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Testing Gibrat's Law for European Multinational Enterprises

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Abstract

This paper investigates the link between firm size and growth for European multinational enterprises based on the AMADEUS firm-level database. Using data for about 20,000 firms for the period 2000 2004, we find that firm size has a significant negative impact on firm growth of the multinational enterprises. This holds when growth and its level are measured in terms of employment or turnover. Estimates for seven broad industry groups reveal that the negative relationship can be observed in all industries with higher effects in business services and in the investment goods industry. Furthermore we find that the average year of foundation of the foreign affiliates has a positive impact on the growth of the parent companies.

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Das Wichtigste in Kürze

Seit dem Jahr 2002 hat Österreich seine traditionell defizitäre Direktinvestitionsbilanz gemessen an den Beständen ausgleichen können. Der damit verbundene rasante Anstieg des ausländischen Direktinvestitionsbestands hat das Interesse an der Performance und den Charakteristika österreichischen multinationalen Unternehmen geweckt. In der vorliegenden empirischen Studie werden die Determinanten des Umsatz- und Beschäftigungswachstums von über 20.000 Europäischen multinationalen Unternehmen für den Zeitraum 2000 - 2004 untersucht (davon ca. 400 österreichischen multinationalen Unternehmen).

Deskriptive Ergebnisse zeigen, dass die österreichischen multinationalen Unternehmen -gemessen am Median - mit einer Mitarbeiterzahl von 115 etwas größer sind als der Durchschnitt der europäischen Unternehmen mit 81 Mitarbeiter. Am größten sind die multinationalen Unternehmen in der Schweiz, Großbritannien und den Niederlanden. Zudem ist die Umsatzwachstumsrate der österreichischen multinationalen Unternehmen (Medianwachstum 4,3%) höher als im Durchschnitt der westeuropäischen Länder. Am schnellsten wachsen die multinationalen Unternehmen in Irland, Griechenland, Spanien und Finnland. Dagegen sind sie am langsamsten in der Schweiz gewachsen. Ein weiteres Charakteristikum österreichischer Unternehmen ist das junge Durchschnittsalter der ausländischen Töchter. Der Median des Gründungsjahrs der Töchter liegt im Durchschnitt bei 1994, während in der gesamten Stichprobe das Durchschnittsjahr bei 1990 liegt. Nur in Irland, Griechenland und Norwegen sind die Töchter ähnlich jung.

Hauptergebnis der empirischen Analyse auf Basis von 20.000 Firmenbeobachtungen ist, dass kleine bzw. mittelgroße multinationale Unternehmen schneller wachsen als große multinationale Unternehmen. Dies gilt sowohl für die Beziehung zwischen Umsatzwachstum und der Höhe des Umsatzes zu Beginn des Betrachtungszeitraums, als auch für die Beziehung zwischen Beschäftigungswachstum und der Beschäftigung zu Beginn der Periode. Das Wachstum hängt auch signifikant vom durchschnittlichen Gründungsjahr der Tochterunternehmen ab. Je früher die Töchter gegründet wurden desto höher das Wachstum der Mutter. Dieser Zusammenhang gilt auch für die österreichischen multinationalen Unternehmen.

Abstract

This paper investigates the link between firm size and growth for European multinational enterprises based on the AMADEUS firm-level database. Using data for about 20,000 firms for the period 2000 - 2004, we find that firm size has a significant negative impact on firm growth of the multinational enterprises. This holds when growth and its level are measured in terms of employment or turnover. Estimates for seven broad industry groups reveal that the negative relationship can be observed in all industries with higher effects in business services and in the investment goods industry. Furthermore we find that the average year of foundation of the foreign affiliates has a positive impact on the growth of the parent companies.

1. Introduction

The main aim of this paper is to investigate empirically the relationship between firm size and growth for European multinational enterprises. Another aim is to analyze whether the growth of multinational enterprises differs across countries and industries. There are numerous studies on the empirical relationship between firm size and firm growth (see the surveys by Sutton, 1997; Geroski, 1999 and Lotti et al., 2003). The majority of the studies find a negative relationship between firm size and growth implying that Gibrat's Law is not confirmed. This holds for both, new-born or established firms. For instance, studies using data for U.S manufacturing firms find a robust negative relationship between size and growth (see Hall, 1987; Bottazzi and Secchi, 2003; Evans, 1987a, 1987b). Analyses for European firms find similar evidence (see for a survey Coad, 2007; Hart and Oulton, 1996 for the UK). However, Geroski and Gugler (2004) find that Gibrat's Law tends to hold for a sample of large European firms with a minimum of 100 employees. Overall, the negative dependence of growth on size as a "statistical regularity" is referred by Sutton (1997). Only few studies find that growth is independent from its firm size.

Overall, the number of studies focusing on multinational enterprises is limited. An exception is study by Oberhofer and Pfaffermayr (2008), who find that the initial size has a negative impact on the employment growth rate of multinational enterprises. Furthermore, few studies are available using data for specific sectors. For instance, Variyan and Kraybill (1992) find a significantly negative relationship between size and growth rate. In contrast, using data for small-scale Dutch services firms, Audretsch et al. (2004) find no significant relationship.

In this paper, we re-investigate the relationship between size and growth in terms of employment and turnover for European multinational enterprises (MNE). MNE are defined as enterprises having an affiliate in at least one foreign country. Furthermore, we provide separate regression results for seven broad industry groups.

The study is organized as follows. In section 2, we introduce the empirical model and the description of the data follows in section 3. The empirical results are presented in part 4. Section 5 concludes.

2. Empirical model

As stated before, we analyze the relationship between growth and firm size. Following Geroski (1999) the empirical model can be described as follows

$$\Delta S_i = \beta \ln S_i + \alpha AGE_i + v_i ,$$

where i denotes the firm. S denotes the size of the multinational enterprise measured by turnover or employment for the year 2000. Δ is the difference operator and refers to the average annual change of the variables between 2000 and 2004. v_i is the error term that is assumed to be mutually independent and normally distributed. ß is the speed of convergence. If firm growth is independent of size, then β takes the zero value. If ß is significantly negative, then we conclude that smaller firms grow faster than their larger counterparts and the law of Gibrat (1931) can be rejected. Since firm growth decreases with firm age according to Jovanovic (1982), we include average year of foundation of the foreign affiliates as a additional explanatory variable. All regressions include industry and country dummy variables.

In order to test whether the slope parameter differs between industries, we provide separate regressions for the seven industries (i.e. mining & energy, consumer manufacturing, intermediate manufacturing, investment manufacturing, distributive trade, transport & financial intermediation and business services; see Table 5 in appendix for the classification of the industries). In general, the specification in long differences can be estimated by OLS. However, in order to control for extreme observations influencing the mean, we apply the robust regression technique, which is an iterative, weighted least-squares procedure that puts less weight on outliers.

3. Data and descriptive statistics

The firm level data on EU multinationals and its affiliates used in the paper is derived from the "AMADEUS" database of company accounts which is provided by the Bureau Van Dijk. AMADEUS covers only European firms and thus limits the information on European affiliates of the multinationals. The database has also been used by Cuyvers et al. (2005) and Konings and Murphy (2006) for a panel of European firms to analyze a similar question. In contrast to these papers we add to the AMADEUS based data, company data from the Bureau Van Dijk's "BANKSCOPE" database. This second data source includes balance sheet and income and loss statements of EU banks, that are not included in the AMADEUS database.

From these two databases we extracted data for all EU companies holding a minimum share of 10 percent in a foreign (European) subsidiary. On the basis of information on the parent-affiliate ownership structure all foreign affiliates were identified and linked to the data of the parent company. For the sample of selected parent companies we extracted data on the number of employees, the turnover, the cost of employees, the 4-digit NACE industries. Unfortunately, we found only limited coverage of the relevant variables for the years 1996 to 1999 and also 2005, so that in the empirical analysis we had to stick to the period 2000 - 2004.

Our data set includes 15 OECD-countries: Austria, Belgium, Switzerland, Germany, Spain, Finland, France, United Kingdom, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Sweden.

Table 1 shows summary statistics for the median average annual change in the multinational corporation's employment, turnover in current prices between 2000 and 2004 and the level of employment and turnover for the year 2000. In addition, we calculate the median year of foundation of the foreign affiliates. This table also contains a breakdown by country. Table 2 shows the summary statistics by industry. As expected, the median growth rate of turnover of the multinational enterprises is the highest in Ireland of about 8.3 per cent per year between 2000 and 2004, followed by Greece, Spain and Finland. The growth rate of turnover of Austrian multinational enterprises is 4.3 percent and slightly above the European average of 3.8 percent per year. At the low end we find Switzerland, Great Britain and Germany with turnover growth rates of 2 percent and less.

Table 1: Descriptive statistics by country

	Median average annual percent. growth in turnover 2000 - 2004	Median average turnover in 2000 (1,000 €)	Median average annual percent. growth in employm. 2000 - 2004	Median average employment in 2000	Median year of foundation of foreign affiliates
Austria	4.3	29,360	0.0	115	1994
Belgium	2.9	10,413	0.0	37	1988
Switzerland	1.4	129,842	0.2	370	1981
Germany	2.0	31,400	0.0	135	1989
Spain	6.2	8,446	1.9	50	1991
Finland	4.7	16,358	1.5	85	1992
France	3.6	15,113	1.1	82	1988
United Kingdom	1.9	56,992	1.6	258	1990
Greece	8.0	9,742	0.0	70	1997
Ireland	8.3	41,042	0.0	60	1995
Italy	3.9	25,196	0.4	99	1988
Netherlands	3.2	74,934	0.5	205	1986
Norway	4.2	4,289	0.0	25	1995
Portugal	2.4	18,307	-1.9	193	1992
Sweden	3.8	6,055	0.8	28	1989
Total sample	3.8	17,360	0.5	81	1990

Source: Own calculations based on AMADEUS. Number of observations is 23,500 for turnover and 20,000 for employ-ment.

Table 2: Descriptive statistics by industry

	Median average annual percent. growth in turnover 2000 – 2004	Median average turnover in 2000 (1,000 €)	Median average annual percent. growth in employm. 2000 - 2004	Median average employment in 2000	Median year of foundation of foreign affiliates
Mining & energy	5.6	25,423	0.4	122	1990
Consumer manufacturing	2.2	29,533	0.0	117	1988
Intermediate manufacturing	2.7	33,634	0.0	150	1989
Investment manufacturing	3.1	29,641	0.0	170	1989
Distributive trade	3.7	24,388	1.4	54	1989
Transp. & financial intermed.	5.4	11,769	1.6	40	1990
Business services	4.1	7,901	0.4	35	1990

Source: Own calculations based on AMADEUS.

A slightly different pattern can be observed when performance is measured by employment growth. In this case Spanish multinational enterprises have the highest growth rate, followed by British and Finish multinational cooperations. The median average firm size of the multinational enterprises is 81 when measured by the number of employees and € 17 mn when measured as turnover. The median size of multinational firms, in terms of employment, is the highest in Switzerland, followed by Netherlands, and Great Britain. A roughly similar pattern can be observed

when the size of multinational enterprises is measured by turnover. The firm size of Austrian multinational companies is slightly above the average of Western European multinationals.

4. Empirical results

Table 3 and 4 summarize the estimation results of the link between size of multinational firms and their growth. While Table 3 shows the estimation results when growth and size are measured in terms of turnover, Table 4 presents the results for the relationship between employment growth and its initial level. All regressions are performed using the robust regression technique that gives less weight on observations with large residuals.

For the total sample we find that firm size measured by the logarithm of turnover in 2000 has a significant and negative impact on the growth rate of turnover between 2000 and 2004. This indicates that the growth rate is decreasing with the size of multinational enterprises and implies the rejection of Gibrat's law. The average year of foundation of the foreign affiliates is significantly positively related to firm growth. This is consistent with the theoretical predictions of Jovanovic's (1982) model of firm growth implying that firm growth decreases with firm age. In our case it suggests that multinational enterprises with younger foreign affiliates grow faster. Regarding industry affiliation, Wald-tests indicate that industry effects are jointly significant at the 1 percent level. In particular, we find that the growth rate of turnover is highest in the transport and banking & insurance sector as well as in the other production sector. Evidence for country dummy variables show that the growth rate is significantly higher for multinational enterprises in Greece and Spain than that of the reference country France. Austrian multinational enterprises also show a higher growth rate (+1.1 percentage points compared to the reference country).

Table 3: Robust regression estimates of the determinants of turnover growth

	(i)			(ii)			(iii)		
	Coeff.		t	Coeff.		t	Coeff.		t
log turnover in 2000				-0.004	***	-11.55	-0.004	***	-10.95
Aver. year of foundation of foreign affil.							0.698	***	7.70
Country dummy variables (ref France):									
Austria	0.012	*	1.84	0.013	**	2.04	0.011	*	1.75
Belgium	-0.006	*	-1.87	-0.010	***	-2.78	-0.010	***	-2.86
Switzerland	-0.026	***	-3.75	-0.017	**	-2.37	-0.014	*	-1.91
Germany	-0.010	***	-3.46	-0.008	***	-2.72	-0.007	**	-2.47
Spain	0.026	***	10.09	0.023	***	8.73	0.023	***	8.52
Finland	0.012	**	2.07	0.012	**	2.01	0.011	*	1.85
United Kingdom	-0.020	***	-6.09	-0.014	***	-4.19	-0.013	***	-4.00
Greece	0.037	***	5.90	0.035	***	5.46	0.031	***	4.76
Ireland	0.016		1.17	0.021		1.53	0.020		1.48
Italy	0.013	***	4.62	0.013	***	4.56	0.010	***	3.03
The Netherlands	-0.002		-0.49	0.004		0.81	0.005		1.05
Norway	-0.001		-0.12	-0.005		-1.02	-0.008		-1.63
Portugal	-0.005		-0.74	-0.005		-0.73	-0.007		-0.96
Sweden	0.003		0.73	-0.001		-0.28	-0.001		-0.22
Industry dummy variables (ref consumer manufacturing):									
Mining & energy	0.037	***	9.77	0.036	***	9.53	0.034	***	8.75
Intermediate manufacturing	0.008	**	2.18	0.008		2.28	0.008		2.13
Investment manufacturing	0.011	***	2.92	0.010	***	2.78	0.010	***	2.64
Distributive trade	0.018	***	5.32	0.017	***	5.13	0.016	***	4.82
Transport & financial intermediation	0.028	***	8.33	0.023	***	6.95	0.022	***	6.51
Business services	0.022	***	6.57	0.017	***	4.79	0.015	***	4.23
Constant	0.017	***	4.97	0.063	***	12.18	-5.239	***	-7.61
Number of observations	23,488			23,488			22,714		

Notes: Estimates are obtained using the robust regression method. ***, ** and * denote significance at the 1 percent, 5 percent and 10 percent level.

The estimation results for the size-growth relationship in terms of employment are quite similar. Again we find a significantly negative relationship between growth and its initial level. The coefficient on the initial level of log employment is -0.005 and quite similar to the coefficient on the initial level of log turnover. For the sample of Austrian multinational enterprises, we also find that year of foundation has a positive impact of growth, whereas the initial level has a negative sign. However, the coefficients are not significant in all cases (see Table 6 in appendix).

When the sample is split between seven broad industry groups we find that the initial level of turnover has a significantly negative impact on growth in five out of seven industries (see Table 7 and Table 8 in appendix). For the employment growth equation, there is a robust negative and

significant coefficient in all cases. This negative effect was more pronounced in investment goods manufacturing industry and in business services.

Table 4: Robust regression estimates of the determinants of employment growth

	(i)			(ii)			(iii)		
	Coeff.		t	Coeff.		t	Coeff.		t
log employment in 2000				-0.005	***	-13.77	-0.005	***	-14.46
Aver. year of found. of the foreign affil.				0.666	***	9.24			
Country dummy variables (ref France):									
Austria	-0.007		-1.30	-0.008		-1.34	-0.006		-1.02
Belgium	-0.004		-1.38	-0.008	***	-2.99	-0.008	***	-2.93
Switzerland	-0.003		-0.65	0.008		1.62	0.005		1.06
Germany	-0.011	***	-4.83	-0.009	***	-3.67	-0.010	***	-4.04
Spain	0.010	***	4.89	0.007	***	3.36	0.008	***	3.55
Finland	0.004		0.83	0.003		0.60	0.004		0.72
United Kingdom	0.002		0.69	0.008	***	3.24	0.008	***	3.04
Greece	-0.010	*	-1.94	-0.015	***	-2.97	-0.012	**	-2.36
Ireland	-0.018	*	-1.76	-0.020	**	-2.07	-0.019	*	-1.93
Italy	-0.006	**	-2.52	-0.009	***	-3.70	-0.007	***	-2.91
Netherlands	-0.005		-1.44	0.001		0.16	-0.001		-0.27
Norway	-0.001		-0.15	-0.009	**	-2.06	-0.006		-1.46
Portugal	-0.039	***	-3.76	-0.037	***	-3.60	-0.033	***	-3.22
Sweden	-0.001		-0.28	-0.005	*	-1.65	-0.005	*	-1.82
Industry dummy variables (ref consumer manufacturing):									
Mining & energy	0.015	***	5.02	0.013	***	4.49	0.014	***	4.89
Intermediate manufacturing	0.006	**	2.15	0.006	**	2.09	0.007	***	2.39
Investment manufacturing	0.006	**	2.14	0.007	**	2.32	0.007	***	2.54
Distributive trade	0.022	***	8.53	0.018	***	6.74	0.019	***	7.25
Transport & financial intermediation	0.024	***	9.27	0.018	***	6.76	0.019	***	7.30
Business services	0.018	***	6.86	0.012	***	4.23	0.013	***	4.81
Constant	-0.001		-0.50	-5.033	***	-9.20	0.024	***	7.66
Number of observations	20,762			20,762			20,026		

Notes: Estimates are obtained using the robust regression method. ***, ** and * denote significance at the 1 percent, 5 percent and 10 percent level.

5. Conclusions

This paper has examined the link between firm size and growth for multinational firms based on the AMADEUS firm-level database. Using data for about 20,000 firms we find that firm size has a significant negative impact on firm growth. This holds when growth and its level are measured in terms of employment or turnover. Estimates for seven broad industry groups reveals that the negative relationship can be observed in all industries with higher effects in business services and in the investment goods industry. This means that Gibrat's law can be rejected. Furthermore we find that the average year of foundation of the foreign affiliates has a positive impact on the growth of multinational enterprises.

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7. Appendix

Table 5: Classification of industries

Other production	10	Mining of coal and lignite; extraction of peat
Other production	11	Extraction of crude petroleum and natural gas and services
Other production	12	Mining of uranium and thorium ores
Other production	13	Mining of metal ores
Other production	14	Other mining and quarrying
Consumer manufacturing	15	Food products and beverages
Consumer manufacturing	16	Tobacco products
Consumer manufacturing	17	Textiles
Consumer manufacturing	18	Wearing Apparel, Dressing And Dying Of Fur
Consumer manufacturing	19	Leather, leather products and footwear
Intermediate manufacturing	20	Wood and products of wood and cork
Intermediate manufacturing	21	Pulp, paper and paper products
Intermediate manufacturing	23	Coke, refined petroleum products and nuclear fuel
Intermediate manufacturing	24	Pharmaceuticals
Intermediate manufacturing	25	Rubber and plastics products
Intermediate manufacturing	26	Other non-metallic mineral products
Intermediate manufacturing	27	Basic metals
Investment manufacturing	28	Fabricated metal products
Investment manufacturing	29	MACHINERY, NEC
Investment manufacturing	30	Office, accounting and computing machinery
Investment manufacturing	31	Electrical machinery and apparatus nec
Investment manufacturing	32	Electronic valves and tubes, telecommunication equipment
Investment manufacturing	33	Scientific instruments
Investment manufacturing	34	Motor vehicles, trailers and semi-trailers
Investment manufacturing	35	Other transport equipment
Consumer manufacturing	36	Manufacturing nec
Consumer manufacturing	37	Recycling
Other production	40	Energy supply
Construction	F	CONSTRUCTION
Distributive trade	50	Sale, maintenance, repair of motor vehicles and motorcycles
Distributive trade	51	Wholesale trade and commission trade
Distributive trade	52	Retail trade, repair of household goods
Distributive trade	H	HOTELS AND RESTAURANTS
Transport	60	Inland transport
Transport	61	Water transport
Transport	62	Air transport
Transport	63	Supp. and auxiliary transp. activities; activities of travel agencies
Communications	64	POST AND TELECOMMUNICATIONS
Financial intermediation	65	Financial intermediation, except insurance and pension funding
Financial intermediation	66	Insurance, pension funding, except compulsory social security
Financial intermediation	67	Activities related to financial intermediation
Real estate and business activities	70	Real estate activities
Real estate and business activities	71	Renting of machinery and equipment
Real estate and business activities	72	Computer and related activities
Real estate and business activities	73	Research and development
Real estate and business activities	74	business activities

Table 6: Robust regression estimates of the determinants of turnover and employment growth (subsample Austria)

	Dependent variable: average annual percent. change in turnover 2000 -2004				Dependent variable: average annual percent. change in empl. 2000 - 2004			
	Coeff.		t		Coeff.	[f]	t	
log turnover in 2000	-0.004		-1.21	log employment in 2000	-0.004	**	-2.24	
Aver. year of found. of foreign affil.	1.440	**	1.91	Aver. year of found. of foreign affil.	0.316		0.72	
Mining & energy	0.029		1.06	Mining & energy	0.019		1.05	
Intermediate manufacturing	0.039		1.51	Intermediate manufacturing	0.045	**	2.50	
Investment manufacturing	0.067	**	2.53	Investment manufacturing	0.039	**	2.07	
Distributive trade	0.021		0.87	Distributive trade	0.032	**	1.90	
Transp. & financial intermed.	0.052	**	2.05	Transp. & financial intermed.	0.039	**	2.30	
Business services	0.026		0.97	Business services	0.014		0.80	
Constant	-10.891	*	-1.90	Constant	-2.404		-0.72	
Number of observations	392			Number of observations	257			

Notes: Estimates are obtained using the robust regression method. ***, ** and * denote significance at the 1 percent, 5 percent and 10 percent level.

Table 7: Determinants of turnover growth between 2000 and 2004

	Mining & energy			Consumer manufacturing			Intermediate manufacturing			Investment manufacturing			Distributive trade			Transp. & financial intermed.			Business services		
	Coef.		t	Coef.		t	Coef.		t	Coef.		t	Coef.		t	Coef.		t	Coef.		t
log turn. 2000	0.000		-0.33	-0.001		-1.03	-0.005	***	-4.91	-0.006	***	-5.71	-0.003	***	-3.57	-0.006	***	-5.63	-0.018		-12.50
yr. foun.	1.131	***	4.28	0.665	**	2.52	0.383	**	2.14	0.767	***	4.02	0.541	***	2.91	0.673	***	2.59	1.128	***	2.71
AT	-0.009		-0.49	-0.020		-1.04	0.029	**	2.52	0.050	***	3.44	-0.007		-0.72	0.033		1.45	0.024		0.78
BE	-0.028	**	-2.15	-0.004		-0.40	0.005		0.77	-0.012		-1.25	-0.012	*	-1.82	-0.026	**	-2.57	0.000		0.03
CH	-0.009		-0.42	-0.024		-0.94	0.013		0.78	-0.012		-0.63	-0.008		-0.43	-0.037		-1.35	0.049	**	2.52
DE	-0.014		-1.49	-0.021	**	-2.29	-0.009		-1.51	0.014	**	2.10	-0.019	***	-3.34	-0.004		-0.34	0.019		1.65
ES	0.027	***	3.30	0.007		1.02	0.019	***	3.48	0.022	***	3.23	0.014	***	2.72	0.035	***	4.44	0.045	***	4.25
FI	-0.014		-0.71	0.035	**	2.09	0.015		1.38	0.040	***	3.60	-0.005		-0.40	-0.017		-0.94	0.021		0.67
GB	-0.014		-1.34	0.009		0.82	-0.028		-4.10	-0.023	***	-2.76	-0.015	**	-2.03	-0.007		-0.72	0.052	***	3.92
GR	0.027	*	1.74	0.017		0.99	0.035	***	3.16	0.063	***	3.48	0.043	***	3.89	0.028		1.08	-0.132	***	-4.23
IE	-0.010		-0.20	0.093	**	2.10	0.017		0.61	-0.195	***	-3.68	0.011		0.36	0.016		0.40	0.068		1.61
IT	0.026	***	2.63	-0.025	***	-3.30	0.015	**	2.51	0.009		1.47	0.005		0.81	0.028	**	2.34	0.059	***	3.26
NLI	-0.007		-0.56	-0.002		-0.17	0.011		1.12	-0.011		-1.00	-0.005		-0.68	0.031	**	2.06	0.064	***	2.48
NO	-0.016		-1.02	0.004		0.28	0.018	*	1.66	0.000		0.00	-0.004		-0.30	-0.024	**	-2.07	-0.014		-0.56
PT	0.041	**	2.35	-0.038	*	-1.81	-0.005		-0.38	-0.001		-0.06	-0.050	***	-2.88	0.008		0.31	-0.053	*	-1.95
SE	0.029	*	1.95	0.006		0.46	0.000		-0.03	0.015	*	1.80	-0.014	**	-2.24	0.000		-0.02	-0.008		-0.73
Const.	-8.530	***	-4.25	-5.007	**	-2.50	-2.837	**	-2.08	-5.738	***	-3.96	-4.039	***	-2.86	-5.015	**	-2.54	-8.391	***	-2.66
# of obs	2,120			1,695			2,807			2,642			4,427			4,823			4,200		

Notes: Estimates are obtained using the robust regression method. ***, ** and * denote significance at the 1 percent, 5 percent and 10 percent level.

Table 8: Determinants of employment growth between 2000 and 2004

	Mining & energy			Consumer manufacturing			Intermediate manufacturing			Investment manufacturing			Distributive trade			Transp. & financial interm.			Business services		
	Coef.		t	Coef.		t	Coef.		t	Coef.		t	Coef.		t	Coef.		t	Coef.		t
log em. 2000	-0.007	***	-6.70	-0.005	***	-3.91	-0.009	***	-10.30	-0.010	***	-10.03	-0.004	***	-4.67	-0.003	***	-3.86	-0.006	***	-5.44
yr. foun.	0.565	***	2.77	0.342		1.64	0.364	**	2.44	0.633	***	3.73	0.704	***	4.19	0.881	***	5.03	0.528	*	1.82
at	-0.030	**	-1.89	-0.035		-1.58	0.014		1.17	0.018		1.22	-0.016		-1.51	-0.003		-0.18	-0.023		-1.04
be	-0.026	***	-2.69	-0.016	**	-2.24	-0.004		-0.63	-0.005		-0.62	-0.010	*	-1.75	-0.023	**	-3.17	0.008		0.85
ch	-0.008		-0.53	-0.007		-0.43	0.011		1.00	0.006		0.55	0.006		0.44	-0.008		-0.41	0.022	*	1.81
de	-0.036	***	-4.73	-0.009		-1.25	-0.007		-1.47	0.010	*	1.82	-0.017	***	-3.35	-0.012	*	-1.72	0.002		0.29
es	0.002		0.30	-0.007		-1.13	-0.001		-0.17	0.007		1.24	0.011	**	2.33	0.003		0.55	0.021	***	2.78
fi	-0.016		-0.98	-0.003		-0.22	0.011		1.22	0.022	**	2.52	-0.015		-1.42	-0.004		-0.32	0.021		0.96
gb	0.025	***	3.08	0.005		0.65	-0.006		-1.01	-0.007		-1.05	0.006		0.90	0.009		1.43	0.032	***	3.77
gr	-0.023	*	-1.88	-0.010		-0.76	-0.009		-0.97	-0.007		-0.52	-0.023	**	-2.36	-0.031	*	-1.73	-0.017		-0.77
ie	-0.030		-1.02	-0.085	****	-2.77	-0.013		-0.68	-0.021		-0.86	-0.024		-1.10	-0.024		-0.81	-0.011		-0.35
it	-0.028	***	-3.58	-0.022	***	-3.60	-0.010	**	-2.06	-0.007		-1.45	0.000		0.08	-0.006		-0.77	-0.002		-0.19
nl	0.001		0.06	-0.014		-1.57	0.015	**	2.04	0.002		0.30	-0.006		-0.95	-0.003		-0.41	0.014		0.95
no	-0.040	***	-3.29	-0.029	**	-2.33	-0.008		-0.86	0.005		0.46	-0.007		-0.62	-0.004		-0.49	0.000		-0.02
pt	-0.040	*	-1.71	-0.158	***	-3.99	-0.012		-0.77	-0.025		-0.77	0.026		0.52	-0.062	*	-1.68	-0.066	**	-2.33
se	0.004		0.38	-0.006		-0.61	-0.012	*	-1.91	0.001		0.20	-0.006		-1.04	-0.015	*	-1.95	0.002		0.29
Const.	-4.231	***	-2.73	-2.566		-1.62	-2.714	**	-2.39	-4.754	***	-3.69	-5.310	***	-4.16	-6.652	***	-5.00	-3.974	*	-1.81
# of obs	1903			1563			2656			2557			4018			3835			3494		

Notes: Estimates are obtained using the robust regression method. ***, ** and * denote significance at the 1 percent, 5 percent and 10 percent level.