

POLISH SMALL FIRMS: STRUCTURE, EXPECTATIONS AND OPTIMISM

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Abstract

Two surveys of Polish small firms were carried out in Gdansk and Lublin in 1999. Four studies of these surveys, 2 descriptive and 2 statistical are summarised and analysed. This reveals the structure of the small firm sector, its expectations with respect to EU accession and its short term expansion plans. The typical nature of the small firm is described and the regional differences in small firms between Gdansk and Lublin are identified with Gdansk having the more developed private sector and a more advanced level of firm development. The statistical analysis of the questionnaires by two teams reveals a series of significant variables correlated with optimism vis-à-vis the impact of EU accession and also with intentions to expand output in the 1999-2001 period.

JEL classification: C22, C52, L00, P27

Key Words: Polish small firms; surveys, statistical analysis.

1. Introduction

The Polish government after 1989 introduced an unprecedented economic reform plan known as the Economic Transformation Program. This plan was designed to stabilise the economy, promote structural reforms and put the country on the right path to becoming a market economy. Poland benefited from the difficult but effective introduction of truly market-driven mechanisms into the economy and became the first country in the region to rebound from transformational recession and exceed GDP levels experienced before post-communist reforms. A moderate recovery during 1992-1994 was followed by robust growth (the fastest in Central Europe) during 1995-99 that was driven by a rapid expansion of the new private sector. Poland's GDP was 20 percent larger in 1999 than in 1989. Deceleration of the economy was experienced at the end of the decade. Seventy percent of the economy had been privatised, with some 3 million new small businesses created in the 1990s. Small firm policy has been an important plank of the reform process. The purpose of this paper is firstly to build a comprehensive picture of small firms in Poland, secondly to assess their optimism about accession to the EU as well as their intentions to expand output in the 1999-2001 period, and thirdly to examine the factors that are correlated with this optimism. The structure of this paper is as follows. After the introduction, Part 2 outlines the surveys that provided the data upon which the research was built and the four teams that investigated this data. Part 3 describes the general characteristic shared in common by many Polish small firms. Part 4 describes the regional differences that exist between Gdansk and Lublin. Part 5 summarises the statistical investigation by two teams of the data. Part 6 gives the results of this investigation and Part 7 concludes.

2. The surveys

Two sample surveys were carried out of small firms in Poland in the areas of Gdansk and Lublin in 1999. They were part of a research programme "An Empirical Study of Small and Medium Size Enterprises in Poland: Phase 11".¹ Small firms were defined as employing between 10 and 49 employees² and most of the NACE sectors categories (industry, trade, construction, transport and services) were included in the population. The first survey was carried out in Lublin in June 1999 and it sampled around 5% (135) of small enterprises in the region. This survey was examined by Blawat, Ossowski and Zieba (2001) - hereafter BOZ - who reported on the overall picture that emerged from examination of the data. The second and larger survey was carried out in the last quarter of 1999 and covered both regions of Gdansk and Lublin. This sampled around 5% of the small firm population in both areas. In the areas of Gdansk 239 firms were selected by a stratified sampling technique out of a population of 4706 firms. In Lublin 137 small firms were similarly sampled out of a population of 2740. This particular survey was examined

¹ These surveys were financed by the European commissions PHARE ACE PROGRAMME 1997, Contract Number p97-8123-R.

² The small firm definition (10-49 employees) is in accord with the EU and also with recent Polish legislation (1999 "Law on Economic Activity").

by three teams in total: firstly Szreder (2001) who examined the data for Gdansk and provided an overall description of small firms in this area; secondly Ghatak, Manolas, Rontos and Vavouras (2001) - hereafter GMRV- who statistically analysed the data for both regions using a dichotomous logit model; and finally Ghatak, Mulhern and Stewart -hereafter GMS – who analysed statistically the data for Gdansk alone using censored estimation techniques and OLS. The purpose of the BOZ and Szreder papers was to give an overall picture of small firms in both regions. They concentrated on the competitive advantages of small firms, employment and labour conditions, knowledge of EU markets, financial questions (credit and so forth) and factors determining the development of the small firm sector. The purpose of the statistical papers by GMVR and GMS was to test for the optimism of small firms in the light of possible EU accession for Poland as well as their optimism concerning expansion plans in the two years following the surveys. This present paper will synthesise the results of this work, present an overall view of the work of the four teams so that a wider readership can appreciate the state of small firms in Poland and analyse the variables that are associated with small firm optimism regarding the EU and immediate expansion prospects. This, of course, links in with the growing work that attempts to understand the reasons for the growth of small firms and their changing share of employment and production (Miller 1986, Acs & Audretsch 1989, Schwalbach 1990, Segenberger 1990, Carlsson 1991, Piore & Sabel 1994, Storey 1994, Thomadakis & Droucopoulos 1996, Trau 1997, Spilling 1998, Mulhern & Stewart 1999).

The questionnaires consisted of 58 general questions many of which had sub-sections. Considerable data was collected. Professional enumerators were employed to ensure maximum quality and minimum non-sampling error. The sampling technique used a proportionate stratification sampling method across the chosen sectors. Micro enterprises with less than 10 employees were not included since such data was not regarded as reliable.

The province of Lublin is in Southeast Poland and borders on the Ukraine and Belarus. Industrialisation is moderate and agriculture is dominant in the area. Gdansk is a far more industrialised region in Western Poland, closer to the EU and famous for its shipyards.

3. General Characteristics of Lublin and Gdansk Small firms

Naturally there are significant differences in small firm characteristics between the two areas. However there are also many similarities. In both areas the great majority of small firms are young and in the private sector. They are largely self financing and have low export penetration. In the three years leading up to 1999 they reported increasing profits and a slight increase in firm size. They were generally positive about joining the EU and about short to medium term growth. They generally assessed themselves as of medium technological capacity and were in broad agreement about the factors helping them achieve their growth potential.

On average throughout the two regions 94% of the sampled small firms belonged to the private sector. Most are sole enterprises and partnerships – frequently family based businesses. They depend very heavily on their own capital for investment. Bank loans are regarded as expensive and are generally avoided. In Gdansk 95% of firms said they financed their economic activity with revenue from sales, 26% included some bank credit in this financing, while only 1.7% had sources of finance in shares. These small firms mostly cater for the domestic market. Exports play a very minor role in their total sales. The few exports that have been established are mostly self-financed. It is not that exports are regarded as risky but rather that small firms complain of the difficulty in finding foreign partners, lack of specialists in the area and the need for more marketing - all factors that government could do something about. Most of the exports that exist in the Lublin area for example are agricultural products exported to nearby Ukraine. National presence for the small firms is low and around 70% of firms are orientated exclusively to their local market.

The great majority of small enterprises are typical start-up enterprises under ten years of age reflecting the post 1999 expansion. However the average length of life of these small firms has been increasing from 1996-1999. Gross profits had been increasing since 1997 and in Gdansk, for example, were 18% higher than in 1998 and 22% higher than 1999.

The average firm size was around 18 employees in both provinces and there has been a small increase in the average size of small firms in the three years 1997-1999. However this increase is largely accounted for by the increase in the medium size range of small firms (16-25 employees) rather than in the smaller range.

The majority of small firms do not operate with licensing, subcontracting or franchising arrangements. In Lublin for example most firms saw franchising as of little value. However as we shall see in the next section there is as rule greater participation in such activities in Gdansk.

In both regions firms were asked to assess their own technological level – they did not think it very low and most put it at medium. However many assessed as high the technological level of their products. It would seem difficult however to treat this assessment as nothing less than subjective.

On average 93% of firms in both regions reported little difficulty recruiting people with the right qualifications. Otherwise it was generally reported that experience is gained on the job rather than by special training schemes. Trade union membership in small Polish firms is very low.

In both provinces the majority of firms were positive in expectation about joining the EU (59% in Lublin and 70% in Gdansk). However, breaking up the Gdansk and Lublin samples into branches of economic activity reveals striking differences in their expectations of the impact of EU accession. Table 1 reveals the breakdown.

Branch	Negative	Positive	Total
Manufacturing	38	32	70
Construction	18	23	41
Trade	56	83	139
Hotels-Restaurants	0	12	12
Communication	5	21	26
Financial intermediation	1	9	10
Other services	5	44	49
Total	123	224	347

At one end of the spectrum hotels and restaurants are unreservedly optimistic about EU entrance while manufacturing is on balance pessimistic.

Few firms (on average 18%) had taken any action in preparation for EU membership.³ There was little fear of capital mobility after accession and in general foreign competition was not anticipated as a problem. This is probably because many small firms in services, transport and construction for example, are operating principally in the local economy. Most enterprise managers believe that the quality, variety and modernity of their products, relatively low costs and prices and good reputation will allow them to expand in an enlarged EU. Managers seem to be rather over-confident about their knowledge of the market and the expenditure on human capital [i.e. staff development and training] is quite low. However, the majority of managers expect a positive impact of the Polish accession to the EU due to higher demand, production and employment. Both regions had positive expectations of growth within the following two years and there was substantial unanimity between the two provinces on the main factors helping them achieve this goal. These were (averaging for the two provinces):

- a. high quality of employees (66%)
- b. good knowledge of market (73%)
- c. promotion and marketing (16%)
- d. new technologies (17%)

It is of interest and concern that good management in the survey was not as highly valued as the above factors. Szreder reports...

³ There is nothing unusual about this. For example an international survey carried out on UK SMEs in 1993 commented.."The majority of small businesses in the UK remain unprepared for the single Market, believing they will not be affected. They continue to display a complacent attitude to the potentially more competitive trading environment" (Pera International 1993).

“It seems interesting that less than 5% of respondents (in the Gdansk region) regard high qualifications of managers as a key factor in reaching company’s development objectives. Respondents undervalue the role of professional management and good decision making in the firm’s activity and development” (Szreder 2001 p85)

There was substantial agreement about the help wanted from government. This included lower taxes, lower interest rates and protectionism. The latter was especially ironic given that it coexisted with general optimism about joining the EU.

4. Differences between Small Firms in Lublin and Gdansk.

There were significant differences between small firms in the two regions. In general Gdansk has the greater development of the small firm sector as well as greater expectation from the EU and future growth. This is evidenced by the level of the following variables: private sector development, international orientation, network arrangements, formal collaboration with other Polish firms, levels of R&D and innovation, external financial help and grants, the existence of restructuring arrangements, subcontracting, and intention to increase output.

Gdansk has the more developed private sector with more firms legally constituted as limited companies and partnerships rather than sole proprietors. Table 2 illustrates this.

	Sole proprietor	Partnership	Ltd Comp	State-owned	Joint stock	Other
Lublin	43%	27%	19%	4%	4%	2.2%
Gdansk	32%	30%	27%	2%	4%	3.5%

There are, of course, greater number of small firms in Gdansk than Lublin. However in the case of Gdansk a faster increase in the larger size firms in the range is reported compared to Lublin. Gdansk has more international orientation with more foreign capital and ownership. Five percent of Gdansk firms had a mixture of foreign capital while, 2% were established with entirely foreign capital. The presence of foreign capital in Lublin is a rarity. Like Lublin firms, the majority of small firms in Gdansk (75%) were set up on individual initiative but, unlike Lublin, 20% were a spin off or buy-out of the assets of another company. While only 2.5% of Gdansk small firms had any participation in foreign enterprises there was no report of such activity in the Lublin sample.

Network arrangements are generally low in both regions but significantly higher in Gdansk - Table 3 illustrates.

Table 3				
Participation in Network Arrangements				
	Co-owners of polish firms	Participation with foreign firms	Franchising	Sub contracting
Lublin	3%	0%	7%	5.2%
Gdansk	9%	2.5%	3%	38%

Sub contracting criterion – 50% of work to come from this activity.

Franchising – 45% of firms in both provinces had never heard of or considered using it.

Also there are substantial subcontracting arrangements in the Gdansk region where 38% of small firms are reported to have significant levels. In addition Gdansk had three times the Lublin level of co-ownership of other Polish firms.

Gdansk generally has a higher level of formal collaboration between firms or organisations than Lublin. Not surprisingly Gdansk firms also report such arrangements to be more useful. The exception to this was the high figure for Lublin firms being connected to consumer organisations.

Table 4				
Formal Collaboration between Firms				
	Suppliers	Research institutes	Consumer organisations	Collaboration found useful
Lublin	35%	7%	24%	62%
Gdansk	77%	13%	8%	97%

Research institutes include consulting firms.

As expected there was a significant difference in R&D and innovation between the two regions with Gdansk having more of both. In Lublin none of the sample had R&D departments employing 2 persons – however they did report 6% of their firms employing some labour in this capacity. Of the Lublin firms 19% compared with 21% of Gdansk firms had introduced major organisational changes in 1998-1999. In Gdansk on the other hand 6% had R&D departments (employing 2 persons on average). In Lublin only 1% of small firms get external financial help (e.g. grants) compared to the 7.5% figure of Gdansk. A similar gap between the two regions was observed in any recent restructuring arrangements with a far greater level being reported in Gdansk

Table 5					
Variables indicating Change in Small Firms: 1998-1999					
	R&D	Innovation	Grants	Major organisational change	Restructuring
Lublin	0%	30%	1%	19%	1.5%
Gdansk	6%	49%	7.5%	21%	7%

R&D – refers to employing two people in this department. Lublin although registering a figure of 0% did have 6% of its firms reporting some R&D research – employing one person at least part time in this capacity.

Innovation – refers to introduction of technological change in the final products or services.

Grants – refer to external financial help of any sort outside of bank loans.

Restructuring – refers also to mergers and takeovers.

Technological change was divided into two areas – new or improved products and new or improved methods of production. Significantly greater change was once again observed in the Gdansk region with respect to products or services (49% compared to Lublin’s 30%). However with respect to new technologies in the production processes both regions were nearly equal.

Table 6		
New or Improved Technologies 1998-1999		
	Products or services	Production processes
Lublin	30%	16%
Gdansk	49%	15%

Technology - refers to introduction of technological change in the producing of products/services or in their production.

Greater numbers of firm’s were investing in the Gdansk region in 1998-1999 than in Lublin. Only 31% of Lublin firms made some investment in 1999 while 60% of Gdansk firms invested. The reason for this is perhaps that the Gdansk firms have more profits from which to invest. While it is impossible to get profit figures from small firms in these surveys this can be induced from the following:

Table 7				
Sources of Financing Investment				
	Profits	Owner’s capital	Bank Loans	Leasing
Lublin	22%	16%	16%	0%
Gdansk	48%	29%	17%	14%

We can observe that the Gdansk firms are more than twice as likely to be investing from their own profits. This indicates that they both have enough profits from which to invest and that they have probably more confidence in the future. No leasing finances were reported in the Lublin region compared to a 14% contribution from this source towards investment in the Gdansk region. Both regions report a comparable low level of bank loan contribution towards their investment. It is not that bank loans are difficult to get but small firms complain of high interest rates. Excessive demands from the banks in terms of requirements and documentation are also complained about although to a far less extent.

Zero growth rates were expected by a significant number of firms in both regions (36% in Lublin compared to 29% in Gdansk). Moderate growth rates of between 0-5% were expected by 22% of Lublin’s small firms while only 13% of Gdansk’s population reported such expectation. In general higher growth was expected in the Gdansk region. A significant greater number expected higher growth rates in excess of 5% and 10%. The following table gives the breakdown of these figures.

Table 8		
Percentage of Firms Intending to Increase Output in 200-2001		
Intention to increase output by	Lublin	Gdansk
<0	1.4%	0%
0%	36%	29%
>5%	22%	13%
5-10%	25%	35%
>10%	15%	29%

In both Gdansk and Lublin only one firm in each sample said it would not continue in business in the following year.

In general the education of the workforce in the Gdansk region was at a higher level than that of Lublin. For example 20% of the Gdansk workforce was reported to have a university level education while only 12% of the Lublin workforce could claim this.

Table 9				
Comparative Educational level of workforce				
	Higher	Post-secondary	Secondary	Basic vocational
Lublin	12%	7%	48%	32%
Gdansk	20%	13%	29%	37%

Knowledge of EU markets was, as expected, at a low level. However surprisingly, greater knowledge was claimed in the Lublin area. Table 10 give the results.

Table 10			
State of Knowledge of EU Markets			
	High	Medium	Low
Lublin	21	63	16
Gdansk	18	62	20

Gdansk, with good reason, expects more from the EU than Lublin with respect 70% of Gdansk small firms compared to 58% of Lublin's having positive expectations. These expectations include increases in productivity and profitability of Polish enterprises as well as greater selling opportunities in EU markets. However on average 82% of firms in both regions had made no preparation for this. When asked in more detail to evaluate four dimensions of the impact of expected changes in Polish business regulations after accession, both regions broadly agreed that all of the following would positive impact on small firms:

- * Unification of regulations related to technical norms and standards.
- * Mutual recognition of business certificates.
- * Exclusion of custom duty documents.
- * More freedom of capital flows between countries.

5. The Statistical Investigation

Two statistical investigations were conducted on the available data from the two regions⁴. The first by the GMRV team analysed the data for both Gdansk and Lublin and tested for optimism about joining the EU. The second team, GMS tested for expectations for expansion in the two years following the survey in 1999. A combination from the following variables were chosen by each team for investigation. These were:

Variable code	Description
A	region of establishment
B	branch of economic activity
C	legal status
D	ownership of other national firms
E	ownership of other foreign firms
F	subcontracting activity
G	franchising activity
H	export activity
I	knowledge of EU markets
J	national presence
K	technological level of firm
L	technological level of products
M	use of internet
N	R&D by firm
O	fixed asset investment in 1999
P	increase in fixed assets in 1998-99
Q	number of employees in 1999
R	human capital in the firm – employee education where - % with higher education - % with post-secondary education - % with secondary (education. - % with primary education
S	policy on professional education
T	existence of trade unions in the firm
U	recruitment difficulties
V	difficulty of obtaining a bank loan
W	existence of a bank loan in 1988-99
X	either domestic or foreign firms as the major competitors
Y	level of demand
Z1	proportionate change in income from 1997 to 1998
Z2	estimated proportionate change in income from 1997 to 1999

The above variables were chosen from a list of 58 questions. The dependent variable was different for both teams. For GMRV it was optimism of small firms with respect to

⁴ The methodology and results are explained in the appendices.

accession to the EU. For GMS it was optimism regarding expansion within the next two years. These two independent variables are similar in some respects – one would expect some overlap in the responses. However they test for different things. Poland was not expected to join the EU in the two years following 1999 – the general expectations were for a date shortly after that. Accordingly GMS tests for the short to medium term economic expectations of small firms within a relatively known environment. GMVR tests for the medium to long term expectations of Polish small firms in the context of EU accession – an unknown event with political and institutional dimensions. Nevertheless they both test the optimism of small firms within different time horizons and given the range of questions they are revealing about the perception of small firms on the influences on future growth and integration to the EU. In this respect the research is valuable since it is not product of policy makers and government but comes directly from small firms themselves. It tells us what they value most in their efforts to achieve prosperity.

The choice of the above variables from the original list of 58 reflected the following expectations.

It was expected that *region* (Gdansk rather than Lublin), *legal status* (private rather than public), and *branch of activity* (tourism rather than manufacturing) would positively correlate with small firm optimism. Gdansk is closer to the EU and has a history of industrialisation, Private organisations had carried the dynamism of the growth of the 1990s and were expected to continue doing so. Tourism would benefit from greater freedom and economic interchange, whereas manufacture would be threatened by EU imports.

Variables D to J were all expected to have positive signs in the statistical analysis i.e. those small firms answering positively to possessing any of these characteristics were expected to be also optimistic about EU accession and expansion plans. We expected that any existing *international experience of the firm* would be positively correlated with expansion plans especially in the context of EU accession. In addition we expected that any small firms that had network arrangements as well as activity beyond their own local area (i.e. *national presence*) would be better placed to future growth. Consequently a number of questions (ownership of foreign firms, existing franchising arrangements, knowledge of EU markets and export activity) probe for this experience. Nugent (1996) and Mata (1993) both demonstrate the important role of exports in small enterprise share in manufacturing. Many of the more competitive firms in the manufacturing sector of developed economies also have experience in *sub-contracting arrangements*. The teams expected that those firms already with this experience would be more optimistic about expansion within the EU. It was also anticipated that firms *owning other national firms* would be better placed to exploit future growth and the EU markets by virtue of economies of scale and scope.

Variables K to T all represent supply side considerations, i.e. variables to some extent within the control of the individual firms and having a direct bearing on their productivity. These supply side factors such include:

Factor productivity - this is sometimes proxied ⁵ by the level *and recent increase of fixed assets* - one important factor in the measurement of productivity levels. We expect that those firms with higher levels of fixed assets and those with recent increases in this level would be more optimistic about expansion plans. Recent increases in *investment levels* are expected to positively influence future expansion plans. Investment is linked to innovation and productivity improvements. Acs and Audretsch (1989) have convincingly argued and shown evidence for this link in small firms. Variables O and P have therefore positive expected signs.

The *technological level* of the firm and its products as well as the existence of *R&D*. We expect that firms at higher technological levels would be more optimistic about expansion. However this needs to be tested empirically. It may be that firms at the lower end of the technological spectrum would be more optimistic about expansion since they do not envisage being in competition with foreign firms with superior technologies – they exist in local niche markets inaccessible to competition. The reverse might be the case for the more technologically advanced firms who might fear EU accession and the consequent competitive exposure. Accordingly we are somewhat open as to the signs on variables K, L and N - although the expectation is that they will be positive. It was expected that the *use of the internet* indicating an important aspect of information technologies would be associated with optimism of the small firm with respect to EU accession and the sign on this was expected to be positive.

The *size of the firm* - measured by the number of employees – may affect expansion plans. We expected that the larger of the small size firms would be more likely to expand in the light of EU accession. However this is a complex question and small firm investigators are naturally keen to ascertain which size levels of the small firm stratum are likely to grow or increase their share under particular conditions. Related to this question is whether the firm owns other national or foreign firms. Expectations were cautious though on balance the sign on this variable was positive.

The level of *human capital* is expected to influence a firm's growth prospects. Variable R on this is divided into four parts asking for the levels of education in the firm's workforce. The existence of the firm's policy on professional education is also asked. All expected signs on R and its sub-questions as well as on S are positive.

Labour market restrictions affect a firm's optimism about expansion. Consequently two of the variables, T and U reflect the existence of trade union activity in the firms and the difficulties of recruitment. Expected signs on these were negative.

⁵ We had no data on sales turnover in our questionnaire and therefore lacked a denominator for the calculation of labour productivity.

Credit conditions. Small firms, the world over, complain of the difficulty of obtaining credit. Consequently variables V and W ask small firms if bank loans are already in existence and the difficulty of obtaining such loans. Expected signs were positive on V and negative on W.

Direct influence upon future growth and optimism about EU accession such as the *level of demand*, as well as recent increases in *turnover* are all expected to be positive. Past growth is not sufficient to explain future expectations but it is a significant part of the equation. Expected signs on Y, Z1 and Z2 were positive.

6. Results

GMRV showed general optimism about accession to the EU within the Gdansk and Lublin areas: 61% of small firms were optimistic about accession, 35% were pessimistic while only 4% did not respond to this question. The results of the logit statistical analysis showed that this optimism was correlated with 6 variables from the questionnaire. These were:

the region of establishment: there were greater expectations by Gdansk rather than Lublin small firms of positive impact from EU accession.

branch of activity: it was the tourism sector (restaurants and hotels) that without reservation believed they would gain from accession. However most other sectors, on balance, also expected to gain. The exception to this was the manufacturing sector where, by a small margin, the majority of firms expected a negative impact.

ownership of other enterprises was strongly correlated with optimism concerning the EU probably because of a belief that economies of scale and scope would be highly beneficial in the a wider European market.

extent of internet use was believed by small firms to be important for reaping the benefits of the EU. This probably reflects the awareness of the need for some leap in communication technology in the face of enormously expanded market possibilities.

knowledge of EU markets was, unsurprisingly, related to optimism of the impact of the EU on small firms.

the difficulty of obtaining a bank loan reflects the belief that difficult credit conditions can be a major restriction on small firm expansion and the possibility of growing within the EU market.

The GMS team testing Lublin small firms for those variables that influenced optimism concerning economic growth in the two years following the survey showed cautious optimism for expansion possibilities. Their results indicated that the more efficient firms

and those with proven competitive advantage were optimistic about expansion. These were firms that would have already expanded significantly in the growth period of the 1990s and were confident they could outpace the deceleration in the later part of the decade. GMS's results showed the following variables to be determinants of Polish small firms' intentions to expand production:

the existing level of export activity - this indicated the belief by Lublin firms that firms already exporting were better placed to continue expansion in the immediate future.

the existing level of franchising activity was correlated with optimism concerning expansion possibilities and probably indicates the degree of modernisation and internationalisation achieved by a select number of firms and their optimism about continued expansion.

a recent increase in fixed assets is an indicator of investment for the future and clearly those firms who had invested were better prepared for and anticipated expansion in the short term.

the difficulty in obtaining a bank loan proved significant in the GMS analysis (also significant in the GMRV results) and further illustrates the extensiveness of this complaint.

the level of human capital proved significantly correlated with expansion plans and emphasises the importance of this variable for productivity and growth. In general the higher the level of human capital in the firm the greater its plans for expansion.

the technological level of a small firm's products was found to be positively related to expansion plans and illustrates the important connection between technological advancement, productivity and growth. Both Acs and Audretsch (1990) and Carlsson (1984) demonstrated the important link between small firm growth and technological improvement. This variable proved to be non-linear however indicating that at higher levels of technological product development there was less belief in expansion in the coming two years. This may indicate that firms at the lower end of the technological spectrum were less in danger of competition than those more developed. These less developed firms would probably be exclusively serving local niche markets. Such non-linearity may also reflect expectations of deceleration affecting the faster growth firms.

the estimated proportionate change in income from 1997 to 1999 - this variable is intuitively related to immediate growth prospects based on the simple expectation that past performance is significantly related to immediate short term future performance. This variable could also be used as a proxy for profits (the data for which is impossible to get in Poland from small firms). Profits are clearly related to investment plans and the capacity to invest. Again this variable proved to be non-linear perhaps indicating that the larger of the small firms, or those growing faster, were anticipating more competition than those who were smaller. However it may also have reflected rational expectations concerning the possibility of a downturn in the economy

The two teams produced a comparable set of results and the differences between them are accounted for largely by the types of questions they asked and the somewhat different nature of the dependent variable. For example taking GMVR's results and comparing them to those of GMS. Three variables proved significant in GMVR's statistical analysis which did not appear in the GMS results. These were: *branch of activity*, *region of establishment* and *use of internet*. This was because the GMS team did not test for these variables. Since the GMS team was looking only at the Lublin area they could not test for regional differences – something that could only be done by the GMVR study since it comprised two regions. The internet variable was tested for and proved significant only in the GMVR survey, whose dependent variable was *optimism about EU accession*, because it was considered vital to a future in which communication on a continental scale is clearly of such long run strategic value. It was not judged to be of such significance with respect to *short run growth prospects* – the focus of the GMS study. One variable naturally proving significant in the GMVR results – *knowledge of EU markets* – did not prove significant in the GMS results, although it was tested for. This is explained by the different dependent variable. In the case of GMVR's study there is an obvious connection between optimism about EU accession and knowledge about EU markets. However it would not necessarily influence the GMS variable – expected growth in the two years following the survey – to the same extent since Poland was not expected to have joined the EU within this time period. The variable *ownership of other enterprises* was reported significant in the GMVR study but not in the GMS study. This may be accounted for again by the different dependent variable. Ownership of other enterprises might well be more highly correlated with optimism about EU accession, a longer term question with institutional and political ramifications, and less highly correlated with short term growth prospects.

The remaining variable of significance in the GMVR study was *the difficulty of the enterprise in getting a loan from banks*. This also proved significant in GMS study and further illustrates the ubiquity of this complaint.

7. Conclusion.

The surveys carried out on Polish small firms in 1999 have revealed much about the structure and expectations of small firms with respect to EU accession and economic expansion. Very importantly the results of the statistical investigations have revealed those variables, in the small firm's own estimation, that are significantly correlated with such anticipated expansion.

The typical Polish small firm has characteristics like many small firms in other countries. It is overwhelmingly of a sole proprietor or partnership structure. Most are family based firms that are self financing and suspicious of banks. They tend to be locally focussed with few export outlets and low also in national presence. Most describe themselves of medium level technology. Only a small group of them are involved in franchising, subcontracting and licensing. They belong overwhelmingly to the private sector (a feature

of Polish transition is the bottom up privatisation programme) and they are generally optimistic about immediate economic expansion and also about the impact of Polish accession to the EU upon their enterprise. However the survey was not without its anomalies. For example, small firms were favourably disposed towards the EU and expected much from accession but very few had taken any action in preparation for it. Also many small firms welcomed the possibility of greater sales in EU countries but also wanted their government to take more protectionist measures.

Significant differences were revealed between the two regions of Gdansk and Lublin. Gdansk, the more industrialised and developed region, not surprisingly had a significantly more developed private sector than Lublin. For example Gdansk small firms tended to be of a more developed legal structure (limited companies rather than just sole proprietors or partnerships). They engaged in more networking arrangements (e.g. they did significantly more sub-contracting) and they had more formal collaboration with research institutes or consultants. They had higher levels of innovation and had achieved more improvements in the technological level of their products and services. They had also accomplished significantly more restructuring than Lublin small firms. Although largely self financing they had significantly more external finance (e.g. grants from governments) and tended to finance their investment more from profits. They had high levels of leasing revenue compared to none in Lublin. They had higher levels of human capital and intended to expand at higher rates than Lublin firms. In general they were more optimistic about accession to the EU.

The results of the survey showed general optimism, however, in the two regions about EU accession although there were notable differences between different branches of the economy in their response. At one level tourism expected to do very well while manufacturing, on balance, feared the prospect of an unprotected border. The results of the statistical investigations showed a number of variables with which such optimism was correlated. In the GMRV analysis, optimism concerning accession to the EU was correlated with six variables, namely: region of establishment; branch of activity; ownership of other enterprises; extent of internet use; knowledge of EU markets and the difficulty of obtaining a bank loan. In the GMS analysis optimism concerning expansion in the two years following the survey (late 1999) was correlated with seven variables, namely: the level of exports and franchising activity, the technological level of the small firms products, the level of human capital, the estimated proportionate change in income during the previous two years (1997-1999) and the difficulty of obtaining a bank loan.

If we put these two results together and ask what they tell us about the underlying factors that produce optimism in the Polish small firm sector it is clear, by way of contrast that firms in Gdansk in the service sector or in financial intermediation expect to do well while a manufacturing firm in Lublin is less sanguine. Firms that expect to do well also generally have higher technological levels of their products or services and have higher levels of education of their employees. They have often overcome the difficulty of obtaining finance and generally have greater international knowledge and orientation as well as networking arrangements. Their recent levels of income have been generally been

higher than average. In short these firms are more developed, earning more income, and have higher levels of technology and productivity.

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Appendix 1 GMRV Methodology and Results

Methodology

Commenting on the methodology of their paper the GMRV team state:

To achieve the objectives of our paper, we use the dichotomous logit analysis. A Conditional Forward Stepwise Method is also selected. A Logit Analysis is useful in our case as we would like to know the structural characteristics and other factors that explain the dependent variable that is defined by the choice of individuals over a finite and unordered set of alternatives. More specifically, we study the positive or negative influence of the accession of Poland to the European Union on the performance of the small enterprises. In the logit regression analysis, the dependent variable can be a dummy (dichotomous) variable with value '1' if the enterprise is going to be influenced advantageously and the value '0' if it is not. Predicted values could be quantitative or categorical variables. In the latter case, the predicted capability of the model is increasing as the values and the direction of 'b' coefficients predicted for every one of the categories of explanatory variables rise. A useful rule is that the larger a positive estimated coefficient of a variable's category, the higher the probability of a unit (enterprise) included into this category to have the characteristic (positive influence) indicated by the dependent variable and the smaller a negative coefficient the lower the probability

For the estimation of our model, we use the maximum likelihood approach. The statistical significance of 'b' coefficients has been tested by the Wald statistic which is equal to the square of the well known 't-statistic' as it is preferred in the case of logit analysis. We also use special tests to avoid missing good candidates that have been hypothesized to be significantly correlated in the past literature (Harissis K., 1986). The model's overall goodness of fit is tested by the likelihood ratio test statistic. After choosing the best model, the probability of an enterprise with certain characteristics and economic performance to be positively influenced due to the possible accession to the EU can be predicted by using the following formula :

$$P = \frac{1}{1 + e^{-(\Sigma\beta)}} \quad (1)$$

where β are the regression coefficients of the categories to which the enterprise belongs. The expression e denotes the exponential function.

A brief description of the logit model is also undertaken here. Let P_i be the probability that the i th enterprise will have a positive influence from the Poland's accession to the EU and let $Q_i = 1 - P_i$ be the probability that the enterprise will have a negative impact from the accession. In the specification of the model it is natural to define P_i as an ordinate of a cumulative distribution function (CDF) since P_i lies between zero and one, i.e.

$$P_i = F(t) \quad (2)$$

where $F(\cdot)$ is a distribution function. If $f(\cdot)$ is the associated density function, then we have

$$P_i = \int_{-\infty}^t f(z) dz \quad (3)$$

This expression will be made more specific in the context of the subject examined by expressing the upper limit t as a function of the characteristics and the performance of the individual enterprise having the view. Thus, we may put

$$t = X_i \beta \quad (4)$$

where $X_i = (X_{i1}, X_{i2}, \dots, X_{ik})$ is a vector of the determinants of the probability of "having a positive or negative impact" and β is a vector of unknown coefficients.

Hence equation (3) can be written

$$P_i = \int_{-\infty}^{X_i\beta} f(z)dz = F(X_i\beta) \quad (5)$$

$$\text{and } Q_i = 1 - P_i = 1 - F(X_i\beta) \quad (6)$$

defining

$$Y_i = 1 \text{ if the } i\text{th enterprise has a positive impact} \\ = 0 \text{ otherwise}$$

then we have

$$\Pr \{Y_i = 1\} = F(X_i\beta) \quad (7)$$

$$\Pr \{Y_i = 0\} = 1 - F(X_i\beta) \quad (8)$$

Assuming that $F(\cdot)$ is taken to be cumulative distribution function of the standardized logistic distribution; viz.:

$$F(t) = \frac{1}{1+e^{-t}}, \quad -\infty < t < \infty \quad (9)$$

then we can define the logit p_i by using (2), (4), (9) as

$$\text{logit of } P_i = \frac{1}{1+e^{-X_i\beta}} \quad (10)$$

or

$$\log \frac{P_i}{1-P_i} = X_i\beta \quad (11)$$

The model can be estimated by maximizing the likelihood function

$$L(Y_i/X_i) = \prod_{i=1}^n [F(X_i\beta)]^{Y_i} [1-F(X_i\beta)]^{1-Y_i}$$

The log likelihood is

$$L = \sum_{i=1}^n Y_i \ln F(X_i\beta) + \sum_{i=1}^n (1-Y_i) \ln [1-F(X_i\beta)] \quad (13)$$

setting to zero the first and second order derivatives of the above equation with respect to β and specifying the cdf, $F(\cdot)$, we can obtain an estimator of β .

We emphasize the use of non linear methods of estimation, such as logit and probit analysis when a number of qualitative variables have to be tested for their association with a set of alternatives as these models assume that all explanatory factors determine the dependent variable simultaneously. Alternative methods that could be used are either test χ^2 in cross tabulated data or multiple regression analysis. Neither of these two methods could be considered satisfactory. The former assumes that the various casual factors work quite independently of each other in determining the variable examined, whilst the latter overcomes these

problems only to provide results which are neither statistically efficient nor unambiguously determined when the dependent variable is a dummy variable.

The logit analysis suggested here overcomes these problems and provides a powerful tool for the examination of discrete decisions or points of views in this or other areas.

Results

Variable	Category	Code	B coef.	S.E.	Wald Stat	Sign. Level
Region		A				
	Gdansk	1	0.31	0.14	4.87	0.027
Branch of Economic Activity		B			14.48	0.024
	Manufacture	1	-1.87	1.48	1.6	0.2
	Construction	2	-1.26	1.49	0.71	0.39
	Trade	3	-1.23	1.47	0.7	0.4
	Hotels	4	5.54	8.69	0.41	0.52
	Transport-Storage					
	Communication	5	-1.05	1.54	0.47	0.49
	Fin. Intermediation	6	-0.3	1.74	0.03	0.86
Ownership of other enterprises		C				
	No	1	-0.73	0.41	3.21	0.07
Extent of Internet use		M			7.96	0.019
	No use	1	-0.48	0.2	3.73	0.05
	Yes, in a slight extent	2	-0.36	0.19	3.68	0.05
Knowledge level of EU markets		I			17.21	0.0002
	High	1	0.67	0.26	6.55	0.01
	Medium	2	0.28	0.19	2.32	0.13
Difficulty of getting a loan		V			3.2	0.2
	No	1	0.323	0.18	3.11	0.08
	Yes	2	-0.26	0.22	1.35	0.24
Constant			2.32	1.52	2.35	0.12

Appendix 2

GMS methodology and results

Methodology

Commenting on the methodology of their paper the GMS team state:

The variable that we model is denoted Y. This variable indicates the intention of an enterprise to decrease, maintain or increase (and if so by how much) production over the coming two years. The values assigned to Y correspond to each of the five possible responses to the question of a firm's intention to expand output. In respective order these values are, 1 (decrease production), 2 (maintain production), 3 (increase production by less than 5%), 4 (increase production by 5% to 10%) and 5 (increase production by more than 10%).

The values of the dependent variable are represented by integers ranging from 1 to 5. However, the upper and lower values include unbounded data, that is, Y taking a value of 5 corresponds to a small firm's intention to increase production by *more* than 10%. Similarly, when Y is 1 this means that firms' production will decrease by some unspecified amount. We will therefore consider censored estimation. We employ the Quadratic Hill Climbing optimisation algorithm with a normally distributed error using the EViews 3.1 software. In our estimations, reported below, the Jarque-Bera test never indicated significant departures from normality suggesting the validity of our assumption of normality that is, we estimate the model to ensure that the values of Y predicted by the model lie between 0.51 and 5.49. Allowance of an extra 0.49 units on either side of the boundary provides a consistent range of values surrounding each integer that correspond to each response. Hence, each integer value can be identified through the process of rounding. Censoring the dependent variable to lie between 0.99 and 5.01 produced almost identical results suggesting estimation is robust to the censoring values used.

For comparative purposes we also apply the method of ordinary least squares (OLS). This method provides more information, in terms of diagnostic testing, which turns out to inform the specification of our model. In particular, it suggests the use of a non-linear functional form. We outline both the linear and non-linear forms of the model.

The general specification in which estimated linear models are nested is:

$$Y_i = \sum_i \beta_i X_i + u_i \quad (1)$$

where u_i is a stochastic error.

The potential explanatory variables (X_i s), with a brief description, are listed in Table 1. The theoretically expected sign of each variable's coefficient is indicated in the variable name (legend) in Table 1. A "P" in the name indicates an expected positive sign, an "N" is indicative of an expected negative sign. The potential explanatory variables are taken from the surveyed questionnaire.

All models are of the dependent variable, Y, use the same 162 cross-sectional observations and are estimated by OLS. OLS T denotes OLS t-ratios and White T White's heteroscedasticity adjusted t-ratios. Adj R² represents the adjusted coefficient of determination, s is the regression's standard error and DW is the Durbin-Watson statistic. FSC1 is a modified F-version of Breusch-Godfrey's test for first-order serial correlation, FFF1 is the F-version of Ramsey's Reset test for non-linear functional form, $\chi^2 N2$ is the Jarque-Bera test for normality and FH1 is an F-version of White's test for heteroscedasticity. F(1→) is an F-test for the variables deleted from the general regression to obtain the reported equation. Figures in squared parentheses denote probability values.

Results

Table 3: Alternative OLS and Censored Non-Linear Regression Estimates

Model →	OLS 4			Censored 4	
	Coef	OLS T	White T	Coef	T-ratio
Intercept	1.849	9.491	10.473	1.849	9.766
H	0.459	2.397	2.665	0.459	2.467
G	0.840	1.908	3.212	0.840	1.963
L	0.983	3.796	4.190	0.983	3.906
P	0.612	5.012	4.979	0.612	5.157
R	0.006	1.920	1.884	0.006	1.976
V	-0.308	-1.975	-1.985	-0.308	-2.032
Z2	0.006	4.214	4.293	0.006	4.336
L ²	-0.399	-2.272	-2.595	-0.399	-2.338
AdjR ²	0.459			0.465	
S	0.847			0.842	
DW	2.072				
QLB1				0.185 [0.667]	
QLB2				0.601 [0.741]	
FSC1	0.243 [0.623]				
FFF1	3.885 [0.051]				
χ^2 N2	3.995 [0.136]			4.373 [0.112]	
FH1	0.066 [0.797]				
F(1→)	1.128			1.094	

Both OLS and censored regression models are reported. The distribution is F(30, 123) and the 5% critical value is approximately 1.68 – this statistic is based on the distribution F(30, 120).