Using Worker Flows in the Analysis of Establishment Turnover: Evidence from Germany

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Background

Establishment and Firm turnover is a central topic in Economics. The notion that producer entry and exit is an important form of reallocation of production factors and thus contributing to aggregate growth has inspired a long line of theoretical and empirical research. One aspect of this reallocation mechanism is the role of this churning process in the creation and destruction of jobs. Administrative data is often used to study job creation and destruction. For Germany the best source of information of this kind is the establishment history panel (BHP) of the Institute of Employment Research (IAB) in Nuremberg. While this dataset is extremely rich in its variables, a big drawback is that information on establishment entries and exits solely relies on the first and last appearance of an establishment's ID (BNR) in the dataset. This clearly rests on the assumption that a BNR does not change during the lifetime of an establishment. Hence we introduce a new way of identifying as well as classifying types of entries and exits in the BHP using worker flow information between establishments. If, for example, an establishment changes its BNR, this would be reflected as a large flow of workers from a BNR that ceases to exist to a new BNR.

Data and Methodology

The establishment history panel (BHP) is created by collapsing social security records data on the establishment-year level so that for each establishment and year there is a record with information on workforce characteristics on June 30th of the respective year. The resulting dataset is a panel comprising the universe of German employment liable to social security since the year 1975. Entries and exits in the BHP are identified by using the first and last appearance of an establishment's BNR. Although not all new BNRs are also new establishments the reverse is true. This allows us to focus on new BNRs solely to identify and classify new establishments.

Our strategy to classify new BNRs into new establishments, spin-offs and ID changes is based on the extent to which workers in a new BNR have been employed at a common BNR in the year before. Similarly, in order to classify exiting BNRs we have a look at the extent to which the workers of an exiting BNR move to a common BNR in the next year.

Having access to the underlying social security records of the BHP we can observe directly how many workers move between each establishment pair between two consecutive years. We will call all workers who move from an establishment A to an establishment B, a *cluster* of workers. Such a cluster will represent an *inflow* in establishment B and an *outflow* in establishment A. Of all the clustered inflows to a BNR, we call the largest (highest number of workers) one in a given year the *maximum clustered inflow* (MCI). Similarly we call the largest flow of all the clustered outflows in a year from a given BNR the *maximum clustered outflow* (MCO).[1] For the classification of entries and exits we only use the MCI and MCO in the first and last year of BNR appearance. We will call the BNR the MCI originates from the predecessor, the BNR the MCO goes to the successor. In order to apply the classifications to the data it is necessary to define cutoffs for the MCI and MCO. Our definitions and cutoffs follow Benedetto et al. (2007) and are displayed in ***table 1***.

Results

In a first step we classify all new BNRs in the BHP during the time period 1976-2004 according to the classifications in ***table 1***. The left part of ***table 2*** displays the frequency of each type of entrance.[2] Although true new openings contribute most to all new BNRs, continuing forms of entries (spin-offs and ID changes) sum up to around 5 percent of all new BNRs. The importance of those categories becomes even more severe when looking at the number of workers among those groups of establishments. The right panel of ***table 2*** displays the number of workers for each entry category. Apart from the first-place category “unclear entry”, the category “spin-off (pulled)” now ranks higher and the continuing forms of entries sum up to about 30 percent of jobs created by new entries. This result has two implications. First of all it shows the dimension of the bias when classifying those continuing forms of entries as true entries, as is the case when solely relying on a BNR’s first appearance in the BHP data. Second it indicates that those forms of entries differ in initial entry size from true

1 In addition to inflows from other establishments, there are also workers that were not employed in a social security liable job on June 30th of the previous year. In our flow data we cannot distinguish between whether these workers were unemployed at that time or worked in a job not covered by our data (self-employed, government or jobs below the earnings threshold for social security). The MCI (and similarly the MCO) is the maximum of all inflows from other establishments, so if no workers come from other establishments the MCI would be 0.

2 For a more detailed classification as seen in table 1 see Appendix A

Table 1: Classification of entries and exits

Entries		Predecessor exits			Predecessor continues		
		MCI / Predecessor Employment			MCI / Predecessor Employment		
	MCI / Inflows	<30	30-80	>80	<30	30-80	>80
Small (<=3 employees)	-	New Estab (small)	New Estab (small)	New Estab (small)	New Estab (small)	New Estab (small)	New Estab (small)
>3 employees	<30	New Estab (mid & big)	New Estab (mid & big)	New Estab (mid & big)	New Estab (mid & big)	New Estab (mid & big)	New Estab (mid & big)
	30-80	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear
	>80	Spin-off pushed	Spin-off pushed	ID Change	Spin-off pulled	Spin-off pulled	Unclear

Exit		Successor is entrant			Successor is existing estab.		
		MCO / Successor Employment			MCO / Successor Employment		
	MCO / Outflows	<30	30-80	>80	<30	30-80	>80
Small (<=3 employees)	-	Small Death	Small Death	Small Death	Small Death	Small Death	Small Death
>3 employees	<30	Atomized Death	Atomized Death	Atomized Death	Atomized Death	Atomized Death	Atomized Death
	30-80	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear
	>80	Spin-off pushed	Spin-off pushed	ID Change	Take-Over / Restructuring	Take-Over / Restructuring	Unclear

Notes: MCI stands for Maximum Clustered Inflow: the size of the largest cluster of inflowing current workers. Inflows stands for all the total number of workers that arrived since the previous year at a BNR, which for a new BNR is the same as total current employment. MCO stands for Maximum Clustered Outflows: the size of the largest cluster of outflowing current workers. Outflows are all workers that leave the BNR until the next year.

openings. To have a closer look at the latter, in a second step we displays mean sizes for all BNRs in 2000 concerning their age and initial entrytype. ***Figure 1*** shows the results. As ***table 2*** already implies especially spin-offs (pulled) are related to greater establishment sizes in contrast to true openings. Additionally the figure suggests that growth rates also differ between entrytypes. Therefore in a next step we plan to have a closer look at selected entry cohorts and track their sizes (and other characteristics) over time.

Table 2: number of new BNRs and workers in new BNRs

Entrytype	**Freq.(BNR)**	**Perce**
New estab(small)	1,102,667	70.77
Unclear	207,133	13.29
New estab(mid & big)	127,413	8.18
Spin-off (pulled)	59,593	3.82
Spin-off(pushed)	34,960	2.24
ID change	26,389	1.69
Total	1,558,155	100

Entrytype	**Freq.(wor**	**Percen**
Unclear	3,048,242	35.04
New estab(small)	1,704,481	19.59
Spin-off (pulled)	1,578,090	18.14
New estab(mid & big)	1,361,986	15.65
Spin-off(pushed)	555,415	6.38
ID change	452,111	5.2
Total	8,700,325	100

Figure 1: Establishment size by age and type of entrance

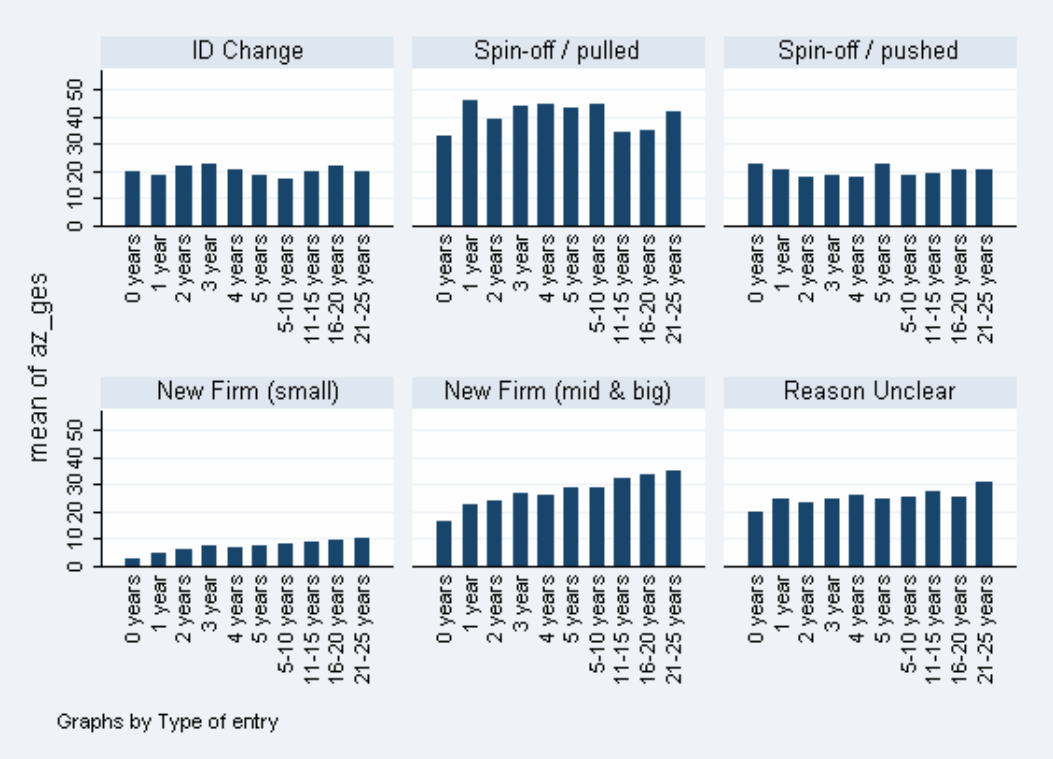

Table 3 shows the frequencies for exit types during the time period 1975-2003. Again the continuing forms of exits (take-over, ID change and spin-offs) contribute about 5 percent to all exiting BNRs. In contrast to the entry classification the pattern stays the same when looking at the number of workers in each exit type category.

Table 3: number of exiting BNRs

Exittype	**Freq.**	**Percent**
Small death	954,756	70.16
Unclear	185,976	13.67
Atomized death	151,685	11.15
Take-over	26,232	1.93
ID change	24,640	1.81
Spin-off(pushed)	17,522	1.29
Total	1,360,810	100

References

Bendetto, G. / Haltiwanger, J. / Lane, J. / McKinney, K. (2007): Using Worker Flows to Measure Firm Dynamics. Journal of Business & Economic Statistics, 25 (3): pp.299-313.

Appendix A

A: classification of entries and exits

Entries		Predecessor exits			Predecessor continues		
		MCI / Predecessor Employment			MCI / Predecessor Employment		
	MCI / Inflows	<30	30-80	>80	<30	30-80	>80
Small (<=3 employees)	-	78,628 (5.05)	117,383 (7.53)	121,009 (7.77)	656,815 (42.15)	106,319 (6.82)	22,513 (1.44)
>3 employees	<30	14,628 (0.94)	9,470 (0.61)	4,951 (0.32)	88,428 (5.68)	8,312 (0.53)	1,624 (0.1)
	30-80	15,624 (1.00)	74,242 (4.76)	23,069 (1.48)	62,251 (4.0)	26,490 (1.7)	2,219 (0.14)
	>80	7,144 (0.46)	27,816 (1.79)	26,389 (1.69)	41,602 (2.67)	17,991 (1.15)	3,238 (0.21)

Exit		Successor is entrant			Successor is existing estab.		
		MCO / Successor Employment			MCO / Successor Employment		
	MCO / Outflows	<30	30-80	>80	<30	30-80	>80
Small (<=3 employees)	-	52,443 (3.85)	100,878 (7.41)	138,263 (10.16)	550,484 (40.45)	89,796 (6.6)	22,892 (1.68)
>3 employees	<30	14,090 (1.04)	17,199 (1.26)	11,089 (0.81)	98,028 (7.2)	9,774 (0.72)	1,505 (0.11)
	30-80	9,597 (0.71)	75,079 (5.52)	37,587 (2.76)	42,864 (3.15)	17,779 (1.31)	1,618 (0.12)
	>80	2,256 (0.17)	15,266 (1.12)	24,640 (1.81)	17,504 (1.29)	8,728 (0.64)	1,451 (0.11)

Note: Cell entries display number of entering /exiting BNRs. Numbers in brakets refer to percentages of all entering /exiting BNRs.