

Soft Budget Constraints in Polish Manufacturing. Evidence from Panel Data.

draft version

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Abstract

The authors examined a soft budget constrain (SBC) theory using Polish manufacturing panel data. In the research panel of more than 10 000 enterprises covering the period 1998-2002 have been used. Authors validated the hypotheses of existence of SBC in Poland. It turned out that SBC in polish manufacturing are decreasing in subsequent periods, thus the time trend had the strongest influence on the dependent variable. The size of the enterprise and form of ownership proved to be the main economic explanatory variables. Moreover Herfindhall indexes and outstanding debt ratio were also statistically significant. The results showed importance of increasing competitive pressure and of continuing privatization and deregulation reforms in Polish economy.

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Introduction

Budget constraints are one of the fundamental notions in economics. When making their decisions, individuals, households, enterprises and institutions alike are subject to such constraints. The existence of budget constraints means that a person who makes economic decisions has to balance costs with income to ensure the maintenance of liquidity and the generation of profits. In the event of running a loss on economic operations, entrepreneurs must make decisions about covering it from equity or otherwise about restructuring or putting their businesses into receivership.

Such activities are necessitated and driven by a number of market disciplines that have their bases in the legal system, from corporate governance, the products market, the equity market, or others. Under certain economic conditions, however, the discipline system does not function fully effectively and the budget constraint is “softened” : that is, as it is felt by economic entities. It is seen in the continued operation of entities despite losses generated by them and with increasing liabilities towards other stakeholders within this group of entities. Incidence of fixed employment or its increase in this group of entities is also characteristic. The notion of a “soft” budget constraint was conceived in the process of describing and analysing the socialist (planned) economy offered by Kornai (1979). This phenomenon has also been recognised in free market economies, though its presence there is rather more restricted; it is, nonetheless, particularly visible in transition economies. Weakening of the budget constraints, among others, occurs through the channels of the lending system, the taxation system, state subsidies, and through a channel that restricts competition on the products market or may be due to a dysfunction of the regulatory discipline relating to the lack of sanctions for default on payments due. Research shows that weakening of budget constraints in the economy increases with the degree of the state’s involvement. The probability of its occurrence increases proportionately to state ownership of companies (industries) (Everaert and Hildebrandt, 2001). The Polish economy has shown symptoms of soft budget constraints (Neneman and Sowa, 2000). Budget constraints that affect the market economy are weakened (eroded) in Poland mainly due to arrears in state budgets, and rather less to public subsidies and “soft” bank credits. In certain industries of the Polish economy (mining, metalworking), outstanding liabilities, including over 60% owed to state budgets, have reached volumes totalling their annual revenues and thus dictate the way in which the current operations of those industries are conducted (Rogowski, 2002). On the basis of statistical aggregates, Neneman and Sowa (2000) have estimated the volume of “state subsidies” that had towards the end of the 90s been transferred through such channels into the economy, thus weakening budget constraints within individual sections and sectors of the Polish economy.

The volume of state subsidies increased in the period 1998-2002 from over PLN 6.7 bn in 1998 to more than PLN 10 bn in 2002. Direct subsidies accounted for less than 40% of the state aid, while a substantial part of it was provided in the form of various tax reliefs² and exemptions.

Table 1**Volume of state subsidies granted to entrepreneurs in 1998-2002**

Value of state aid³					
(in PLN m)					
	1998	1999	2000	2001	2002
Total	6,762.3	9,076.1	7,712.0	11,194.8	10,277.6
Of which direct expenditure (e.g. subsidies)	34.5%	34.9%	47.3%	25.8%	38.0%
Depletion of budget revenues (e.g. tax reliefs)	65.5%	65.1%	52.7%	74.2%	62.0%

In this paper we take up the challenge that has been put forward by Neneman and Sowa (2000:5) to review conditions for soft budget constraints at a firm level, which has so far been impossible due to no access to data, and the lack of a methodology (procedures) for such research.

Description of data used in the model

The panel data used in research has been constructed on the basis of data from GUS F-01 quarterly reports (Report on revenues, costs and financial performance and fixed asset investments). The research has employed annual data (4Q data) and data collated for years 1998 through 2002. Table 1 shows basic information on the volume of sets in F-01. Enterprises may be clearly identified in the database using a notional statistical number. Additionally, an individual company is characterised by the following variables:

- financial status,
- basic and detailed legal justification,
- organisational structure,
- symbol of the European Classification of Activities (NACE),
- basic and detailed form of ownership,
- section,

² Here understood as a tax collection waiver.

³ Data from *The Report about public aid for enterprises in Poland* by the Polish Office for Competition and Consumer Protection (UOKiK).

– voivodeship.

Each record in the database comprises over 100 fields with economic variables (revenues, costs, employment, etc.).

The panel data comprises 10 461 enterprises. These are enterprises the statistical number of which has been present in all years, which means that they have conducted their business operations uninterruptedly throughout the whole period of 5 years that has been reviewed. The disadvantage of such an approach is that it does not provide for a possibility to take into account newly established enterprises. It also eliminates companies that have gone into liquidation (that have ceased to exist in the period reviewed). It does, however, allow changes in the ownership and legal status of the enterprises and their financial performance to be observed.

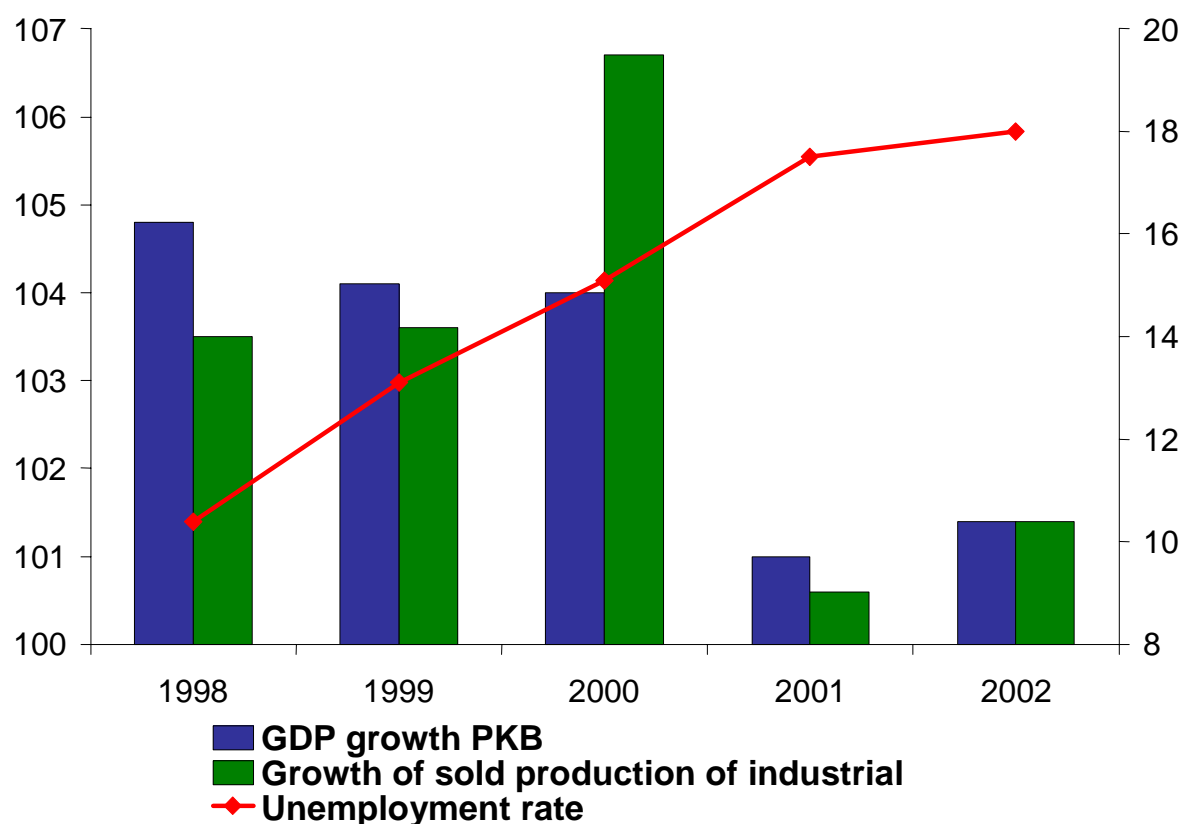
Due to the size of the statistical data, the constructed panel data on enterprises (Panel) provides for verification of economic hypotheses at the section level, and in certain cases within the division of the economy. The following divisions are most frequently represented in the entire sample and in the Panel: foods (15), construction (45), wholesale and retail trade (51, 52) (see: Tables 1, 2 in Appendix 1). These divisions also dominate in terms of the number of persons employed. Average employment in the Panel and within the entire sample is highest in mining – divisions (10), (13) aviation (62) and telecommunications (64), i.e. divisions that are dominated by natural monopolies (e.g. aviation). Despite over-representation of large enterprises, the so constructed Panel seems to be a representative sample and it seems a reasonable basis for examining the occurrence of soft budget constraints in the Polish economy.

The size and basic descriptive statistics for all data and for Panel are presented in Tables 3 and 4 (Appendix 1.). Its analysis leads to the following observations (conclusions):

- The population examined, like the entire sample, shows an annually decreasing number of large enterprises and enterprises with dominant state ownership. This is a very crucial observation since the occurrence of Soft Budget Constraints (SBC) is related to operations of large and/or state enterprises.
- In the subsequent years under review, the average size of an enterprise (measured by the number of employed) has been decreasing. The weakening economic outlook in 2000-2002, that had a particularly adverse impact on industry (see: Chart 1) forced enterprises to cut their staff and due to deterioration in their financial conditions contributed to the increase of average outstanding debts.

Chart 1.

Growth of sold production of industry and GDP and the unemployment rate in Poland
in 1998–2002.



- An overall decrease of employment in enterprises (by close to 25% as of 1998) is another characteristic feature perceived as a visible effect of the continued restructuring and a weakening outlook in the period under review.
- The weaker outlook is particularly seen in net sales that have remained more or less at the same level since 2000. In subsequent years, the number of loss-making enterprises has also been growing (by over 50% since 1998).
- Within the period under review, the growth of outstanding debts is higher than the growth of sale revenues. It may be indicative of the existence of soft budget constraints (enterprises may take out loans despite deterioration in their financial conditions).
- Average outstanding debts in individual divisions vary significantly, which is related to technological structures. An interesting phenomenon is observed when comparing the average employment in the Panel and across the entire sample. Actually, in all divisions in the Panel, employment is higher than in the entire sample. This may indicate that enterprises that employ more staff (bigger ones) stand higher chances of “surviving” in the next five years.

In view of the adopted definition of soft budget constraints, outstanding debts in the Panel of enterprises shall have to be subjected to a more detailed review (Table 5., Appendix 1.). Average outstanding debts taken by enterprises in the period under review grew from PLN 21,000 in 1998 to over 30,000 in 2002. The average size of outstanding debts grew, mainly in private enterprises, from over PLN 13,000 in 1998 to over PLN 25,000 in 2002, which may be related to the fast privatisation process (particularly in 1999-2000). Average outstanding debts incurred by state enterprises range from PLN 50 m to PLN 60 m in the period reviewed, but what it is even more important is that they are over two times higher than the debts incurred by private enterprises. The increase of outstanding debts in small and large enterprises alike displayed a similar pattern in the period under review with the over 59% of growth accounted for by small and 76% by large enterprises in the years 1999–2002. Division of enterprises into large and small businesses has been based on the employment-level criterion (small enterprises being classed as those employing less than 250 staff).

The concentration ratio in a specific section or division is another variable that may be of critical importance in case of SBC. The research has used the Herfindahl-Hirschman⁴ index. Pursuant to the economic theory, a division or whole sections of the economy that have a monopolistic (oligopoly) structure may use their position to take advantage of soft budget constraints. In the Panel, the H-H index, in the formula of $\sum \left(\frac{q_i}{q}\right)^2$

where:

q_i – sales of *i-th* enterprises,

$q = \sum q_i$ – sales of all enterprises in the section,

has been calculated for individual divisions. Differences in individual divisions are significant. As might be anticipated, within the divisions (see: Table 6., Appendix 1) production of foods (15), wholesale trade (51) they are very low (below 0.01), which indicates a low market concentration. Whereas divisions like metal ore mining (13), manufacturing of oil refinery products as well as water and air transport (61, 62) are characterised by a high market concentration index, which may increase the probability of SBC occurring.

In turn, the SBC analysis as proposed (and defined) might be destabilised by subsidies granted to enterprises. The increase of subsidies per unit of production sold can be observed in the period under review. In 2002, subsidies reached almost 0.1% of revenues from sales.

⁴ The H-H index measures market concentration. Its increase indicates a growing concentration within a section or division of the economy.

Equally important is also the fact of the rapid growth of subsidies to state enterprises up from 0.1% in 1999 to over 0.5% in 2002. It may significantly distort the research, since directly subsidised enterprises may thereby afford to abandon internal forms of financing. Interestingly, subsidies to small enterprises rapidly grew nearly tenfold in 1999-2002. Conversely, in enterprises employing over 250 staff the ratio of subsidies to net revenues from sales has been stable since 2000. This may be related to an overall trend to cut down average employment by enterprises, thus a part of “large” enterprises might be transferred to the “small” enterprises category. It should, however, be remembered that substantial amounts of subsidies are granted to enterprises (e.g. in the form of tax reliefs or exemptions) (see: Table 1) yet might not have been included in model, thus making the results incomplete and affecting the final conclusions.

In turn, the variable added value per employee, being an indicator of efficiency should contribute to weakening of the phenomenon of Soft Budget Constraints, since more efficient, “healthier” enterprises should no longer need such a form of assistance.

Research assumptions (hypothesis)

The objective of this research has been to estimate factors effecting development of soft budgeting in manufacturing companies. As the dependent variable in the model, modified Schaffer’s (1998) measure for net bank financing, was used. The authors defined it as the change in outstanding debt to the income from sale.

$$alldebt = \frac{Sbc_debt_t - Sbc_debt_{t-1}}{Sbc_rev_t};$$

where:

Sbc_debt – outstanding debt in enterprises,

Sbc_rev – net income from sale in enterprises

Dummy variables *Soft* was defined as follows:

Soft=1 when *alldebt*>10 and *sbc_los*>0.

Soft=0 in the rest of the cases

where:

Sbc_los – net loss of enterprises.

Based on the Everaert and Hildebrandt [2001] and Schffer [1997] the authors tried to test the hypothesis that SBC are more likely to occur in big and/or state enterprises.

Firms with high level of employment (big ones) are more likely to receive SBC because of socio-political motives. The ‘State’ will help (or even rescue) such firms because it will not

accept the social consequences (unemployment). In the model there are several variables used which are proxies for size of the enterprises:

Sbc_emp – number of employees,

Sbc_rev – revenue from sale,

Sbc_smes – dummy variable which is equal to 1 for enterprise with less than 250 employees,

Sbc_add – value added per employ.

According to the authors view paternalism still exists in transition economy especially as regards to state owned enterprises. That is why in the model we use:

Sbc_state – dummy variable which is equal to 1 when enterprise is state owned.

If parameters coefficient with this variable is positive it means that probability of SBC in state owned enterprises is greater.

Soft budget constrains are more likely to occurs also in monopolistic sections of economy. In order to capture the influence of concentration effect we use Herfindal index (*Sbc_her*).

We also distinguish few sections of economy in order to check if some of them are more likely to receive SBC (variable *Division*).

In the model there are also dummy variables (*Year*) which indicate each year in the sample period. This way we can observe if probability of SBC changes during the time.

Detailed description of all the variables is included in Appendix 2.

Model description

The Binomial Probit Model has been used to analyse conditions of soft budgeting occurrence. In qualitative response (QR) models, the explanatory variable is discrete. As regards a specific case of binary models, the explanatory variable has been a dummy variable. The intended result of estimation is to determine the probability of explanatory variables' impact on a dichotomical explanatory variable. The Probit Model is based on a standard cumulative distribution function.

In response, the existence of the function in the following formula may be assumed $I_i = \alpha + \beta X_i$, where X_i is an observable, while I_i is a non-observable variable. In fact, Y_i is observable which assumes the value of 1 when $I_i > I^*$ and 0 otherwise. I^* is a threshold value of the utility index. Marking the standard cumulative distribution function as $F(z)$, where $F(z) = P(Z \leq z)$, we have

$$P_i = P(Y_i = 1) = P(I_i > I_i^*) = F(I_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{T_i} e^{-t^2/2} dt = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\alpha + \beta X_i} e^{-t^2/2} dt$$

where $t \sim N(0,1)$.

$$I_i = F^{-1}(I_i) = F^{-1}(P_i) = \alpha + \beta X_i$$

The total probability density function of the observed sample (likelihood function) has the formula:

$$L = \prod_{Y_i=0} F\left(\frac{-\alpha - \beta X_i}{\sigma}\right) \prod_{Y_i=1} \left[1 - f\left(\frac{-\alpha - \beta X_i}{\sigma}\right)\right]$$

Parameters α and β are estimated by maximising the L function. This is non-linear, which makes the application of MNK methodology impossible.

The Logit Model is similar to the Probit Model. It is, however, based on the logistic distribution function and is characterised by “thick tail areas”. The choice between using the Probit and Logit Models is arbitrary. As shown by Greene (1999), there are mathematical advantages for either of them. On theoretical grounds; however, it is difficult to decide which of them is better in a given application (Greene, 1999).

With their sign, estimated β coefficients show the direction of change in probability only. They are applied to determine the utility index I. The interpreted results of estimations with Probit Models are ultimate effects showing a percentage change in the probability of a random event stemming from the change of the explanatory variable by a unit. Ultimate effects are derived from rescaling of estimated β coefficients. In case of the Probit Model:

$$\frac{\partial P(Y_t = 1 | X_t)}{\partial X_{kt}} = \text{random component} \cdot \beta_k, \quad \text{where random component} = \phi(x' \beta)$$

of which, the ultimate effect $k = \beta_k \cdot \text{random component}$.

In the analysis of soft budgeting, the explanatory variable is *Soft* marker variable, where

$$Soft = \begin{cases} 1 & \text{when } sbc_alldebt \geq 10\% \text{ and } sbc_los > 0 \\ 0 & \text{otherwise} \end{cases}$$

Also, the *Soft1* variable was taken into consideration during the estimation process,

$$Soft1 = \begin{cases} 1 & \text{when } sbc_alldebt \geq 0 \text{ and } sbc_los > 0 \\ 0 & \text{otherwise} \end{cases}$$

however, the model with the *Soft* variable produced better results. The model quality was significantly improved after a dummy variable had been added for subsequent years

(variables *year2000*, *year2001*, and *year2002*). The input model did not contain the variable showing the size of the enterprise's debts. Thus, modification related to adding the *debt_rev* variable showing the level of outstanding debts to revenues.

Data are shown as the panel. Thus, the Probit Model taking account of the Panel structure has been estimated. These estimates, however, had much worse results than in the case of the model that did not take such a structure into account. The final model has the following formula:

$$\begin{aligned}
 P(\text{Soft} = 1) = & (\beta_1 + \beta_2 \text{sbc_her} + \beta_3 \text{sbc_emp} + \beta_4 \text{sbc_smes} + \beta_5 \text{sbc_state} + \\
 & + \beta_6 \text{sbc_exp} + \beta_7 \text{sbc_add} + \beta_8 \text{sbc_sub} + \beta_9 \text{debt_rev} + \beta_{10} \text{sbc_rev} + \beta_{11} \text{sbc_debt} + \\
 & + \beta_{12} \text{dzial10} + \beta_{13} \text{dzial11} + \beta_{14} \text{dzial15} + \beta_{15} \text{dzial27} + \beta_{16} \text{dzial40} + \beta_{17} \text{dzial50} + \\
 & + \beta_{18} \text{rok2000} + \beta_{19} \text{rok2001} + \beta_{20} \text{rok2002})
 \end{aligned}$$

Results of estimations have been shown in Tables 1 and 2 (in Appendix 2). The table presents both the parameter estimates and the ultimate effects arrived at as a result of rescaling the parameters with the random component. The model from Table 1 has been estimated on all sample of enterprises (52 305 observation). The model from Table 2 has been estimated on a restricted sample of manufacturing enterprises (from divisions 1-40) and does not include service companies. The model quality is quite high. The parameter convergence process has been performed in five iterations, which means the lack of collinearity in the model. The majority of variables are significant, and the degree of matching the model with empirical data R^2 does not give rise to reservations. The likelihood ratio (LR) test for significance of all parameters has rejected the hypothesis that all the direct parameters equate to zero.

Research results

The size of soft budgeting is most affected by the time trend (*year2000*, *year2001*, *year2002*), divisions of the economy (*division10*, *division11*, *division15*, *division27*, *division40*, *division50*), the ownership structure (*sbc_state*), and the volume (*sbc_smes*). In small companies (*sbc_smes=1*), the probability of soft budgeting increasing above the 10% level is lower by 2.4% than in case of large enterprises in the full model and by 1.1% in the restricted model. In case of the full model, state companies (*sbc_state=1*) display a probability higher by 3.8% than private companies and 7.7% higher in case of the restricted model. The impact of division 10 is insignificant in the full model, whereas in the restricted model companies from this division show a probability of soft budget constraints as much as 15.4% less than for other companies. In case of the full model, membership in division 15 increases the probability by 1.4%, while in case of manufacturing companies lowers it by 2.1%. Companies from division 27 show a higher

probability of soft budgeting increasing above the 10% level by 8.3% in the full model and by 5.1% in the restricted model. Companies from division 40 display a probability 3% higher than in the model for all companies and by 8.8% in the model for manufacturing companies. In division 50, the probability of soft budget constraints increasing above the 10% level is lower by 4.2%. Compared with 1999, the probability of increasing soft budget constraints above the 10% level has been growing year after year. A negative impact of year2000, year2001, and year2002 variables has been continuously smaller and stood at -6%, -4.4%, and -3.9%, respectively in the full model, and at -7.4%, -5.2%, and -5.2% in the restricted model. The Herfindal (*sbc_her*) market concentration index has much slighter an impact on soft budget constraints increasing above the 10% level. The increase of the Herfindal index by 1 (in the scale from 0 to 100) results in the increase of probability by approximately 0.16% in the full and restricted models. The impact of relative debts (*debt_rev*) and the added value (*sbc_add*) is significantly different in the two models. The increase of relative debts by 1% results in the increased probability of soft budget constraints growing above the 10% level by 0.000056% in the full model and by 0.0006% in the restricted model. An added value increase of 1 leads to a decrease of probability by 0.0028% in the full model and by 0.3% in the restricted model. The effect of exports, employment, the level of revenues and outstanding debts and subventions (in case of the restricted model only) is marginal, though statistically significant.

Summary (conclusions)

The authors managed to examine a soft budget constrain (SBC) theory using Polish manufacturing panel data. In the research panel of more than 10 000 enterprises covering the period 1998-2002 have been used. The Binomial Probit Model has been used to analyse conditions of soft budgeting occurrence. We used modified Schafer's (1998) measure for soft budget constrains variable. Authors validated the hypotheses of existence of SBC in Poland. It turned out that SBC in polish manufacturing are decreasing in subsequent periods, thus the time trend had the strongest influence on the dependent variable. The size of the enterprise and form of ownership proved to be the main economic explanatory variables. Moreover Herfindhall indexes and outstanding debt ratio were also statistically significant. Due to our findings occurred that large and/or state owned enterprises in concentrated sections are more likely to receive SBC. These results stressed importance of increasing competitive pressure and of continuing privatization and deregulation reforms in Polish economy.

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APPENDIX 1

Table 1.

Number of Enterprises and Employment in Individual Divisions (all data)

YEAR	Number of Enterprises					Employment				
Division	2002	2001	2000	1999	1998	2002	2001	2000	1999	1998
10	35	39	52	55	41	165,748	170,740	179,769	200,214	235,077
11	4	4	3	4	2	1,080	1,030	901	933	575
13	2	2	2	2	2	19,048	19,318	19,514	19,860	20,583
14	105	115	115	114	115	16,984	19,917	23,788	24,881	26,156
15	1,492	1,534	1,610	1,565	1,587	288,489	283,013	300,051	321,220	338,964
16	11	12	11	11	11	7,123	8,047	9,265	10,069	11,430
17	298	328	333	342	370	60,464	64,051	73,193	81,250	98,951
18	570	621	654	689	731	88,817	98,921	113,176	124,839	140,519
19	150	176	184	196	223	21,925	24,308	28,742	31,684	40,067
20	326	343	356	332	347	55,003	59,983	67,369	62,423	65,844
21	156	151	156	149	138	25,895	25,282	27,291	28,969	29,852
22	259	251	255	249	222	41,336	40,116	42,277	43,556	38,643
23	20	17	19	17	17	17,688	18,391	19,862	25,137	20,108
24	273	270	285	272	259	87,785	89,605	94,941	105,871	113,274
25	461	475	454	428	369	69,014	67,078	68,541	69,195	65,450
26	440	466	471	470	475	89,427	94,551	105,442	107,569	115,226
27	164	172	175	163	153	66,969	71,169	84,764	102,640	126,439
28	711	712	709	639	608	110,768	108,629	110,226	108,255	112,071
29	736	782	848	838	818	142,422	152,749	170,888	190,080	212,877
30	22	19	20	16	12	2,909	3,365	3,120	3,125	2,792
31	266	272	282	277	272	70,826	73,890	76,961	78,093	82,295
32	76	87	90	101	108	21,264	24,946	27,204	29,293	30,436
33	130	130	136	130	125	27,285	24,938	25,452	25,976	27,361
34	212	226	226	215	200	68,568	70,180	81,494	85,959	91,560
35	135	139	150	139	134	63,722	69,463	72,485	74,784	81,774
36	465	502	511	496	504	99,802	98,815	108,502	110,307	109,410
37	31	32	26	28	31	3,338	3,588	3,264	3,852	4,512
40	354	365	373	378	465	171,332	179,031	179,782	189,063	198,573
41	222	216	212	203	268	43,792	43,144	42,325	41,450	43,476
45	1,923	2,190	2,386	2,383	4,370	230,777	274,993	330,355	350,128	425,262
50	366	387	407	345	918	38,799	40,408	42,728	39,893	55,844
51	1,399	1,508	1,609	1,432	3,953	200,131	211,080	224,855	204,573	282,196
52	1,121	1,170	1,243	1,268	2,973	214,609	202,183	204,330	201,971	245,587
55	183	185	186	186	357	43,733	45,208	46,323	43,353	48,414
60	505	540	532	526	932	238,080	243,870	285,176	284,510	339,997
61	14	11	11	16	22	2,281	2,353	3,725	4,527	5,663
62	3	3	4	4	5	4,462	4,974	5,359	5,215	4,482
63	181	198	204	204	389	42,004	44,242	44,018	43,237	50,842
64	47	43	47	48	75	165,802	181,595	181,447	185,251	187,425
65	NA	NA	NA	NA	62	NA	NA	NA	NA	90
66	NA	NA	NA	NA	1	NA	NA	NA	NA	0

67	NA	NA	NA	NA	36	NA	NA	NA	NA	0
70	538	550	548	536	1,035	71,049	74,526	75,809	75,311	91,546
71	21	18	17	18	37	2,781	2,608	2,821	2,692	3,341
72	136	136	115	92	212	19,780	17,823	16,177	13,504	15,580
73	10	10	238	238	299	988	847	51,500	53,679	630
74	742	734	696	640	1,220	191,586	190,147	178,348	144,241	150,369
80	34	31	23	18	55	2,660	3,444	2,141	1,699	1,127
85	185	159	102	96	532	24,956	35,760	17,817	17,229	12,823
90	200	194	203	205	313	23,515	31,196	24,448	24,531	27,805
91	5	5	3	2	3	434	467	304	260	89
92	70	68	75	112	285	18,400	18,497	20,447	26,793	38,052
93	52	59	62	67	111	9,104	9,392	12,640	20,230	23,182

Table 2.

Comparison of the Share in the Panel against the Total Enterprises

Year	Number of Enterprises					Employment					Average Employment				
	2002	2001	2000	1999	1998	2002	2001	2000	1999	1998	2002	2001	2000	1999	1998
10	60%	51%	38%	40%	54%	91%	91%	91%	88%	93%	152%	178%	236%	221%	173%
11	75%	75%	100%	75%	100%	89%	89%	100%	100%	100%	119%	119%	100%	133%	100%
13	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14	77%	71%	72%	72%	71%	83%	83%	87%	88%	89%	107%	116%	120%	122%	124%
15	66%	64%	61%	63%	61%	78%	80%	78%	77%	75%	118%	125%	128%	124%	123%
16	82%	75%	82%	82%	82%	98%	98%	98%	98%	98%	119%	130%	119%	120%	120%
17	72%	66%	66%	64%	59%	83%	84%	82%	79%	76%	115%	127%	125%	124%	128%
18	72%	66%	63%	60%	56%	79%	81%	80%	78%	76%	109%	122%	128%	132%	135%
19	71%	61%	58%	54%	48%	79%	79%	76%	73%	66%	112%	130%	130%	136%	139%
20	57%	53%	51%	54%	52%	71%	75%	74%	76%	74%	126%	140%	144%	140%	143%
21	65%	66%	63%	66%	70%	78%	83%	81%	80%	83%	120%	126%	129%	122%	119%
22	54%	56%	56%	56%	63%	68%	73%	73%	70%	77%	125%	130%	131%	125%	123%
23	60%	71%	68%	76%	76%	81%	84%	85%	88%	97%	135%	119%	124%	115%	127%
24	67%	68%	65%	69%	72%	87%	90%	91%	89%	90%	130%	132%	140%	129%	126%
25	57%	56%	57%	60%	69%	72%	75%	77%	79%	83%	125%	135%	135%	132%	121%
26	67%	63%	61%	62%	61%	80%	82%	82%	84%	81%	120%	131%	135%	137%	132%
27	66%	62%	60%	66%	71%	75%	84%	84%	88%	90%	113%	135%	140%	134%	127%
28	60%	58%	58%	63%	66%	70%	73%	76%	77%	77%	117%	125%	131%	122%	117%
29	70%	66%	61%	62%	64%	79%	81%	80%	79%	81%	114%	123%	131%	126%	127%
30	50%	58%	55%	69%	92%	42%	60%	86%	91%	98%	84%	103%	156%	132%	107%
31	71%	70%	69%	70%	71%	77%	79%	81%	83%	80%	108%	113%	117%	118%	113%
32	74%	66%	64%	59%	58%	75%	81%	78%	76%	78%	102%	124%	121%	128%	134%
33	63%	62%	60%	62%	63%	77%	75%	76%	75%	77%	122%	120%	126%	123%	122%

34	62%	58%	61%	62%	66%	73%	73%	79%	85%	91%	118%	125%	130%	138%	137%
35	65%	65%	61%	65%	69%	84%	78%	77%	88%	84%	129%	119%	127%	134%	123%
36	62%	58%	57%	59%	58%	73%	75%	75%	74%	74%	119%	130%	131%	126%	129%
37	55%	53%	62%	64%	58%	68%	71%	78%	79%	72%	124%	134%	127%	124%	125%
40	84%	81%	80%	79%	65%	87%	87%	92%	93%	92%	104%	108%	116%	118%	142%
41	83%	86%	85%	89%	67%	87%	90%	92%	96%	92%	104%	105%	109%	108%	137%
45	70%	62%	57%	57%	31%	78%	77%	75%	74%	63%	111%	124%	132%	129%	201%
50	56%	52%	51%	59%	22%	64%	65%	67%	74%	51%	114%	124%	133%	125%	231%
51	53%	50%	47%	54%	20%	69%	70%	70%	74%	50%	130%	141%	148%	138%	254%
52	79%	75%	70%	69%	29%	76%	79%	78%	80%	64%	96%	106%	113%	116%	216%
55	58%	58%	56%	56%	29%	78%	80%	76%	80%	73%	133%	137%	135%	142%	251%
60	70%	65%	65%	66%	38%	37%	38%	92%	93%	91%	54%	59%	142%	142%	241%
61	71%	73%	73%	50%	36%	88%	92%	94%	90%	88%	124%	126%	129%	179%	243%
62	100%	100%	100%	100%	60%	100%	100%	100%	100%	99%	100%	100%	100%	100%	164%
63	67%	65%	66%	66%	34%	81%	82%	85%	86%	74%	120%	127%	129%	131%	215%
64	57%	60%	53%	52%	35%	95%	96%	99%	99%	98%	165%	158%	186%	190%	282%
70	85%	82%	82%	83%	43%	87%	86%	88%	90%	76%	103%	105%	107%	108%	175%
71	43%	39%	41%	39%	22%	58%	59%	62%	70%	63%	136%	153%	152%	179%	292%
72	53%	51%	60%	75%	33%	63%	68%	73%	86%	64%	119%	132%	122%	115%	195%
74	57%	57%	59%	64%	34%	63%	67%	71%	79%	71%	111%	118%	120%	124%	211%
85	28%	31%	49%	52%	9%	42%	69%	63%	69%	100%	151%	219%	128%	132%	1064%
90	80%	82%	79%	78%	51%	78%	60%	80%	79%	72%	99%	73%	101%	101%	140%
92	76%	76%	71%	46%	18%	91%	93%	91%	68%	49%	120%	122%	128%	146%	266%
93	75%	68%	68%	70%	44%	86%	86%	86%	90%	85%	115%	127%	126%	128%	193%

Table 3.

Basic statistics (all data)

Year	2002	2001	2000	1999	1998
Number of enterprises	15,861	16,657	17,429	16,954	26,802
of which large ones (with more than 250 employees)	2,593	2,719	3,025	3,149	3,191
Enterprises with dominant state ownership	2,348	2,579	3,141	3,360	4,779
Average employment in total population	218	218	225	238	158
Average employment (in enterprises employing more than 250 employees)	843	847	834	846	827
Average net revenues from sales	58,400	54,073	51,392	45,685	29,388

Table 4.

Basic statistics (Panel)

Year	2002	2001	2000	1999	1998
Number of enterprises	10,461	10,461	10,461	10,461	10,461
of which large ones (with more than 250 employees)	2,096	2,260	2,502	2,615	2,710
Enterprises with dominant state ownership	1,892	1,961	2,032	2,070	2,094
Total employment	2,626,697	2,804,086	3,158,043	3,292,795	3,480,912
Employment growth (1998=100)	75%	81%	91%	95%	100%
Average employment	251	268	301	315	333
Average net revenues from sales	721,773,748	721,015,025	718,442,010	635,854,245	567,885,421
Growth of net revenues from sales (1998=100)	127%	127%	126%	112%	100%
Outstanding debts	316,645,041	310,619,830	298,622,482	262,519,975	219,921,538
Outstanding debts growth (1998=100)	144%	141%	136%	119%	100%

Table 5

Average outstanding debts detailed statistics

Variable	Year	1998	1999	2000	2001	2002
Average outstanding debts	Total	21,023 (211,201.69)	25,094 (222,785)	28,548 (261,092)	29,695 (269,473)	30,271 (275,220)
	State enterprises	51,303	55,416 (440,979)	61,135 (509,109)	50,344 (351,343)	53,968 (377,972)
	Number of enterprises	2,094	2,070	2,032	1,961	1,892
	Other	13,444	17,612 (116,777)	20,691 (147,719)	24,931 (246,536)	25,038 (246,553)
	Small enterprises (employment below 250)	6,445	8,350 (81,544)	9,291 (83,984)	9,627 (84,693)	10,225 (80,584)
	Number of enterprises	7,751	7,846	7,959	8,201	8,365
	Large enterprises	62,681	75,324 (418,655)	89,799 (507,647)	102,510 (550,822)	110,264 (586,705)

Table 6

H-H Indexes for individual divisions

Division	2002	2001	2000	1999	1998
10	0.079	0.081	0.075	0.074	0.088
11	0.645	0.670	0.783	0.661	0.904
13	0.935	0.931	0.928	0.920	0.923
14	0.024	0.021	0.028	0.026	0.028
15	0.004	0.004	0.003	0.003	0.003
16	0.201	0.202	0.193	0.196	0.214
17	0.030	0.030	0.024	0.016	0.012
18	0.013	0.012	0.011	0.010	0.009
19	0.018	0.015	0.014	0.014	0.012
20	0.034	0.033	0.028	0.024	0.023
21	0.063	0.080	0.075	0.068	0.079
22	0.021	0.023	0.023	0.022	0.021
23	0.490	0.423	0.409	0.405	0.347
24	0.022	0.021	0.021	0.021	0.022
25	0.017	0.016	0.019	0.020	0.024
26	0.009	0.010	0.009	0.009	0.009
27	0.062	0.055	0.057	0.054	0.067
28	0.009	0.008	0.007	0.011	0.009
29	0.011	0.010	0.009	0.011	0.010
30	0.163	0.168	0.243	0.250	0.356
31	0.036	0.032	0.035	0.035	0.027
32	0.165	0.147	0.136	0.123	0.136
33	0.041	0.076	0.074	0.089	0.090
34	0.067	0.061	0.070	0.097	0.129
35	0.054	0.059	0.084	0.087	0.094
36	0.018	0.014	0.013	0.010	0.012
37	0.095	0.079	0.094	0.080	0.080
40	0.052	0.056	0.057	0.057	0.060
41	0.027	0.025	0.026	0.028	0.027
45	0.006	0.004	0.003	0.003	0.002
50	0.023	0.024	0.018	0.017	0.009
51	0.006	0.006	0.006	0.008	0.005
52	0.017	0.016	0.012	0.009	0.004
55	0.061	0.060	0.064	0.078	0.064
60	0.076	0.115	0.204	0.229	0.221
61	0.360	0.383	0.381	0.305	0.243
62	0.840	0.862	0.840	0.864	0.932
63	0.026	0.026	0.027	0.028	0.020
64	0.236	0.278	0.308	0.319	0.331
65	NA	NA	NA	NA	0.076
66	NA	NA	NA	NA	1.000
67	NA	NA	NA	NA	0.192
70	0.010	0.009	0.010	0.011	0.006
71	0.198	0.443	0.340	0.224	0.195
72	0.038	0.039	0.046	0.043	0.030

73	0.207	0.281	0.014	0.012	0.010
74	0.008	0.008	0.009	0.011	0.009
80	0.051	0.057	0.080	0.100	0.044
85	0.017	0.018	0.023	0.026	0.006
90	0.012	0.011	0.013	0.015	0.014
91	0.342	0.271	0.592	0.581	0.525
92	0.144	0.156	0.149	0.157	0.132
93	0.044	0.036	0.031	0.039	0.028

APPENDIX 2

Table 1

Results of Probit Model Estimates – Model for All Divisions

Explanatory variable: *soft*

Explanatory variables	DF/dx	β
Debt_rev	0.00006***	0.000347***
Sbc_rev	-0.00000009***	-0.0000005***
Sbc_debt	0.00000008***	0.0000005***
Sbc_her	0.001679***	0.010313***
Sbc_emp	0.0000018***	0.00001***
Sbc_smes	-0.02419***	-0.14852***
Sbc_state	0.03878***	0.23812***
Sbc_exp	0.0000044***	0.00002***
Sbc_add	-0.000028***	-0.00017***
Sbc_sub	0.0000032	0.00002
Division10	0.01930	0.11849
Division11	-0.06143	-0.37720
Division15	0.01427***	0.08763***
Division27	0.08321***	0.51091***
Division40	-0.03024***	-0.18568***
Division50	-0.04247***	-0.26077***
Year2000	-0.06114***	-0.37538***
Year2001	-0.04435***	-0.27231***
Year2002	-0.03915***	-0.24037***
Constant	-0.17882***	-1.09792***

LR statistics = 1160.67 $\sim \chi^2$ (19)

Number of observations: 52 305

Parameters in bold (β) and ultimate effects (dF/dx) are statistically insignificant. Their significance level is shown by the following markings: *** for 1%, ** for 5%, and * for 10%.

Table 2

Results of Probit Model Estimates – Model for Manufacturing Divisions

Explanatory variable: *soft*

Explanatory variables	DF/dx	β
Debt_rev	0.000603***	0.00309***
Sbc_rev	-0.0000001***	-0.0000007***
Sbc_debt	0.0000001***	0.0000007***
Sbc_her	0.001737***	0.00890***
Sbc_emp	0.000012***	0.00006***
Sbc_smes	-0.010830**	-0.05551**
Sbc_state	0.077930***	0.39948***
Sbc_exp	0.000032***	0.00016***
Sbc_add	-0.000364***	-0.00186***
Sbc_sub	0.000021*	0.00011*
Division10	-0.15405***	-0.78970***
Division11	-0.08257	-0.42327
Division15	-0.02184***	-0.11200***
Division27	0.05183***	0.26573***
Division40	-0.08804***	-0.45135***
Year2000	-0.07485***	-0.38374***
Year2001	-0.05229***	-0.26808***
Year2002	-0.05366***	-0.27509***
Constant	-0.18371***	-0.94178***

LR statistics = 1119.04 $\sim \chi^2$ (18)

Number of observations: 26 033

Parameters in bold (β) and ultimate effects (dF/dx) are statistically insignificant. Their significance level is shown by the following markings: *** for 1%, ** for 5%, and * for 10%.

Table 3

Definition of used variables

Symbol	Description
<i>Soft</i>	Explanatory variable marker variable, where $Soft = \begin{cases} 1 & \text{when } sbc_alldebt \geq 10\% \text{ and } sbc_los > 0 \\ 0 & \text{otherwise} \end{cases}$
<i>Debt_rev</i>	outstanding debt per income from gross sale
<i>Sbc_rev</i>	income from gross sale
<i>Sbc_debt</i>	outstanding debt
<i>Sbc_her</i>	Herfindahl-Hirschman index
<i>Sbc_emp</i>	employment
<i>Sbc_smes</i>	dummy variables indicating small vs. large enterprises
<i>Sbc_state</i>	ownership (state vs. private)
<i>Sbc_exp</i>	Income from export sale per income from gross sale
<i>Sbc_add</i>	value added
<i>Sbc_sub</i>	subsidies
<i>Division...</i>	division of economy (NACE) code
<i>Year...</i>	dummy variable indicating year
<i>Constant</i>	constant