Where Do Jobs Go When Oil Prices Drop?

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International Energy Forum - Bank of Canada
Commodity Cycles and their Implications

April 25, 2016

Introduction

- Growth in U.S. employment in 2014 had been concentrated in mining (BLS, 2015)
- Development of technologies in oil extraction (e.g. shale)
- Falling oil prices since July 2014 $\Rightarrow$ Where do jobs go when oil prices fall?

Introduction

- "The U.S. economy and the stock market will not even notice the fall in oil prices" (Ro, 2014)
- Our results indicate that lower oil prices have disproportionate effects on different economic sectors (energy, manufacturing, services)
- We show that an unexpected drop in oil prices stimulate net employment growth in sectors that are energy intensive

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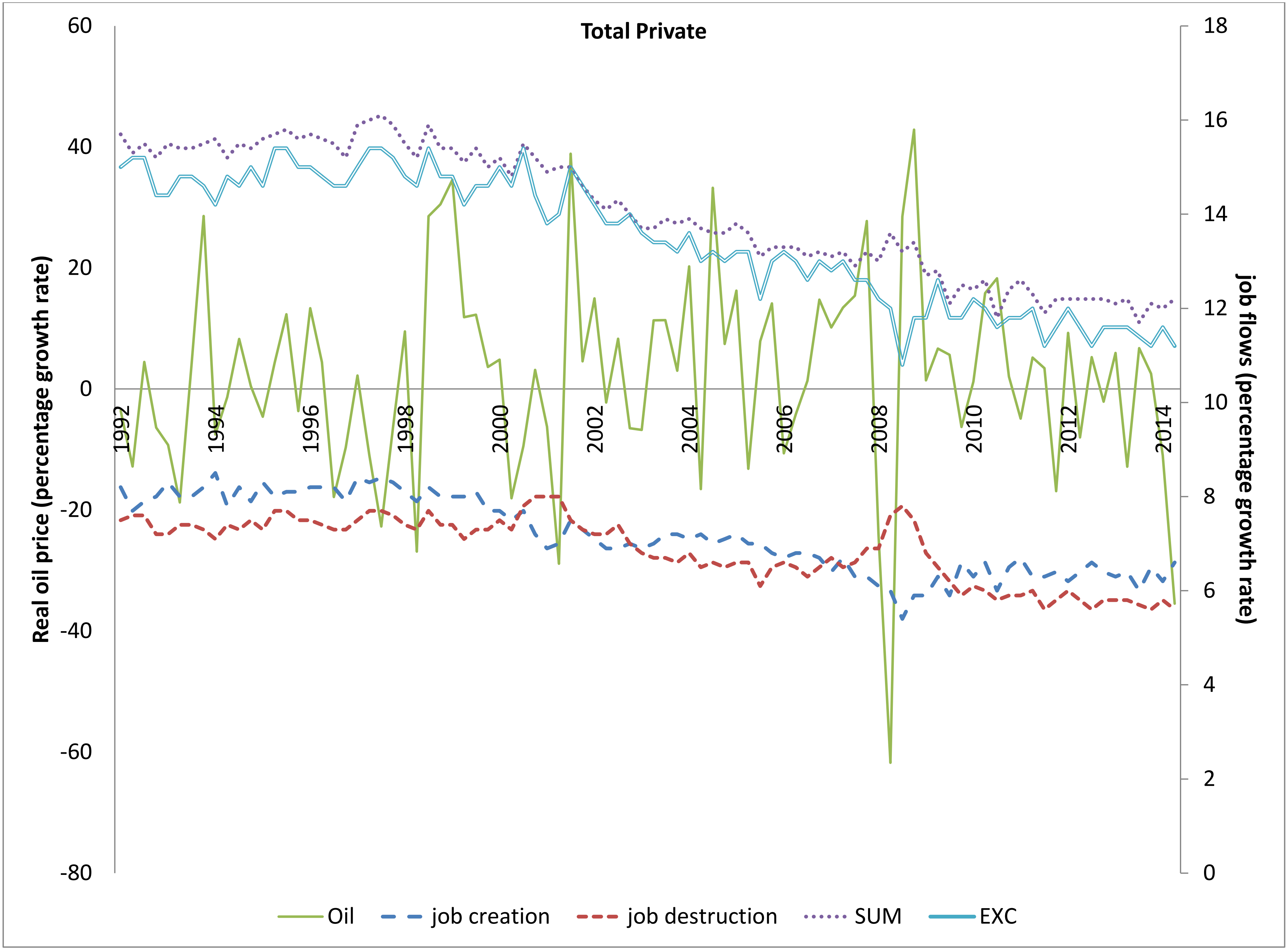
    - $EXC_{i,t} = SUM_{i,t} - |NET_{i,t}|$

Figure 1: Oil prices and job flows



Model

Consider the joint dynamics of Y_t and F_t to be given by a *FAVAR*:
Observation equation:

$$X_t = \Lambda^y Y_t + \Lambda^f F_t + u_t \tag{1}$$

Transition equation:

$$\begin{bmatrix} Y_t \\ F_t \end{bmatrix} = A(L) \begin{bmatrix} Y_{t-1} \\ F_{t-1} \end{bmatrix} + e_t$$

where $Y_t = [o_t, TNEG_t, TPOS_t, i_t]'$ is a 4×1 vector of observable macroeconomic variables. F_t is a vector of unobserved common factors that drive the vector X_t.

Model Specification

- $N = 174$ observable variables. $T = 90$observations.
- Number of factors are chosen using Bai and Ng (2002) information criterion (ICp2(k)).
- The information criterion leads us to select a total of 7 factors (4 observed and 3 unobserved).

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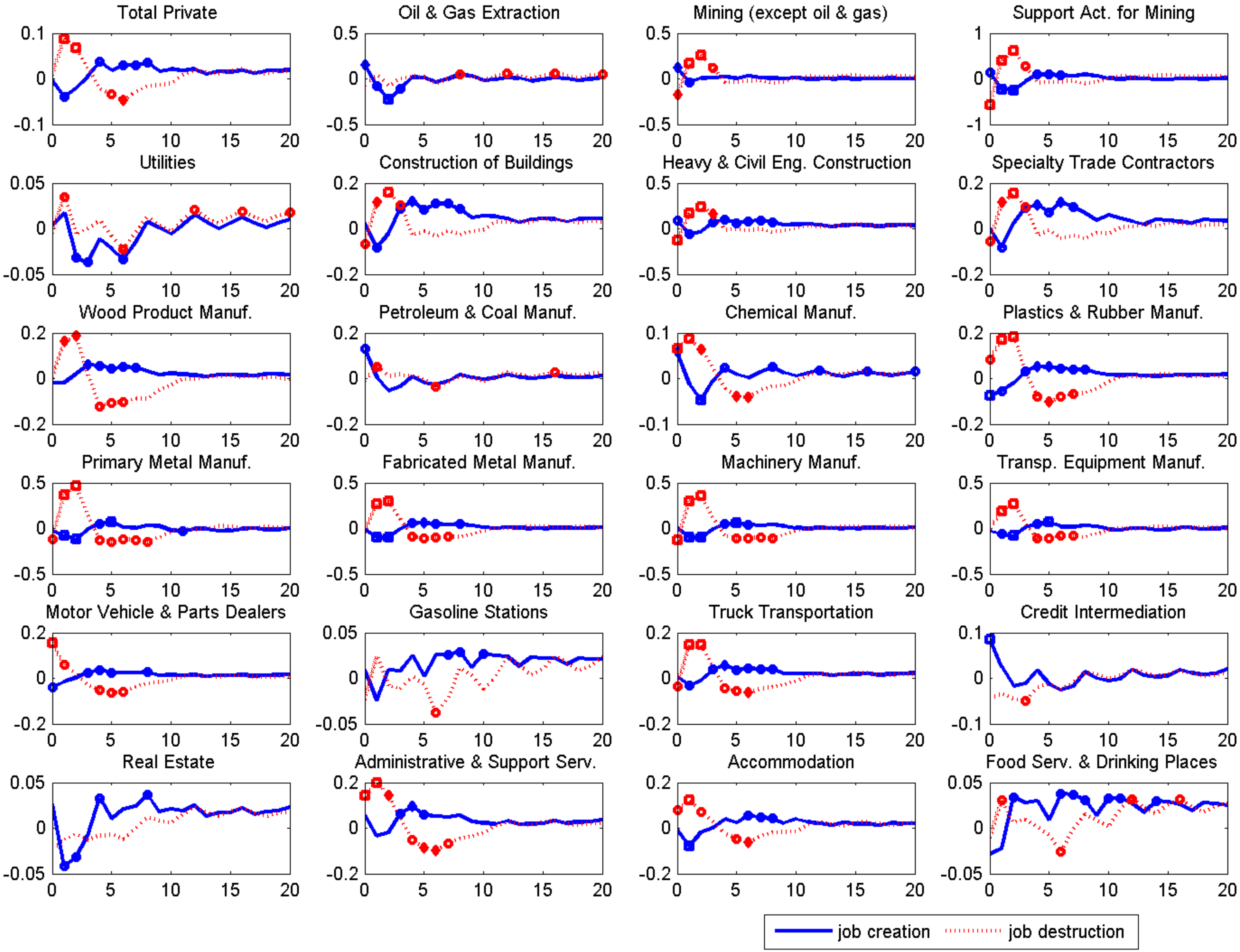
    - The quality spread responds contemporaneously to innovations in all the other aggregate variables.
  - We estimate the response of the aggregate and industry-level variables to a 1% decrease in the real oil price.

Figure 2: Responses of job creation and job destruction to a negative oil price shock of 1 s.d.



Notes: Squares, diamonds and circles represent significance at the 5%, 10% and 32%, respectively

The Effects of Oil Prices on Job Flows

The cumulative effects of negative oil price shock on job flows

	POS		NEG		NET		SUM		EXC	
Sectors	1 year	2 year	1 year	2 year	1 year	2 year	1 year	2 year	1 year	2 year
Total Private	-0.02	0.09	0.16	0.03	-0.18	0.06	0.14	0.13	-0.16	-0.42
Crop Production	0.38	0.67	0.38	0.52	0.00	0.15	0.77	1.19	0.03	0.31
Oil & Gas Extraction	-0.24	-0.23	-0.07	-0.06	-0.18	-0.17	-0.32	-0.28	-0.94	-0.94
Mining (exc. O. & G.)	0.11	0.18	0.34	0.21	-0.22	-0.03	0.45	0.38	-0.47	-0.73
Support Act. for Min.	-0.30	0.03	0.61	0.32	-0.92	-0.29	0.31	0.35	-2.43	-3.02
Construction of Build.	0.12	0.52	0.28	0.19	-0.15	0.32	0.40	0.71	-0.23	-0.39
Plas. & Rubb. Manuf.	-0.07	0.11	0.39	0.07	-0.45	0.04	0.32	0.18	-0.41	-1.04
Transp. Equip Manuf.	-0.11	0.02	0.40	0.03	-0.51	-0.01	0.29	0.05	-0.54	-1.28
Credit Intermediation	0.10	0.06	-0.19	-0.23	0.30	0.29	-0.09	-0.17	-0.39	-0.48

Entry/Exit Versus Existing Establishments

- Do changes in job creation (destruction) stem mainly from the response of expanding (contracting) establishments or opening (closing) establishments?
- Modify the FAVAR by separately including in the vector of industry-level variables X_t the job destruction rates of contracting and exiting establishments and the job creation rates of expanding and entering establishments
- Estimate the FAVAR and use the same identification restriction

Figure A.2a: Responses of job creation from expanding and opening establishments to a negative oil price shock of 1 s.d.

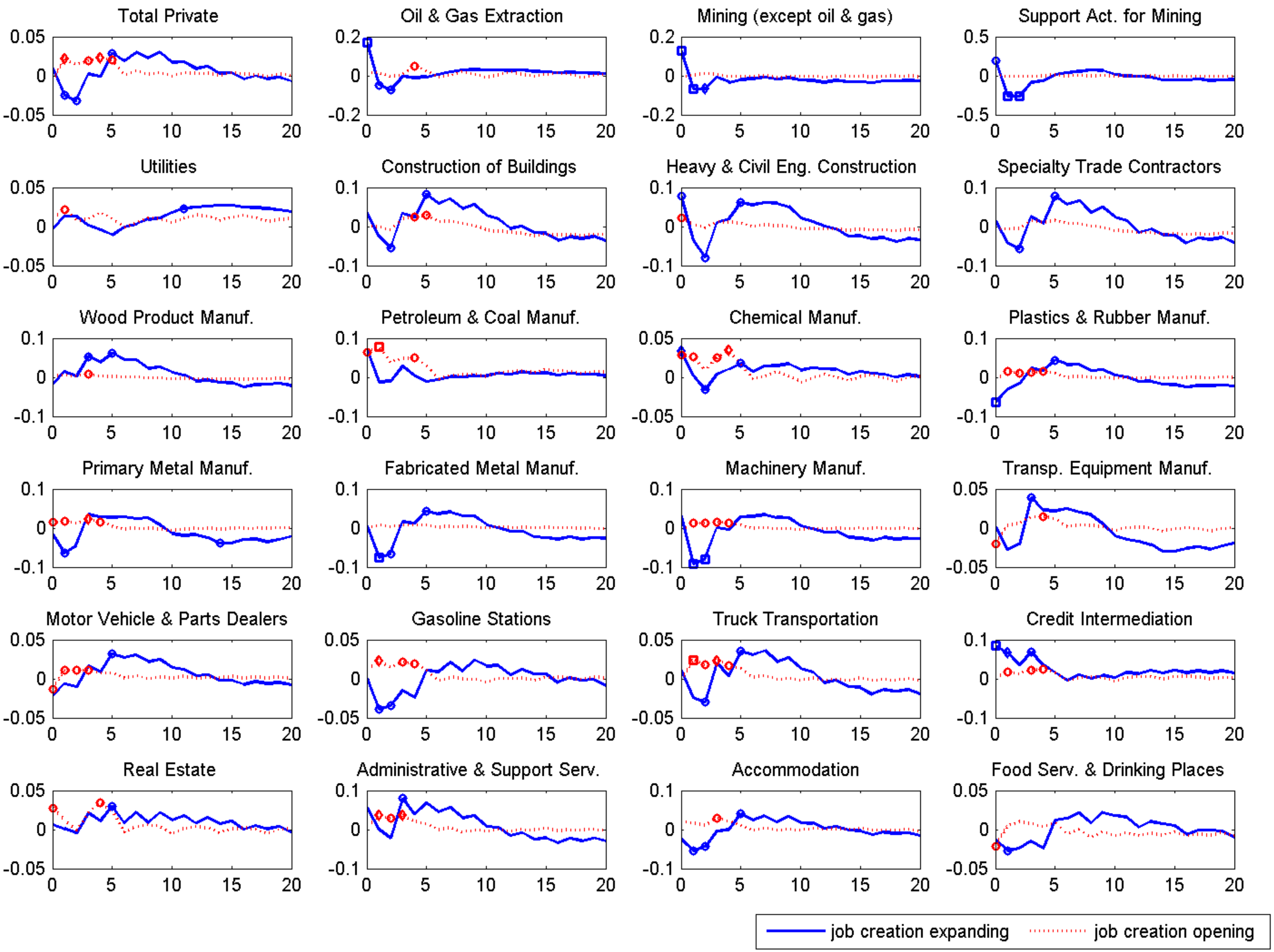


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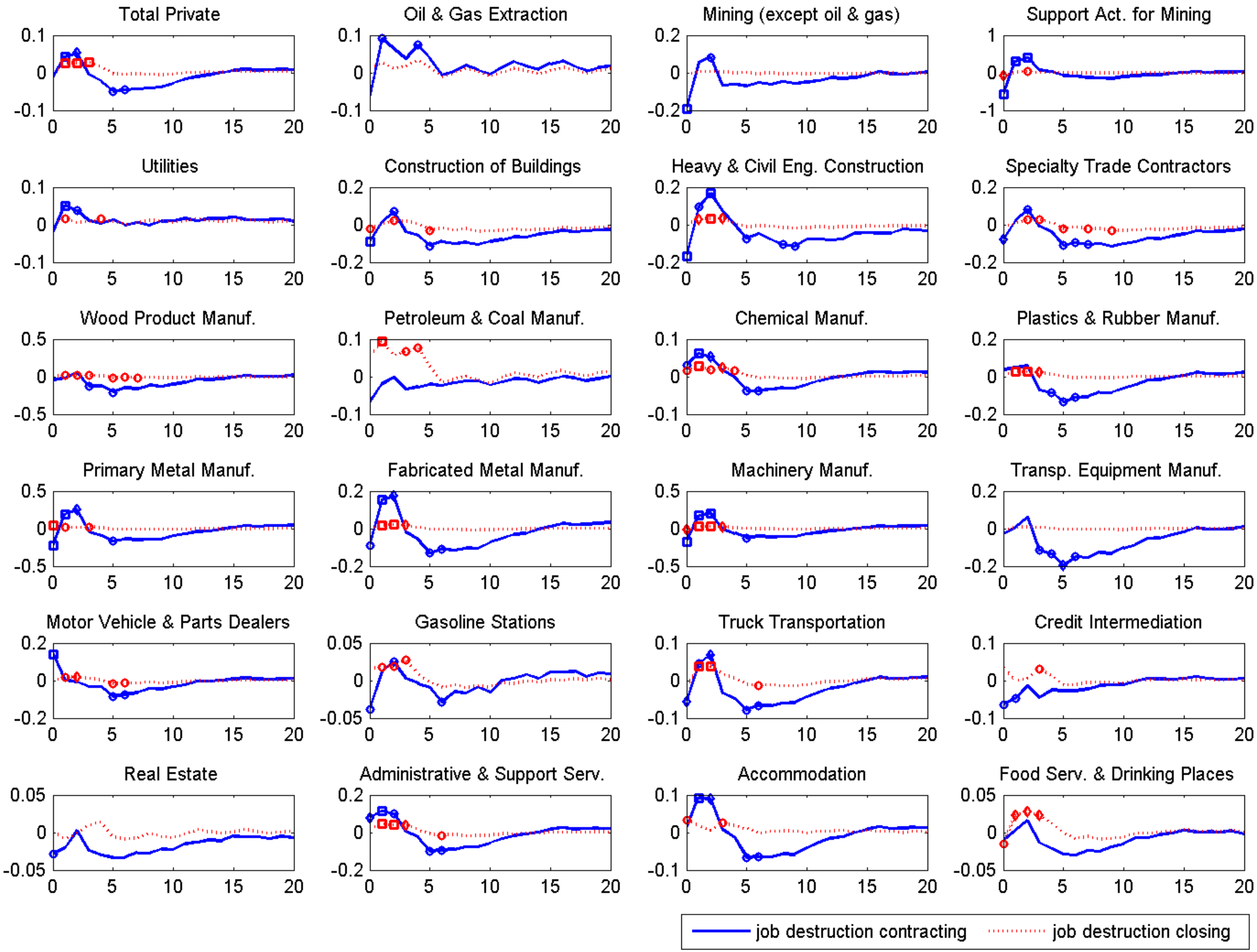
Figure A.3a: Responses of job destruction from contracting and closing establishments to a negative oil price shock of 1 s.d.



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Cumulative change in job flows due to a 1 s.d. negative oil price shock

	POS expanding		POS opening		NEG contracting		NEG closing	
Sectors	1 year	2 year	1 year	2 year	1 year	2 year	1 year	2 year
Total Private	-0.046	0.054	0.070	0.100	0.054	-0.125	0.091	0.076
Crop Production	-0.118	-0.165	0.170	0.217	-0.113	-0.300	0.049	0.028
Oil & Gas Extraction	0.033	0.081	0.079	0.113	0.199	0.252	0.096	0.107
Mining (except Oil & Gas)	-0.047	-0.107	0.009	-0.009	-0.187	-0.418	0.005	-0.005
Support Act. for Mining	-0.483	-0.306	-0.026	-0.024	0.241	-0.205	-0.020	-0.027
Construction of Buildings	0.013	0.272	0.036	0.096	-0.102	-0.502	0.027	-0.068
Plastics & Rubber Manuf.	-0.074	0.053	0.045	0.056	-0.012	-0.451	0.095	0.082
Transp. Equipment Manuf.	0.014	0.098	0.018	0.039	-0.218	-0.849	0.016	0.003
Credit Intermed. & Related Act.	0.292	0.316	0.079	0.094	-0.195	-0.286	0.079	0.051

Historical decomposition

The cumulative effects of a negative oil price shock on job flows are given by

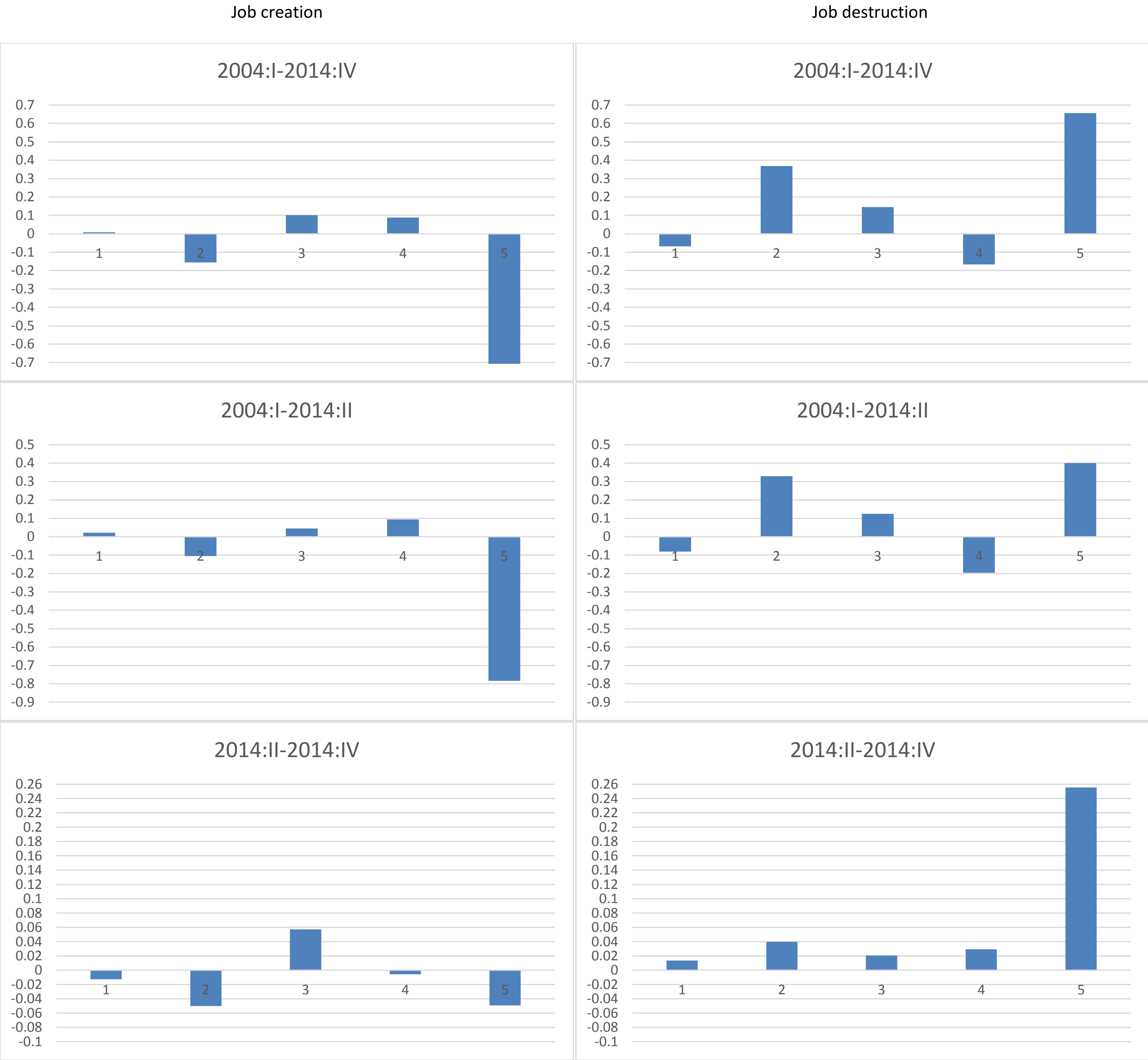
$$\begin{bmatrix} \widehat{Y}_t \\ \widehat{F}_t \end{bmatrix} \approx \sum_{i=0}^{t-1} \widehat{\Theta}_i \widehat{v}_{t-i}$$

where

- $\widehat{Y}_t$ and $\widehat{F}_t$ denote, respectively, the 4×1 and 3×1 vectors of fitted aggregate variables and estimated factors of the *FAVAR*,
- $\widehat{\Theta}_i$ denotes the matrix of estimated structural impulse responses at lags $i = 0, 1, 2, \ldots$
- $\widehat{v}_{t-i}$ is a vector of estimated structural shocks.

We focus on the second and third elements of $\widehat{Y}_t$, $\widehat{TNEG}_t$ and $\widehat{TPOS}_t$

Figure 3: Contribution to Cumulative Change in Job Creation and Job Destruction



Notes: 1 = Oil Price Shock; 2 = Total Private Job Destruction Shock; 3 = Total Private Job Creation Shock; 4 = Quality Spread Shock; 5 = Factor Shock.

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  3. The unexpected drop in oil prices has a positive effect on employment that is not limited to the manufacturing sector examined in previous studies. Instead, it extends to the construction and service sectors.
  4. The impact on job flows in agriculture and forestry, instead, is rather small.

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  - Most of the decline in job creation during the first year stems from changes in job flows from expanding establishments in manufacturing and services.
- However, we found that oil price shocks explained only a small fraction of the cumulative change in net employment both during the rapid shale oil expansion (2004:I-2014:II) and during the oil price collapse (2014:II-2014:IV).