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“Schumpeterian Job Creation
New Evidence from Danish Entrepreneurs”

Workshop on ECONOMICS OF ENTREPRENEURSHIP
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INTRODUCTION: BACKGROUND

- The issue:
  - Job creation in start-ups vs. incumbents
- Existing literature:
  - Framework:
    - Davis & Haltiwanger (1992), Haltiwanger et al. (2013)
  - Findings:
    - Start-ups contribute significantly to gross job creation (GJC).
    - Start-ups accounts for the entire net job creation (NJC).
- A job is a job:
  - A net measure at the firm level
    - E.g. Job creation equals 2 when a firm opens up 10 white-collar jobs and closes down 8 blue-collar jobs
  - Simultaneous destruction is either not accounted for (GJC) or fully accounted for (NJC)

INTRODUCTION: CONTRIBUTION

- We introduce:
  - A measure of skill-specific job creation and destruction at the firm level
  - A measure of “surplus” jobs defined as jobs created on top of any simultaneous destruction of “similar” jobs in “neighbouring” firms

METHODOLOGY: TRADITIONAL MEASURES - FIRM

- Davis and Haltiwanger (1992) and Davis *et al.* (1996):

$$C_{it} = \max(X_{it} - X_{it-5}, 0)$$
$$D_{it} = \max(X_{it-5} - X_{it}, 0)$$

- C_{it} - Gross job creation
- D_{it} - Gross job destruction

- Measures can be aggregated for start-ups and incumbents

- Measures do not distinguish between different types of jobs

METHODOLOGY: INCLUDING SKILL CONTENT - FIRM

- Measure similar to traditional measure but distinguishes between different types of education as proxy for skill-content of job:

$$C_{it}^{e} = \max\left(X_{it}^{e} - X_{it-5}^{e}, 0\right)$$
$$D_{it}^{e} = \max\left(X_{it-5}^{e} - X_{it}^{e}, 0\right)$$

- X_{it}^{e}: employment of workers with education type *e*

- E.g., 7 types of education = 7 measures per firm

- Can be aggregated to get a firm-level measure and further to the aggregate economy level

METHODOLOGY: JOB CLUSTER (e, c)

- Idea: A job cluster, (e, c), consists of all jobs of education type, e, within a given industry-region cell, c

- Gross job creation in (e, c):

$$GJC_c^e = \sum_{i \in c} C_i^e$$

- Net job creation in (e, c):

$$GJD_c^e = \sum_{i \in c} D_i^e$$

$$NJC_c^e = GJC_c^e - GDC_c^e = \sum_{i \in c} (C_i^e - D_i^e)$$

METHODOLOGY: "SURPLUS" JOBS

- "Surplus" jobs: defined as jobs created on top of any simultaneous destruction in job clusters

$$SJC_c^e = \max(NJC_c^e, 0)$$

- "Surplus" jobs equal
  - net job creation if positive
  - 0 if net job-creation is negative

- Can be assigned to start-ups and incumbent firms, respectively

- Flip side: "Deficit" jobs
  - "Surplus" job creation – "Deficit" job destruction = Net job creation

METHODOLOGY: ASSIGNING "SURPLUS" JOBS

- Incumbent firms:
  - Number of "surplus" jobs is equal to the net job creation in the cluster (if positive), as start-ups have no net destruction by definition
- Start-ups:
  - Number of "surplus" jobs is equal to net job creation less any net job destruction by incumbents in the same job cluster
  - If net job creation by start-ups is less than the net job destruction by incumbents, the number of "surplus" jobs created by start-ups is zero

$$SJC_c^e = SJC_{in\in c}^e + SJC_{su\in c}^e$$
$$= \max(NJC_{in\in c}^e, 0) + \max\left(NJC_{su\in c}^e - \max(-NJC_{in\in c}^e, 0), 0\right)$$

Application to Danish data

DATA: STATISTICS ON NEW ENTERPRISES

- Genuinely new firms
  - All start-ups that have not existed under a different name, with a different owner, or in another legal form
  - Must not have been started by persons, who already are registered as business owners at the VAT authorities
- Cleaned for
  - re-starts of businesses after closure
  - changes in the firm-registration information.
- Covers “business-related industries”

DATA: OTHER ISSUES

- Five-year time period (2002-2007)
- Firm types:
  - Start-ups are established after 2002
  - Incumbents are firms that existed in 2002
- Jobs:
  - Allow for up to two jobs per individual per year at the census date in November
  - A primary occupation and a secondary occupation

RESULTS: AGGREGATE GROSS AND NET JOB CREATION

Number of education groups	Incumbent firms		Start-up firms		Start-ups' share of:
	GJC_A^{in}	NJC_A^{in}	GJC_A^{su}	NJC_A^{su}	GJC_A
1	596,535	-69,272	218,059	218,059	0.268
7	665,058	-69,272	218,059	218,059	0.247
32	697,257	-69,272	218,059	218,059	0.238

70,000 more jobs under cluster-based method

Results using method Davis and Haltiwanger (1992)

Results using cluster-based method (7 education types)

Relatively constant

RESULTS: "SURPLUS" JOBS

# clusters	# industries	# regions	# education groups	Incumbent firms			Start-up firms		
				SJC_A^{in}	GJC_A^{in}	NJC_A^{in}	SJC_A^{su}	GJC_A^{su}	NJC_A^{su}
7,175	233	5	7	148,933	665,058	-69,272	140,280	218,059	218,059
1,094	233	5	1	111,708	596,535	-69,272	147,211	218,059	218,059
23,332	233	5	32	166,891	697,257	-69,272	138,411	218,059	218,059

Somewhat sensitive

SJC equals 290.000 jobs.
"Deficit" jobs = 140,000

Fairly insensitive

RESULTS: JOB CREATION BY EDUCATION GROUPS

	Incumbent firms			Start-up firms		
	GJC_A^{in}	NJC_A^{in}	SJC_A^{in}	GJC_A^{su}	NJC_A^{su}	SJC_A^{su}
Total	665,058	-69,272	148,933	218,059	218,059	140,280
By education group:						
Primary schooling	198,586	-40,159	36,035	62,769	62,769	39,140
Vocational education	213,246	-61,085	31,690	78,056	78,056	41,490
High school	74,400	-5,062	16,934	23,104	23,104	13,629
Short further education	37,529	6,043	12,548	10,175	10,175	7,731
Medium further education	56,046	9,048	18,286	18,440	18,440	15,592
Long further education	41,505	15,307	19,046	11,985	11,985	10,952
Unknown	43,746	6,636	14,394	13,530	13,530	11,746

RESULTS: JOB CREATION BY EDUCATION GROUPS - continued

	Start-ups' share of:		"Surplus" jobs created by:	
	GJC_A	SJC_A	*start-ups*	*incumbents*
Total	0.25	0.49	0.64	0.22
By education group:				
Primary schooling	0.24	0.52	0.62	0.18
Vocational education	0.27	0.57	0.53	0.15
High school	0.24	0.45	0.59	0.23
Short further education	0.21	0.38	0.76	0.33
Medium further education	0.25	0.46	0.85	0.33
Long further education	0.22	0.37	0.91	0.46
Unknown	0.24	0.45	0.87	0.33

SUMMARY: CONCLUSION

- Introduce two new measures:
  - Job creation and destruction are extended by education-specific measures
  - Develop a measure of “surplus” jobs created on top of any simultaneous destruction of similar jobs
- Findings:
  - The contribution of start-ups is less than for traditional measures
  - Start-ups accounts for the entire net job creation but create on average around half of the “surplus” jobs. Less for high-skilled jobs.
  - Start-ups create around 0.6 “surplus” job for each gross job
  - Incumbents “reshuffles” individuals within the same cluster to a higher extent but do create “surplus” jobs
  - Creation of high skilled jobs are to a higher extent “surplus” jobs than the creation of low-skilled jobs