Did the Job Ladder Fail after the Great Recession?

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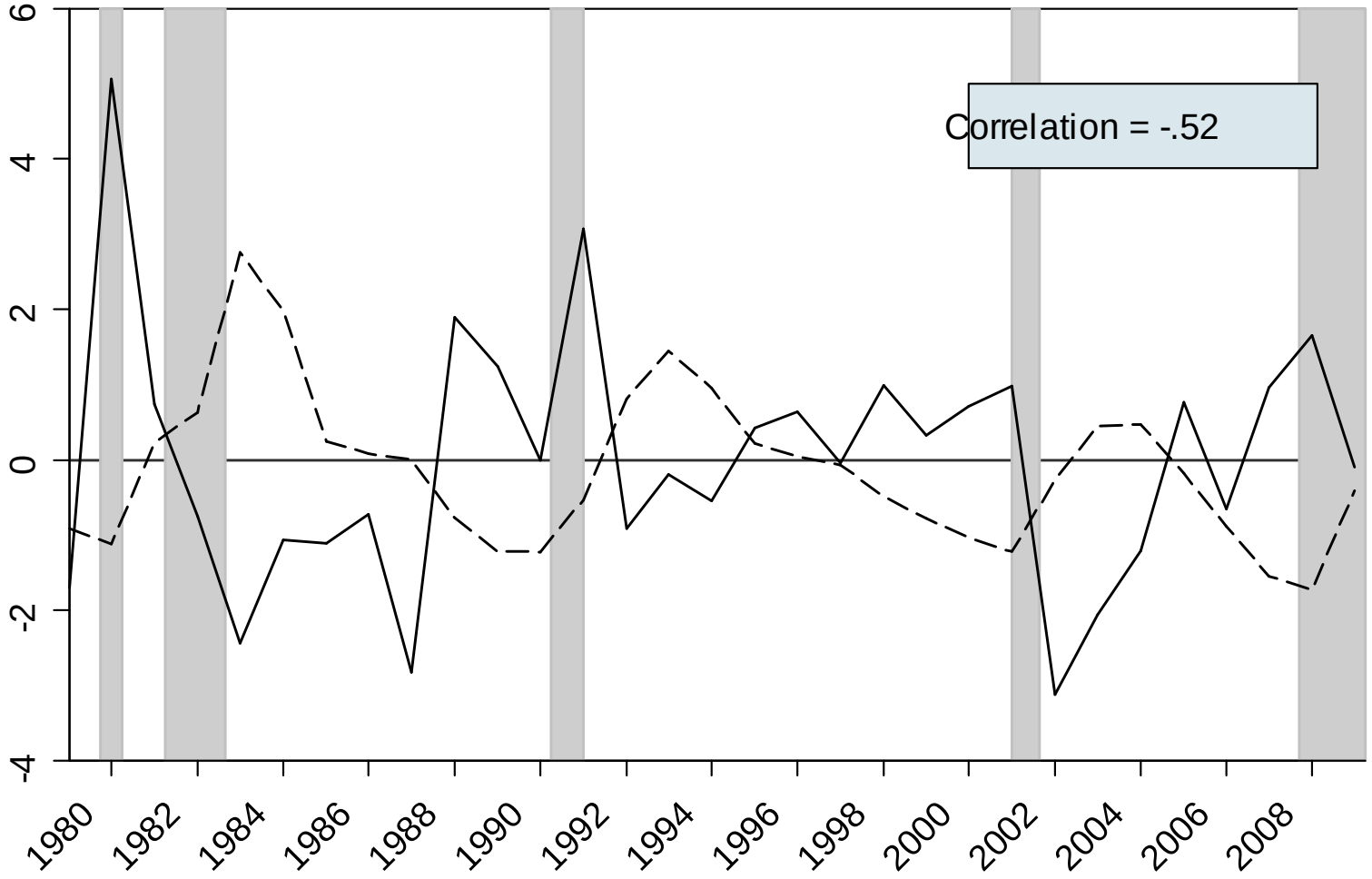
The job ladder over the business cycle

Moscarini and Postel-Vinay (NBER MA 2008, AER 2012, Restud 2013)

- small firms are the bottom rung of the job ladder: less productive, pay less, lose workers to larger competitors
- when unemployment is high, all firms can hire easily from unemployment, large firms poach less, small firms grow faster
- as economy expands and unemployment declines, hiring constraints tighten; job-to-job quits upwards on the wage/size ladder accelerate; large firms poach workers from small firms and keep growing; small firms stall; competition intensifies; wages rise
- in recessions, large firms have more employment to shed; small firms sustain job creation, through early recovery
- contrast with credit constraints, which tighten in recessions

Firm size and growth over the business cycle

Census' Business Dynamic Statistics, annual (from MPV 2012)



Solid = Differential net job creation, Dash = HP-detrended unemployment rate.
Categories defined each year as <50 and >1000.
Shaded areas indicate NBER contractions.
Source: BDS and authors' calculations.

Equilibrium job search models and business cycles

Search	Wage setting	Steady State	Stochastic	Emphasis
Random	Bargaining (Nash)	DMP	Shimer 05	u volatility
Directed	Commitment (posting)	Moen 97	Menzio and Shi 10, 11	u volatility
Random	Sequential Auctions	Postel-Vinay and Robin 02	Robin 11	u volatility, wages
Random	Commitment (posting)	Burdett and Mortensen 98	Moscarini and Postel-Vinay 08, 12, 13	firm size

Overview of this paper

- our past work used data on **net** employment flows by firm size, and on EE gross flows
- here: new JOLTS data on all **gross** flows (hires, quits, layoffs) by establishment size, and focus on the Great Recession (GR)
- we describe evolution of gross and net workers flows during the GR at monthly frequency
- we estimate *business cycle job ladder model*, which fits well gross and net employment flows across establishment size classes
- our estimated "sampling weights", model-based measure of hiring effort, by size class, that rationalize data within the model, are more sensible than JOLTS' direct measure of vacancies by establishment size

The job ladder in the GR: Findings

- small employers (*establishments*) lost employment at unusual pace, relative to large ones and to previous recessions
- job-to-job quits collapsed, especially towards large, high-paying employers
- vacancy yield took off, especially at small employers
- with falling attrition and high vacancy yield, small employers further reduced hiring effort
- **bottomline**: new jobs at small employers, traditional first step of the ladder out of unemployment, vanished, in part because large employers stopped poaching

Establishments vs Firms

Table: Firm and establishment size

Firm size category (employees)	Mean establishment size (employees)	Employment share (percent)	Cumulated employment share (percent)
1 to 4	2.1	5.4	5.4
5 to 9	6.4	6.4	11.8
10 to 19	12.4	7.73	19.53
20 to 49	24	10.66	30.2
50 to 99	39.1	7.57	37.77
100 to 249	48.9	8.7	46.47
250 to 499	53.5	5.62	52.09
500 to 999	57.4	5.11	57.2
1000 to 2499	61.8	6.91	64.11
2500 to 4999	58.4	5.19	69.3
5000 to 9999	56	5.38	74.68
10000+	62.2	25.32	100

Establishment size and growth in the GR (JOLTS)

Solid, left scale = Differential net JC (large minus small), MA-smoothed.
Dash, right scale = Unemployment rate, detrended.
Categories defined within each JOLTS sample as <50 and >1,000.
Shaded areas indicate NBER contractions.
Source: JOLTS, BLS, and authors' calculations.

Firm size and growth in the GR

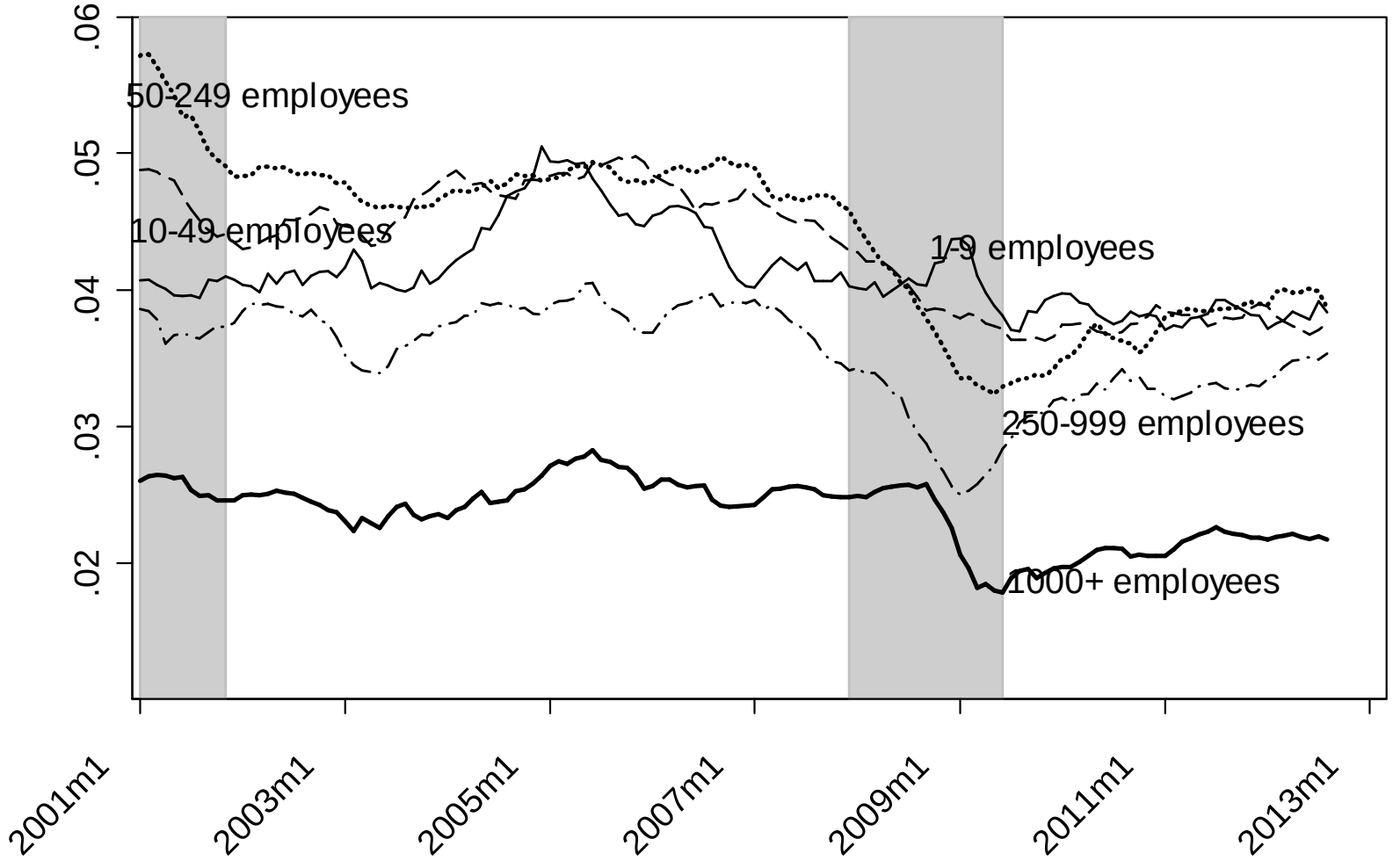
Payroll service company ADP, 2005-2013, monthly

Solid, left scale = Differential net JC (large minus small), MA-smoothed.
Dash, right scale = Unemployment rate, detrended.
Categories defined each month as <50 and >1000. Shaded areas indicate NBER contractions.
Source: ADP, BLS, and authors' calculations.

Establishment/firm wage and growth

- employer size-wage correlation is well-known: we confirm it for both establishments and firms
- Kahn and McEntarfer (2014): net employment growth at high-paying establishments is more responsive to the business cycle than that of low-paying establishments, because the separation rate declines when unemployment is high, and more so at small establishments
- Haltiwanger, Hyatt and McEntarfer (2014): workers quit from low- to high-paying firms, especially at times of low unemployment

Hiring rates by establishment size (JOLTS)



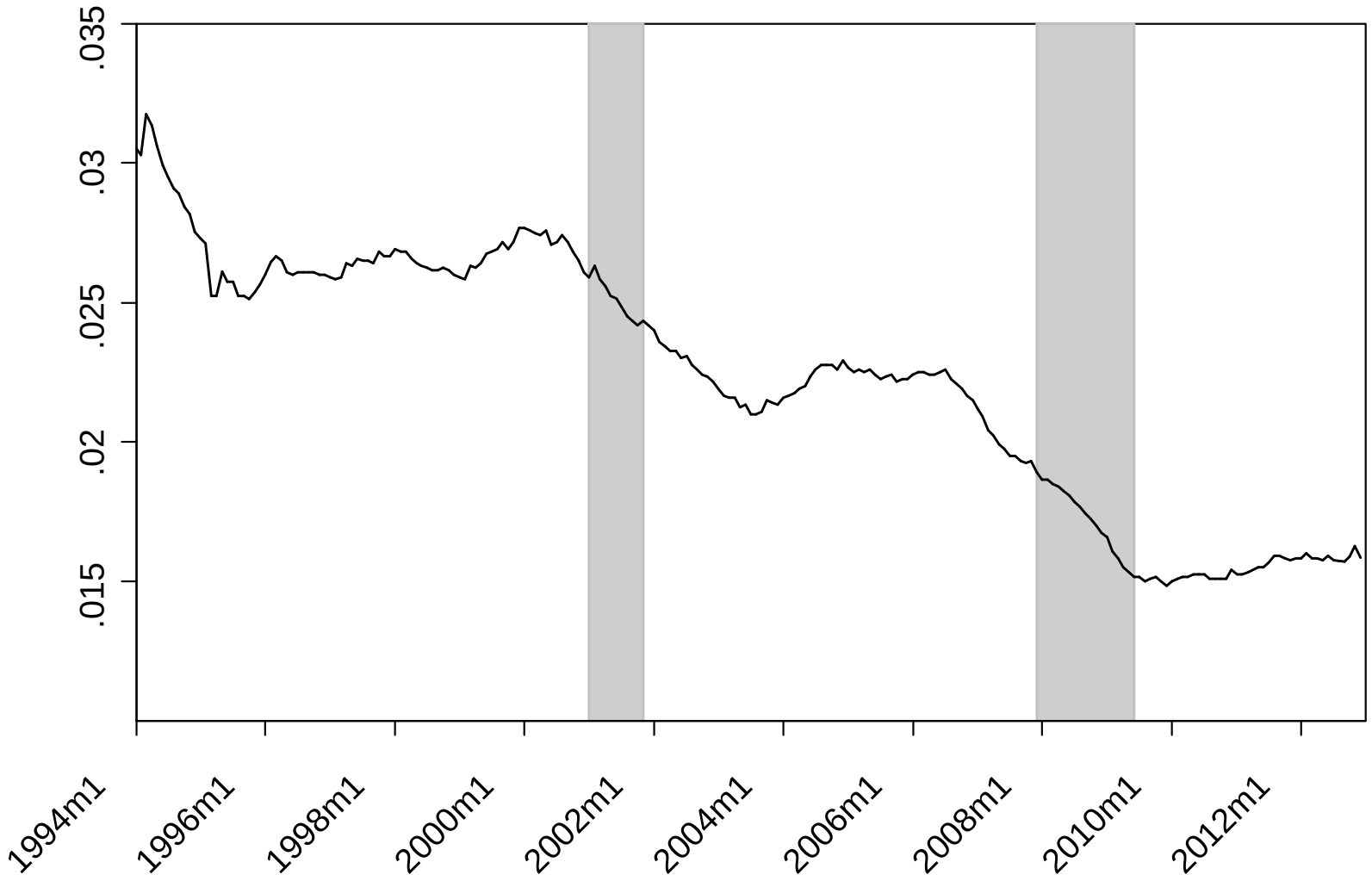
Average hire rate by size class, MA-smoothed.
Shaded areas indicate NBER contractions.
Source: JOLTS and authors' calculations.

Layoff rates by establishment size (JOLTS)

Average layoff rate by size class, MA-smoothed.
Shaded areas indicate NBER contractions.
Source: JOLTS and authors' calculations.

Job-to-job transitions (CPS)

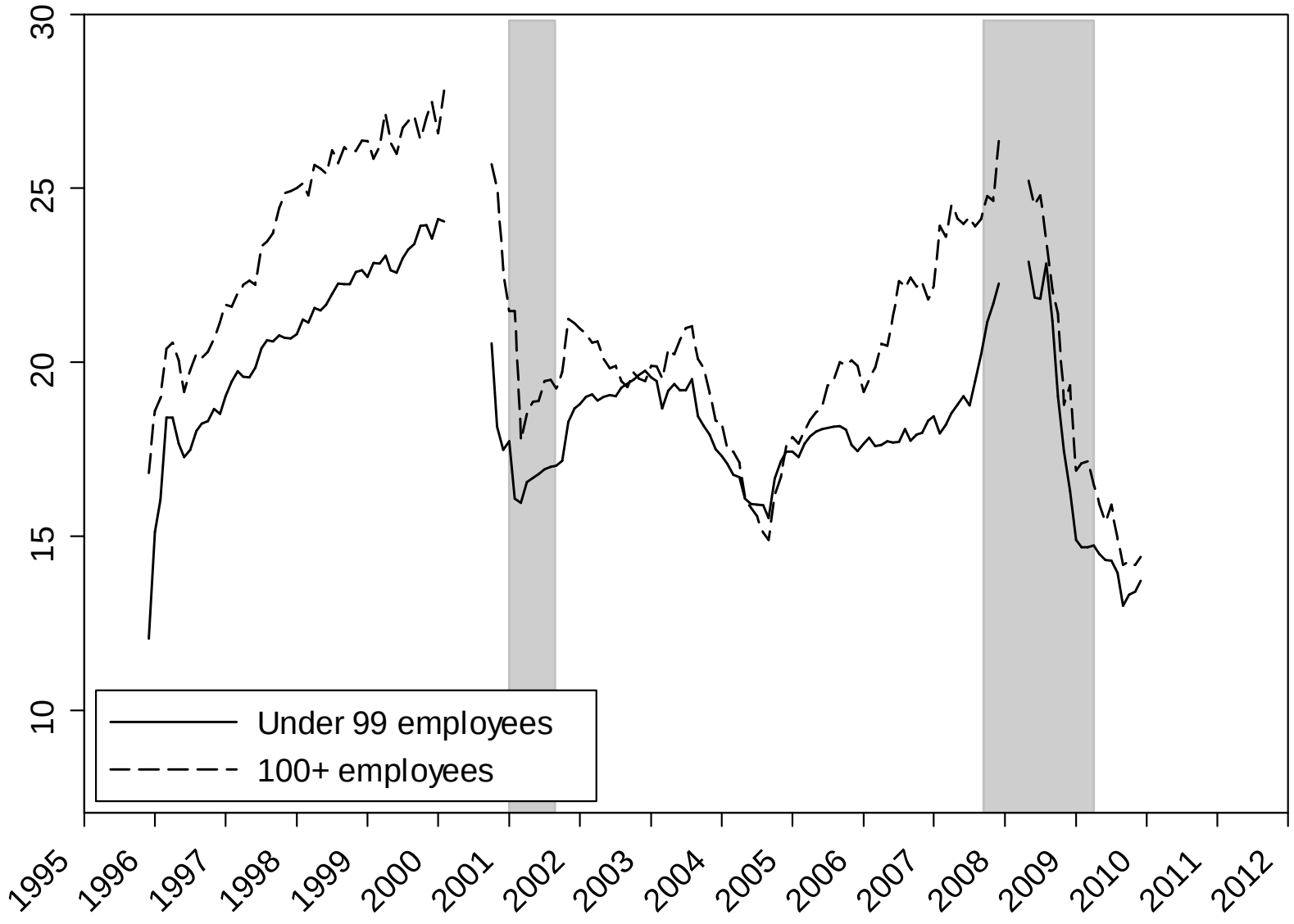
From matched records, 1994-2013, monthly



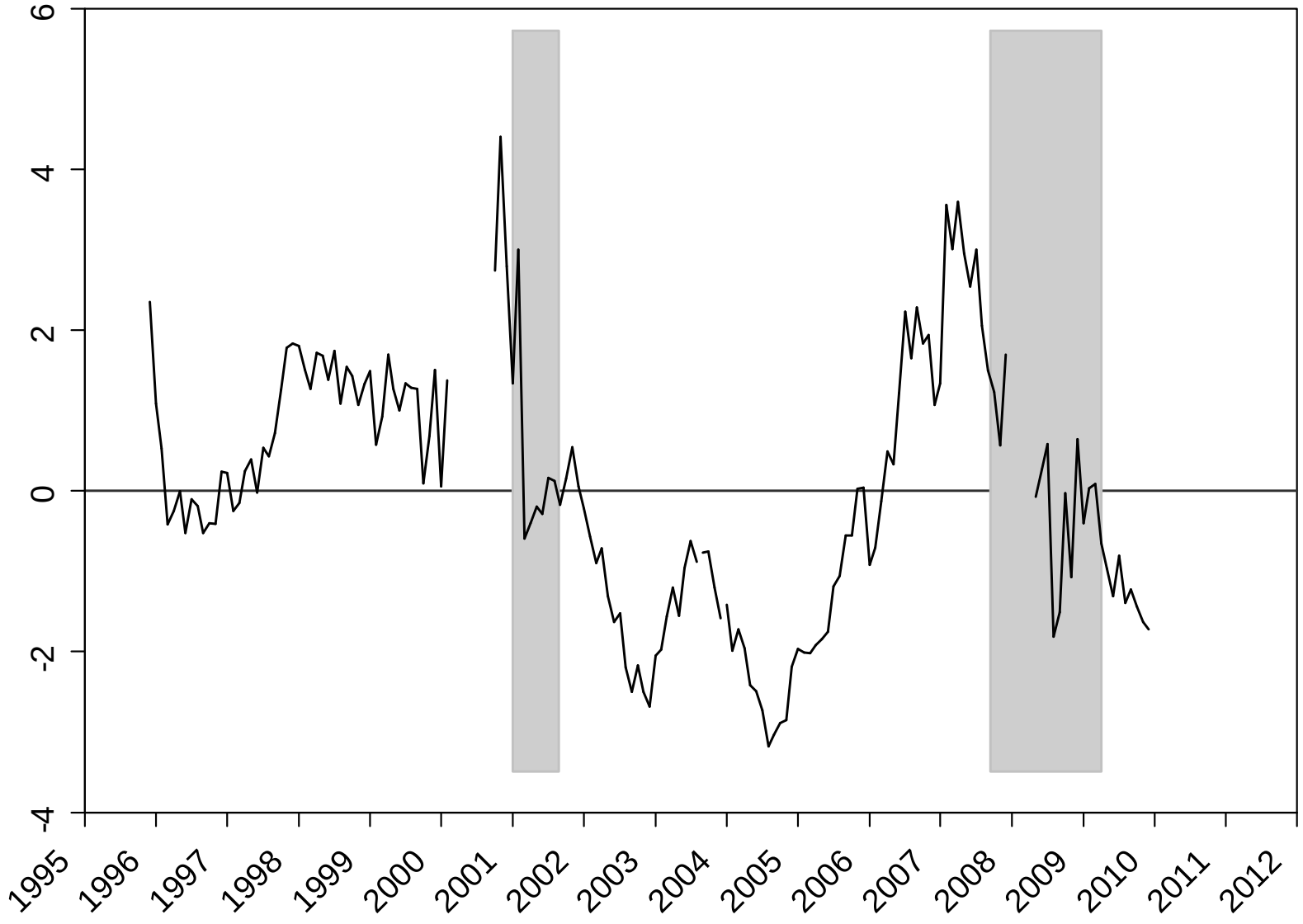
Shaded areas indicate NBER contractions.
Source: CPS compiled by Fallick and Fleischman (2004), and authors' calculations.

Share of hires from other establishments (SIPP)

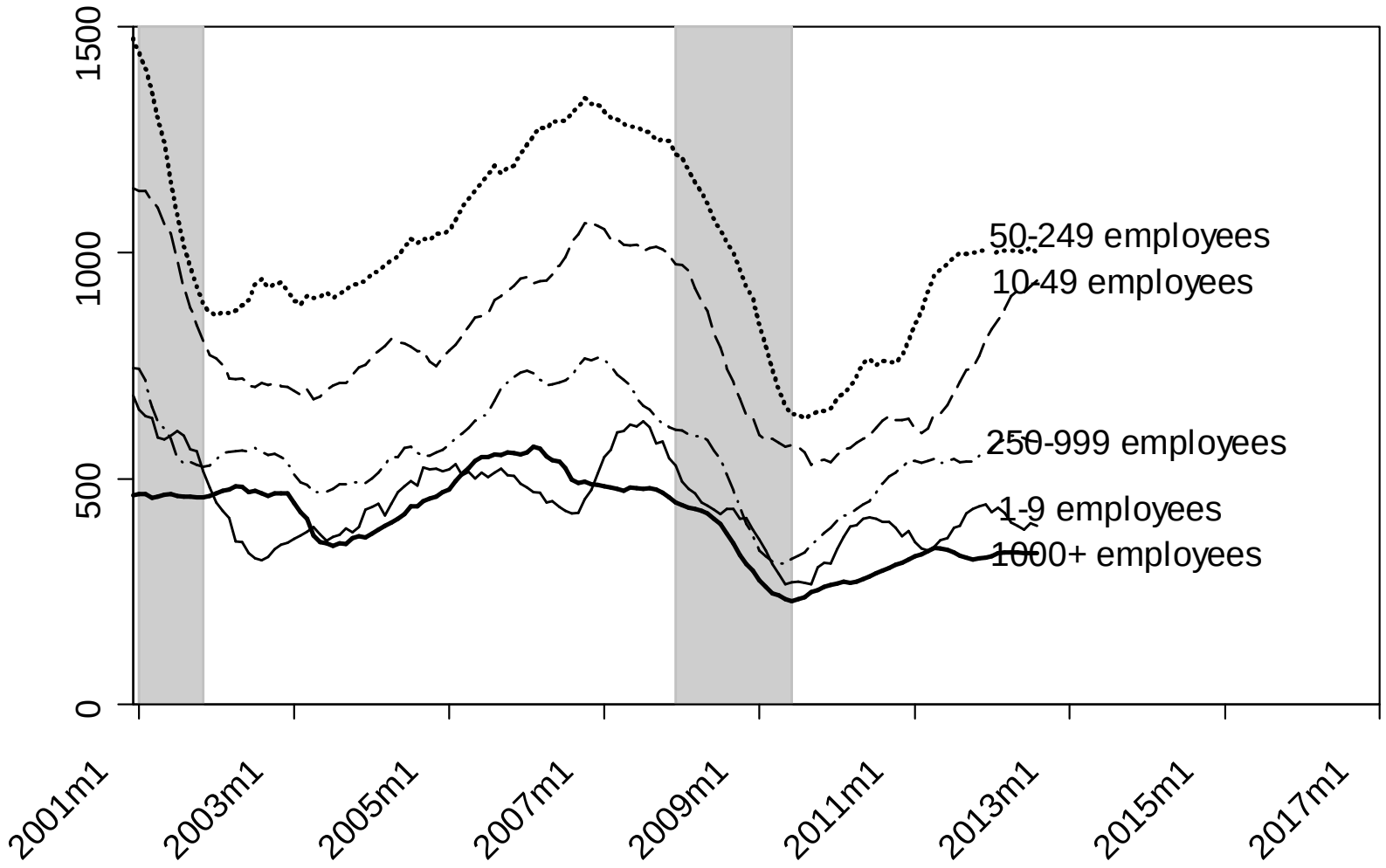
by size of hiring establishment, 1996-2012, monthly



Differential poaching intensity (SIPP)

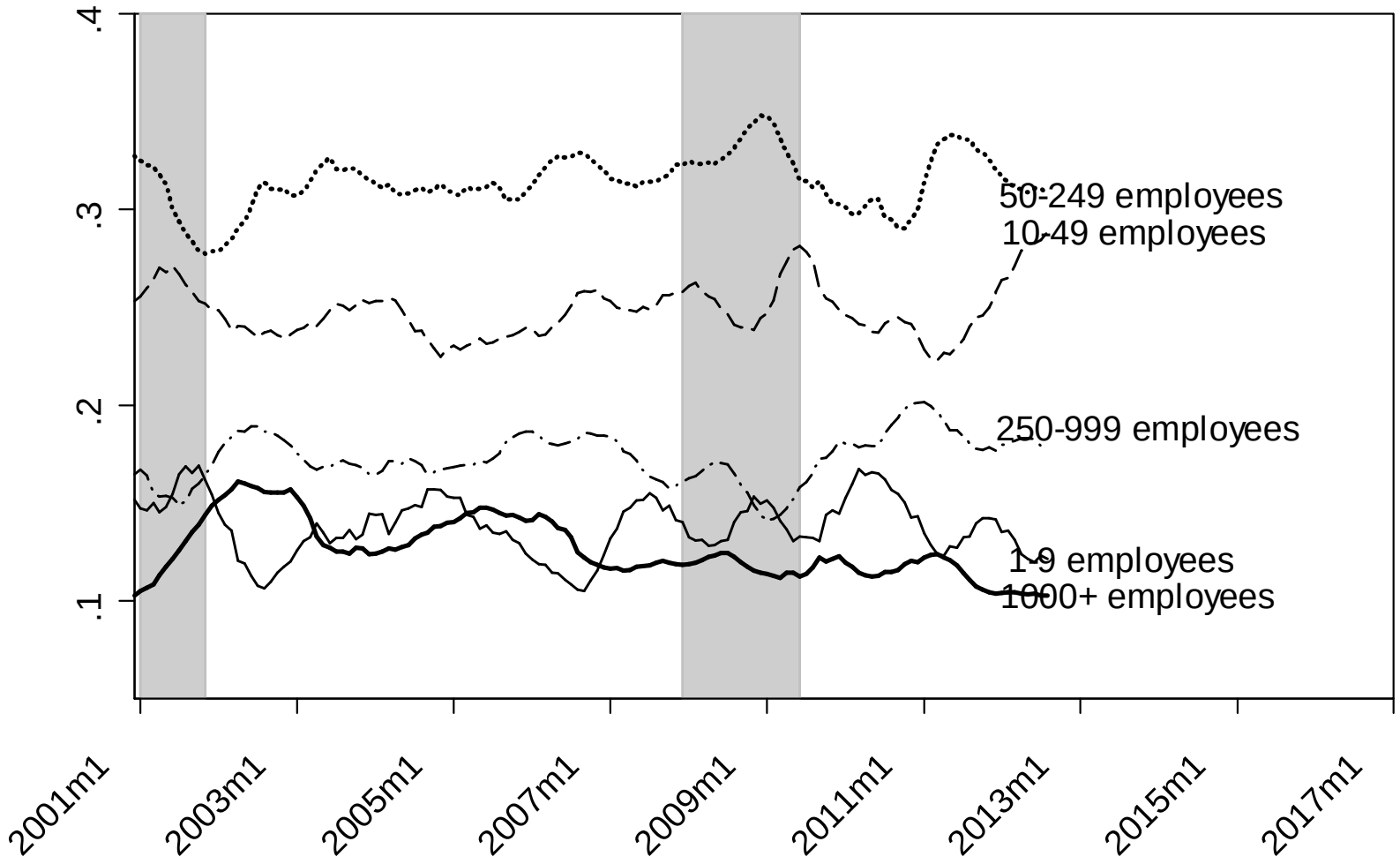


Vacancy rates by size (JOLTS)



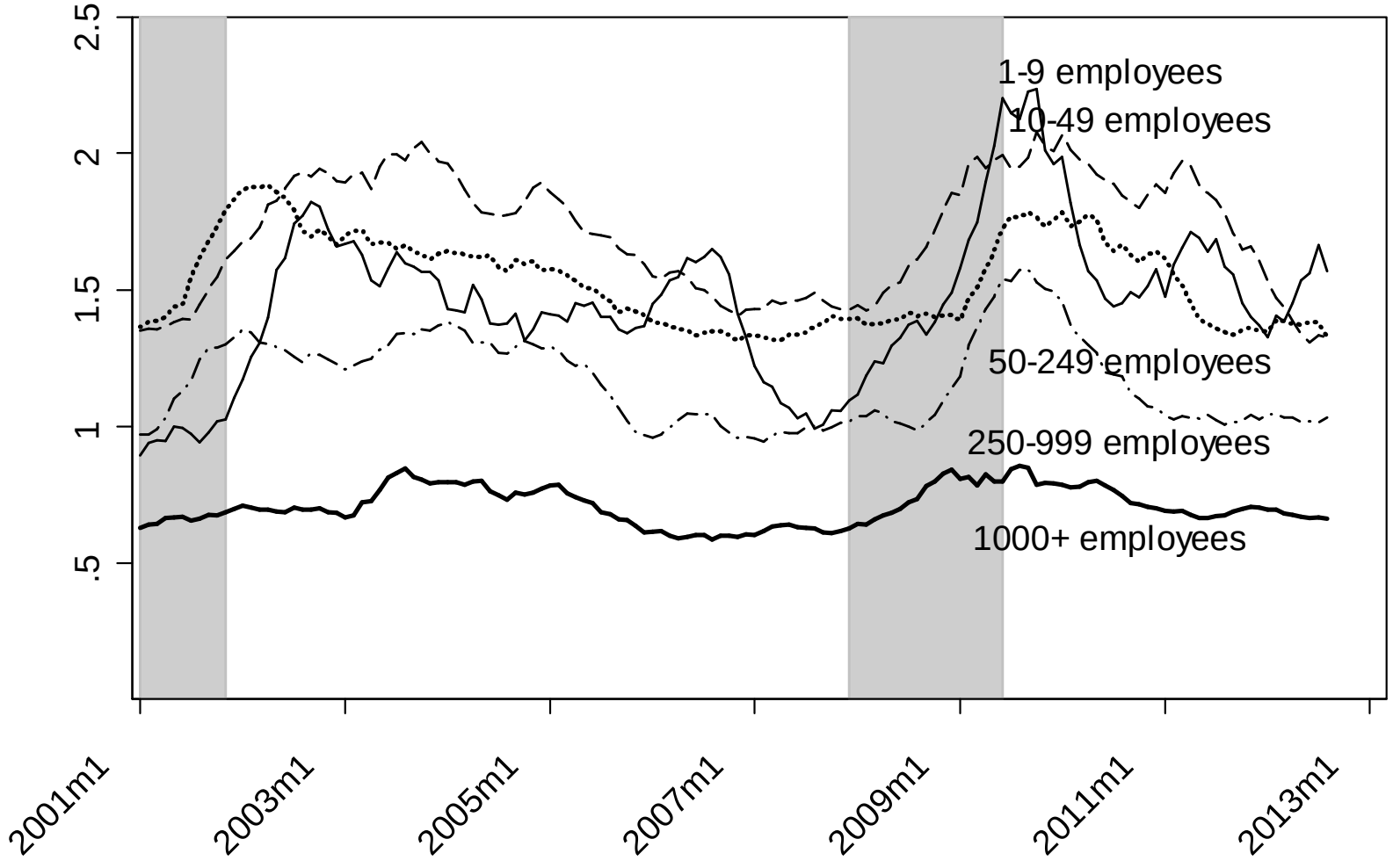
Vacancies by size class.
Shaded areas indicate NBER contractions.
Source: JOLTS, and authors' calculations.

Vacancy shares by size



Vacancy shares by size class.
Shaded areas indicate NBER contractions.
Source: JOLTS, and authors' calculations.

Vacancy yields by size (JOLTS)



Average vacancy yield by size class, MA-smoothed.
Shaded areas indicate NBER contractions.
Source: JOLTS and authors' calculations.

Descriptive evidence: Recap

1. net job creation performance of small *establishments* unusual in GR
2. small establishments fired more but reduced hiring less than large employers
3. both job to job quits from all employers and poaching by large establishments collapsed
4. vacancy rates (measure of hiring effort) declined fairly uniformly across establishment size classes
5. vacancy yields (return from hiring effort) rose especially at small establishments

Stochastic job ladder model

- $x \in [0,1]$ is the rank of a firm in the job ladder: workers always prefer firms with higher x
- employed workers separate with chance $\delta_t \in (0,1)$ into unemployment, with chance $\rho_t \in (0,1)$ into another job
- unemployed workers contact firms with chance $\lambda_t \in (0,1)$ employed workers contact others firms with chance $s\lambda_t \in (0,1)$;
- conditional on a contact, worker draws an offer from c.d.f. $F_t(x)$ ("sampling distribution"); $\overline{F}_t(x) = 1 - F_t(x)$
- $\Rightarrow$ higher ranked firms are larger: employment c.d.f. $N_t(x)$ convex
- all $t-$dated objects are realizations of stochastic processes

Stochastic job ladder model: Measurement equations

- net workers flows

$$\begin{aligned} N_t(x) - N_{t-1}(x) &= -\left[\delta_t + \rho_t + s\lambda_t \overline{F}_t(x)\right] N_{t-1}(x) \\ &\quad + \left\{\rho_t N_{t-1}(1) + \lambda_t \left[1 - N_{t-1}(1)\right]\right\} F_t(x). \end{aligned}$$

- gross worker flows

$$\begin{aligned} \text{E to U flow: } & \mathrm{EU}_t(x) = \delta_t N_{t-1}(x) \\ \text{U to E flow: } & \mathrm{UE}_t(x) = \lambda_t \left[1 - N_{t-1}(1)\right] F_t(x) \\ \text{E to E Quits: } & \mathrm{QE}_t(x) = \rho_t + s\lambda_t \int_0^x \overline{F}_t(x') \, dN_{t-1}(x'). \end{aligned}$$

Estimation methodology

- we apply the four equations to size classes, defined by rank cutoffs x_k, $k = 1, 2...$
- example E to E Quits from size class k

$$\rho_t \left[N_{t-1}\left(x_k\right) - N_{t-1}\left(x_{k-1}\right) \right] + s\lambda_t \int_{x_{k-1}}^{x_k} \overline{F}_t\left(x'\right) dN_{t-1}\left(x'\right)$$

- we estimate, by minimum distance, turnover parameters $\delta_t, \lambda_t, \rho_t, s$ and sampling weights $\left\{F_t\left(x_k\right)\right\}_{k=1,2..4}$ to fit our model-based net and gross worker flows to JOLTS data, for each of four size classes, and for each month in the JOLTS sample
- we do no use JOLTS vacancies but estimate sampling weights $F_t\left(x\right)$ and compare them to vacancies by size in JOLTS

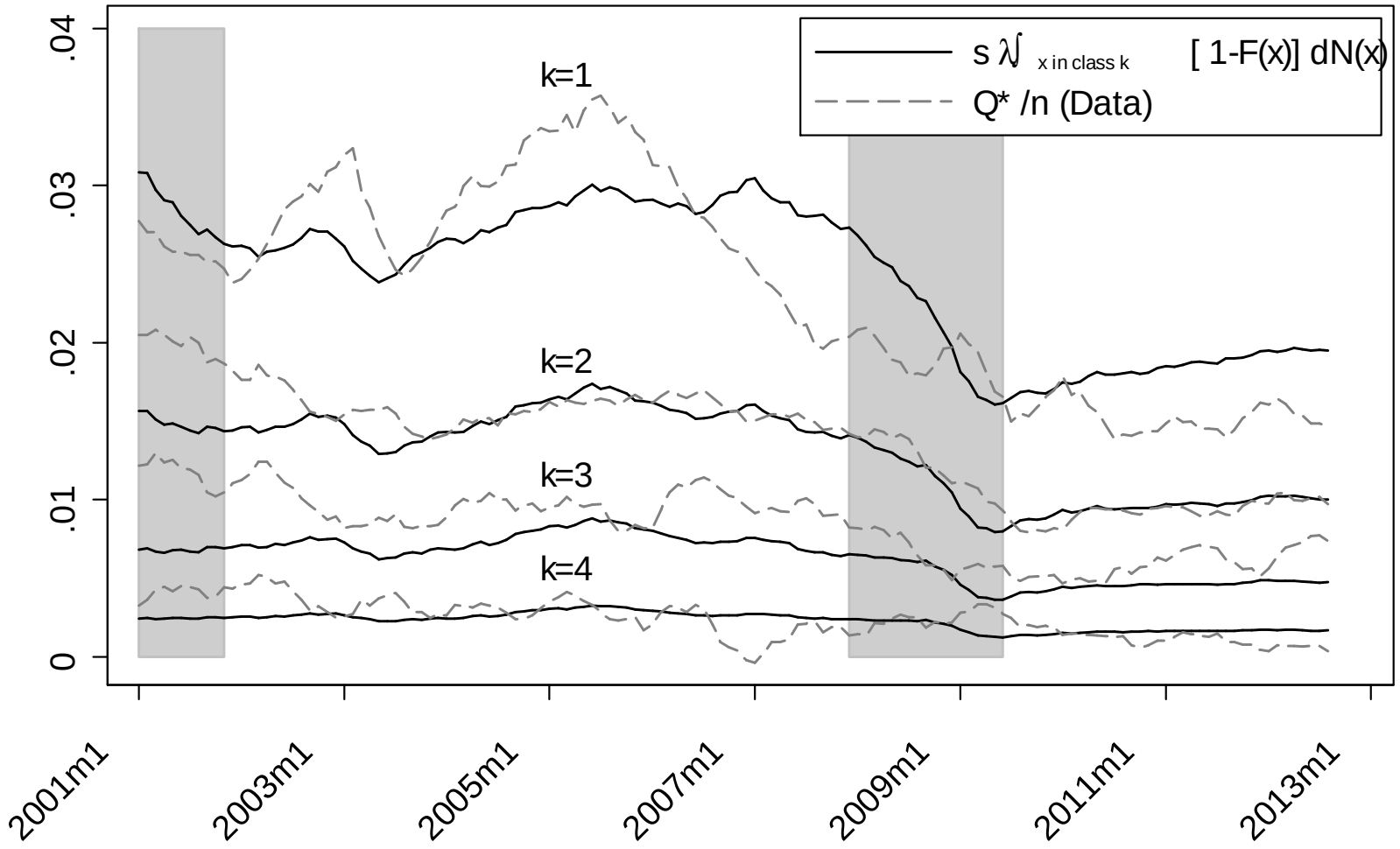
Empirical implementation: CPS and JOLTS

1. total accession rate from non-employment (U and N) in CPS measures contact rate λ_t
2. quits in JOLTS are the sum of quits to other jobs $\mathrm{QE}_t(x)$ and quits to unemployment; to isolate former, we multiply total JOLTS separations (quits+layoffs) by EE/(EE+EU+EN) in CPS
3. we add the remaining quit rate into unemployment to JOLTS' layoff rate to estimate total separation rate δ_t into unemployment

Empirical implementation: size misclassification

- JOLTS is collated by size of establishment
- we consider firms as relevant decision-makers (offer contracts)
- large firms own hundreds of small/medium establishments
- establishment size fluctuates due to mean-reverting shocks
- assume that size of each firm at quantile x is observed with error $\pi(x)$ and allocated to size class k with probability m_k
- calibrate $\pi(x)$ and m_k to match establishment size distribution in JOLTS and firm size distribution in its sampling frame QCEW

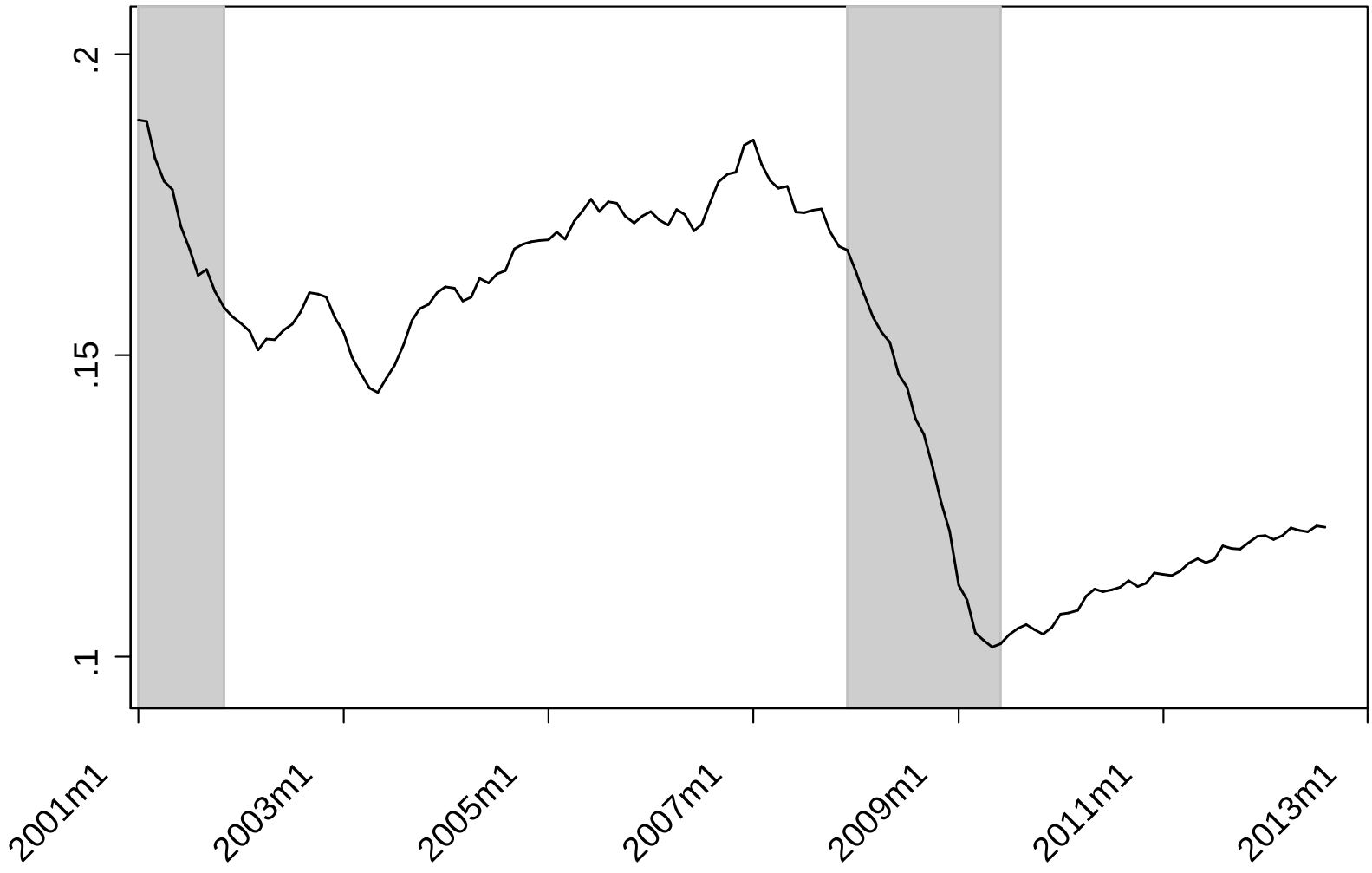
Estimation results: job to job quit rates (data and model)



The 'Data' series are corrected for misclassification.
Shaded areas indicate NBER contractions.
Source: JOLTS, CPS, and authors' calculations.

Estimation results: contact probability

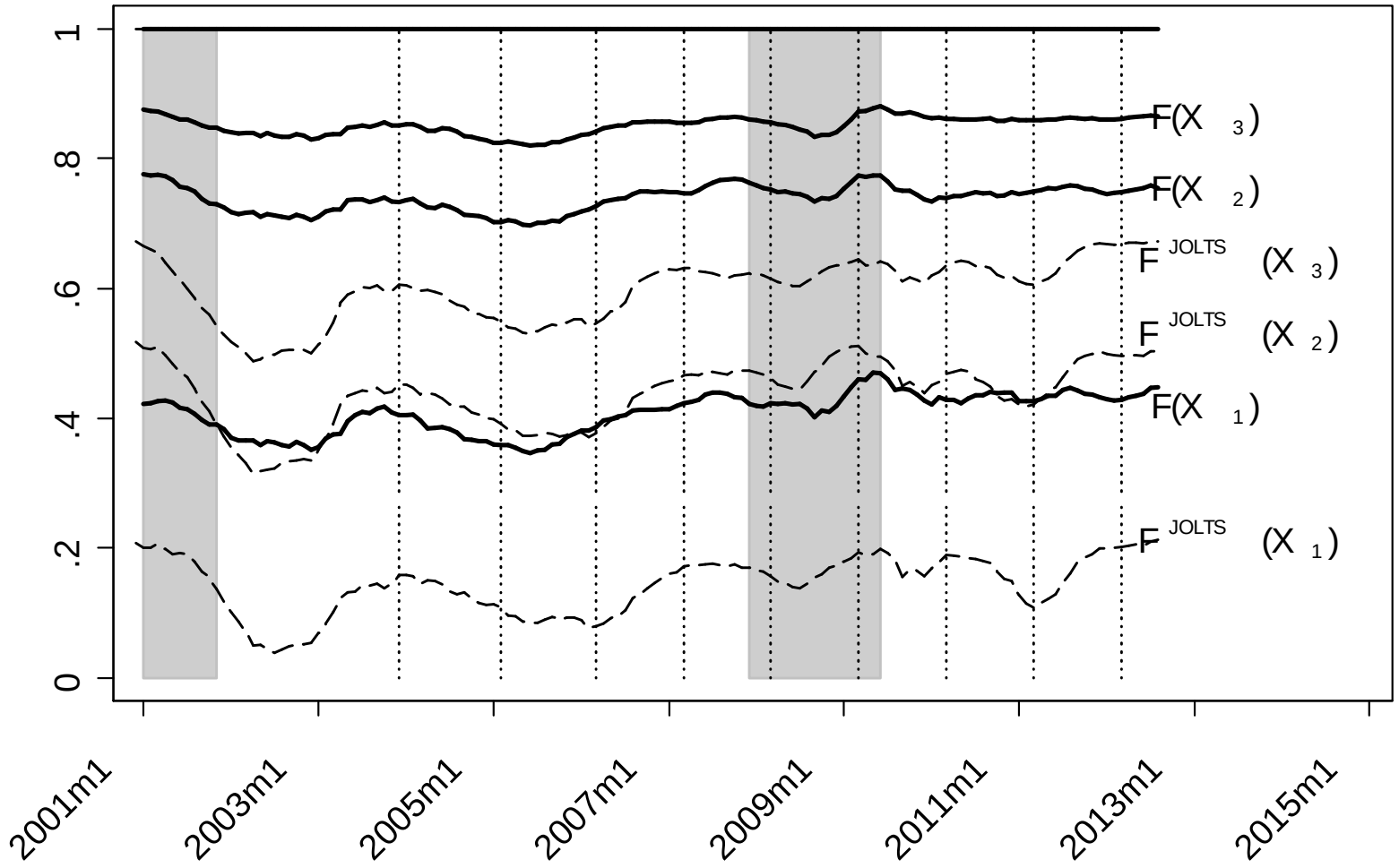
- Estimated path of λ_t



Shaded areas indicate NBER contractions.
Source: JOLTS, CPS, and authors' calculations.

Estimation results: sampling distribution (model vs. JOLTS vacancies)

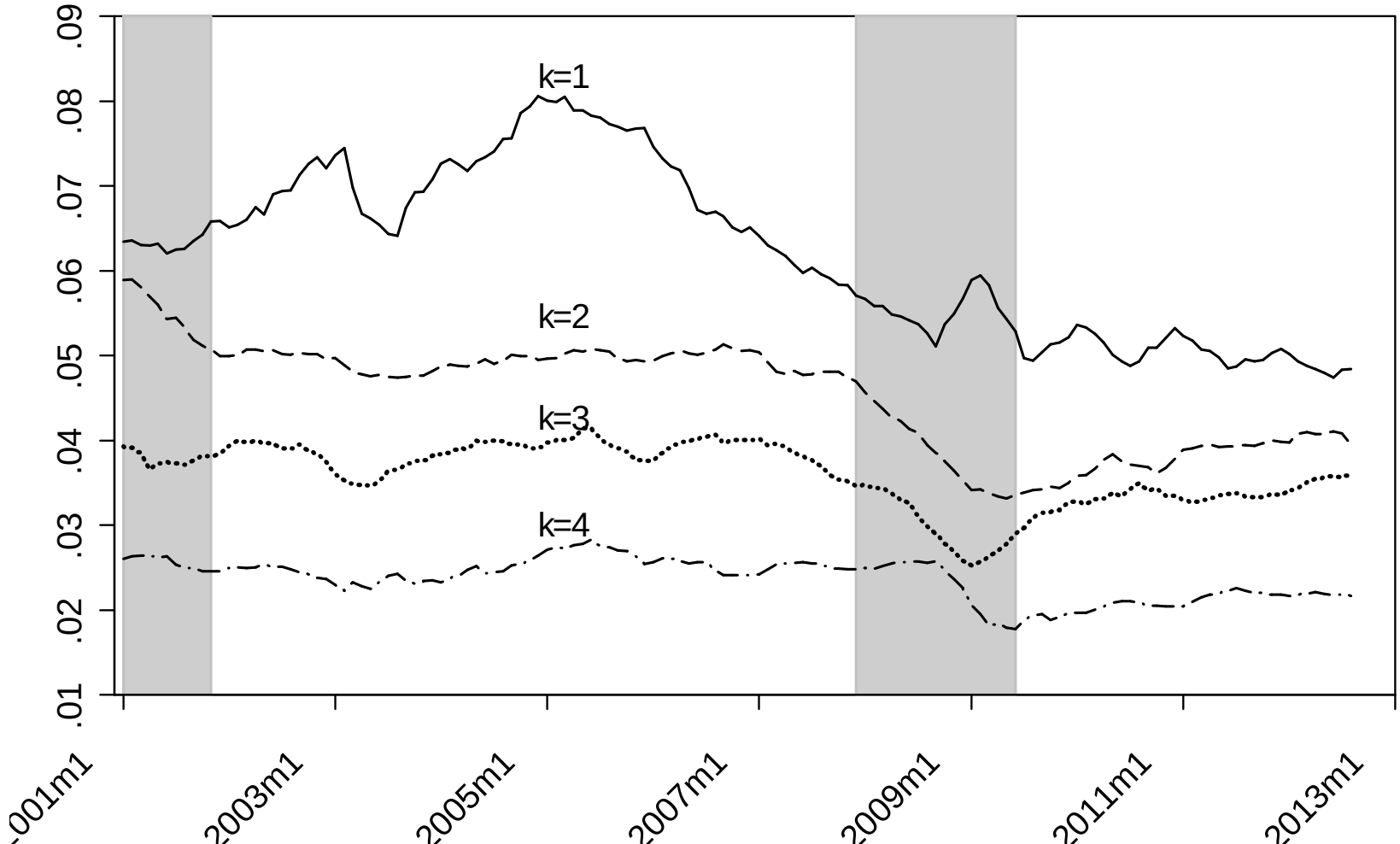
- model speaks to "missing vacancies" at small employers in JOLTS:



Shaded areas indicate NBER contractions.
Vertical dotted lines indicate JOLTS re-sampling dates.

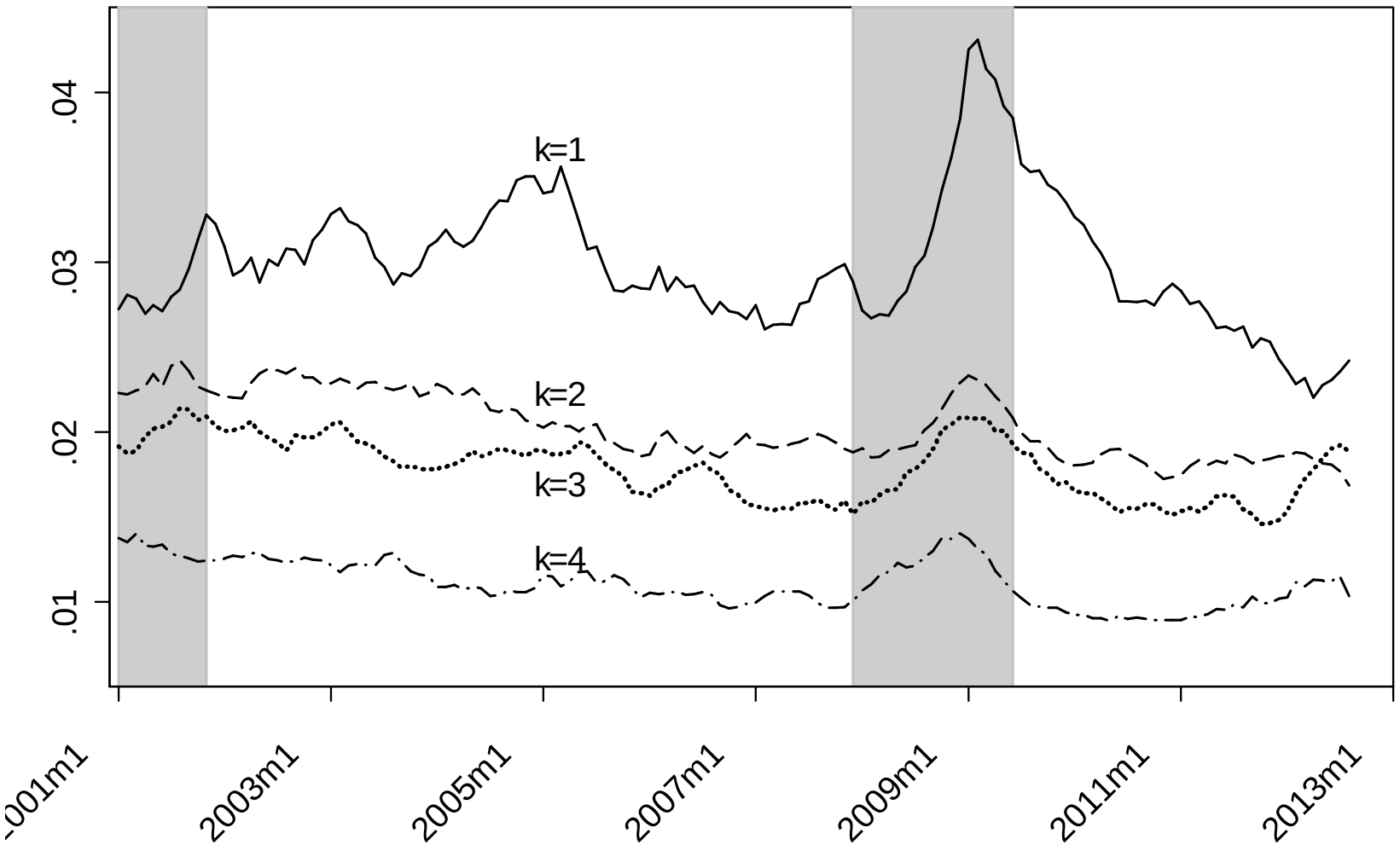
Estimation results: hiring rates during GR after reclassification

- fall everywhere but at smallest employers (class $k = 1$) due to their high vacancy yield



Estimation results: layoff rates during GR after reclassification

- spike mostly at smallest employers



Average layoff rate by size class, corrected for misclassification.

Interpretation

- during and after GR, high unemployment:

1. created congestion for employed job searchers: sharp decline in job to job quits reverberated down the job ladder, attrition fell
2. raised yield of the few posted vacancies

- facing lower attrition and higher vacancy yields, small employers laid off more workers and posted fewer vacancies
- jobs at small, low-paying employers, traditional point of (re-)entry for the unemployed, dried up, partly because of the slower movement up the job ladder

Conclusions

- cyclical dynamics of employment at large and small firms sheds light on the nature and propagation of aggregate shocks
- job to job quits and poaching important to understand dynamics of unemployment
- Great Recession: job ladder stuck at the bottom
- wage growth unlikely to resume until poaching does