

# US Labor Market Churn

## Macro Trends and Predictions

### Key Insights

- Churn refers to the co-occurrence of workers arriving and departing in a given period at a firm. Aggregate churn abstracts from the firm level, measuring gross flows in and out of jobs in the entire economy in a given period.
- The decline in aggregate churn in 2023 was driven by declining separations, which corroborates the argument that the US was not in recession during the post-Spring 2022 hiring slowdown.
- Changes in the aggregate churn rate lead changes in labor market tightness. The aggregate churn rate towards the end of last year suggests more labor market slack than what was indicated by the ratio of job openings to unemployed workers. Reliance on the latter measure may have led to policy calibration based on an overly optimistic reading of the labor market at that time.
- Aggregate churn currently suggests that labor market tightness will stabilize as the year continues.

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### Introduction

Not every job opening is a new job. Some, if not many jobs, are simply replacements caused by workers quitting. This process is commonly referred to as backfilling. Backfilling is a key component of an important labor market dynamic known as churn. Churn refers to the inflow and outflow of workers into a firm, and economy-wide or aggregate churn refers to the inflow and outflow of workers into jobs. Churn may be caused by backfilling workers who quit or by the concurrent creation of new positions and destruction of old ones. This research note examines aggregate labor market churn in the US since the turn of the century.

Worker reallocation is a key vehicle for labor market dynamism and productive efficiency gains. Churn informs how dynamic worker reallocation is, and the aggregate churn rate serves as a useful indicator for the extent of worker reallocation economy wide. In this note, we first define churn and the churn rate. Next, we examine the aggregate churn rate from the turn of the century (2001) to the end of 2023. Finally, we examine the relationship between aggregate churn and labor market tightness using public and LinkedIn data. Changes in the aggregate churn rate lead changes in labor market tightness. The aggregate churn rate towards the end of 2023 suggests more labor market slack than what was indicated by the ratio of job openings to unemployed workers, which may

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have implications for policy calibration at that time. We conclude with a discussion of aggregate churn today and what we might expect to see going forward as a result.

### What is labor market churn?

Churn refers to the co-occurrence of workers arriving and departing in a given period of time at a firm. Workers depart firms via quits, layoffs, retirements, or discharges (i.e., involuntary termination) and arrive as new hires. A worker may arrive as a new hire in order to replace a departed worker or take on a new position. Churn gauges the total number of concurrent instances of workers arriving and departing. Churn can occur through quits even if a company's headcount and roles remain unchanged. A worker quitting may create a job opening for another worker to replace them (backfill).<sup>1</sup> Churn can also occur when an employer eliminates a job while at the same time creating a new one. Effectively, churn measures "the portion of worker turnover not due to [...] when [...] establishments expand [and] contract."<sup>2</sup> Mathematically, the gross churn rate at company (c) at time (t) is defined as in Burgess et al. (2001):<sup>3</sup>

$$\text{Gross Churn Rate}_{c,t} = \frac{2 \min\{\text{Hires}_{c,t}, \text{Separations}_{c,t}\}}{\frac{1}{2} (\text{Employment}_{c,t} + \text{Employment}_{c,t-1})}$$

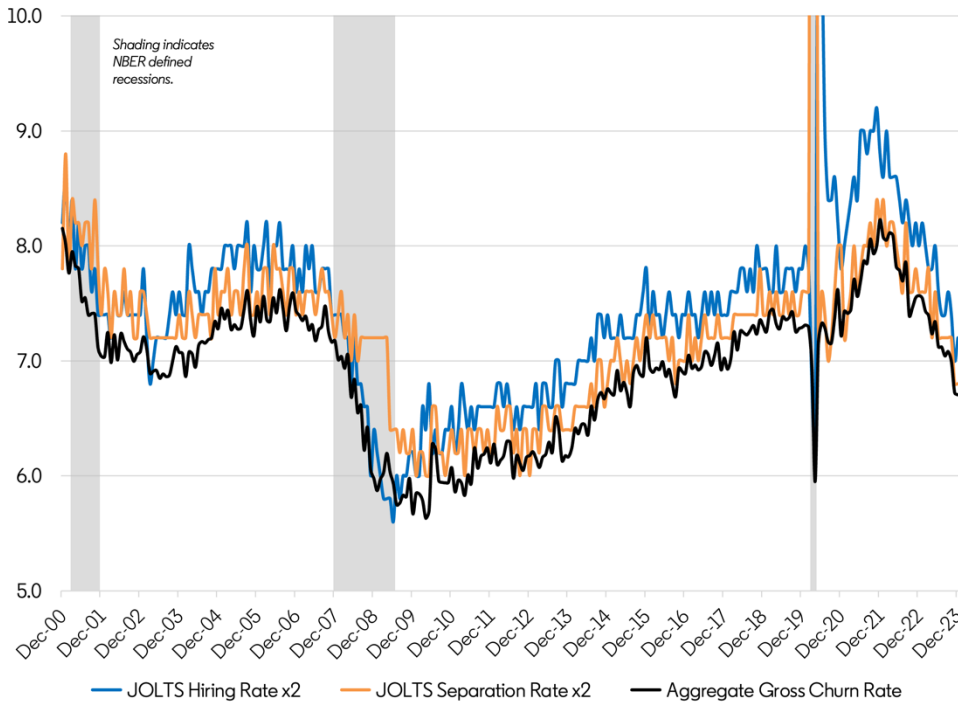
The gross churn rate is defined as the number of co-occurrences of hires and separations (i.e., the minimum) at time t times two (one flow for a hire, one flow for a separation) divided by the average employment level at time t and the prior period t-1. A company's headcount shrinks whenever the number of separations exceed the number of hires and vice versa. The gross churn rate captures the number of workers flows that took place which neither contracted nor expanded headcount relative to the size of the workforce. A rapidly expanding company will increase hiring, but its churn rate will not increase if it maintains few separations.

### What is aggregate labor market churn?

Aggregate churn abstracts from the firm level, measuring gross flows in and out of jobs in the entire economy in a given period. It is calculated analogously to churn at the firm level but measured economy wide. It captures the volume of worker flows that took place net of employment expansion or contraction, thus aggregate churn serves as a useful barometer for the level of economy-wide worker reallocation. The reallocation of workers is essential for a dynamic labor market and likely consequential for labor market performance. Even a stagnant labor market with no employment growth may see productivity gains if workers churn to better employer matches.

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## US Aggregate Gross Churn Rate (%)



Source: JOLTS and CES, Bureau of Labor Statistics; Author's Calculations

Note: Figure 1. All series are seasonally adjusted. The aggregate gross churn rate is calculated using not seasonally adjusted hires, separations, and employment to construct a raw aggregate gross churn rate series which is then seasonally adjusted using X-13ARIMA-SEATS. Separations fell precipitously when mass layoffs slowed sharply in May 2009 toward the end of the Great Recession.

The US aggregate gross churn rate displays behavior consistent with the hiring and separation rates on which the series is based (Figure 1).<sup>4</sup> During the early 2000s recession, aggregate churn slowed as hiring slowed and quits followed. A recovery in separations (via quits) in subsequent years increased aggregate churn until hiring slowed sharply at the onset of the Great Recession. Even as hiring began to recover in 2010, separations (quits) continued to languish at record lows until 2014, resulting in lower churn. From 2014 to early 2020, the labor market gradually recovered with increased churn driven by consistent recovery in hiring and quits. A sharp slowdown in hiring at the onset of the COVID-19 pandemic derepressed churn for several months in 2020 before giving way to the Great Reshuffle. During the Great Reshuffle, hiring and quits accelerated, rapidly accelerating aggregate churn. Since peaking in early 2022, separations (via quits) have slowed alongside hiring, leading to less churn. Aggregate churn normalized around 2016-2017 levels in 2023 until another slowdown in separations in late 2023 put churn on par with 2014 levels.

Though layoffs, retirements, and discharges also influence separations, the bulk of separations (and hence churn) is typically driven by quits. As documented in Lazear and McCue (2017), declines in hiring drive *initial declines* in churn in recessions followed by subsequent declines in separations. The most recent decline in churn was not driven by hiring declines but by decline in separations (via quits), which corroborates the argument that the US was not in recession during the post-Spring 2022 hiring slowdown.

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The slowdown in separations post-Spring 2022 followed a slowdown in hiring with separations peaking after hiring. The slowdown in hiring reflected an underlying slowdown in labor demand (driven in part by monetary tightening), which reduced opportunities for workers to quit and go to new employers. In addition, this initial slowdown in separations (via quits) may have had knock on effects for churn. As fewer workers quit, fewer opportunities opened up for workers to replace workers who departed. Without a commensurate increase in layoffs, like the one that occurred between August 2008 and April 2009, separations fell throughout 2022 and 2023, leading to lower aggregate churn. As a result, we now see less aggregate churn than we did in 2018-2019, which may be consequential for the performance of the labor market. Lower aggregate churn may mean more inefficient employer-employee matches persistent as fewer opportunities open up simply from workers moving around.

## Validating its measurement

Perspective regarding churn depends on the validity of its measurement. The construction of the aggregate gross churn rate relies on two survey datasets produced by the Bureau of Labor Statistics (“BLS”):

1. Job Openings and Labor Turnover Survey (“JOLTS”)
2. Current Employment Statistics (“CES”).

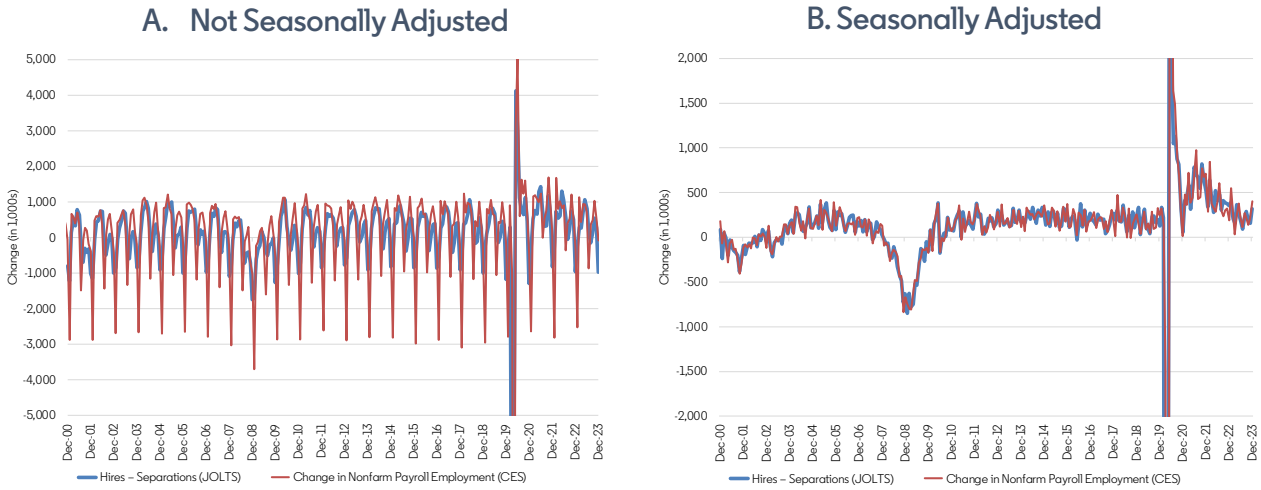
The BLS tracks hires and separations at establishments via JOLTS to create aggregate hires and separations series.<sup>6</sup> The BLS tracks employment through the CES and benchmarks JOLTS to the CES each month.<sup>7</sup>

A necessary condition for the aggregate gross churn measure to be valid is consistency between JOLTS and CES on their respective measures of employment growth. To evaluate this, we plot the raw employment level change implied by the JOLTS series (measured by the difference in hires and separations) against the raw change in nonfarm payroll employment in CES (Figure 2, Panel A). As shown, the CES raw series exhibits more extreme changes compared to the JOLTS raw series. After adjusting for seasonality, the two series align with only minor discrepancies (Figure 2, Panel B).

Given the consistency of JOLTS and CES, a natural question is how payroll employment growth and churn co-move. Payroll employment growth is the expansion or contraction of employment, and aggregate churn is portion of worker turnover *not due to* employment expanding or contracting. Mathematically, employment growth is the difference between hiring and separations and churn is the minimum. Thus, by construction, these measures only move in the same direction when hiring is smaller than separations. As a result, we only expect to see co-movement during a sharp hiring slowdown. Employment growth and churn co-move strongly during the sharp hiring slowdowns of the Great Recession and COVID-19 Recession (Figure 3). During a gradual hiring slowdown, like in 2022-2023, separations will decline gradually as the slowdown in hiring portends less opportunity for quit-driven separations. Thus, even though employment continued to grow at a steady pace in 2023, aggregate churn declined as the hiring slowdown led to less quit-driven separations. Examining only the change in nonfarm payroll employment supports the view that the labor market had as much, if not more, momentum than prior to the pandemic whereas aggregate churn indicates substantially less momentum than prior to the pandemic.

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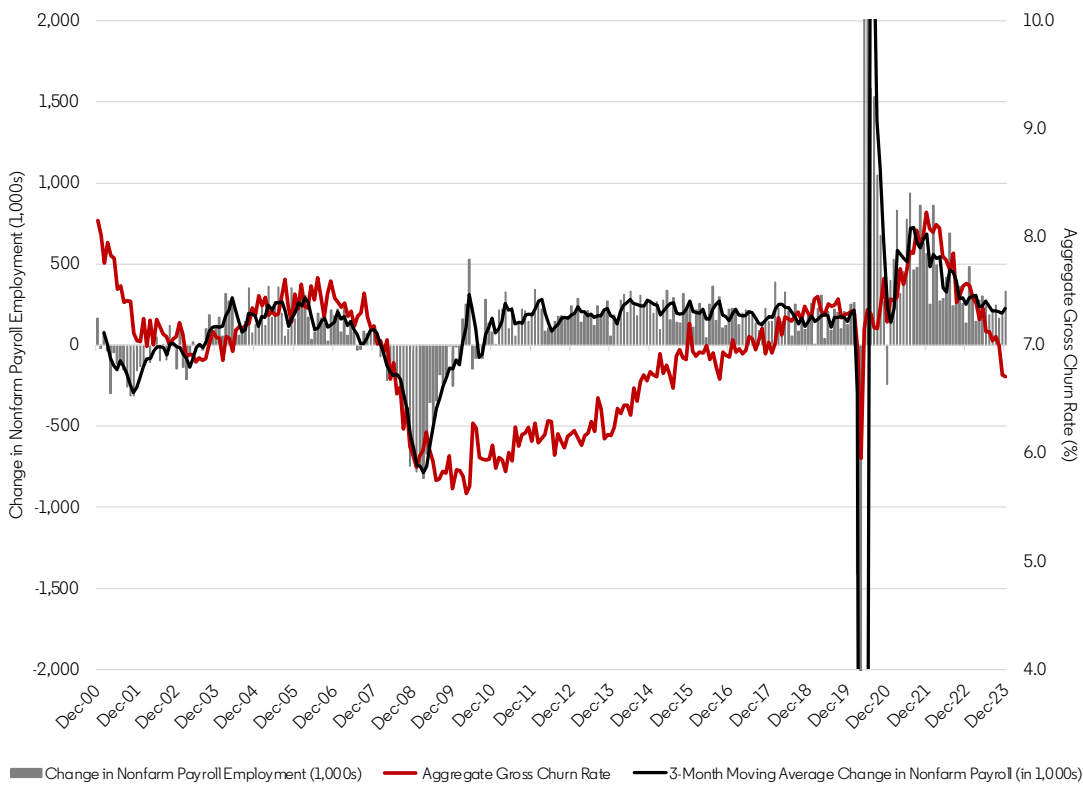
## JOLTS vs. CES



Source: JOLTS and CES, Bureau of Labor Statistics; Author's Calculations

Note: Figure 2. Panels A and B. The JOLTS net employment change is calculated by seasonally adjusting the raw hires minus separations series using X-13ARIMA-SEATS.

## Aggregate Gross Churn vs. Change in Nonfarm Payroll



Source: JOLTS and CES, Bureau of Labor Statistics; Author's Calculations

Note: Figure 3.

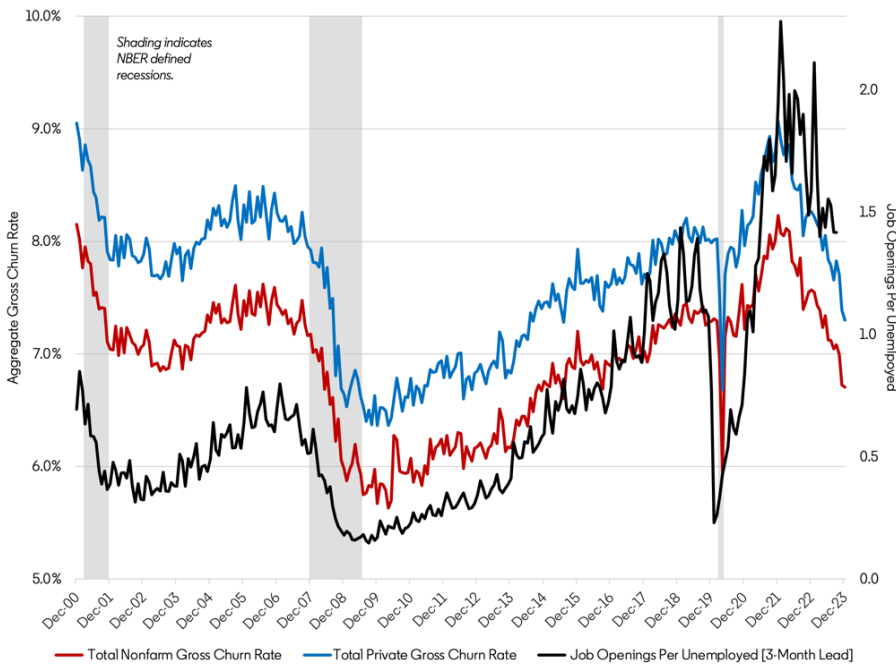
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# Churn and Labor Market Tightness

While churn is distinct from employment growth, it remains intimately tied to labor market tightness.<sup>8</sup> As mentioned, churn is primarily driven by changes in separations except for in the early days of recessions. Separations affect the flow of workers into unemployment as well as prospects for job openings (backfill or creative destruction). Job openings and unemployment comprise a canonical indicator for labor market tightness – the ratio of job openings to unemployed workers. Given the logical ties between churn and tightness, it stands to reason that aggregate churn may provide a means to anticipate changes in labor market tightness. Anticipating changes in tightness may in turn aid in forward-looking policy calibration where the balance between labor demand and supply (tightness) is a key consideration.

We plot the aggregate gross churn rate economy-wide and for the private sector alongside the ratio of job openings to unemployed workers (Figure 4). The ratio of job openings to unemployed workers is displayed shifted back one quarter. First, we see that changes in aggregate churn directionally align with changes in the ratio of job openings to unemployed workers. Second, we see that aggregate churn leads this canonical measure for labor market tightness. Changes in aggregate churn precede similar changes in the ratio of job openings to unemployed workers. A collapse in hiring at the start of Great Recession led to a downturn in churn and later an upturn in unemployment and increased labor market slack, compounded by the slow recovery in job openings. Both churn and labor market tightness languished at record lows through 2014. As churn picked up, labor market tightness subsequently increased until the COVID-19 pandemic. By late 2023, aggregate churn continued to slow from its 2022 peak, while the ratio of job openings to unemployed workers leveled out. Third, we see increased volatility in the ratio of job openings to unemployed workers but no such comparable increase in churn volatility.<sup>9</sup>

## Aggregate Gross Churn and Job Openings Per Unemployed



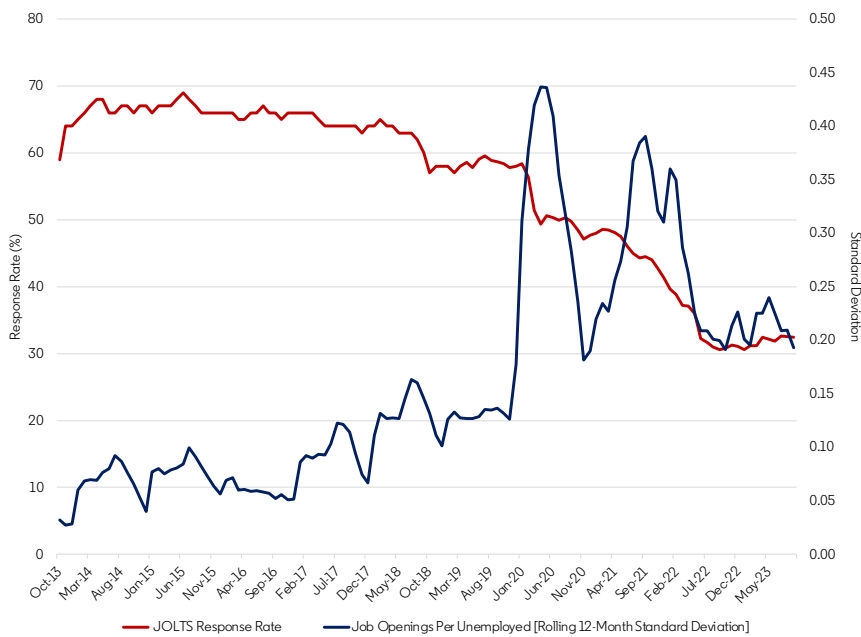
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Source: JOLTS and CES, Bureau of Labor Statistics; Author's Calculations

Note: Figure 4. The time series for job openings per unemployed worker is displayed shifted back by one quarter.

Evidence suggests changes in the response rate to JOLTS likely account for the increased in volatility in this measure of labor market tightness. In particular, the increased volatility appears driven by the JOLTS job openings series rather than the Current Population Survey's unemployment series. Furthermore, volatility increase in the JOLTS job openings series appears tied to changes in the response rate to the survey (Figure 5).<sup>10</sup> From 2013 to 2023, we see the response rate to the Job Openings and Labor Turnover Survey decline. As the decline begins to accelerate in 2017-2018, volatility in the job openings per unemployed worker series (measured by the rolling 12-month standard deviation of the series) increases. The first notable increase in volatility occurs in mid-2018 when we see a sharp drop off in the response rate. The next notable increase occurs at the onset of the pandemic. Eventually, volatility settles at a higher level as the response rate settles at a lower rate and the pandemic-induced drop off in the rate of responses to JOLTS ceases.

## JOLTS Response Rate and Volatility



Source: JOLTS and CES, Bureau of Labor Statistics; Author's Calculations

Note: Figure 5.

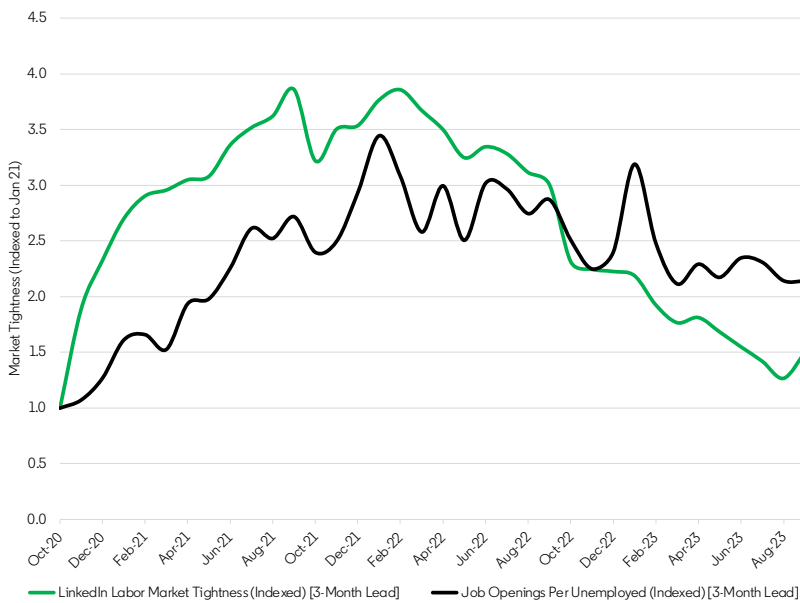
This increase in volatility raises the prospect that recent changes in job openings per unemployed worker may be a less reliable indicator of recent labor market tightness. Hence, we consider a measure of tightness using alternative data.

As an alternative measure of recent labor market tightness, we consider the LinkedIn Labor Market Tightness metric. This metric provides a private sector sourced, alternative measure for tightness based on the ratio of number of job postings on LinkedIn to the number of active applicants. Compared to the canonical measure, this

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metric adds on-the-job search to the labor supply side of the tightness ratio and thus is typically lower in levels but directionally similar.<sup>11</sup> Comparing these measures starting in 2021, we see that they track directionally with both peaking in early 2022 (Figure 6). However, we begin to see divergence in these measures for labor market tightness in 2023 with the LinkedIn measure indicating loosening labor market conditions throughout 2023 compared to job openings per unemployed worker. Job openings per unemployed worker indicate a steady degree of labor market tightness throughout the latter half of 2023. However, the substantial decline in the JOLTS response rate (from 60% in 2019 to 30% in 2023) and its seemingly disproportionate on job openings raise concerns about the reliability of the conclusion that tightness held steady throughout the latter half of 2023.

## Labor Market Tightness Measures



Source: JOLTS and CES, Bureau of Labor Statistics; Author’s Calculations

Note: Figure 6. The time scale is shifted back by one quarter so data for October 2020 is January 2021 data. LinkedIn’s Labor Market Tightness metric is calculated as the number of active job openings posted directly on LinkedIn divided by the total number of active applicants. Active applicants are members who submit at least one application to a job opening in a given month.

Examining churn and tightness using an alternative tightness measure, we see that aggregate churn – both for all sectors and the private sector– tracks next quarter LinkedIn labor market tightness closely from 2021 through 2023 (Figure 7). Aggregate churn peaks in early 2022, followed by a peak in labor market tightness, according to both the LinkedIn Labor Market Tightness metric and job openings per unemployed worker. From 2022 to early 2023, we see more slack in labor market conditions, according to both tightness measures, preceded by an ongoing decline in aggregate churn. Aggregate churn continues to decline throughout 2023, followed by declines in the LinkedIn Labor Market Tightness metric. However, we see no such decline in job openings per unemployed.

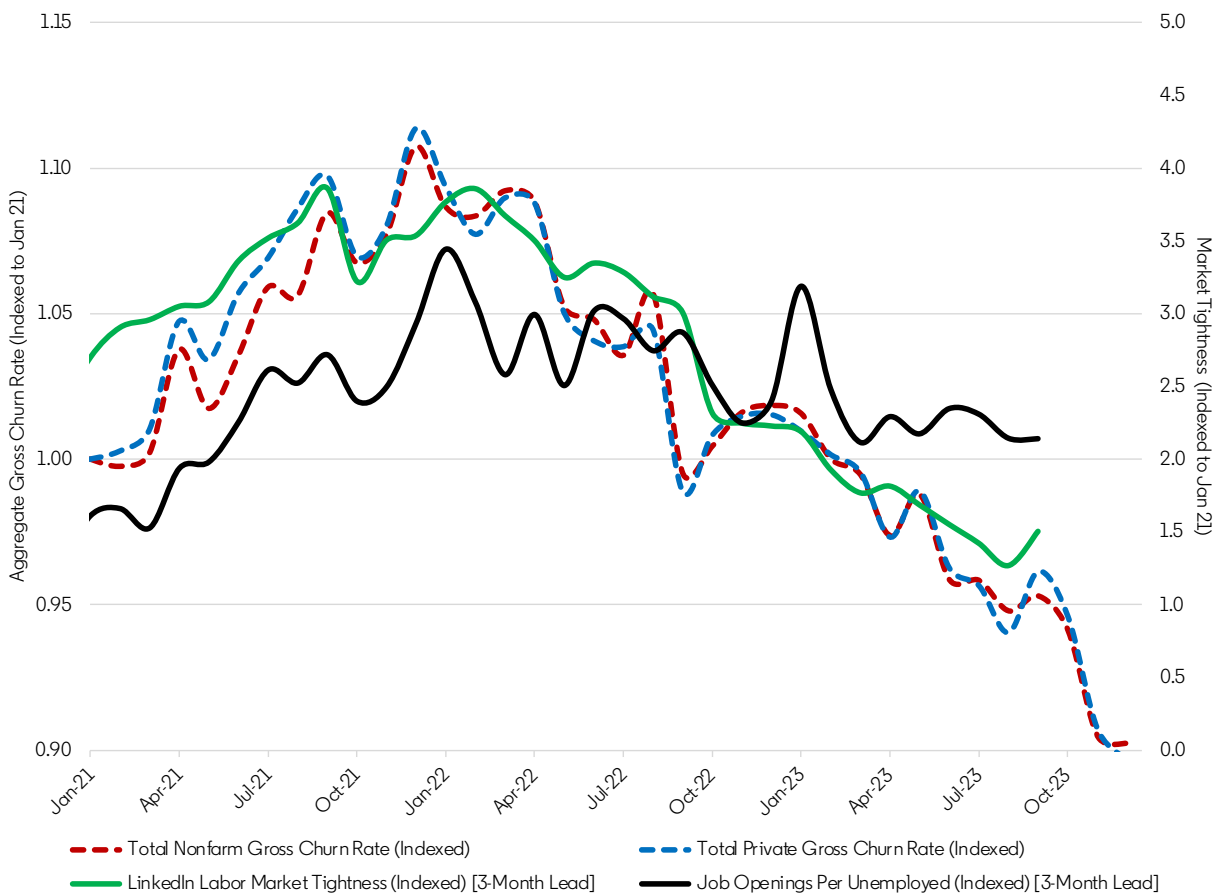
Given the historical relationship between aggregate churn and tightness (Figure 4) and increased volatility and potentially decreased reliability of the canonical tightness metric (Figure 5), the evidence suggests that labor market conditions continued to loosen in the latter half of 2023 even though job openings per unemployed worker



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did not indicate that this was the case.<sup>12</sup> If it was the case that the labor market conditions loosened more than job openings per unemployed worker suggested in 2023, then the canonical measure for tightness created scope for policy miscalibration with respect to the strength of the labor market (in terms of the balance between labor demand and supply). Indeed, this measure was cited in the Federal Open Market Operations Committee’s December meeting minutes where they set monetary policy. In the meeting, “some participants highlighted that the ratio of vacancies to unemployed workers had declined to a value only modestly above its level just before the pandemic.”<sup>13</sup> Effectively, some participants assessed that labor market tightness had normalized to just above pre-pandemic levels, but this presumes that labor market tightness held steady in the latter half of 2023 based on job openings (vacancies) per unemployed worker. It may well be the case that the labor market continued to loosen in the latter half of 2023 as indicated by aggregate churn and the LinkedIn labor market tightness metric. Thus, some policymakers at the time may have taken an overly optimistic stance on labor market conditions when calibrating monetary policy.

### Aggregate Gross Churn and Labor Market Tightness



Source: JOLTS and CES, Bureau of Labor Statistics; Author’s Calculations

Note: Figure 7.

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### Churn Today

Aggregate churn serves as a useful indicator for the intensity of worker reallocation and may also be an important leading indicator for labor market tightness. Based on late 2023 aggregate churn trends, we expect to see that labor market tightness declined in the first half of 2024. Since January, the ratio of job openings per unemployed worker has declined. As of May, aggregate churn sits around the same level as the end of 2023, thus we expect to see labor market tightness stabilize as the year continues. In terms of measurement, aggregate churn may at times provide a more reliable (leading) indicator for tightness than job openings per unemployed worker, which has likely suffered from a substantial decline in the JOLTS response rate. At the very least, aggregate churn should be considered alongside job openings per unemployed worker along with alternative measures of tightness.

# Appendix

## Endnotes

1. While no such statistic appears readily available in the US, employers in Germany classified over *half* of job vacancies (56%) as replacement hires for old jobs rather than new jobs. See Yusuf Mercan and Benjamin Schoefer, 2020. “Jobs and Matches: Quits, Replacement Hiring, and Vacancy Chains,” *American Economic Review: Insights*, vol. 2(1), pp. 101-124.
2. See Weingarden, Alison, 2020. “Worker Churn at Establishments over the Business Cycle,” *FEDS Notes*. Washington: Board of Governors of the Federal Reserve System, August 24, 2020, <https://doi.org/10.17016/2380-7172.2379>.
3. Burgess, Simon and Julia Lane and David Stevens, 2001. “Churning dynamics: an analysis of hires and separations at the employer level,” *Labour Economics*, vol. 8(1), pp. 1-14.
4. In Figure 1, the Job Openings and Labor Turnover Survey (“JOLTS”) hiring rate and separation rate displayed are scaled by a factor of two (“x2”) to be on the same scale of the gross churn rate.
5. Lazear, Edward P. and Kristin McCue, 2017. “Hires and Separations in Equilibrium,” *NBER Working Papers* 23059, National Bureau of Economic Research, Inc.
6. An establishment is a physical location where goods are produced, and services are provided. A company or firm may have multiple establishments. See Bureau of Labor Statistics. (2011). Chapter 2. Employment, Hours, and Earnings from the Establishment Survey. In *BLS Handbook of Methods* (p. 1). Department of Labor. <https://www.bls.gov/opub/hom/pdf/ces-20110307.pdf>.
7. See Bureau of Labor Statistics (2024, July 2). *Job Openings and Labor Turnover Technical Note*. U.S. Bureau of Labor Statistics. Accessed July 2, 2024, <https://www.bls.gov/news.release/jolts.tn.htm>
8. Labor market tightness measures the ratio of the demand and supply of workers. See Wiczer, David and Santiago Martinez, 2023. “Labor market tightness and how to measure it.” Federal Reserve Bank of Atlanta, December 1, 2023. <https://www.atlantafed.org/blogs/macroblog/2023/12/01/labor-market-tightness-how-to-measure-it>.
9. Volatility refers to the magnitude of the changes seen in the series. Changes in volatility can be measured by a rolling standard deviation over a fixed time range (e.g., 12 months).
10. Interestingly, the JOLTS labor turnover series (e.g., hires, separations, quits, layoffs) do not appear to show an enduring increase in volatility in 2023 like the job openings series.
11. See Ghayad, Rand, Carl Shan, and Yao Huang (2022, November 7). *The U.S. labor market is less tight than it appears*. Harvard Business Review. <https://hbr.org/2022/11/the-u-s-labor-market-is-less-tight-than-it-appears>.
12. Of course, it could also be the case the relationship between aggregate churn and tightness broke down in the second half of 2023, hence the lack of decline in job openings per unemployed worker following declines in aggregate churn during that period. However, evidence taken in totality tilts against this theory.
13. Board of Governors of the Federal Reserve System. (2023, December 13). *Minutes of the Federal Open Market Committee December 12–13, 2023*. Accessed July 2, 2024, <https://www.federalreserve.gov/monetarypolicy/files/fomcminutes20231213.pdf>