online Appendix Table A3: Bank-level results with labor turnover variables over different time periods

This table reports the regression results for the effects of bank labor turnover on bank risk and performance in commercial lending using labor turnover variables over varying time periods at the bank level (within banks across municipalities). Panel A reports the results with 6-month backward moving labor turnover variables. Panel B reports the results with labor turnover variables at $t-6$ (6 months lagged). Panel C reports the results with labor turnover variables at $t-12$ (12 months lagged). Panel D reports the results with labor turnover variables at $t-18$ (18 months lagged). *Turnover hire*, *Turnover fire*, *Turnover total* and all control variables are lagged by one month. Bank FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Bank-level results with 6-month backward moving average labor turnover												
Dependent variable	Loan loss reserve ratio (%)			Loan growth (%)			Return on assets (%)		Return on assets (%), 12-month			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire (6mo)</i>	-0.904* (0.538)			45.113*** (8.991)				0.096 (0.232)			-0.163 (0.194)	
<i>Turnover fire (6mo)</i>		4.726*** (1.767)			-51.722*** (12.520)				-1.025* (0.556)			-1.083* (0.603)
<i>Turnover total (6mo)</i>			0.351 (0.617)			24.145** (9.686)				-0.156 (0.227)		-0.374** (0.164)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.553	0.556	0.553	0.061	0.057	0.057	0.254	0.254	0.254	0.401	0.402	0.402
Number of obs.	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223

Panel B: Bank-level results with labor turnover at $t-6$ (6 months lagged)												
Dependent variable	Loan loss reserve ratio (%)			Loan growth (%)			Return on assets (%)		Return on assets (%), 12-month			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire (t-6)</i>	-0.376* (0.197)			13.355*** (4.214)				-0.089 (0.069)			-0.081 (0.065)	
<i>Turnover fire (t-6)</i>		0.762** (0.315)			-13.545*** (3.463)				-0.109 (0.140)			-0.199 (0.128)
<i>Turnover total (t-6)</i>			-0.082 (0.185)			6.482* (3.853)				-0.096* (0.059)		-0.113** (0.053)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.553	0.556	0.553	0.057	0.055	0.055	0.254	0.254	0.254	0.401	0.401	0.401
Number of obs.	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223
Panel C: Bank-level results with labor turnover at $t-12$ (12 months lagged)												
Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (%), 12-month</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire (t-12)</i>	-0.555*** (0.198)			11.135*** (2.993)			-0.117** (0.055)			-0.118* (0.069)		
<i>Turnover fire (t-12)</i>		0.742* (0.391)			-7.227 (5.208)			-0.176 (0.133)			-0.155 (0.134)	
<i>Turnover total (t-12)</i>			-0.272 (0.207)			7.177** (2.984)			-0.132*** (0.050)			-0.128** (0.063)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.554	0.553	0.553	0.056	0.055	0.056	0.254	0.254	0.254	0.401	0.401	0.401
Number of obs.	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223
Panel D: Bank-level results with labor turnover at $t-18$ (18 months lagged)												
Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (%), 12-month</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Turnover hire (t-18)</i>	-0.510*** (0.155)			10.479*** (2.164)			-0.128* (0.074)			-0.100 (0.074)		
<i>Turnover fire (t-18)</i>		0.194 (0.319)			-12.657*** (4.121)			-0.025 (0.139)			-0.106 (0.130)	
<i>Turnover total (t-18)</i>			-0.382** (0.154)			6.189** (2.479)			-0.110 (0.074)			-0.102 (0.069)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.554	0.553	0.553	0.056	0.055	0.055	0.254	0.254	0.254	0.401	0.401	0.401
Number of obs.	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223

Online Appendix Table A4: Bank-level results of IV analysis and placebo tests

This table reports the regression results of the IV analysis and placebo tests for the effects of bank labor turnover on bank risk and performance in commercial lending at the bank level (within banks across municipalities). Panel A reports the IV analysis final stage results at the bank level. Panel B reports the placebo test results at the bank level. *IV-Turnover hire*, *IV-Turnover fire*, *IV-Turnover total*, *Placebo Turnover hire*, *Placebo-Turnover fire*, *Placebo-Turnover total* and all control variables are lagged by one month. Bank FE and Time FE are the fixed effects. Details on variable definitions and according data sources are shown in Appendix A. Standard errors are robust and clustered at the bank-municipality level and shown in parentheses. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: IV analysis final stage results at the bank level												
Dependent variable	Loan loss reserve ratio (%)			Loan growth (%)			Return on assets (%)			Return on assets (% 12-month)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>IV-Turnover hire</i>	-15.180** (7.739)			529.013 (357.015)			5.543 (3.560)			4.409** (1.859)		
<i>IV-Turnover fire</i>		18.482 (30.465)			-583.029 (1371.557)			-17.595 (16.556)			-0.950 (6.917)	
<i>IV-Turnover total</i>			-20.018 (14.432)			681.083 (690.147)			10.159 (7.379)			4.617* (2.439)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.553	0.553	0.553	0.056	0.055	0.055	0.254	0.254	0.254	0.401	0.401	0.401
Number of obs.	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223

Panel B: Placebo test results at the bank level												
Dependent variable	<i>Loan loss reserve ratio (%)</i>			<i>Loan growth (%)</i>			<i>Return on assets (%)</i>			<i>Return on assets (% 12-month)</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Placebo-Turnover hire</i>	2.943			-12.173			2.228			0.847		
	(3.688)			(81.073)			(1.485)			(0.981)		
<i>Placebo-Turnover fire</i>		-24.473*			695.907			-1.704			4.745	
		(11.975)			(487.798)			(6.481)			(4.059)	
<i>Placebo-Turnover total</i>			1.636			22.415			2.064			1.049
			(3.551)			(85.669)			(1.479)			(1.017)
Labor controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.553	0.553	0.553	0.055	0.056	0.055	0.254	0.254	0.254	0.401	0.401	0.401
Number of obs.	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223	29,223