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**Working Paper**

## Direct and indirect effects of new business formation on regional employment

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Direct and Indirect Effects of  
New Business Formation on  
Regional Employment

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### **Abstract**

We investigate the impact of new business formation on regional employment. The main effects occur after a considerable time lag. Obviously, a large part of the effect is not due to job creation by the newcomers but rather is of indirect nature. This implies that a large part of the debate about job creation by new businesses so far has been misleading.

JEL-classification: M13, O1, O18, R11

Keywords: Regional growth, new businesses, entrepreneurship, time lags, start-up cohorts.

### **Zusammenfassung**

*“Direkte und indirekte Effekte des Gründungsprozesses auf die regionale Beschäftigung”*

Wir analysieren den Einfluss von Gründungen auf die regionale Beschäftigung. Die wesentlichen Effekte treten erst mit erheblicher zeitlicher Verzögerung auf. Offensichtlich ist ein großer Teil der Wirkungen nicht auf die Beschäftigungsentwicklung der Newcomer zurück zu führen, sondern mehr indirekter Natur. Dies impliziert, dass ein wesentlicher Teil der bisherigen Debatte über die Beschäftigungswirkungen von Neugründungen von falschen Voraussetzungen ausgeht.

JEL-Klassifikation: M13, O1, O18, R11

Schlagworte: Regionalentwicklung, Unternehmensgründungen, Entrepreneurship, Time Lags, Gründungskohorten.

## 1. Introduction<sup>1</sup>

Most people are apt to believe that a high level of new business formation in a region stimulates its economic development. However, in contrast to this widespread conviction there is no clear and indisputable empirical proof for this hypothesis. Some results of recent research suggest that a relatively long time period is needed for the main effects of new business formation on economic development to become evident (Audretsch and Fritsch, 2002; van Stel and Storey, 2004). This paper investigates the time lag structure of these effects using data for West Germany.

## 2. Possible effects of new business formation on regional growth

The effects of new businesses on economic development can be of direct and of rather indirect nature (figure 1). One type of contribution that start-ups make to economic development is given by their size and growth, which may be labeled the *direct effect*. This direct effect of new businesses stood in the centre of the debate initiated by David Birch's study of "The Job Generation Process" (Birch, 1979). Two types of *exits* may result from the entry of new capacities. First, some of the new businesses will probably fail to be sufficiently competitive and thus have to leave the market after some time. Second, incumbents may be forced to decline or exit by their new competitors (crowding out). Further effects that are more indirect in nature result from intensified competition due to entry and pertain to the supply-side of the market. There are four main kinds of such *indirect supply-side effects* of new businesses. First, actual and potential market entries *secure efficiency* by contesting established market positions (Baumol, Panzar and Willig, 1988). Second, the crowding out of incumbents by new rivals ("creative destruction") may *accelerate structural change*. Third, entry can lead to amplified innovation if newcomers supply new products or apply new production methods or spur innovation activity in incumbent firms. Fourth, innovative entry may lead to a *greater variety* of products and problem solutions that may stimulate intensified

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<sup>1</sup> Financial support from the German Science Foundation (grant FR 242/7-1) is gratefully acknowledged.

division of labor as well as follow-up innovation. All these supply-side effects of new business formation may result in significant *improvements of the competitiveness* of an economy, industry, or region, and thereby *stimulate economic growth*.

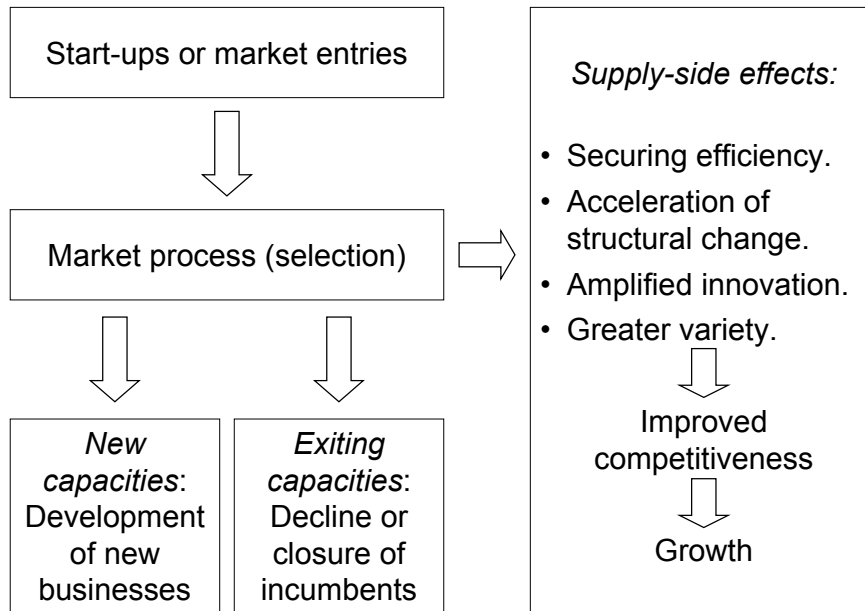


Figure 1: Entry, exit and the market process

While the direct impact of new business formation on employment, namely the setting-up of new capacities, is positive by definition, the net effect of employment in new capacities minus employment in exiting capacities may well be negative. At a given market volume, such a negative net effect of entry on employment can be expected if market selection is in accordance with a “survival of the fittest” scenario that results in increased labor productivity. If overall demand remains constant and the market mechanism forces the relatively inefficient firms to exit, an increase of employment due to the entry of new businesses can only be expected from the supply-side effects. The magnitude of these supply-side effects should depend on the quality of the newcomers as well as on the efficiency of market selection. Quality of newcomers in this context means their competitiveness and thus the challenge that they pose for the incumbents. The efficiency of the market process with regard to the effects of entries may be judged by the speed and the reliability by which it discriminates between the better and the inferior solution resulting in a

“survival of the fittest” scenario. In the case that the market selection process favors an inferior alternative, then no competitiveness-increasing supply-side effects will emerge.

Considerable time may be required for the different effects to emerge. Therefore, an analysis of the impact of new business formation on development should account for start-ups of former time periods.

### **3. The development of entry cohorts**

Our data on new business formation and regional employment is from the establishment file of the German Social Insurance Statistics (see Fritsch and Brixy, 2004, for a description). This database provides information about all establishments that have at least one employee who is subject to obligatory social insurance. Start-ups consisting of only the owner are not included.<sup>2</sup> Currently, the information on West Germany is available on a yearly basis for a time period of 20 years, from 1983 to 2002.

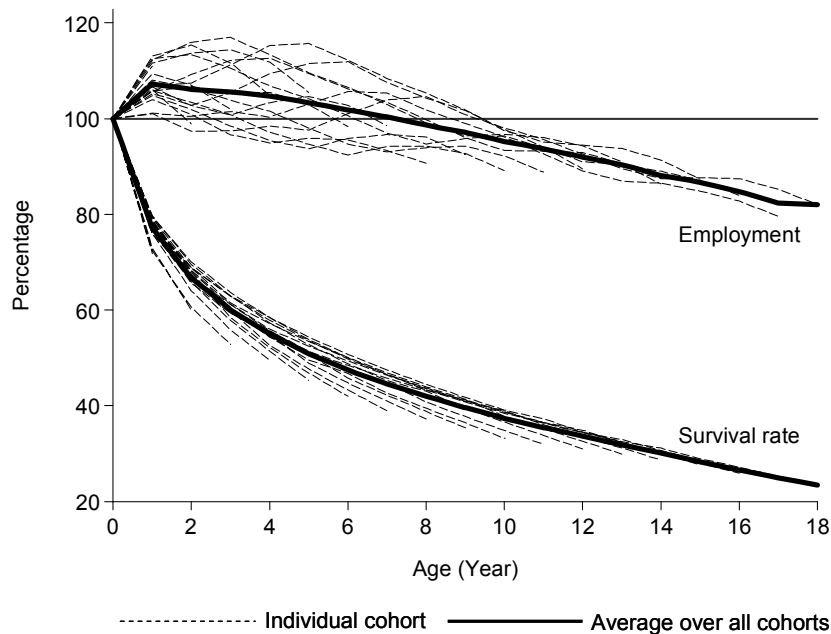
The development of entry cohorts represents the direct employment effect of new businesses. It is the result of two processes, survival and growth (figure 2). To analyze the development of entry-cohorts, we calculated an index as the annual employment proportional to the initial employment (= 100 percent) of each entry-cohort. The survival rate gives the share of businesses which were established at a certain time and survived the respective observation period. Figure 2 shows the evolution of employment and the survival rates in the different entry cohorts for all private sector industries. Dotted thin lines represent the individual cohorts and the thicker line gives the average value over all cohorts for which information for the respective year exists. Despite the variation between individual cohorts, a quite clear trend for average employment and survival rates can be identified. Employment in entry cohorts

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<sup>2</sup> We exclude new establishments with more than 20 employees in the first year of their existence; as a result, a considerable number of new subsidiaries of large firms are not counted as start-ups. The share of new establishments in the data with more than 20 employees in the first year is rather small (about 2.5 percent). Applying a definition without a size-limit does not lead to any significant changes of the results.



first grows above the initial level, but after having reached a peak, employment declines and falls below the initial number after about eight years. After 18 years cohort employment is slightly above 80 percent of this initial level. According to the average survival rate only a bit more than 50 percent of the new businesses still exist after five years. At the end of our observation period more than 75 percent of the new businesses had been closed down.



*Figure 2: The evolution of employment and survival rates in entry cohorts*

The development of employment in entry cohorts makes clear that the direct employment effect of new business formation is strongest in the year that follows the start-up. From the second year on this direct employment effect is abating. However, the direct employment effects of the annual cohorts accumulate over the years. In 2002, the final year of our analysis, the employment share of businesses founded in the 18 preceding years account for about 25 percent (see Fritsch and Weyh, 2004, for details).

#### **4. The employment effect of new business formation over time**

The development of entry cohorts does not include indirect effects of new business formation such as the crowding out of incumbents and the

improvements on the supply-side. In order to assess the overall impact on regional development, we estimate models that relate start-up rates to regional employment change. However, based on this approach we will only be able to detect that part of the indirect effects which occurs in the respective region and not their impact on other regions. This results in an underestimation of the indirect effects whereas the extent remains unclear.

Our dependent variable is regional employment change calculated over a two year period and measured as a percentage. We included the yearly start-up rates at the beginning of the inspected employment change period (current year) and for the ten preceding years. The start-up rate is calculated as the number of new businesses over size of workforce in the respective region (labor market approach). We apply panel estimation techniques that allow us to account for unobserved region-specific factors. We find that start-up rates of successive years are highly correlated so that the inclusion of start-up rates for preceding periods into the model leads to pronounced multicollinearity. Due to the observed high correlation of start-up rates the regression coefficient for a certain year may not necessarily reflect the impact of start-up activity in only this specific year but in other years as well. To cope with this multicollinearity we applied Almon polynomial lags for estimating the time lag structure (Greene, 2003). This procedure leads to a considerably clearer picture of the lag-structure but the basic pattern is quite similar to what we get without employing the Almon method (figure 3). Other variables for regional characteristics that may have been relevant for employment change, such as population density, did not prove to have any statistically significant effect and were therefore omitted.<sup>3</sup> To account for spatial autocorrelation we included an average of the residuals in the adjacent regions, which could be an indication of unobserved influences that affect larger geographical entities than district and that are not entirely reflected in the explanatory variables (cf. Anselin 1988).

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<sup>3</sup> See Fritsch and Mueller (2004) for separate regressions for high-density agglomerations, moderately congested regions and rural areas.

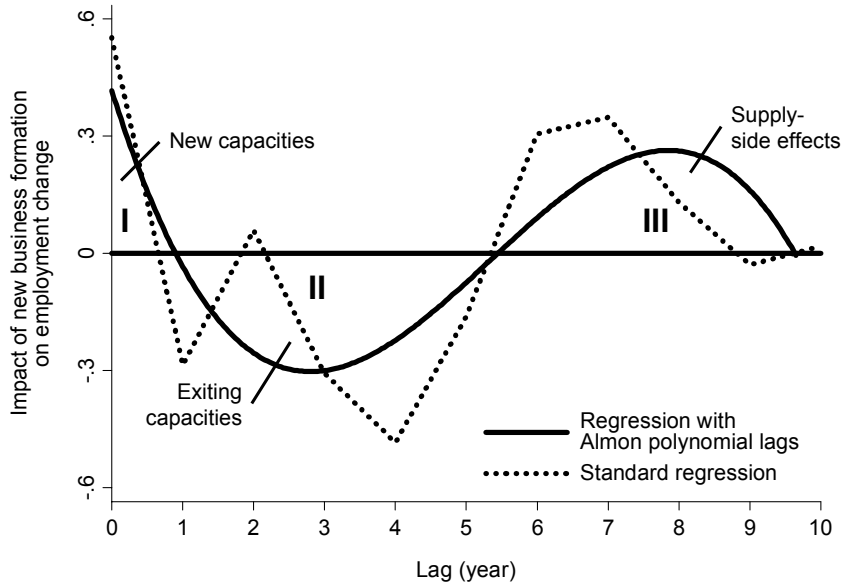


Figure 3: Direct and indirect effects of new firm formation on employment change over time

The pattern we found for the lag distribution of the impact of new business formation on regional employment suggests a certain time sequence of the different effects.<sup>4</sup> The positive employment impact for start-ups in the current year can be understood as the additional jobs that are created in the newly founded businesses at the time of inception. This direct employment effect is given by area I in figure 3. Since employment in entry cohorts tends to be stagnant or declining from the second or the third year on (section 3), new business formation activity in the years  $t-1$ ,  $t-2$  and in earlier years should not lead to any additional direct employment effect in future years. Moreover, we may assume that the negative impact that the start-ups of the years  $t-1$  to  $t-5$  have on employment (area II in figure 3) results from exiting capacities, i.e. new businesses that fail to be competitive and from the crowding-out of incumbents. The positive impact of new business formation for the years  $t-6$  to  $t-10$  on employment is probably due to a dominance of indirect supply-side effects, i.e. increased competitiveness of the regional suppliers resulting from market selection (area III in figure 3). After about nine or ten years the impact

of new business formation on regional employment has faded away and no significant impact of earlier start-up rates can be found.

If our interpretation of the lag structure is correct, the pattern implies that the employment gain due to indirect supply-side effects of new business formation is much larger than the initial employment created in the newly founded businesses, i.e. the direct employment effect. One indication for this conjecture is that, according to the estimated coefficients, area III in figure 3 representing the indirect supply-side effect is always larger than area I which indicates the initial employment effect. This becomes particularly clear if the supply-side effects are compared to the net effect of new capacities and exiting capacities that is given by area I minus area II. Because we cannot account for those parts of the supply-side effects that occur in other regions or industries, this type of impact is probably underestimated here. But if the true supply-side effects are considerably larger than what we have estimated, this supports our conclusion that this type of effect is the most important result of new business formation for economic development.

## **5. Final discussion**

Our results and interpretations clearly suggest the indirect supply-side effects of entries are far more important than the amount of jobs that are directly created in the new businesses. An analysis of the employment effects of new business formation that mainly focuses on the development of the entrants is therefore inadequate. It is not necessary that the new businesses survive and exhibit strong growth in order for these supply-side effects to occur. The critical point in this respect is that improvements are made, whether on the side of the newcomers or on the side of the incumbents. Therefore, even those start-ups that fail to survive competition may make an important contribution. Our results

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<sup>4</sup> The results of the full models are displayed in table A1 in the Appendix. Results in figure 3 are based on a third-order polynomial that led to the most significant and plausible results. For a discussion of results with other types of polynomial see Fritsch and Mueller (2004).

imply that the evolution of indirect supply-side effects of new business formation takes some time. Therefore, the net-employment effect over the first six or seven years may well be negative. New businesses do lead to more employment – but in the longer run.

Obviously, the quality of market selection is of crucial importance for the emergence of the supply-side effects of new business formation that are likely to result in improved competitiveness and employment growth. Policy should therefore safeguard the quality of this selection process and avoid everything that could disturb the survival of the fittest scenario. This means, for example, that failure of new businesses and market exits should be understood as necessary elements of market selection and that policy should abstain from subsidizing firms in order to prevent them leaving the market. Moreover, stimulating and supporting entries should not result in unfair competition that jeopardizes the liability of market selection.

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## Appendix

*Table 1: The impact of lagged start-up rates on regional employment change*

	Two year regional employment change (percentage)	
	Standard regression	Almon method assuming a polynomial of 3 <sup>rd</sup> order
Constant	-1.28** (3.13)	-1.19** (2.95)
Start-up rate current year	0.55** (6.65)	0.42
Start-up rate year t-1	-0.29** (5.12)	-0.03
Start-up rate year t-2	0.06 (0.78)	-0.25
Start-up rate year t-3	-0.31** (4.07)	-0.30
Start-up rate year t-4	-0.48** (6.60)	-0.22
Start-up rate year t-5	-0.16* (2.28)	-0.07
Start-up rate year t-6	0.31** (3.95)	0.09
Start-up rate year t-7	0.35** (4.73)	0.22
Start-up rate year t-8	0.13* (1.93)	0.26
Start-up rate year t-9	-0.03 (0.40)	0.16
Start-up rate year t-10	0.02 (0.26)	-0.13
Spatial autocorrelation (residuals in adjacent regions)	0.48** (8.01)	0.52** (9.68)
R <sup>2</sup>	0.16	0.16
F value	32.41	53.21
Number of observations (No. of obs. per district)	2,608 (8)	2,608 (8)

*Notes: Robust Huber-White estimates; t-values in parentheses, \*\* statistically significant at the 1% level; \* statistically significant at the 5% level.*

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