# "Effects of trade exposure to China on firms and workers in manufacturing in Italy"

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# Aims

- Test whether the increase in exposure to trade with China affected manufacturing workers and firms in Italy.

- Assess prospects related to both firms and workers looking at multiple outcomes.

- Verify whether risks related to trade exposition differ according to firms' and individuals' characteristics.

- *N.B. We only focus on incumbents in 2001, thus we do not estimate total effects for the Italian economy (e.g. through delocalisation, newcomers' characteristics, changes of GVCs)*

# **Novelties**

- First analysis – together with Citino, Linarello 2019 – on the China syndrome in Italy (Autor et al. 2013, 2014 for the US), a (previously) large exporter country with a relatively rigid LM.

- Few studies (Autor et al for US, Utar for DK, Dauth et al. for Germany) studied effects on careers of incumbent workers

- We focus on manufacturing workers (as in Autor et al. 2014), and on manufacturing firms (neither on industries nor on LLMs).

- Workers and firms followed for many years (2001-2016), using a measure of trade exposure at the 3-digit industry level.

- Focus on multiple individuals' and firms' outcomes in the labour market.

- Focus also on the crisis period.

# Outline

- Background about the increase in trade exposure with China in Italy at 2 digits NACE.

- The empirical strategy and the IV

- Data, sample rule, dependent variables and main findings at the firm level

- Data, sample rule, dependent variables and main findings at the worker level


- *Due to time limits we mostly focus on IV results about firms which are definitive and are a major novelty in the literature, without focusing on heterogeneity according to individuals' or firms' characteristics*

# Trend in trade exposure in Italy

- Data from UN-Comtrade

- We consider gross Import (without distinguishing final and intermediate goods)

- We normalize gross Import with respect to the number of employees in the sector in 1991 in Italy

- Clear evidence of a general increase in import from China in manufacturing, especially since 2001 (when China entered WTO)

- But large differences in trends and levels within manufacturing sectors (especially if 3-digit Nace are considered)! => we exploit this variability
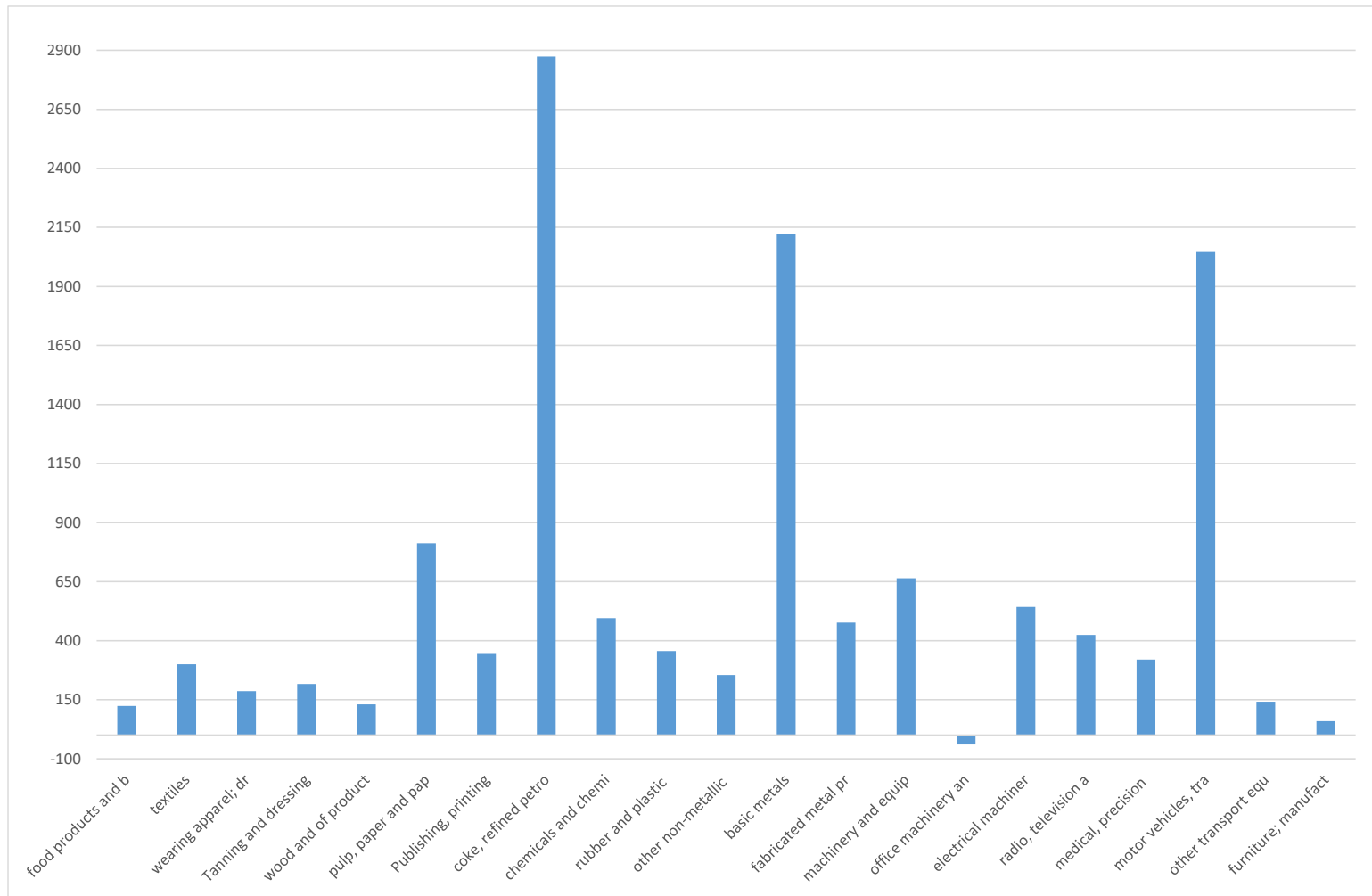
# Employees and firms in manufacturing
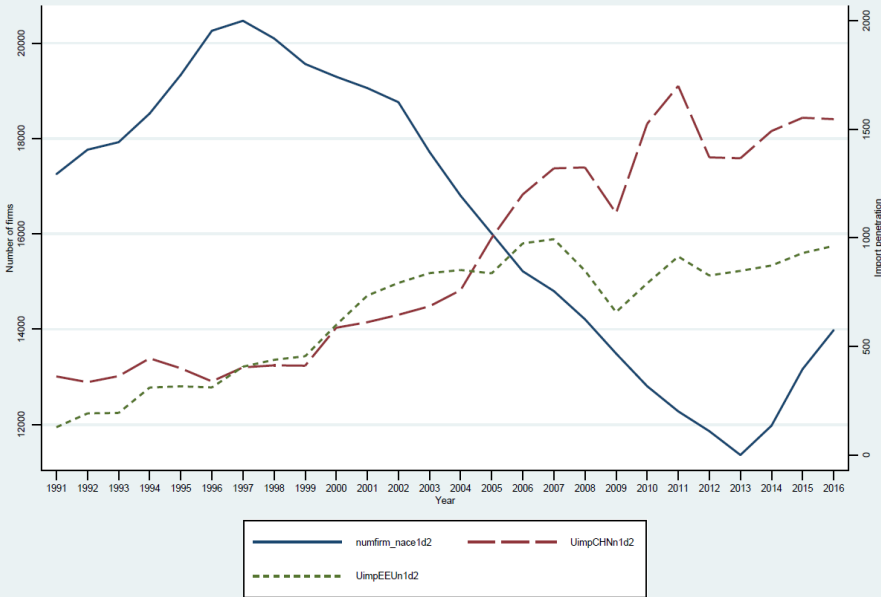
# The trend of import in manufacturing
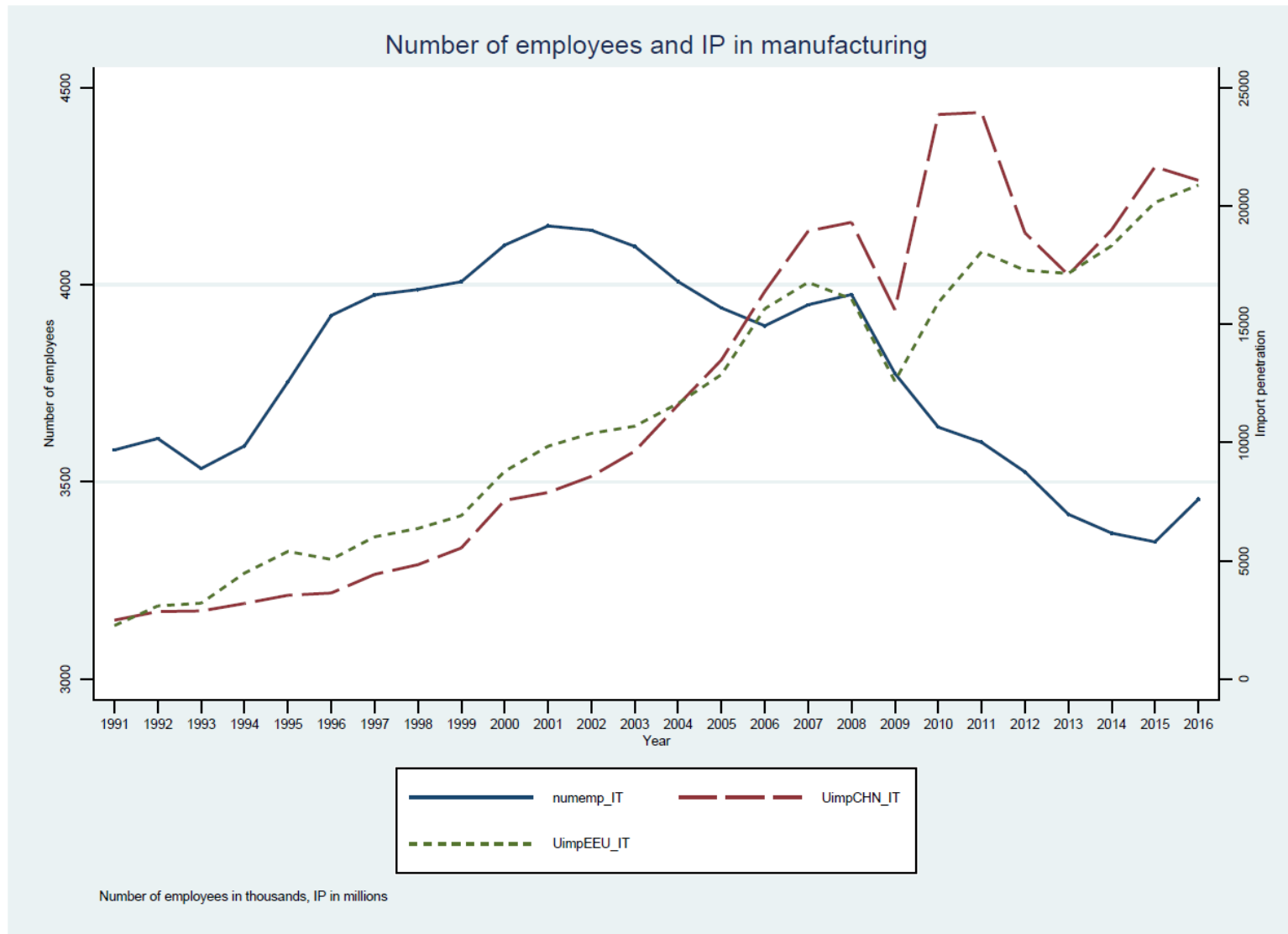
# 2001-2016 change in import per worker in Nace_d2 industries

# Textiles (left) and Dressing (right)

# Machinery and electrical machinery
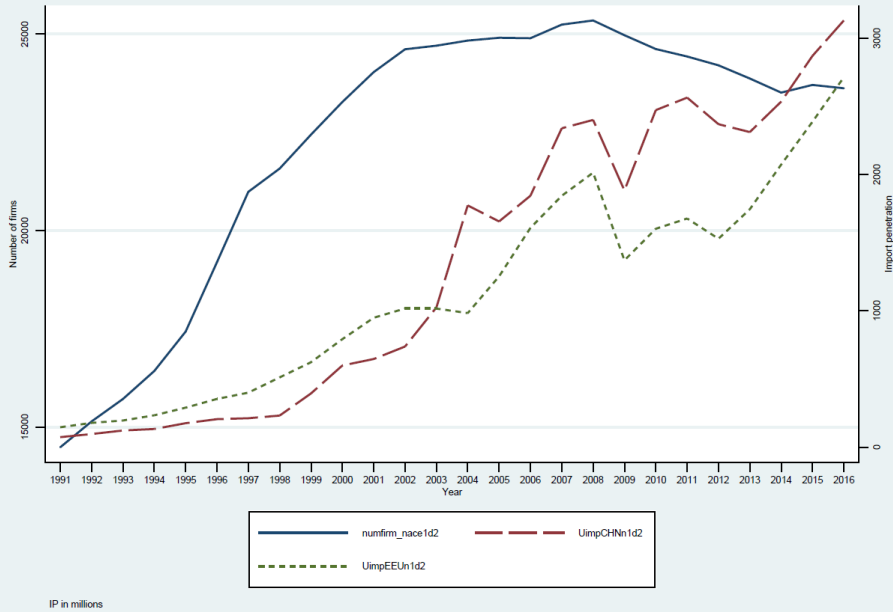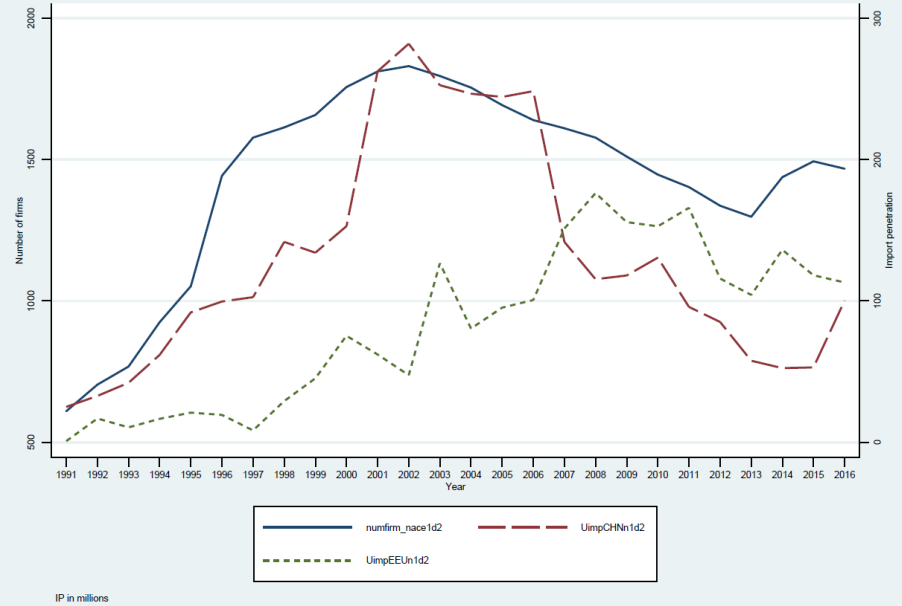
# Food/beverages and motor vehicles
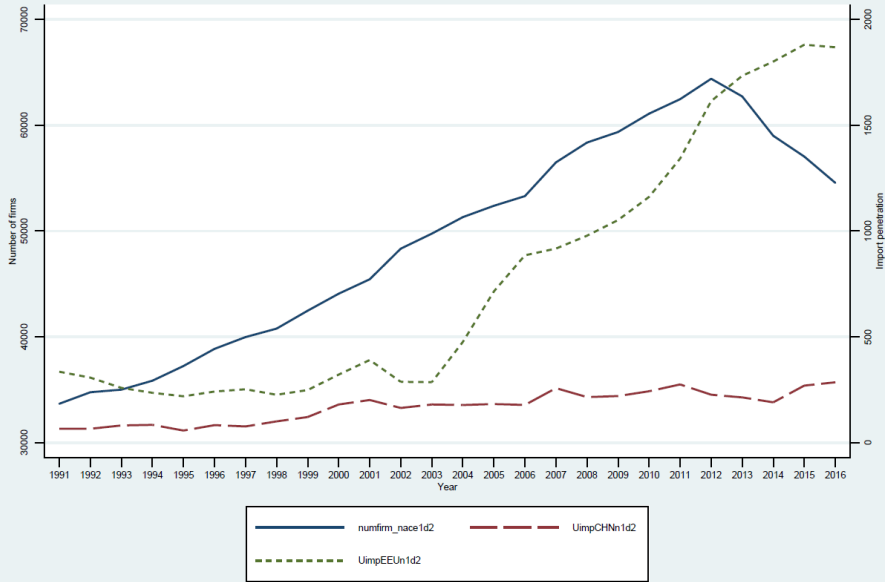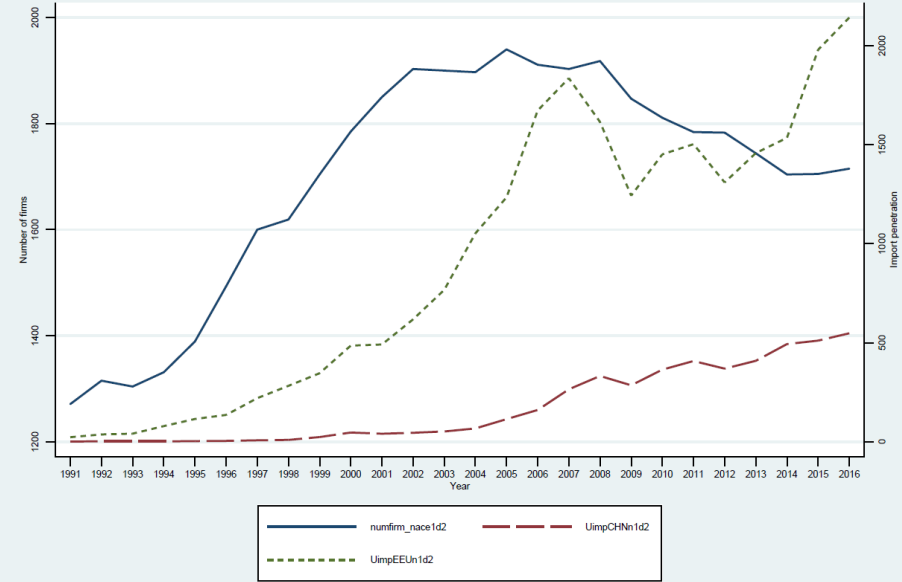
# Empirical strategy

- Test by OLS and IV whether individuals' and firms' outcomes from time $t$ (2001) to time $t+s$ are affected by the change in trade exposure from $t$ to $t+s$ in the industry $j$ where they were in 2001.

- We compare overtime couples of years (n.b. no pure short and long term effects, because IP changes and because of possible composition effects) => no cumulative effects (as in Autor et al. 2014 or Citino-Linarello 2019).

- Control for dozens of variables at $t$ (also including employment trend in industries in 2001-1991).

$$\Delta y_{ij,t+s,t} = X'_{it}\beta + \gamma \Delta IP^{CHN}_{j,t+s,t} + \delta IP^{CHN}_{jt} + \varepsilon_{ijt,t+s}$$

# The proxy of trade exposure

- The estimated coefficient shows the effect for 1 s.d. increase in the import penetration proxy.

- Import penetration in industry *j* per worker in a base year (as in Autor et al. 2013). Employment by industries provided by firms Census to normalize the import penetration index.

- Industries at 3 digits Nace rev.1.1 (linked to ISIC data in UN-Comtrade using cross-walks tables).

$$\Delta IP_{j,t+s,t}^{CHN} = \frac{\Delta M_{j,t+s,t}^{ITA,CHN}}{L_{j,1991}}$$

# The IV

- The measure of trade exposure may reflect domestic shocks to national industries.

- To capture supply-driven component in national imports from China, we instrument the change of in the import penetration for industry j in other countries following Autor et al. (2013, 2014), assuming that demand changes for traded goods in these countries are uncorrelated with demand changes in Italy.

- Findings robust to the group of other countries considered. Here we show results considering WL5 for the IV (US, JP, CA, NZ, AU)

$$IP_{j,t+s,t}^{CHN} = \frac{\Delta M_{j,t+s,t}^{WL5,CHN}}{L_{j,1991}}$$

# Analyses about firms

# Data for the analyses about firms

- We select manufacturing firms with at least 1 employee in 2001 (around 270,000) by using the firms' archive.

- Firms' archive provides information about firms characteristics (e.g. number of employees, province, data of creation and closing).

- We link these firms to UN-Comtrade data and Census data by using 3 digit NACE rev.1.1.

- We match employer-employees using the universe of private employees => add variables about the distribution of employees outcomes (weeks and wages) and the employment composition (by gender, age, citizenship, tenure, occupation, contract). Compositions weighted by workers' worked weeks in the year.

- Unfortunately, no information available for the whole period about the use of CIG and balance sheets (AIDA-Cerved).

# Firms' survival in 2001-2016
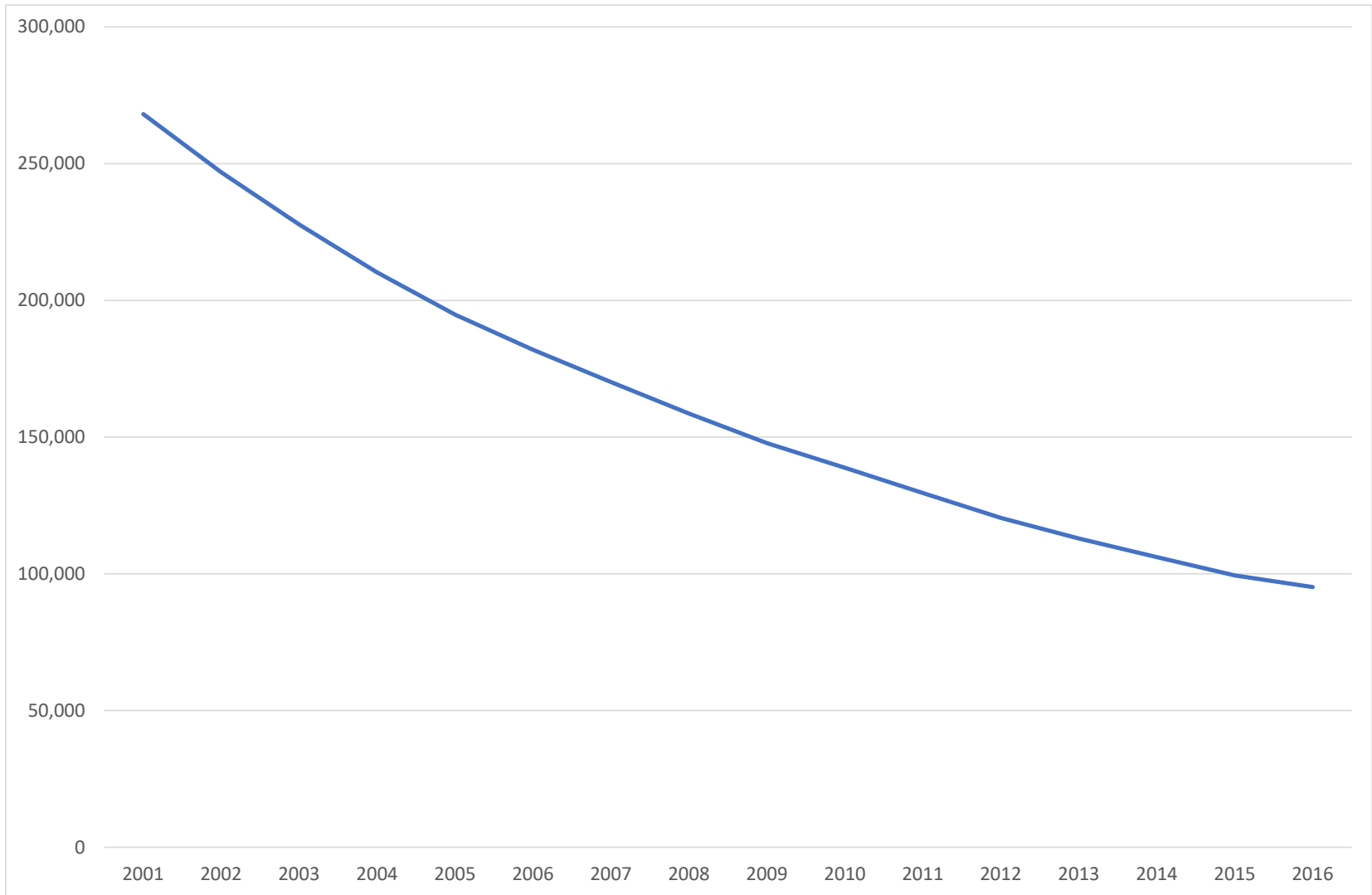
# Estimate of firms' survival in 2001-2016

| | Full sample | | Size (IV) | | Age (IV) | | Area (IV) | | |
|---|---|---|---|---|---|---|---|---|---|
| | OLS | IV | <16 | >=16 | <10 | >=10 | North | Centre | South |
| DUipITACHNn1d3 | -0.0064 | -0.0119 | -0.0088 | -0.0119 | -0.0276** | 0.0029 | -0.0038 | -0.0020 | -0.0516*** |
| | (0.0062) | (0.0082) | (0.0097) | (0.0086) | (0.0131) | (0.0080) | (0.0094) | (0.0118) | (0.0114) |
| Observations | 269,196 | 269,196 | 225,570 | 43,626 | 127,081 | 142,115 | 160,661 | 52,943 | 55,592 |
| R-squared | 0.0973 | 0.0971 | 0.0647 | 0.1076 | 0.0816 | 0.0865 | 0.0763 | 0.1254 | 0.1405 |
| LHS % explained | -1.812 | -3.364 | -2.635 | -2.656 | -8.960 | 0.738 | -0.979 | -0.634 | -18.98 |
| LHS_mean | 0.353 | 0.353 | 0.334 | 0.448 | 0.308 | 0.392 | 0.393 | 0.313 | 0.272 |
| First st. F-stat | | 14.08 | 15.11 | 13.37 | 19.17 | 12.92 | 12.87 | 12.32 | 32.90 |

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

# The dependent variables at the firm level

- *"Death"; Mean and sd of employees' worked weeks and annual gross wages; Log number of employees; Shares of blue-collars, part-timers and fixed-term employees on total employment*

Several control variables (values in 2001):

- $2^{nd}$ degree polynomial on age, $3^{rd}$ polynomial on size, type of firm, shares of employees by gender, age, citizenship, occupation, tenure, part-time and temporary contracts, mean employees experience, mean and sd of wages and worked weeks of the employees, industry's change in occupation in 1991-2001, province and IP from CHN in 2001. We weight for the firm's employment share

- No changes if we exclude firms who die in the year *t+s* or we do not consider weights

- Heterogeneity by classes of firm's size, age and geographical area.

# Main results about firm: summary

- No clear evidence about «annual» death
- Evidence on a decrease in the number of employees
- Clear evidence of internal recomposition of the workforce:
  - ➢ Reduction in the share of blue-collars
  - ➢ «Strongest workers remain» => reduction in the shares of fixed-term and part-time employees and decrease in the within firm «weeks inequality»
  - ➢ No clear evidence about earnings distribution within firms
- Effects due to changes in the number and type of jobs within incumbent firms and composition of survivor firms over time
- Interestingly, results clearly confirmed when focusing on the subgroup of survivors in 2001-2016

# All firms

# Change in the number of employees
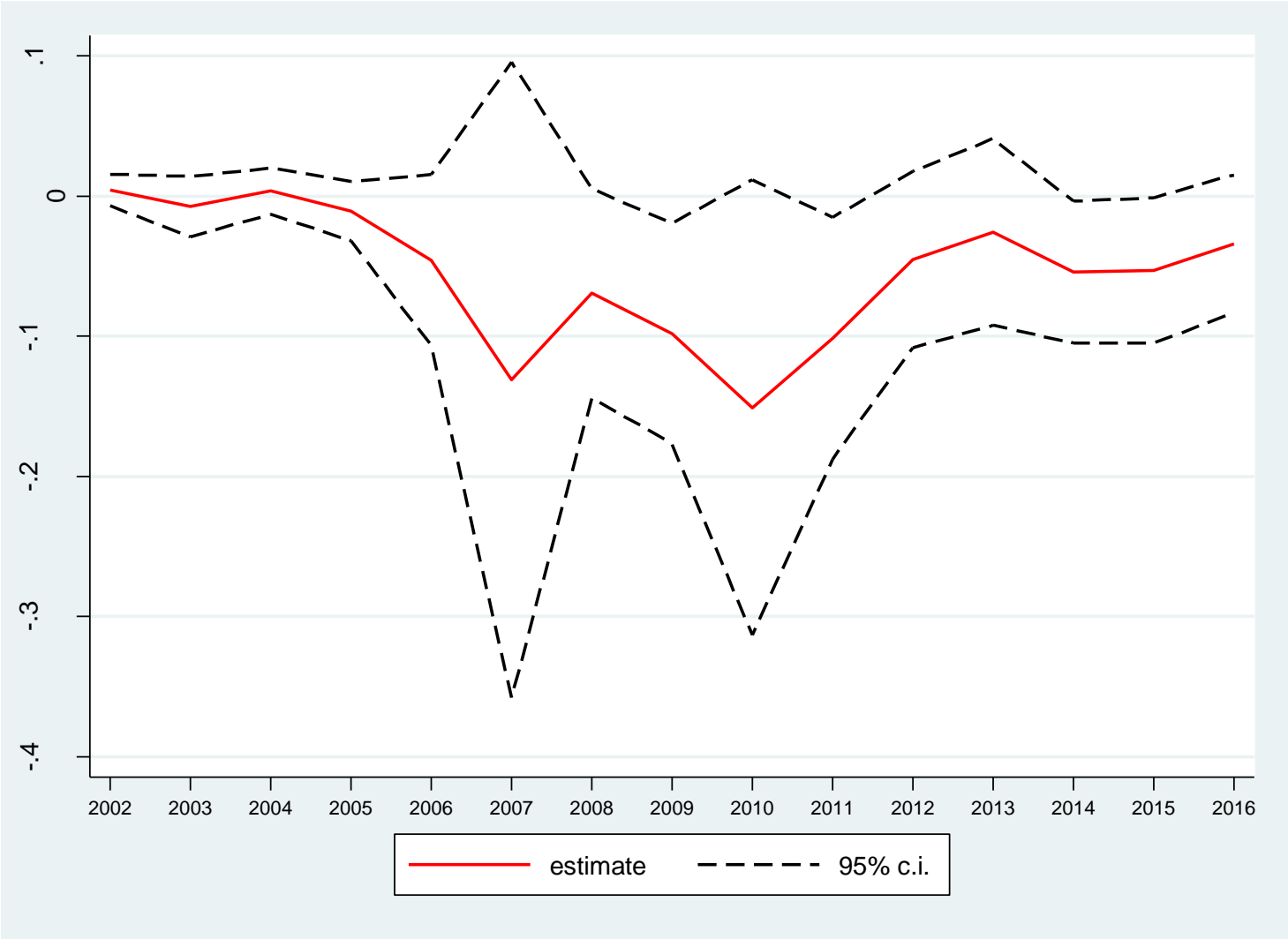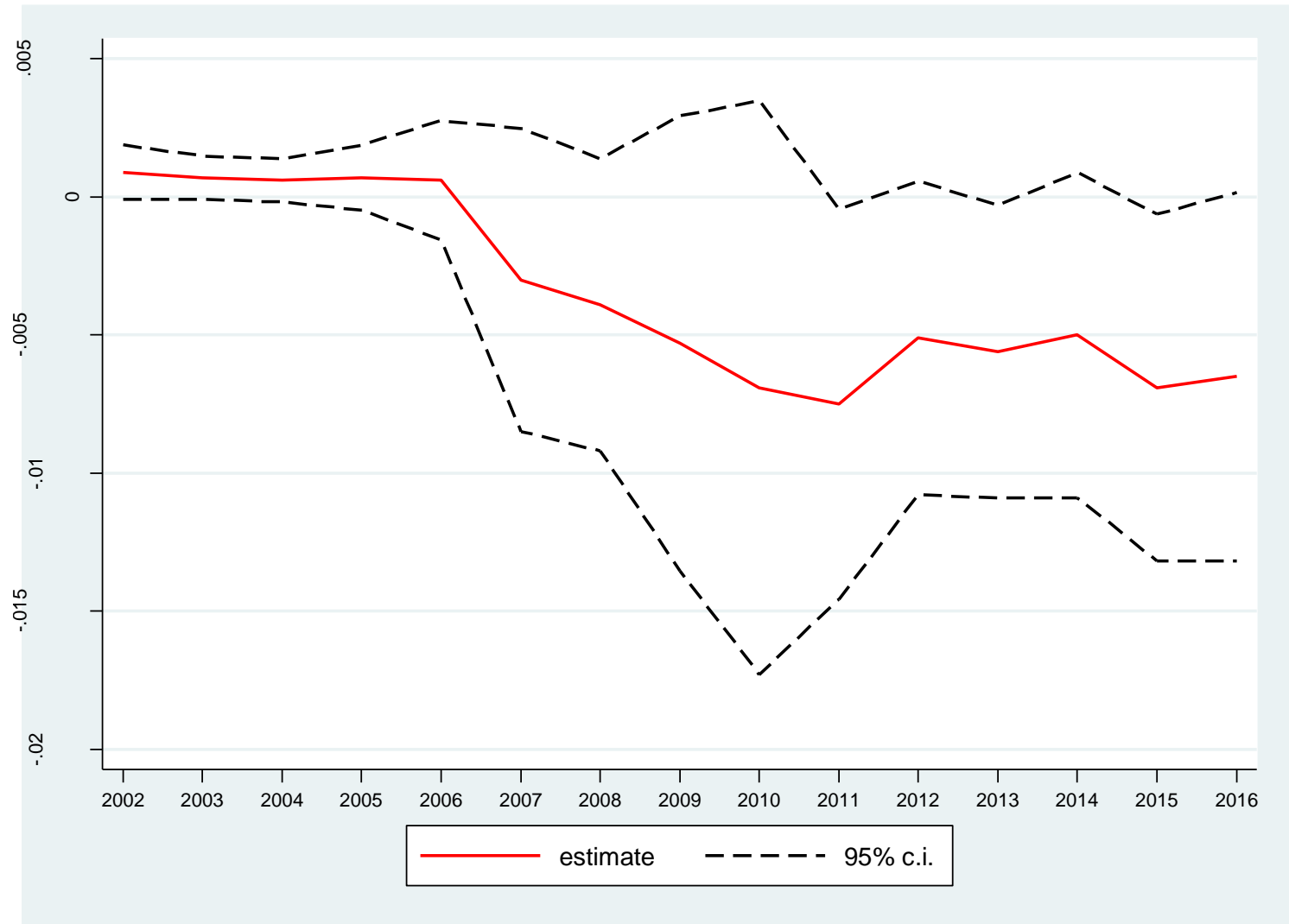
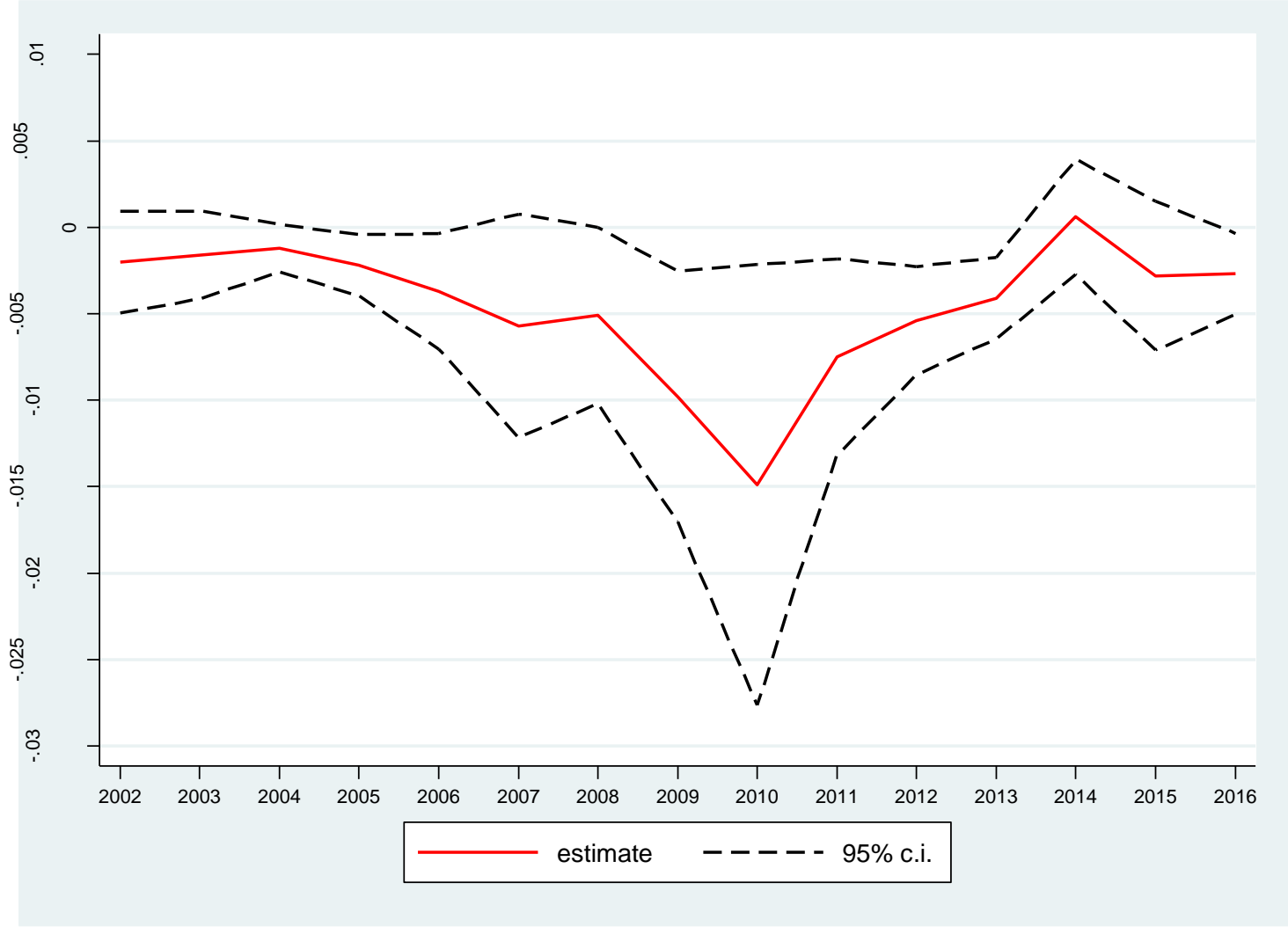# Change in the share of blue-collars
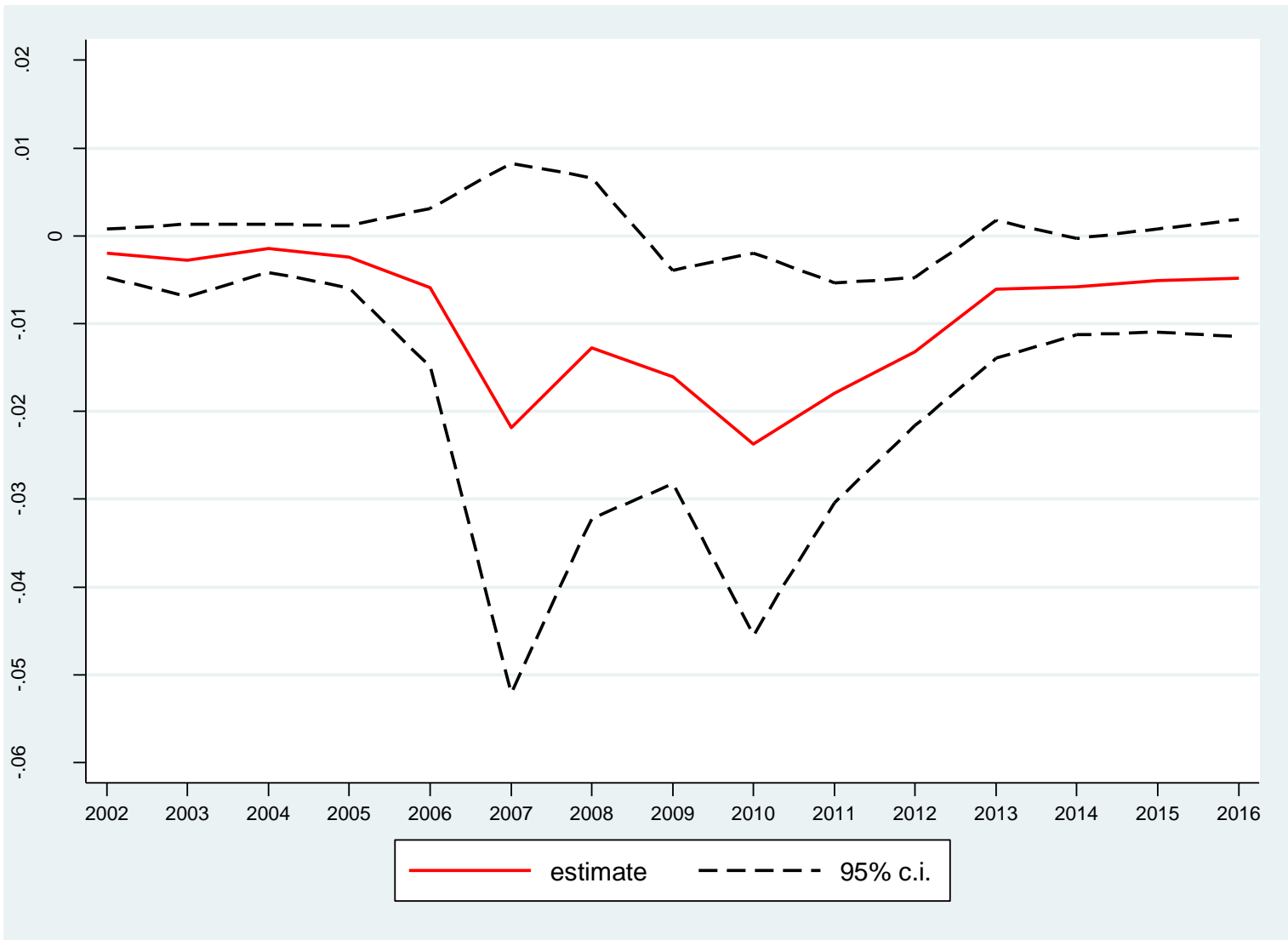
# Change in the share of part-timers

# Change in the share of fixed-term emp.

# Change in sd of worked weeks within the firm
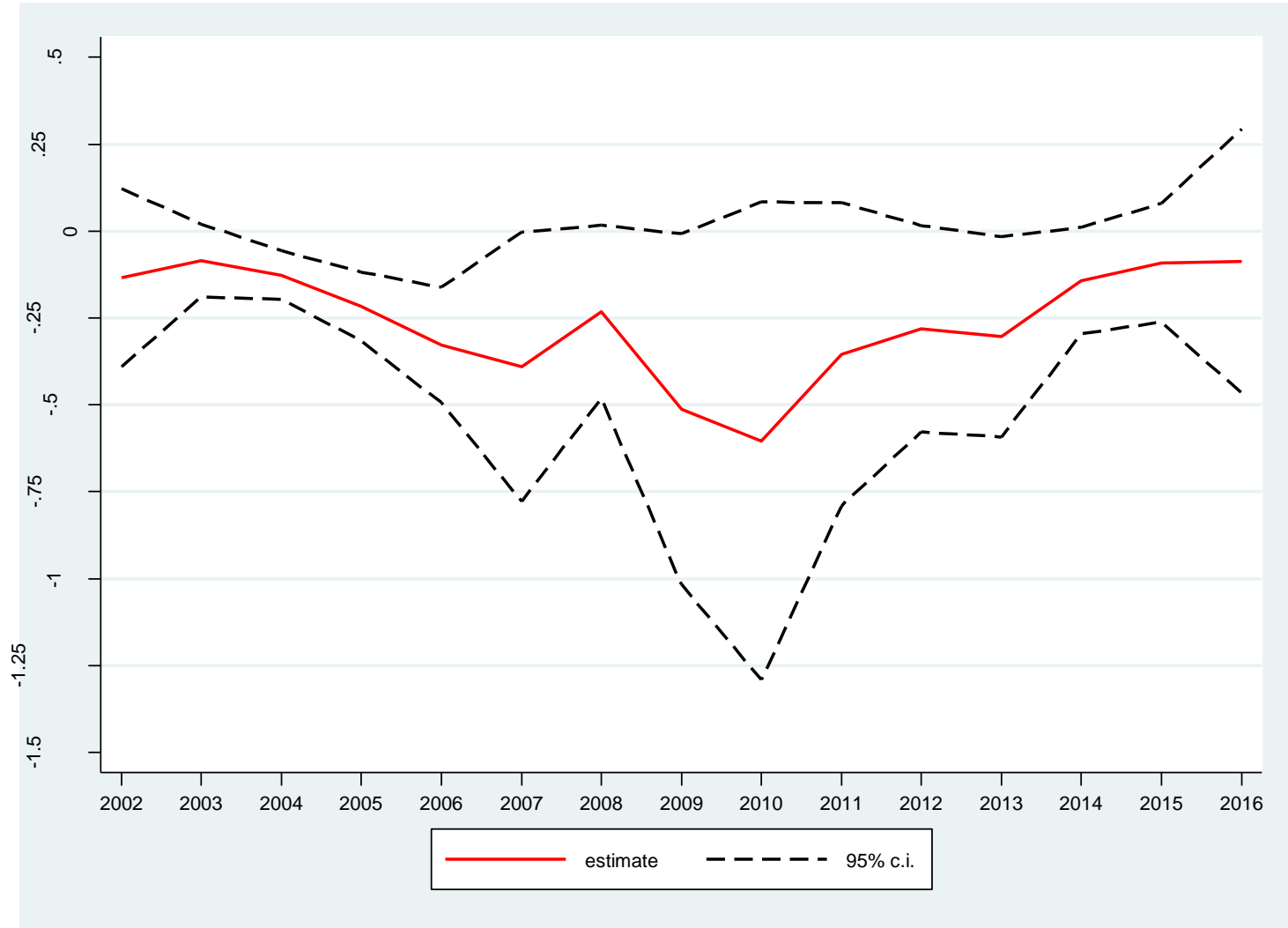
# Survivor firms

# Change in the number of employees among survivors

# Change in the share of blue-collars among survivors
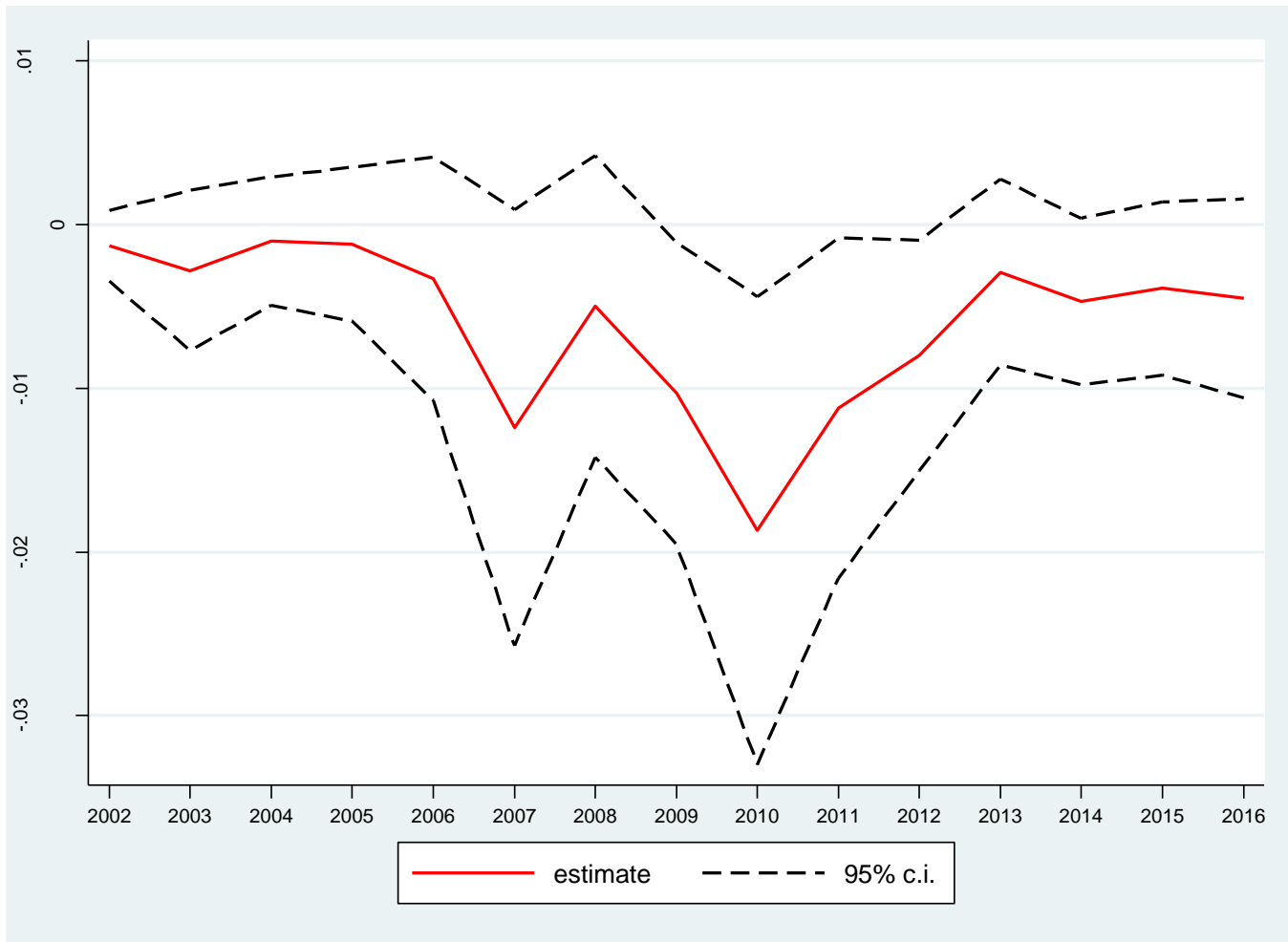
# Change in the share of fixed-term emp. among survivors
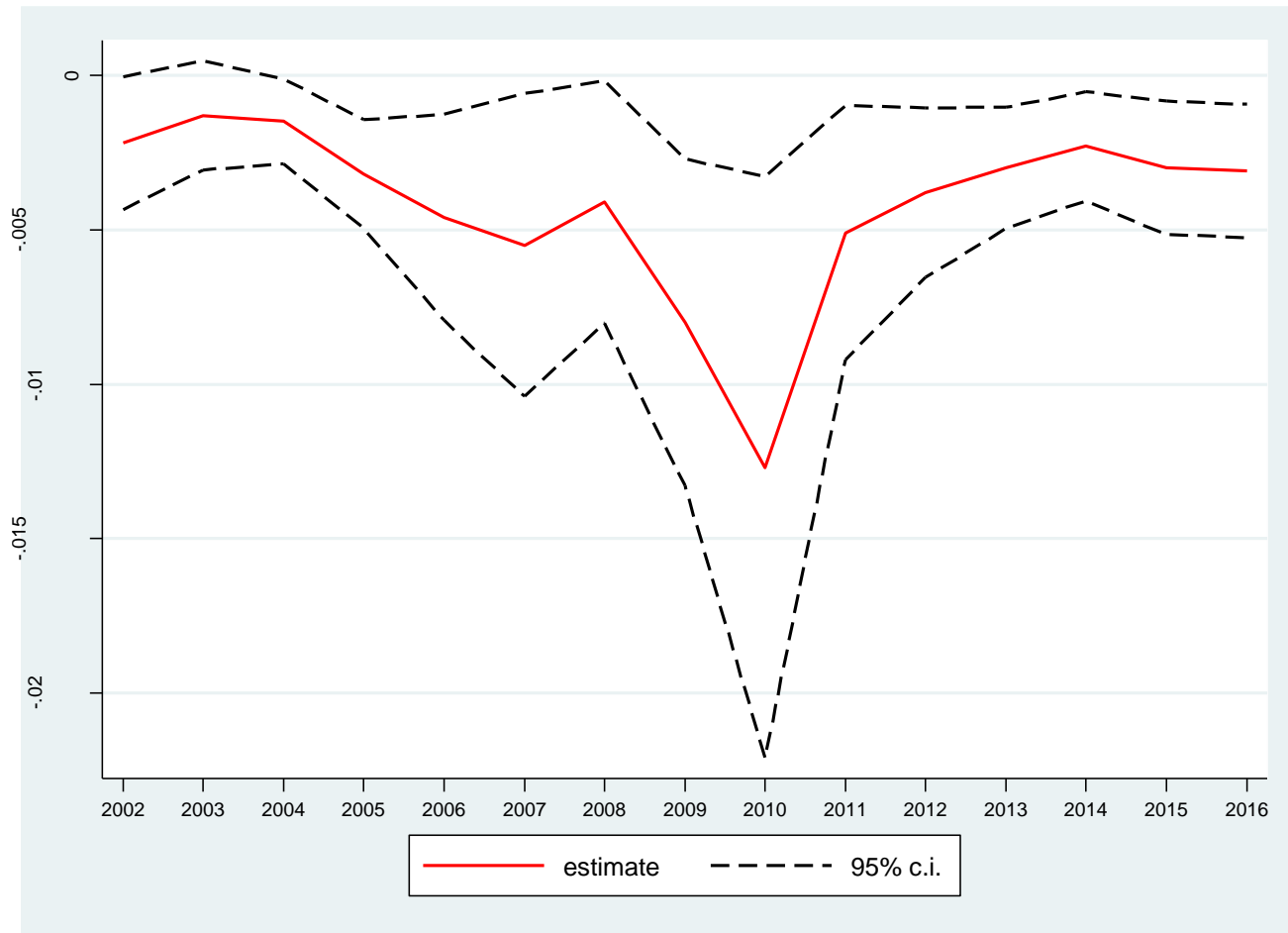
# Analyses about individuals

# Data for the analyses about workers

- We select employees the whole year in manufacturing in 2001 (approximately 4 millions).

- We do not exclude workers according to age/experience.

- As a major novelty, we do not rely on private employees histories only, since we aim at observing risks related to employability => we use the *estratti conto* archive.

- Data on individual working histories linked to industries performances using information on industries of private employees – at 3 digits NACE rev.1.1 – available in INPS data.

# The dependent variables at the individual level: 6 sets of events (a)

1.  Mobility from manufacturing to other work statuses:
    - ✓ To services; to services or other working statuses; to services or unemployment; to unemployment statuses

2.  Mobility within manufacturing:
    - ✓ Considering only those always in manufacturing in 2001-2016; considering those in manufacturing at $t+s$
    - ✓ *N.B. Work in progress about the "direction" of the movement and the firm's change*

3.  Geographical mobility:
    - ✓ Between regions; between 5 macro-areas

# The dependent variables at the individual level: 6 sets of events (b)

4.  Changes in contractual arrangement (fixed-term and part-time)

5.  Changes in yearly work intensity

    ✓ Number of worked weeks as an employee; number of weeks receiving CIG; number of weeks without income

6.  Changes in annual earnings

    ✓ Total earnings changes; changes of earnings of those in manufacturing; changes of earnings of those moving to services

- N.B. Some events defined on subgroups only (i.e. those in manufacturing), other on all individuals

- Retired individuals excluded from the analysis from the retirement year

# Control variables in *t*

- Age (square), gender, dummies on citizenship
- Total work experience (square), experience in the industry (square), tenure (square)
- Dummies on open-ended and full-time contracts, occupation, wages, worked weeks
- Firm's size (cubic), type of firm, IP from CHN in 2001
- Dummies on the province of work
- Change in the number of employee in the industry in 1991-2001
- Heterogeneity by several workers' characteristics (experience, gender, occupation, area of work)

# Workers' cohort in 2001-2016
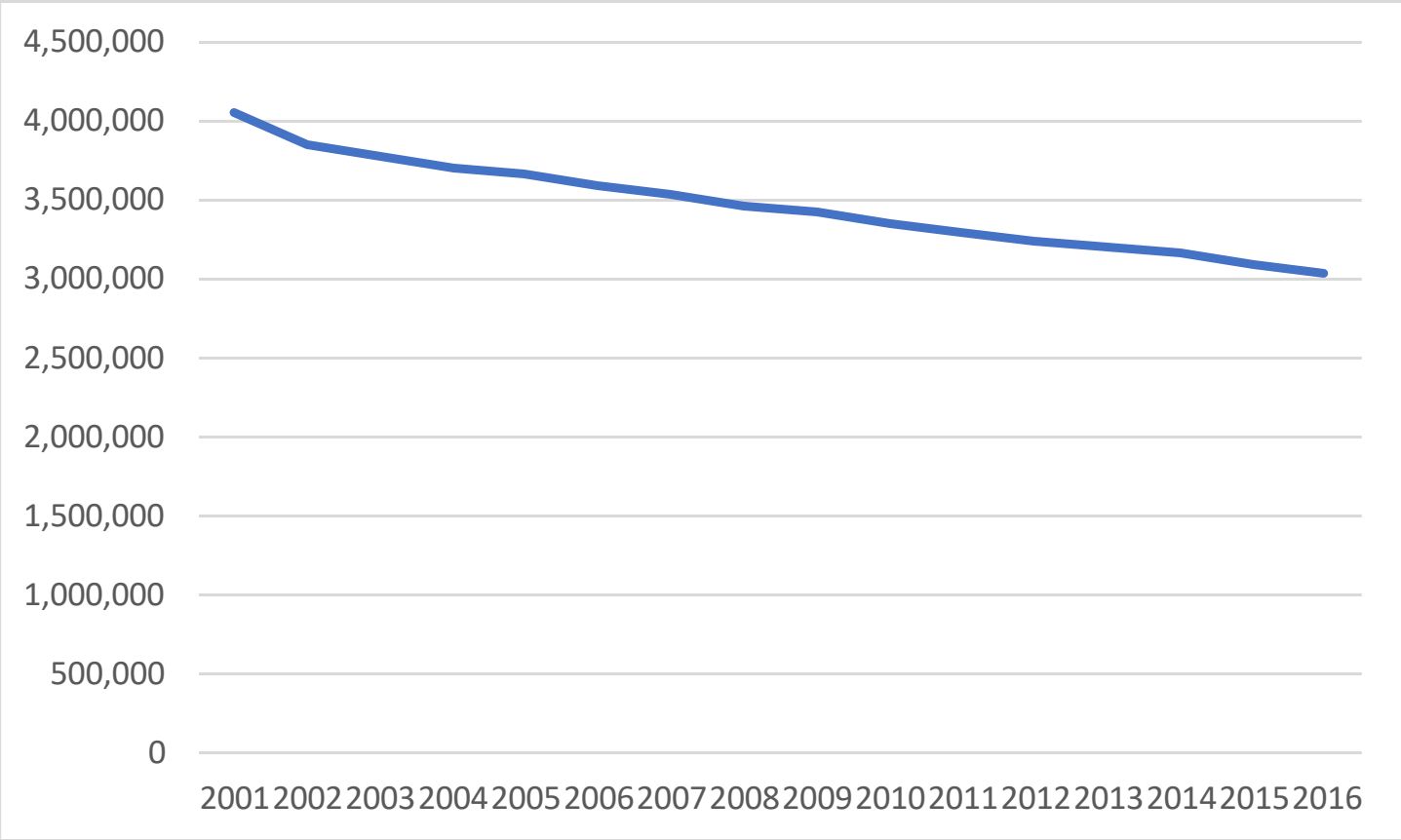
# Major results about workers (a)

| | Within manufacturing (a) | | Within manufacturing (b) | |
|---|---|---|---|---|
| | OLS | IV | OLS | IV |
| 2001-2002 | 0.0107*** | -0.0112** | 0.0162*** | -0.0078 |
| | (0.0016) | (0.0053) | (0.0028) | (0.0061) |
| 2001-2003 | 0.0105 | -0.0111 | 0.0160 | -0.0105 |
| | (0.0103) | (0.0070) | (0.0135) | (0.0108) |
| 2001-2004 | 0.0163*** | 0.0183* | 0.0145** | 0.0128 |
| | (0.0062) | (0.0108) | (0.0069) | (0.0125) |
| 2001-2005 | 0.0376** | 0.0347* | 0.0353** | 0.0418** |
| | (0.0149) | (0.0182) | (0.0159) | (0.0190) |
| 2001-2006 | 0.0605*** | 0.0775* | 0.0535** | 0.0870* |
| | (0.0220) | (0.0427) | (0.0256) | (0.0475) |
| 2001-2007 | 0.0434** | 0.0803** | 0.0409* | 0.0749* |
| | (0.0200) | (0.0404) | (0.0214) | (0.0395) |
| 2001-2008 | 0.0602** | 0.1617*** | 0.0580** | 0.1537** |
| | (0.0248) | (0.0604) | (0.0275) | (0.0629) |
| 2001-2009 | 0.0564** | 0.0886* | 0.0498* | 0.0775 |
| | (0.0253) | (0.0538) | (0.0281) | (0.0537) |
| 2001-2010 | 0.0273* | 0.0503* | 0.0286* | 0.0480* |
| | (0.0141) | (0.0304) | (0.0148) | (0.0289) |
| 2001-2011 | 0.0617** | 0.1095* | 0.0615** | 0.0999* |
| | (0.0247) | (0.0567) | (0.0249) | (0.0520) |
| 2001-2012 | 0.1213** | 0.1783** | 0.1169** | 0.1656** |
| | (0.0525) | (0.0850) | (0.0542) | (0.0809) |
| 2001-2013 | 0.1936** | 0.2698** | 0.1917** | 0.2507** |
| | (0.0792) | (0.1249) | (0.0774) | (0.1158) |
| 2001-2014 | 0.2182** | 0.2938** | 0.2176*** | 0.2758** |
| | (0.0853) | (0.1250) | (0.0817) | (0.1145) |
| 2001-2015 | 0.2493** | 0.3670*** | 0.2477*** | 0.3485*** |
| | (0.0958) | (0.1394) | (0.0921) | (0.1309) |
| 2001-2016 | 0.2574** | 0.4213** | 0.2667** | 0.4153*** |
| | (0.1104) | (0.1689) | (0.1076) | (0.1608) |

# Major results about workers (b)

| | Worked weeks | | Weeks in CIG | | Weeks without income | |
|---|---|---|---|---|---|---|
| | OLS | IV | OLS | IV | OLS | IV |
| 2001-2002 | -0.0173 | -0.0577 | 0.0005 | 0.0005 | 0.0172 | 0.0267 |
| | (0.0143) | (0.0895) | (0.0004) | (0.0025) | (0.0148) | (0.1288) |
| 2001-2003 | -0.0639 | -0.0362 | -0.0006 | 0.0023 | 0.0332 | -0.1567 |
| | (0.0929) | (0.1152) | (0.0019) | (0.0026) | (0.2256) | (0.2112) |
| 2001-2004 | 0.0019 | 0.0082 | 0.0023 | 0.0005 | -0.0383 | -0.3241 |
| | (0.0847) | (0.1210) | (0.0023) | (0.0030) | (0.2452) | (0.2604) |
| 2001-2005 | -0.3340 | -0.0518 | 0.0591 | -0.0460 | 0.7447 | -0.7816 |
| | (0.2250) | (0.2538) | (0.0405) | (0.0423) | (0.7206) | (0.6286) |
| 2001-2006 | -0.5286** | -0.0375 | 0.0473** | 0.0678* | 1.8975 | -1.5392 |
| | (0.2598) | (0.3024) | (0.0190) | (0.0409) | (1.2957) | (1.1716) |
| 2001-2007 | -0.2384* | -0.1613 | 0.0250** | 0.0074 | 0.9556 | 0.1966 |
| | (0.1272) | (0.1620) | (0.0103) | (0.0139) | (0.7259) | (0.7771) |
| 2001-2008 | -0.2654** | -0.2738 | 0.0403 | 0.0228 | 1.2387 | 1.4655 |
| | (0.1174) | (0.2558) | (0.0385) | (0.0653) | (0.7877) | (1.5332) |
| 2001-2009 | -0.3126* | -0.3419 | 0.0450 | 0.1266 | 1.9133** | 1.9282 |
| | (0.1757) | (0.2384) | (0.1500) | (0.2150) | (0.9367) | (1.1950) |
| 2001-2010 | -0.2760** | -0.2303 | 0.1247 | 0.1596 | 0.8247 | 0.6374 |
| | (0.1327) | (0.1481) | (0.1068) | (0.1171) | (0.6425) | (0.6769) |
| 2001-2011 | -0.2154 | -0.2019 | 0.0097 | 0.0575 | 1.2009 | 1.3060 |
| | (0.1335) | (0.1934) | (0.0645) | (0.0973) | (0.9152) | (1.0688) |
| 2001-2012 | -0.2772 | -0.2170 | -0.0545 | -0.0270 | 2.3115* | 1.3560 |
| | (0.2281) | (0.2255) | (0.0996) | (0.1004) | (1.3849) | (1.2036) |
| 2001-2013 | -0.3170 | -0.3549 | -0.0677 | -0.0533 | 2.5370 | 2.1817 |
| | (0.3186) | (0.3246) | (0.1249) | (0.1230) | (1.5842) | (1.6245) |
| 2001-2014 | -0.3869 | -0.3877 | -0.0253 | 0.0325 | 2.5409 | 2.2463 |
| | (0.2657) | (0.2790) | (0.0809) | (0.0812) | (1.5710) | (1.7153) |
| 2001-2015 | -0.4044 | -0.5135** | -0.0136 | 0.0319 | 1.9511 | 1.8664 |
| | (0.2493) | (0.2588) | (0.0455) | (0.0503) | (1.3266) | (1.3783) |
| 2001-2016 | -0.4167 | -0.4761* | -0.0022 | 0.0121 | 1.8904 | 2.0416 |
| | (0.2637) | (0.2560) | (0.0340) | (0.0335) | (1.3285) | (1.4124) |

# **Main findings**

- Effects on incumbents (i.e. a "within" effect!) mostly related to manufacturing recomposition => *what types of industries do workers move to?*

- In some cases (e.g. worked weeks, mobility across regions) expected signs but small size and statistically insignificant due to a large standard error. But these are results related to the "universe"!

- Interestingly, even if no significant, effects with opposite signs before and after the crisis for some events (e.g. mobility to unemployment and services, weeks without income)

- Results do not change when considering only workers still in manufacturing at *t+s-1*

- Do aggregate effects mask heterogeneity according to workers' features?