

DOES ACCESS TO CREDIT
LIMIT THE GROWTH OF
SMALL AND MEDIUM-SIZED
ENTERPRISES IN UKRAINE?

by

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A thesis submitted in partial fulfillment of
the requirements for the degree of

Master of Arts in Economics

Economic Education and Research
Consortium

2001

Approved by _____
Chairperson of Supervisory Committee

Program to Offer Degree _____ Authorized _____

Date _____

Economic Education and Research
Consortium

Abstract

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This paper investigates the state of SME sector in Ukraine. We analyze factors that determine SMEs economic performance during transition. Among the basic determinants of economic performance of the firm are ownership structure, level of product market competition, and access to external funding. This research concentrates on the question of the impact of the availability and amount of external finance in the form of short-term bank loans on net sales to assets performance of SMEs, in comparison to large enterprises, while controlling for other determinants such as ownership type and concentration. Applying the instrumental variables estimation technique we show the positive relationship between amount of short-term bank loans and net sales to assets performance for small and medium-sized enterprises and the absence of such relationship for large enterprises. Possible explanations of the received results as well as some policy implications for improvement of lending to SMEs in Ukraine are proposed.

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ACKNOWLEDGMENTS

The author wishes to express sincere appreciation to Professor Hartmut Lehmann for his advice in the preparation of this paper. In addition, special thanks to Professors Charles Steele, Jerzy Konieczny, Gaffar Magal, and David Snelbecker for their valuable comments on the drafts of this paper. Thanks also to the classmates for their valuable input.

GLOSSARY

SMEs - Small and medium-sized enterprises - are a heterogeneous group, which includes a wide variety of firms that possess a wide range of sophistication and skilled workers and operate in very different markets and institutional environments. The most conventional approach to defining this category of enterprises is based on the number of employees and/or the value of assets (Hallberg, 1999). According to EBRD Transition Report (1999), the upper employment limit for SMEs is 200 full-time employees as an average across transition countries.

Microenterprises - are normally family businesses or self-employed persons operating in the semi-formal and informal sectors of the economy with little perspectives to upsizing and becoming internationally competitive (Hallberg, 1999).

Spin-offs – enterprises created through the process of separating of the part of assets of already existed firm with further distribution of the shares of new company between owners of the old firm.

Internal finance - the fraction of capital expenditures of the firm financed with cash flow from operations.

External finance - the fraction of capital expenditures of the firm not financed with cash flow from operations.

Equity finance - the ratio of the net amount of equity issues to capital expenditures of the firm.

Trade credit - is credit received from other firms and usually treated as the level of accounts payable reported by firms.

Fast growth - is simply a growth rate that cannot be financed through retained earnings (profits).

Ownership concentration - the existence of at least one shareholder that controls more than 25% of firm stock.

Internalization costs - costs associated with motivation, coordination, and control over the efficiency of production within a firm.

Transaction costs - costs of search and negotiation with business partners, contract construction and enforcement.

I n t r o d u c t i o n

One of the key points for successful transition is the entry and expansion of *de novo* created firms that contribute to higher level of employment, output growth and more efficient reallocation of resources. According to the EBRD Transition Report, 95% of start-ups consist of small and medium-sized enterprises (defined as less than 200 full-time employees). Among them, 54% are microenterprises with up to 9 employees and 24% are small enterprises with between 10 to 49 employees. Conversely, 89% of microenterprises and 82% of small firms are *de novo* created. Remaining parts are represented mainly by privatized spin-offs from larger state-owned enterprises (EBRD Transition Report, 1999).

It is quite understandable that small and medium-sized enterprises (SMEs) constitute the most dynamic part of economic system (Pissarides, 1998), accordingly, becoming one of the most important bearings for emerging or developing economies. Why? First of all, because of their small minimum efficient scale of production they are first who move into areas of comparative advantage and high value added. Second, markets with SMEs tend to be much more flexible, competitive and thus socially more efficient. SMEs help to develop stable entrepreneurial climate following the principles of self-responsibility and individual initiative. They provide more equal distribution of incomes consequently supporting social stability and democracy. Finally, expanding SMEs are able to employ a substantial part of the labor force, previously engaged in large sector, creating new job opportunities (Biggs and Snodgrass, 1995).

All of the SMEs positive characteristics described above are extremely advantageous not only for transition economies but also for developed countries. The following numbers can testify this. The share of SME sector in GDP in most developed countries is considerable. Thus, for example, it constitutes 50 – 53% of GDP in

United Kingdom, 50 – 54% in Germany, 52 – 55% in USA, 57 – 60% in Italy and 63 – 67% in France (Oleksiv, 2001).

Taking all of the above considerations into account, the contribution of SMEs to economic development of any country can not be exaggerated. But, unfortunately, that contribution has been rather limited in Ukraine. The share of Ukrainian SME sector in total employment and domestic production is relatively small in comparison to a lot of developed countries and some transition economies. So, the natural question arises: what factors are responsible for the emergence and expansion of the firms and for the improvement in their performance, and whether is the impact of these factors on Ukrainian enterprises different from that in other countries?

Consequently, in the theoretical part of this paper, we analyze different approaches to the question of firm growth or firm size determination, the importance of ownership structure, both type and concentration, level of competition in the product markets, and financing as the determinants of enterprise performance during transition.

The empirical part is devoted to testing the hypothesis about positive influence of the amount of external finance in the form of short-term bank loans on net sales to assets performance of SMEs in Ukraine in comparison to large enterprises. We use instrumental variables estimation technique as opposed to standard ordinary least squares estimation to ensure unbiased estimates of the effect of external financing on enterprise performance.

Our results demonstrate that the amount of short-term bank loans used by SMEs has a significant positive effect on their net sales to assets performance. These results, combined with the fact that a lot of Ukrainian SMEs are constrained in external financing, suggest that Ukrainian authorities should foster the

implementation of the market-oriented policies directed to reduction of credit risks and credit transaction costs of SME lending in order to encourage Ukrainian SME sector growth.

At the same time the data do not allow us to show any significant relationship between short-term bank loans and performance of large Ukrainian enterprises. This may indicate that large enterprises' performance during transition might be more dependent on alternative finance sources such as long-term debt or equity.

The paper is organized as follows. Next chapter discusses in more details general characteristics of economic performance of Ukrainian SME sector in comparison with the corresponding sectors of other economies. Chapter 3 is devoted to the discussion of factors that explain firm emergence and expansion as well as the determinants of enterprise performance during transition. Chapter 4 presents the empirical model developed to test our hypothesis, the data used, and the estimation techniques applied. We finish this chapter with the interpretation of results. Conclusions and policy implications of our findings are given in the concluding chapter 5.

Chapter 2

THE STATE OF UKRAINIAN SME SECTOR

In the first section of this chapter, we discuss the main approach to defining the category of small and medium-sized enterprises across countries by emphasizing Ukrainian state of affairs. Next section is devoted to the analysis of macroeconomic indicators that are usually used in the process of estimating the importance of SME sector at different stages of economic development, such as the share of SMEs in total employment, output, the relative efficiency of SME sector, etc. In the concluding section we try to compare the development of Ukrainian debt market with that of other transition economies because of established close link between external finance and firms creation and expansion.

2.1. The Definition of SMEs

“Small and medium-sized enterprises (SMEs) are a heterogeneous group, which includes a wide variety of firms that possess a wide range of sophistication and skilled workers and operate in very different markets and institutional environments. Although the statistical definition of SMEs varies across countries, the most conventional approach to defining this category of enterprises is based on the number of employees and/or the value of assets” (Hallberg, 1999).

The first definition of small enterprises in Ukraine was stated in the Law of Ukraine *On Ukrainian Enterprises* (1991). According to that document, enterprises that employed under 200 workers in manufacturing and construction, under 100 in science and scientific services, under 50 in other sectors of production, under 25 in the service sector and under 15 employees in retail trade were classified as small

firms. This definition was changed by the Law of Ukraine *On State Support of Small Entrepreneurship*, adopted in October 2000. Consequently, now the subjects of small entrepreneurship in Ukraine are (i) legal entities of any ownership type and structure employing up to 50 workers, irrespective of industries, with at most 500,000 Euro of annual sales and (ii) registered physical entities engaged in entrepreneurial activity without creating legal entity.

Many theoretical and legal sources distinguish the category of microenterprises along with SMEs. According to Hallberg (1999), "...*microenterprises* are normally family businesses or self-employed persons operating in the semi-formal and informal sectors of the economy with little perspectives to upsizing and becoming internationally competitive. In contrast, SMEs usually operate in the formal sector of the economy, employ mainly wage-earning workers, and participate more fully in well-organized markets...". The Presidential Decree *On State Support of Small Entrepreneurship* (1998) defines Ukrainian microenterprises as all subjects of small entrepreneurship employing up to 10 workers with at most 250,000 of Hryvnias of annual sales.

A legally defined category of medium-sized enterprises in Ukraine has not been adopted yet. Following Hollberg's (1999) analysis, the upper limit for "medium-scale" enterprises is usually set between 100 and 250 employees. EBRD Transition Report (1999) gives the upper limit of 200 full-time employees as an average upper size for medium firms across transition countries. Consequently, we have decided to base our treatment of Ukrainian medium enterprises in the empirical part of this paper on the EBRD Transition Report definition.

2.2. Economic Performance of SMEs: the Ukrainian Context

In this section, we try to give a more or less complete picture of the main macroeconomic indexes of Ukrainian SME sector such as its share in total

employment, domestic production, and estimates of its efficiency and growth, etc. Our analysis is based on two main data sources: (i) official statistics provided by State Committee of Statistics (Derzhcomstat) and (ii) numbers projected in *Small and Medium Enterprises Baseline Survey* developed by Management Systems International and Development Alternatives Incorporated in collaboration with the Kiev International Institute of Sociology in 1999. There is a drawback of official statistics because of the absence of separate treatment of medium-sized enterprises in Ukraine. All official statistics available concerns only small Ukrainian enterprises. Therefore, the projected numbers for medium enterprises are taken from the *Small and Medium Enterprises Baseline Survey* (1999), whenever possible.

The database presented in the *Small and Medium Enterprises Baseline Survey* (1999) is based on the interviewing results of approximately 4000 firms of the stratified random sample taken from the business register maintained by the State Committee of Statistics and 4000 households chosen based on the area sampling techniques developed by the Kiev International Institute for Sociology. The interviewing of households is done in order to conduct more accurate projections for the firms with zero or 1 to 5 employees, because this group has the highest proportion of unregistered employment within registered firms as well as a bunch of entire unregistered firms. In addition, it gives the possibility to make inferences about self-employed people not countered by official statistics as well. The database is completed by additional sample of 1000 “street enterprises” in order to fill the gap of unfound firms from the sample of business register. According to the definition “...[a] street enterprise is any business that a consumer would identify by walking through a randomly-selected commercial area...” (Small and Medium Enterprises Survey, 1999, p. 1).

The first piece of evidence supporting the argument that small business in Ukraine is still at the “seed” stage of its development is the miniscule number of active registered small enterprises per capita in comparison to other transition economies.

As it can be seen from Table 1, there were only about 4 small enterprises per 1,000 people in Ukraine in 1999, even though their number increased steadily during the last decade.

Table 1

Main Indexes of Development of Small Enterprises in Ukraine in 1991-1999

Index	1991	1995	1996	1997	1998	1999
Number of small enterprises	47084	96019	96270	136238	173404	197121
Average employment in small enterprises, thousands	1192.4	1124.9	1178.1	1395.5	1559.9	1677.5
Number of small enterprises per 10 thousands of current population level, units	9	19	19	27	34	40

Source: Derzhcomstat, 2000

At the same time the comparable numbers are about 35 active small enterprises per 1,000 people in Poland, 25 in Estonia, 12 in Latvia and 6 in Russia (Yacoub and Senchuk, 2000). These figures can be quite remarkable taking into account the fact that all these countries entered transition at approximately the same period. The prime explanation of the observed situation is that some Central and Eastern European countries and Baltic states have implemented much more consistent reform policies of friendly environment for start-ups and now are considered to be at the latest stages of transition (Roland, 2001).

Share of SMEs in Total Employment. The share of SME sector in total employment varies across countries (Hallberg, 1999). Empirical evidence shows that there is a trend toward an increase in the average firm size along with an increase in income in most countries. However, we can suspect that Ukraine is not expected to be an economy dominated by large-sized enterprises in the medium-term because of

(i) the emergence and development of SME sector and (ii) restructuring and privatizing of state-owned large enterprises usually connected with work force reduction – two main features of transition economies. Table 2 represents two alternative estimates of the share of SMEs in total employment in Ukraine in 1999.

Table 2

Share of SMEs in Total Employment in 1999 (%)

	Official Statistics (Derzhcomstat)	Projected Numbers (SMEs Baseline Survey)
Share of small enterprises in total employment¹	7.7	33.9
Share of medium enterprises in total employment²	n/a	19.8

Source: Derzhcomstat, 2000 and author's calculations

Such a huge discrepancy between official and projected numbers for the category of small enterprises can be partially explained by the fact that cited research includes in employment share calculations self-employed entrepreneurs, who according to estimation account for 36% of small businesses in Ukraine. The survey also allowed for unregistered employment among self-employed, microenterprises and small firms totaling to about 33% of the total employment in small sector not counted by State Committee of Statistics and consequently not reflected in official statistics.

Based on the logic that (i) official shares might reflect the structure of projected ones and (ii) true shares must lie somewhere in between the projected and the official estimates³, we may claim that small enterprises in Ukraine may contribute to about

¹ Both Derzhcomstat and Small and Medium Enterprises Baseline Survey distinguish the category of small enterprises employing up to 50 employees according to Ukrainian legislation.

² Small and Medium Enterprises Baseline Survey distinguishes the category of medium enterprises employing up to 250 employees.

³ Because the projected numbers can be explained only partially.

20% of total employment and medium enterprises – about 12%, totaling to about 32%. However, estimated shares even after adjustment for shadow operation are less than corresponding indexes for both developed and developing economies. Thus, employment share of enterprises with at most 100 employees was 40.1% in the United States (1993), 47.3% in United Kingdom (1986), 45.7% in Germany (1986), 45.8% in France (1986) and even 73.5% in Italy⁴ (1986) (Small and Medium Enterprises Baseline Survey, 1999). As for the number of Latin American countries the share of SMEs in manufacturing sector employment was 44.6% in Argentina (1993), 52.7% in Chile (1996), 44.6% Mexico (1993) (Peres and Stumpo, 2000).

Share of SMEs in Domestic Output. Unfortunately only official data on small Ukrainian enterprise share in output are available. In Ukraine 51% of small enterprises are in trade and catering, only 15% in manufacturing, 10% - in construction, 5% - in consumer services, and 19% - in other sectors. This structure has not changed much in recent years. According to Derzhcomstat statistics, these small firms produced about 8.45% of gross Ukrainian output during 1997/99 (See Table 3).

Table 3

Share of Small Enterprises in GDP (%)

1997	1998	1999
8.98	8.00	8.39

Source: Derzhcomstat, 2000 and author's calculations

⁴ The definition of SMEs in the United States and Western European countries differs from Ukrainian one. Small category in those countries includes enterprises with up to 99 workers whereas medium-sized category encompasses firms with 100-499 employees. But this difference even strengthens the conclusion that Ukrainian SMEs contribute worse to total employment in comparison with developed and large-sized firms oriented economies.

Even though these shares are calculated only for small enterprises, it is rather doubtful that Ukrainian medium enterprises contribute to total GDP more than that, given that their share in employment is lower. At the same time the share of small enterprises may itself be biased downwards because of the considerable SMEs shadow production. Nevertheless, for the sake of rough comparison the share of SMEs in total output in some Latin American countries was 35.9% in Argentina (1993), 60.8% in Brazil (1997), 31.1% Mexico (1993) (Peres and Stumpo, 2000).

Efficiency of Ukrainian SMEs. According to economic theory enterprise efficiency is reflected by total factor productivity, which is usually proxied by labor productivity in empirical studies. Following the widely used definition of labor productivity as the amount of value added per employee, relative efficiency of Ukrainian small enterprises can be calculated as the ratio of their labor productivity to the total economy labor productivity using the shares of small enterprises in total production and employment:

$$\frac{\Pr_{SE}}{\Pr_{total}} = \frac{\frac{Y_{SE}}{E_{SE}}}{\frac{Y_{total}}{E_{total}}} = \frac{Y_{SE}}{Y_{total}} * \frac{E_{total}}{E_{SE}} = S_Y * \frac{1}{S_E}; \quad (2.1)$$

where \Pr_{SE} is the labor productivity of small enterprises and \Pr_{total} is the labor productivity of total economy, Y_{SE} and E_{SE} are the output and employment of small enterprises, Y_{total} and E_{total} are total Ukrainian output and employment, and S_Y and S_E are the shares of small enterprises in total output and employment respectively. (Oleksiv, 2001). The results of relative efficiency calculations are presented in Table 4. It should be noted that these calculations are based on official statistics. In addition, we can talk here about relative efficiency of small enterprises only, not of the whole SME sector, because of the lack of official data on medium-sized firms in Ukraine.

Table 4**Relative Productivity of Small Enterprises**

	1997	1998	1999
Share of SE in total output (%)	8.98	8.00	8.39
Share of SE in total employment (%)	6.17	7.00	7.69
P_{SE}/P_{Total}	1.45⁵	1.14	1.09

Source: Oleksiv, M. Institute for Economic Research and Policy Consulting, 2001.

Small enterprises seem to be more productive than other firms in Ukraine. This is an additional argument, together with the relatively small shares of SMEs in total employment and output, for strengthening activities directed at fostering SME sector development in Ukraine.

Ownership Structure of Ukrainian SMEs. Small enterprises in Ukraine are overwhelmingly non-state owned. The share of such enterprises was about 95% in 1999 in Ukraine (Derzhcomstat, 2000). This is a consequence of the process of small business privatization of the state property, which is, by now, almost complete, and the fact that virtually all start-ups are privately owned. 95% of all *de novo* created firms in transition economies are SMEs (EBRD Transition Report, 1999). Table 5 represents the ownership structure of Ukrainian SME sector following the estimates of the above-cited *Small and Medium Enterprises Baseline Survey* (1999). These numbers are consistent with official statistics.

⁵ Such a big change between 1997 and 1998 estimates of relative performance of small enterprises may be explained by two main facts. First, small enterprises as the most vulnerable businesses might have been greatly depressed by the Russian financial crisis in 1998. Second, definition of small enterprises was changed in 1998. New definition expanded the number of firms included in the category of small enterprises.

Table 5**Ownership Structure of SMEs in Ukraine in 1999 (%)**

Types of Ownership	Small Firms (zero to 50 employees)	Medium Firms (51 – 250 employees)
Private firms, owned by physical entities	38.7	9
Joint stock companies with 25 - 50% held by the State	1.7	8.7
Joins stock companies with over 50% held by the State	1.4	4.4
Joint stock companies with majority-owned by physical or legal entities	25.3	45.7
State-owned firms	5.8	21
Joint venture enterprises	3.7	5
Other⁶	23.4	6.2

Source: Small and Medium Enterprises Baseline Survey. Ukraine, 1999.

2.3. Crediting of Ukrainian Private Sector

The following discussion in the theoretical part of this paper is going to illustrate that appropriate access to external finance has a significant impact on performance of enterprises, both SMEs and large ones, engaged in the growth or restructuring activity during transition. Typically external finance is classified on debt versus equity sources. Apparently, while securities markets were almost absent at the start of transition, bank financing has been playing the role of the most appropriate source of external finance of enterprise investment during transition decade (Pistor *et al.*, 2000).

⁶ Other type of ownership category in Table 5 includes individual commercial activity as well as collective and public (non-profit) ownership types.

Unfortunately, while looking at relative volumes of bank lending, Ukraine again fails in the comparison with CEE countries. Table 6 demonstrates the volumes of bank lending to the private sector as a percentage of GDP in a number of transition economies.

Table 6

Bank Credit to the Private Sector in Transition Economies (% of GDP)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Poland	n/a	10.9	11.4	12.2	12.0	12.7	15.9	18.1	20.6
Hungary	46.3	38.8	32.2	28.2	26.2	22.3	21.7	23.4	22.6
Czech Republic	n/a	n/a	n/a	50.8	57.8	58.1	55.9	66.3	60.1
Slovenia	n/a	34.9	23.3	22.1	22.5	27.5	28.8	28.6	32.5
Slovakia	n/a	n/a	n/a	32.1	24.3	27.8	32.0	44.2	n/a
Bulgaria	n/a	7.2	5.8	3.7	3.8	21.1	35.6	12.6	14.2
Russia	n/a	n/a	n/a	11.8	12.1	8.5	7.2	8.7	12.7
Ukraine	n/a	n/a	3.2	1.4	4.6	1.5	1.4	2.5	7.6

Source: Roland, G. Transition and Economics, 2000. EBRD Transition Report, 1999.

First, it should be noted that presented numbers show lending but to the whole private sector. However, as has been already discussed, the overwhelming majority of SMEs emerging during transition are private. Ukraine fits this pattern as well (see Table 5). Second, these numbers represent bank credit to enterprises regardless of their size. But information of Table 6 is cited for the purpose of comparison between countries and suggests that Ukrainian private enterprises, both large and SMEs, are much more credit constrained than those of other transition economies. Unfortunately, the data about the decomposition of bank credits by the size of enterprises is not available.

To summarize, we may conclude that even after ten years of steady growth (see Table 1), Ukrainian SME sector is still underdeveloped. It provides a relatively small portion of total employment and domestic production and it is, unfortunately, more credit constrained in comparison to more advanced transition countries. The main implication of this discussion is that Ukrainian authorities should foster the implementation of policies directed to development and strengthening of the SME sector as long as they are concerned with successful transition of Ukrainian economy.

Consequently, the purpose of this paper is a theoretical and empirical analysis of the main factors that affect firm emergence and growth and the determinants of enterprise performance during transition, with a special emphasis on the impact of external finance in the form of bank lending on the performance of Ukrainian SMEs.

Chapter 3

FIRM CREATION AND EXPANSION: DETERMINANTS OF ENTERPRISE PERFORMANCE

We begin this chapter with the discussion of the role of SMEs in the framework of contractual theory of the firm. Next we concentrate on the availability of external finance as the decisive factor of firm growth in the context of different approaches to firm size determination. Then we turn to a review of theoretical literature and empirical studies that define and estimate the determinants of enterprise performance, in particular, the amount of additional finance. We conclude this chapter with a discussion of financing sources at different stages of SME development.

3.1. SMEs and the Theory of the Firm

Under the contractual view of the firm, developed by Coase (1937), firms are institutional organizations that appear for the purpose of producing output using some combination of inputs. In production process firms are not the only players: independent individuals might also pursue the same value added activity. The balance between these two forms of production depends on their costs. The costs of individual production are called “transaction costs”, which arise from search and negotiation with business partners, contract construction and enforcement. On the other hand, costs associated with the firm’s operations are referred to as “internalization costs”. These costs are associated with motivation, coordination, and control over the efficiency of production within a firm. In consequence, a new firm emerges in case when internalization costs of a given kind of productive activity are lower than its transaction costs (Suzuki and Lactorin, 1999). As a rule, a new firm is

initially SME. In particular, on average, 95% of start-up cases in transition economies are SMEs (EBRD Transition Report, 1999).

3.2. Approaches to Firm Size Determination

There are several economic theories that try to explain the mechanisms of firm growth and firm size determination. The most basic of them are summarized by Kumar *et al.* (1999). Authors combine different approaches to the determination of firm size into three main categories: technological, organizational and institutional theories.

Technological theories concentrate on the production function or technology characteristics of the firm. In general, these models claim that firm size is restricted by:

- (i) the degree of specialization of the firm and the size of the market it serves;
- (ii) the elasticity of substitution between labor and capital in the production function⁷ (Lucas, 1978);
- (iii) the balance between economies of scale of management and the possibility of losing control over the production process (Rosen, 1982),
- (iv) the quality of human capital⁸ (Kremer, 1993).

⁷ Lucas (1978) associates firms with managers. So, "...[i]f the elasticity of substitution between capital and labor in the production function is less than one, the average firm size increases with per capita wealth...". In the process of output growth wages increase faster than managerial rents, which forces marginal managers to become employees leading to the firms expansion. This implies that larger firms would prevail in industries with more capital intensive technologies (Kumar *et al.*, 1999, p. 4).

⁸ Kremer (1993) argues that the more labor sophisticated the technology is, the more skilled workers are employed. As a consequence, higher human capital countries specialize on the production of complicated products by relatively larger firms.

Organizational theories tend to concentrate more on the control of the production process. Earlier approaches are: Contracting Cost and Transaction Cost theories. According to Contracting Cost or Agency Cost approach (Alchian and Demsetz, 1972) the only difference between within the firm and individual production is in the costs of metering inputs and monitoring agents-managers while the contracting costs of both types of production are the same. In contrast, the Transaction Cost approach (Klein *et al.*, 1978) claims that the costs of contracting and coordinating are different between individual and within firm production and are crucial not only at the stage of firm emergence but at the stages of its development and growth.

The latter approach, or the so-called Critical Resource theories, first developed by Grossman and Hart (1986), rests on the idea that a given economic agent (entrepreneur) has an initial access to critical resource with which he is going to produce. Then he needs to employ some workers in order to expand his activity. In case of physical assets as a critical resource, the number of employees depends on the amount of physical asset under the entrepreneur's controls. Thus, more physical capital intensive firms tend to be larger in employment size. The case with intangible assets is the same in its mechanism. But entrepreneur's property rights might not be fully complete in the real world. This may also limit the number of employees of the firm. As a consequence, larger firms will tend to be dominant in economies with more developed legal systems⁹ (Kumar *et al.*, 1999).

Institutional theories are the last group of theories of the firm size that focus on deterministic power of institutional environment (Kumar *et al.*, 1999). Authors propose to divide them into two main categories: regulatory and financial. The former approach distinguishes the sets of regulatory activities

⁹The more detailed analysis of the similarities and the differences between Contracting Cost and Transaction Cost approaches is given in the paper by Williamson (1988).

that affect the average size of the firms. Thus, high corporate tax policy and anti-trust legislature act as suppressors of firm size. On the other hand, entry restrictions usually tend to increase the average size of the firm.

Finally, and most interesting from the point of view of the present research, there is the financial approach to the question of firm size determination (Kumar *et al.*, 1999). According to this theory the availability of external finance positively affects both the growth of the number of start-ups and the increase of the average size of already existing firms¹⁰. Both these effects have been found by Rajan and Zingales (1998), based on a survey of 43 countries, both developed and developing ones. Consequently, the development of the financial system from the theoretical point of view has an ambiguous effect on firm size structure of the economy since an increase in the ratio of *de novo* created firms tends to decrease the average firm size whereas the expansion of existing companies increases it. However, this theory has the most important practical application, in particular, for transition economies. It is shown by Rajan and Zingales (1998) that economic growth is related to the growth in industrial production and size, of which *two thirds* come from the expansion of existing firms, and *one third* from the creation of new ones. So, in order to stimulate and foster the economic growth of the economy authorities should reform the financial system to ensure efficient availability of different forms of external finance to enterprises.

3.3. Determinants of Enterprise Performance during Transition

Bevan *et al.* (1999) provide comprehensive analysis of the theoretical background as well as empirical evidence of enterprise performance determinants for both established market and transition economies. The authors conclude that there is no

¹⁰ These would suggest the empirical analysis to be based on employment growth regressions. But, as noted in the empirical part of this paper, we cannot do this in our model estimation because of the limitations of the data available. Consequently, we concentrate on the net sales to assets performance of enterprises under investigation.

common unique proxy for enterprise performance indicator - total factor productivity - which can be easily used in empirical research. The majority of applied studies use:

- (i) operating profits as a percentage of sales, total assets, or equity;
- (ii) labor productivity as the ratio of total output (or sales) to amount of labor employed;
- (iii) barter as a pervasive phenomenon in enterprise operation for the case of transition economies.

In contrast, a more or less stable consensus exists in defining the main determinants of economic performance, such as the level of competition in the product markets, ownership type and concentration, and financing as an important component of a more general concept called “business environment”.

Ownership structure. Theoretical analysis suggests that private ownership is considered to be more effective than state ownership. Private owners are directly interested in profits their enterprise earns as far they are the sole claimants. Empirical evidence, summarized by Bevan *et al.* (1999), strongly supports these relationships for Western economies. However, the corresponding review of empirical studies for transition economies found limited evidence on relationship between ownership structure and economic performance of the firms. Authors suggested that the results might stem from specific transition factors. Furthermore, they supposed that discussed linkages should become more visible as transition reforms continue.

Estrin and Rosevear (1999) conducted the first empirical study aimed to find the relationship between different types of ownership structure and economic performance for Ukrainian enterprises. They, however, failed to establish a strong impact of privatization (change of ownership type from state to private) on

enterprise economic performance. They only succeeded to show that insider ownership is sometimes related to better enterprise performance. Andreyeva (2000) obtained similar results, i.e. showed better performance for firms with insider-concentrated ownership structure.

Ownership concentration. Literature on corporate governance stresses the crucial role here of the cost of management monitoring, or so-called agency costs. This cost might be relatively low for most developed economies due to the practice of public analysts' reports giving the possibility for small shareholders to efficiently participate in management monitoring. In contrast, monitoring cost might be quite significant in the case of undeveloped legal framework of minority ownership rights and low transparency of firm management in transition and developing economies, being lower and more efficient the more concentrated ownership is (Shleifer and Vishny, 1997). Large investors tend to reduce agency costs in order to assure the highest return on their investment improving economic performance of the enterprise.

The research in this field was started by Berle and Means (1932), who tried to test the hypothesis that diffused ownership gives significant power to managers whose goals may not coincide with the profit-maximizing interests of shareholders as has been noted above. Later, a set of studies on this topic performed for established market economies found a strong positive relationship between ownership concentration and enterprise performance (Claessens and Djankov, 1999). As for the corresponding empirical studies for transition economies, Claessens and Djankov (1999), Earle and Estrin (1996), and Andreyeva (2000) found a positive relationship between ownership concentration and enterprise performance in the Czech Republic, Russia and Ukraine, respectively.

Competition. Economic theory, in particular industrial organization literature, states that performance or profitability of enterprises is directly determined by market structure. Some sources state that competition tends to lead to profits dissipation,

whereas monopoly power is associated with the process of making non-zero profits and higher ability to afford an engagement in research and development activity (Carlton and Perloff, 1999). On the other hand, it is claimed that firms with monopoly power have no incentive to improve their performance and increase research and development investment since they face less competition (Bevan *et al.*, 1999). Analyzing a subset of empirical studies for established as well as transition economies, Bevan *et al.* find that some of them give strong arguments in support of causal positive relationship between competition and economic performance whereas others fail to find such causality. These relatively weak empirical results in support of the theory lead authors to suggest that any studies of enterprise performance must at least control for the degree of competition enterprises are subjected to (Bevan *et al.*, 1999, p. 14).

One of the recent works in this field for transition economies is Brown and Earle (2000), who study Russian enterprises. They find strong evidence of positive relationship between product market competition and total factor productivity, controlling for import competition, local labor market competition and transportation infrastructure. They also find that private firms outperform state enterprises.

Financing. The process of firm survival and development primarily depends on financing of their operational activity, i.e. long-run capital investment expenditures and widening of working capital. Finance sources may be internal (generated cash flows) or external (bank loans, debt, trade credit¹¹, governmental subsidies, etc.) (Bevan *et al.*, 1999). As for the internal finance, a lot of studies use profits as a proxy for the firm's cash flow available for reinvestment (Johnson *et al.*, 1999). As for the external finance, Rajan and Zingales (1998) define it as "...the fraction of capital

¹¹ Trade credit is usually defined as credit received from other firms and is proxied by the level of accounts payable reported by firms. (Johnson *et al.*, 1999, p. 7)

expenditures not financed with cash flow from operations...”. In addition, equity finance is distinguished by the authors at a separate financing category, which is defined as “...the ratio of the net amount of equity issues to capital expenditures...”. But, of course, all sources are interdependent with economic performance of enterprises.

Economic studies support the idea that internal finance can be more advantageous than external one. Gertner *et al.* (1994) show that the rate of return on investment is higher in case of owner-provided internal market finance than the rate of return on bank loans. Authors argue (p. 1211) that internal capital allocation:

- (i) leads to more monitoring than bank lending;
- (ii) reduces managers’ entrepreneurial incentives;
- (iii) makes it easier to re-deploy poor performing projects.

Therefore internal investors are in a better position than external investors, who are subject to the consequences of principal-agent problem and the problem of asymmetric information. However, empirical evidence shows that external finance is a widespread phenomenon, especially in developed market economies. First of all, external finance may be more advantageous since it might provide greater amount of necessary funds than retained profits¹². Second, firms with potential fast growth such as SMEs must have access to external finance sources by definition.¹³ Third, the disadvantages discussed above may be overcome by the improvement of investors’ legal protection. According to Shleifer and Vishny (1997), “...[t]he principal reason that investors provide external financing to firms is that they receive control rights in

¹² Especially in case of SME financing.

¹³ Following the definition given in Small and Medium Enterprises Baseline Survey (1999, p. 94), “...[f]ast growth ... is simply a growth rate that cannot be financed through retained earnings (profits)...”.

exchange...”. Therefore, the availability of external finance to firms primarily depends on the development of financial and legal systems of the country.

Highly developed markets of debt and equities as well as a system of financial intermediaries in established market economies testify to the deterministic relationship between accessibility of financier’s funds and economic performance of the firms. Transition conditions further strengthen the importance of financing as a determinant of enterprise performance. Access to sufficient capital and adoption of appropriate bankruptcy legislation are of fundamental importance in order to enable restructuring of existing firms (improvement of performance) under transition (Bevan *et al.*, 1999, p. 36) as well as new firms’ growth.

A number of additional factors that affect enterprise performance in transition economies can be introduced: imperfect laws and regulations, difficulties in dealing with administrative authorities and corruption, soft budget constraints, difficulties in dealing with criminal organizations, inadequate infrastructure, uncertain enforcement of business contracts and property rights, often referred to as the quality of “business environment” (Carlin *et al.*, 2001).

At the same time there exists a set of obstacles that is crucial especially for SMEs growth. It includes:

- (i) limited access to external widening of working capital and long-term credit;
- (ii) limited managerial and technical expertise;
- (iii) high transaction costs.

However, lack of finance is generally considered to be the main impediment of SMEs development and growth especially during transition, though a lot of obstacles listed above are inter-related (Pissarides, 1998). SMEs are often seriously weak in

managerial quality, operational experience and other resources. In addition, the operational history of SMEs is hard to be monitored, especially during transition. It means that potential lenders or investors do not extremely desire to lend (invest) their funds in small and medium business.

3.4. Different Stages of SME Development and Financing

Suzuki and Lacktorin (1999) define four basic stages of SME development:

- (i) the “seed” phase;
- (ii) the early-growth phase;
- (iii) the growth phase;
- (iv) the stable and late-growth phase.

The differences of organizational and operational structure of SMEs at these stages determine the sources of their finance.

At the “seed” stage “...the firm may be little more than an idea...” (Suzuki and Lacktorin, 1999, p. 26), so it is usually financed by the founder and/or her friends. The early-growth phase completed by the first output production is still considered a very risky stage by creditors and investors. Thus, SME might seek only for the riskiest finance sources such as angel and venture capital. The growth stage is characterized by a fully established production process of goods or services. The SME starts to generate positive net cash flows and uses this money for so-called internal finance of its operational activity. However, stable expansion usually requires the infusion of external funds in the form of bank loans, lease financing or equity capital. These forms of external finance became available as a rule only when SME reveals stable growth or at the last stage of SME development.

However, not much empirical research has been done in the area of estimation of determinants and obstacles of SMEs performance in Ukraine, in particular the impact of the amount of external finance in the form of bank loans they use. So, my thesis work is aimed at filling this gap, conducting econometric testing of the hypothesis about positive relationship between short-term bank loans and SMEs net sales to assets performance based on the Ukrainian SMEs data described below.

Chapter 4

DATA, MODELING STRATEGY, ESTIMATION TECHNIQUES AND RESULTS

The objective of this thesis is to test the relationship between the amount of external finance in the form of short-term bank loans and economic performance of Ukrainian small and medium enterprises, controlling for other generally accepted determinants of enterprise performance. The first section is devoted to the description of the data set used in our analysis. Next we turn to the empirical model and its main assumptions. Then we proceed with the description of the estimation techniques used. The chapter concludes with discussion of results, limitations of conducted analysis and suggestions for future research.

4.1. Data Description

The data have been obtained from Ukrainian State Stock Market and Securities Commission provided to the Institute for Economic Research and Policy Consulting and German Advisory Group on Economic Reforms. The data are divided into two parts. The SMEs subsample includes 852 enterprises with up to 200 employees¹⁴. The large enterprises subsample consists of 832 companies with more than 200 workers. Empirical research is based on the accounting records of these enterprises taken from their balance sheets and income statements over 1997 and 1998. The sample includes both *de novo* created open joint stock companies and privatized ones after the beginning of Ukrainian independence. The selected enterprises represent all main sectors of Ukrainian economy, as well as all geographical regions.

¹⁴ According to the EBRD Transition Report 1999, the category of medium enterprises includes firms with at most 200 employees.

The selected sample exhibits a certain selection bias. First, the enterprises under consideration are open joint stock companies since the relevant data is not publicly available for the closed joint stock and privately owned enterprises. The second drawback is the “survivor bias” that is present in any SMEs data. We are observing only those SMEs that have performed well and are still active, whereas bad performers have closed and we do not observe them. In contrast, large enterprises rarely fail.

In the small and medium joint stock companies subsample 8.7% have more than 50% of stock owned by state, 21.4% are enterprises with less than 50% of stock in hands of the state and the remaining 69.9% are enterprises with majority of stock owned by the Ukrainian or foreign physical or legal private entities. The distribution of enterprises, both SMEs and large ones, by ownership type is given in the Table A1.

As for the external finance characteristics, only 18.5% of SMEs subsample used short-term bank credits in 1997 and 12% of them in 1998. The reduction in the amount of received credits in 1998 can be explained by the impact of Russian financial crisis as of August 1998 which triggered negative effects in Ukraine followed by Hryvnia’s devaluation and decrease of overall economic activity. The vast majority of bank credits were provided to non-state dominated firms – 95.6% in 1997 and 96.1% in 1998. Moreover, more than half of the total number of credits provided in both years were given to manufacturing, agriculture and wood industries firms, i.e. firms with the most capital intensive technologies. The full information about the distribution of short-term bank loans by ownership type and industries for SMEs is in Tables A3 and A4.

The subsample of large enterprises exhibits slightly different patterns. Thus, 12.2% of the subsample of large enterprises are open joint stock companies with more than 50% of shares held by the state, 22.2% are characterized by mixed ownership with

less than 50% of stock under state control, and the remaining 65.6% are enterprises with more than 50% of the stock held by Ukrainian or foreign physical or legal private entities. For more details see Table A1.

In contrast to the SMEs subsample, 50.5% of the large firms subsample used short-term bank credits in 1997 and 35.7% in 1998. The share of state dominated enterprises that used bank loans is almost three times greater than corresponding share of SMEs – 12.6% of state dominated firms used short-term bank credits in 1997 and 14.1% of them in 1998. As for the industrial distribution of loans, the share of loans provided to capital intensive firms is 75 – 80%. The distribution of short-term bank loans by ownership type and industries provided to sample large enterprises is given in Tables A5 and A6.

In addition, we find it useful to compare the ratio of short-term bank loans to total assets for the group of credited SMEs relative to credited large enterprises. The average amount of bank loans received by large enterprises was about 2.5% of their total assets in 1997 and 2.75% in 1998. In comparison, SMEs borrowed from banks in the amounts equal on average to 5.06% of their assets in 1997 and 6.08% in 1998. In both years, the difference between the ratios for SMEs and large enterprises is statistically significant at 1% significance level.¹⁵ At the same time, an apparent increase in bank loans to assets ratio in 1998 relative to 1997 in both subsamples is not statistically significant. So, we may conclude that Russian financial crisis of 1998 influenced the number of provided loans, but not their relative volumes.

Thus, SMEs' short-term bank credits to assets ratio is more than two times higher than the corresponding ratio for large enterprises in both years. This may be one of the possible explanations of the result received in empirical part of this paper that

¹⁵ Here we use the procedure of testing the difference between the population means based on two independent large samples (Newbold, 1994, p. 355).

the impact of the short-term bank credits on net sales to assets performance proxy is higher for SMEs.

Finally, while comparing the average performance¹⁶ of credited and non-credited SMEs and large enterprises (see Table 7), it should be noted that credited SMEs do not perform better than an average large firm does. The apparent difference is not statistically significant. At the same time, credited SMEs significantly outperform non-credited SMEs, whereas the difference between different groups of large enterprises is insignificant. The average performance of credited and non-credited enterprises by ownership type is presented in Table A7.

Table 7

**Average Performance of Credited and Non-Credited Sample Enterprises
(Net Sales to Total Assets Ratios)**

	The subsample of SMEs		The subsample of large enterprises	
	1997	1998	1997	1998
Total average	42.3%	42.5%	62.4%	60.7%
Credited enterprises	64.9%	72.5%	66.5%	67.0%
Firms without bank credits	37.1%	38.4%	58.2%	57.1%

Source: author's calculations

After the analysis of numbers from Table 7, we can suspect that the impact of external finance on performance of SMEs may be positive and significant. At the same time, this relationship is not apparent in case of large enterprises. But we may encounter the problem of reverse causality between external finance and enterprise performance. It might be claimed that only the most efficient SMEs are able to raise

¹⁶ The discussion about the choice of net sales to assets performance proxy see in the section 4.2. The Model and Definition of Variables.

external finance. Consequently, in the next section we develop and estimate the empirical model aiming at testing the hypothesis about the positive relationship between bank credits and performance of Ukrainian enterprises. In order to purify the impact of external finance on enterprise performance from that of performance on the amount of raised bank credits, we use instrumental variables estimation technique.

4.2. The Model and Definition of Variables

The following empirical analysis of the underlying hypothesis is conducted using the model similar to that of Estrin and Rosevear (1999, p. 1127). They postulate the following general equation form:

$$P_i = f(O_i, X_i, I_i, R_i) \quad (4.1.)$$

where P_i stands for the enterprise economic performance indicator, which is a function of ownership structure variables (O_i), vector of control variables for the firm operating situation (X_i) as well as industrial (I_i) and regional (R_i) controls.

Estrin and Rosevear (1999) use four different proxies for enterprise performance: (i) profitability, (ii) sales, (iii) employment and (iv) barter. Generated profits, as one of the most conventional proxies for total factor productivity in established economies, must be associated with better performance in transition economies as well. At the same time, sales, employment and barter may receive special emphasis for transition economies' performance indicators. First of all, the authors suppose sales to be positively correlated with performance, because, during transition, a lot of old enterprises frequently cease or slow down their production and, in addition, a lot of *de novo* created firms enter the markets and expand. Second, the choice of employment as a performance indicator is based on the assumption that reduction in the number of workers is critical for successful restructuring. Finally, the special

emphasis is done on barter as a pervasive phenomenon in Ukrainian economy. A higher portion of barter transactions is associated with worse enterprise performance because prices used in barter transactions are usually distorted.

As for our study, we have chosen to focus on net sales to total assets ratio NS/TA_{98} as a proxy measurement of total factor productivity. We decided to use net sales to total assets ratio in order to standardize the firms in the set. Certainly, it would be more accurate to look at the value added in case of dealing with sales as the performance proxy, calculated as net sales less the value of intermediate goods and depreciation of capital. But unfortunately, the data available do not contain the information about the cost of the intermediate goods and capital depreciation of the year 1997. In this case, we are not able to control for the previous year performance used in our model discussed below. The exclusion of this control variable leads to model misspecification detected by appropriate tests and the failure of the instruments used in it.

As for other performance proxies, we think that operating profitability of the firms is not the best indicator of enterprise performance since our data rely on the official accounting records. Empirical evidence supports the claim that firms tend to hide their true profitability at the expense of cost inflation, given the unfavorable institutional environment of Ukrainian transition, in particular the onerous taxation system. The data do not allow us as well to focus on the employment changes as performance indicator because we have records about the number of employees only for one year 1998. Finally, official accounting records do not provide any information about the amount of barter.

Since the main tested hypothesis is the relationship between SMEs performance and the amount of external finance, we change the basic model by Estrin and Rosevear (1999) by including the amount of short-term bank credits variable STC_{98} , while

controlling for the ownership type and concentration, size of the firm, industry. In addition we use a vector of proxy variables for the “quality” of the firm.

Contrary to the theoretical background discussed in previous chapter empirical studies do not provide strong evidence that private-owned enterprises outperform state-owned during transition. We think that it would be necessary to include the ownership type dummy into our analysis because small and medium enterprises are much more flexible than large ones and the impact of ownership structure on their performance could be more distinct. So, we use the dummy variables STATE for enterprises with more than 50% of stock owned by the state and MIXED for enterprises with less than 50% of stock held by the state. The PRIVATE variable, which is going to be the base category excluded from estimations, includes enterprises with stock owned by private legal or physical entities both domestic and/or foreign. Unfortunately, the data do not allow us to distinguish between insider and outsider types of ownership.

In order to control for the impact of ownership concentration on economic performance of SMEs the dummy variable CONC is used to distinguish enterprises with concentrated ownership. We have decided to follow the definition of concentration used by Andreyeva (2000), interpreting ownership concentration as an existence of one shareholder with over 25% of the firm stock, or so-called blocking stake, if other shareholders hold dispersed shares.

Finally, for the model to be complete the vector of controls for the company’s operating situation is to be included, since enterprises may differ in technologies, size, internal organization they use and market environments in which they operate.

The available data make it possible to control for previous year performance NS/TA_{97} , because it is natural to suspect that firms will not tend to radically change

current year performance in relation to the previous year. The control for the size of the firm is done by SIZE variable that reflects the number of employees of the firm.

A proxy for old equipment OLDCAP and a “material” of production variable COST reflect other quality characteristics of the firms. The OLDCAP variable is calculated as the ratio of the current value of the capital used in production to the initial capital value. It is logical to suppose that total factor productivity and all proxies of this performance variable will tend to decrease in the process of capital depreciation. The COST variable is calculated as the ratio of “material” costs or the value of intermediate goods to the total amount of production costs. It is included in order to control for the ratio of intermediate goods used in production and distinguish higher value added firms.

The data also give the possibility to control for industrial characteristics by separating SMEs into four groups following the model of Begrer and Udel (1995). The industry dummy CONSTR reflects whether the firm is the construction, services – in SERVICES, or retail – in RETAIL industries. The reference category OTHERIND includes the remaining firms, most of which are in the manufacturing sector.

So, the above-discussed empirical model can be represented by the following equation that we estimate in the next section:

Model Specification 1.

Performance equation:

$$\left(\frac{NS}{TA}_{98} \right)_i = \hat{a}_1 + \hat{a}_2 \ln(STC_{98})_i + \hat{a}_3 \left(\frac{NS}{TA}_{97} \right)_i + \hat{a}_4 MIXED_i + \hat{a}_5 STATE_i + \hat{a}_6 CONC_i$$

$$\begin{aligned}
& + \hat{\alpha}_7 \ln(SIZE)_i + \hat{\alpha}_8 OLDCAP_i + \hat{\alpha}_9 COST_i + \hat{\alpha}_{10} CONSTR_i + \\
& \hat{\alpha}_{11} RETAIL_i \\
& + \hat{\alpha}_{12} SERVICES_i + \hat{\alpha}_i
\end{aligned}
\tag{4.2}$$

where $\frac{NS}{TA}_{98}$ – net sales to total assets ratio in 1998;

STC_{98} - the amount of short-term bank loans in 1998, in 1,000 UAH;

$\frac{NS}{TA}_{97}$ - net sales to total assets ratio in 1997;

MIXED – one if less than 50% of the firm stock is held by the state, zero otherwise;

STATE – one if more than 50% of the firm stock is held by the state, zero otherwise;

CONC – one if there exists at least one shareholder that owns more than 25% of firm stock;

SIZE – the number of employees on the firm;

OLDCAP – the ratio of current value of capital to the initial value of capital;

COST – the ratio of the cost of intermediate goods used to the total production costs;

CONSTR – one if the firm is in the construction; zero otherwise;

RETAIL – one if the firm is in the retail industry; zero otherwise;

SERVICES – one if firm is in the services; zero otherwise.

The definitions of all variables of all model specifications are presented in Table A8.

It should be noted that we decide to estimate the model specifying the natural logarithm of bank credits variable STC_{98} . That is, we suspect that there is diminishing marginal return on credits, i.e. relatively smaller amounts of credits are going to be more effective for enterprise performance improvement than larger amounts that may lead to firm over-leverage and debt servicing problems consequently hampering firm sales growth.

However, we may encounter an endogeneity problem in this model since the amount of bank loans may itself depend on enterprise performance. When a firm owner or manager decides to raise money using such source of external finance as commercial bank, enterprise performance is one of the most important indicators of the data used by banks in making their loan decision. The presence of endogeneity between the dependent variable (enterprise performance proxy) and one of the explanatory variables (the amount of short-term bank loans) will lead to the inconsistent OLS estimates of our model. In this case the assumption that explanatory variable and error terms are uncorrelated or $\text{cov}(\hat{a}_i, X_i) = 0$ is violated because external finance variable will systematically correlate with unobserved things in error terms. Consequently, the variable of external finance ought to be instrumented by other variable, or a vector of variables, which must satisfy the following conditions:

- (i) the vector of instruments should be highly correlated with instrumented variable and
- (ii) it should not correlate with the error terms of the performance equation.

In order to construct the vector of instruments we use the model of investment decision presented in the paper studying firm investment in transition countries by Johnson *et al.* (1999). According to that model, the firm turns to external finance in case when it fully exhausts internally generated funds:

$$\begin{aligned}
 I^d &= R, & \text{if } I^d \leq E_i \\
 I^d &= E_i + L^d, & \text{if } I^d > E_i
 \end{aligned} \tag{4.3}$$

where I^d is the demand for investable funds, R represents reinvested earnings, E_i current profits and L^d firm's demand for loans. However, the amount of bank loans observed in practice is determined not only by the firm's demand for loans but as

well by the willingness of bank to lend to that firm or loan supply. Then under assumption of market clearing, the amount of loans used by the firm is the function of both demand and supply factors received by putting $L^d = L^s$. In their study Johnson *et al.* (1999) estimate the following reduced form loan equation¹⁷:

$$L = L(c, L_1, r, m, R) \quad (4.4)$$

where among the supply factors authors include: c – collateral the firm has to support the loan, r – the interest rate of the funds, L_1 – loans received in the past as an indicator of firms creditworthiness, m – the vector of manager and firm characteristics; and demand factor: R – reinvested profits¹⁸.

Nevertheless, we think that these factors cannot be divided so strictly among the demand and supply groups. Thus, for example, the size of the firm, which enters the vector of manager and firm characteristics, can be considered as a demand factor within the framework of financial theory of firm size determination discussed above. In addition, past external financing may reflect the process of firm's fast growth and, consequently, may be considered as factor that indicates further demand for external funds. Consequently, all of the above-discussed factors can be the prime candidates for the vector of instruments combined with the assumption of the absence of correlation between them and the error terms of the performance equation (4.2) we are estimating.

¹⁷ The original reduced form loan equation (4.4) presented in Johnson *et al.* (1999) includes additional factors representing managers' perceptions of property rights on investment. Taking into consideration the facts that (i) Johnston *et al.* (1999) do not find significant relationship between property rights index and receiving a bank loan and (ii) our data do not allow us to control for such factors, we have decided to exclude property rights index from our considerations under the content of reduced form loan equation.

¹⁸ Reinvested profits are negatively related with the loans and enter loan equation as a factor that determines demand for the external finance.

Unfortunately, the data our analysis is based on do not give information about the collateral and interest on the funds. In addition, we decide not to include the reinvested profits variable into our analysis. We think that reinvested profits entries taken from the income statements of our sample firms are not reliable because of the argument already discussed. Firms in Ukraine intensively use the practice of hiding profits through cost inflation (especially SMEs) because of onerous system of taxation. Consequently, we decide to use the lagged value of the amount of short-term credits STC_{97} as an instrument that satisfies all requirements imposed on vector of instruments. First, amounts of short-term credits in 1997 highly correlate with the amounts of short-term credits in 1998 with the correlation coefficient 0.833. Second, the amounts of bank loans of the previous period are assumed not to correlate with error terms of performance equation of the current period. Firm governance, size, industry and “quality” characteristics from performance equation¹⁹ (4.2.) enter the vector of instruments of bank loans as well as the vector of regressors of the new performance equation and, consequently, serve as instruments for bank credits and instruments for themselves. Therefore, the model is reformulated as follows:

Model specification 2.

First stage (instrumented bank loans equation):

$$\begin{aligned} \ln(STC_{98})_i &= \hat{\alpha}_1 + \hat{\alpha}_2 \ln(STC_{97})_i + \hat{\alpha}_3 \left(\frac{NS}{TA}_{97} \right)_i + \hat{\alpha}_4 MIXED_i + \\ &\hat{\alpha}_5 STATE_i + \hat{\alpha}_6 CONC_i \\ &+ \hat{\alpha}_7 \ln(SIZE)_i + \hat{\alpha}_8 OLDCAP_i + \hat{\alpha}_9 COST_i + \hat{\alpha}_{10} CONSTR_i + \\ &\hat{\alpha}_{11} RETAIL_i + \end{aligned}$$

¹⁹ Standing for vector m.

$$+ \hat{a}_{12}SERVICES_i + u_i$$

Second stage (performance equation):

$$\begin{aligned} \left(\frac{NS}{TA}_{98} \right)_i &= \hat{a}_1 + \hat{a}_2 \ln(STC_{98})_i^* + \hat{a}_3 \left(\frac{NS}{TA}_{97} \right)_i + \hat{a}_4 MIXED_i + \\ &\hat{a}_5 STATE_i + \hat{a}_6 CONC_i \\ &+ \hat{a}_7 \ln(SIZE)_i + \hat{a}_8 OLDCAP_i + \hat{a}_9 COST_i + \hat{a}_{10} CONSTR_i + \\ &\hat{a}_{11} RETAIL_i \\ &+ \hat{a}_{12} SERVICES_i + \hat{a}_i \end{aligned} \tag{4.5}$$

where $\ln(STC_{98})_i^*$ - are the fitted values received from the first stage of estimation procedure for short-term bank credits in 1998 instrumented by the amount of short-term bank loans in 1997 and the set of control variables standing for the firm's governance, size, industry and "quality" characteristics;

and $\frac{NS}{TA}_{98}$ - net sales to total assets ratio in 1998;

STC_{98} - the amount of short-term bank loans in 1998, in 1,000 UAH;

$\frac{NS}{TA}_{97}$ - net sales to total assets ratio in 1997;

STC_{97} - the amount of short-term bank loans in 1997, in 1,000 UAH;

$MIXED$ - one if less than 50% of the firm stock is held by the state, zero otherwise;

$STATE$ - one if more than 50% of the firm stock is held by the state, zero otherwise;

CONC – one if there exists at least one shareholder that owns more than 25% of firm stock;
SIZE – the number of employees on the firm;
OLDCAP – the ratio of current value of capital to the initial value of capital;
COST – the ratio of the cost of intermediate goods used to the total production costs;
CONSTR – one if the firm is in the construction; zero otherwise;
RETAIL – one if the firm is in the retail industry; zero otherwise;
SERVICES – one if firm is in the services; zero otherwise.

However, taking into account the fact that not all enterprises have positive or zero amounts of bank loans in both periods, the above-presented instrument may be not be valid. According to the data, only 80% of STC_{98} variable observations are overlapped by the corresponding STC_{97} ones. Consequently, the model specification can be changed by inclusion of additional variables into the vector of instruments.

Our considerations about the content of expanded vector of instruments for external finance are based on the model of Berger and Udell (1995), who studied the determinancy of different contract characteristics of bank credit lines to SMEs by financial, governance, industry and information characteristics of these enterprises.

The financial characteristics of the developed model include the key financial ratios that are widely used in credit risk analysis in the process of the bank lending decision on the loan characteristics such as loan amount, as well as loan rate and collateral. Among them are leverage ratio (total debt/equity), current ratio (current assets/current liabilities)²⁰, quick ratio ($[\text{current assets} - \text{inventory}] / \text{current liabilities}$), accounts receivable turnover ($\text{account receivable} / [\text{sales} / \text{day}]$), accounts payable turnover ($\text{account payable} / [\text{sales} / \text{day}]$), total assets, etc. The proxy for enterprise performance in the form of pretax profit margin as a percentage of sales is also included in this group of determinants.

²⁰ Next we are going to refer to the current ratio as liquidity ratio of the firm.

As for the governance characteristics Berger and Udell (1995, p. 359) argued that "...[d]ifferent ownership structures may be related to the amount of private information that borrowers have, the risks that borrowers take, and the ability of borrowers to shift the risk to the bank and other fixed-claim holders... " Consequently authors control for different types of ownership and ownership concentration. Moreover, they control for the industry types (CONSTR, RETAIL, TRADE, OTHERIND) which, together with governance characteristics serve for estimation of the lending risk that determines the amount of credits provided by banks, their rates and collateral characteristics, etc. Finally, authors also include a vector of information/relationship variables such as the number of years of relationship of the firm with its current lender, representing the strength of the bank-borrower relationship, and the number of years that current owners are in place.

We would like to add that all these firm characteristics could be considered also as the determinants of the firm demand for loans. Thus, for example, temporarily illiquid but fast growing firms would tend to have higher demand for external finance. The demand for bank loans as well may be higher for private firms, which in contrast to state-owned ones might face much harder budget constraints, etc.

So, we have decided to construct an overlapping vector of instruments for external finance of our model taking into consideration the model proposed by Berger and Udell. The data our analysis is based on unfortunately do not allow us to include exactly the same variables into the vector of instruments. As a result, we select such financial characteristics as liquidity LIQ and leverage ratio of the previous year²¹ LEV₉₇ as overlapping instruments for bank credits. Governance and industrial

²¹ We decide to use the lagged value of leverage ratio because of the threat of possible endogeneity problem between the amount of bank loans and leverage ratio of the firm. On the one hand, highly leveraged enterprises tend to encounter problems with receiving bank finance. On the other hand, new bank credits definitely lead to increase in the firm leverage. Thus, using lagged value of leverage ratio we simply argue that its value affects current level of external finance, but is not affected by amount of current bank loans. At the same time, this is not the problem in case of enterprise liquidity ratio.

characteristics, performance proxy of the previous year, and other control variables the same as in performance equations (4.2. and 4.5.) are going to be the instruments for credits and for themselves. The amount of bank loans in the previous year can be considered as information/relationship characteristic between borrower and lender (a proxy for the so-called credit history or borrower creditworthiness as well as a proxy for fast growing firm). The size of the firm is continued to be measured by the natural logarithm of the number of employees instead of total assets used in Berger and Udell (1995) model in order to avoid the correlation between dependent performance variable and size explanatory variable. Thus, the final model specification that can be represented as follows:

Model specification 3.

First stage (instrumented bank loans equation):

$$\begin{aligned} \ln(STC_{98})_i = & \hat{a}_1 + \hat{a}_2 \ln(STC_{97})_i + \hat{a}_3 LIQ_i + \hat{a}_4 LEV_{97} + \hat{a}_5 \left(\frac{NS}{TA}_{97} \right)_i + \\ & \hat{a}_6 MIXED_i + \\ & + \hat{a}_7 STATE_i + \hat{a}_8 CONC_i + \hat{a}_9 \ln(SIZE)_i + \hat{a}_{10} OLD CAP_i + \\ & \hat{a}_{11} COST_i + \\ & + \hat{a}_{12} CONSTR_i + \hat{a}_{13} RETAIL_i + \hat{a}_{14} SERVICES_i + u_i \end{aligned}$$

Second stage (performance equation):

$$\begin{aligned} \left(\frac{NS}{TA}_{98} \right)_i = & \hat{a}_1 + \hat{a}_2 \ln(STC_{98})_i^* + \hat{a}_3 \left(\frac{NS}{TA}_{97} \right)_i + \hat{a}_4 MIXED_i + \\ & \hat{a}_5 STATE_i + \hat{a}_6 CONC_i \end{aligned}$$

$$\begin{aligned}
& + \hat{\alpha}_7 \ln(\text{SIZE})_i + \hat{\alpha}_8 \text{OLDCAP}_i + \hat{\alpha}_9 \text{COST}_i + \hat{\alpha}_{10} \text{CONSTR}_i + \\
& \hat{\alpha}_{11} \text{RETAIL}_i + \\
& + \hat{\alpha}_{12} \text{SERVICES}_i + \hat{\alpha}_i
\end{aligned}
\tag{4.6}$$

where $\ln(\text{STC}_{98})_i^*$ - are fitted values of short-term bank credits in 1998 received from the first stage of estimation procedure instrumented by the amount of short-term bank credits in 1997, two additional instruments - liquidity ratio and leverage ratio in 1997 - and the set of control variables.

and $\frac{NS}{TA}_{98}$ - net sales to total assets ratio in 1998;

STC_{98} - the amount of short-term bank loans in 1998, in 1,000 UAH;

$\frac{NS}{TA}_{97}$ - net sales to total assets ratio in 1997;

STC_{97} - the amount of short-term bank loans in 1997, in 1,000 UAH;

LIQ - liquidity ratio: high liquid assets/ short-term liabilities;

LEV_{97} - leverage ratio: total debt/equity in 1997;

MIXED - one if less than 50% of the firm stock is held by the state, zero otherwise;

STATE - one if more than 50% of the firm stock is held by the state, zero otherwise;

CONC - one if there exists at least one shareholder that owns more than 25% of firm stock;

SIZE - the number of employees on the firm;

OLDCAP - the ratio of current value of capital to the initial value of capital;

COST - the ratio of the cost of intermediate goods used to the total production costs;

CONSTR - one if the firm is in the construction; zero otherwise;

RETAIL - one if the firm is in the retail industry; zero otherwise;

SERVICES - one if firm is in the services; zero otherwise.

The definitions of all variables are collected in Table A8. Summary statistics for these variables are in Tables A9 and A10.

4.3. Estimation Techniques

The above-developed model is estimated using the following procedure. First Ordinary Least Squares (OLS) are used to estimate model specification 1 for both subsamples. Then the model is estimated by the Instrumental Variables (IV) procedure in order to eliminate the potential endogeneity problem between enterprise performance and the amount of external finance in the form of short-term bank credits. The IV estimation is applied to both model specifications (2) and (3)²². Estimation results are presented in Table 8 for SMEs and Table 9 for large enterprises for different model specifications of the performance equation. All estimations are done using robust techniques in order to address the problem of heteroskedasticity that is a frequent feature of cross-section data.

At the next stage we apply Hausman Specification test in order to test for the difference between received OLS and IV estimates, i.e. we test the hypothesis about the consistency of OLS estimates. Hausman procedure is applied to the vector of endogenous variables and Hausman χ^2 is reported with degrees of freedom equal to the number of endogenous variables (Johnston and DiNardo, 1997, p. 259). Finally, we test the expanded instrumental variables vector of model specification (3) for the validity of the instruments on the basis of the Overidentifying Restrictions test (for technical details of Hausman and Overidentifying Restrictions Test statistics see technical appendix).

The results of the Hausman test are presented along with the estimation results in Tables 8 and 9. Data allow us to reject the null hypothesis about the consistency of OLS estimate of the coefficient $\hat{\alpha}$ that reflects the relationship between the amount of bank loans and enterprise performance in case of SMEs against both IV model specifications ($\chi^2_{\text{Hausman}} = 3.34$ with p-value = 0.068 – for model specification (2) and

²² In case the vector of instruments is greater than vector of instrumented variables the estimator is sometimes referred as Generalized Instrumental Variables Estimator (GIVE) (Verbeek, 2000, p. 137).

$\chi^2_{\text{Hausman}} = 3.91$ with p-value = 0.048 – for model specification (3)). Consequently, we must base our conclusions about the impact of external finance on performance of SMEs on the IV estimates. And the most important finding is that the IV estimation technique makes this relationship statistically significant by solving the endogeneity problem.

As for the large enterprises subsample data do not allow us to reject the consistency of OLS estimate of \hat{a}_2 as well as show insignificance of both OLS and IV estimates of the relationship between short-term bank loans and net sales to assets performance of large enterprises.

Table 8

**Weighted Regression Results for SMEs Subsample.
Dependent Variable: Net Sales to Assets Ratio**

Explanatory variable	OLS (1)		IV(exact identification) ¹ (2)		IV(overidentification) ² (3)	
	Coefficient	Robust St. Error	Coefficient	Robust St. Error	Coefficient	Robust St. Error
<i>ln(STC₉₈)</i>	.0346	.0343	.0729*	.0402	.0713*	.0390
<i>NS/TA₉₇</i>	.2988**	.1288	.2933**	.1257	.2935**	.1258
<i>MIXED</i>	-.0025	.0454	.0079	.0462	.0074	.0463
<i>STATE</i>	-.0267	.0666	-.0121	.0664	-.0127	.0666
<i>CONC</i>	.0373	.0549	.0306	.0550	.0309	.0551
<i>ln(SIZE)</i>	.0107	.0606	.0029	.0596	.0033	.0594
<i>OLDCAP</i>	.1349	.1625	.0994	.1620	.1009	.1628
<i>COST</i>	.7292***	.2334	.7137***	.2287	.7143***	.2294
<i>CONSTR</i>	-.0190	.0373	-.0094	.0374	-.0098	.0372
<i>RETAIL</i>	.3684***	.0941	.3416***	.0920	.3427***	.0928
<i>SERVICES</i>	.0474	.0500	.0485	.0500	.0484	.0500
Constant	-.1844	.1537	-.1402	.1533	-.1421	.1526
R-squared	.3050	-	.2982	-	.2988	-

F-statistics	F(11, 840) = 14.59 p=0.0000	-	F(11, 840) = 14.19 p=0.0000	-	F(11, 840) = 14.28 p=0.0000	-
F-test of significance of IVs in the 1 st stage regressions	n/a	-	F(1, 840) = 128.33 p=0.0000	-	F(3, 838) = 46.70 p=0.0000	-
RESET statistics	F(2, 838) = 80.88 p=0.0000	-	n/a	-	F(2, 838) =0.3419 p=0.7105	-
Hausman statistics	n/a	-	$\chi^2(1)=3.337$ p=0.0677	-	$\chi^2(1)=3.910$ p =0.0480	-
Overidentifying restrictions test	n/a	-	n/a	-	$\chi^2(2)=.7464$ p = .6885	-

Observations = 852; ***, (**), (*) - statistically significant at 1%, (5%), (10%) level

¹ Instrumented: $\ln(STC_{98})$

Instruments: $\ln(STC_{97}) + NS/TA_{97} PRIV \dots SERVICES$

² Instrumented: $\ln(STC_{98})$

Instruments: $\ln(STC_{97}), LIQ, LEV_{97} + NS/TA_{97} PRIV \dots SERVICES$

Table 9

**Weighted Regression Results for Large Enterprises Subsample.
Dependent Variable: Net Sales to Assets Ratio**

Explanatory variable	OLS (1)		IV(exact identification) ¹ (2)		IV(overidentification) ² (3)	
	Coefficient	Robust St. Error	Coefficient	Robust St. Error	Coefficient	Robust St. Error
<i>ln(STC₉₈)</i>	.0002	.0052	.0020	.0073	.0022	.0073
<i>NS/TA₉₇</i>	.7427***	.0446	.7422***	.0449	.7421***	.0449
<i>MIXED</i>	-.0095	.0303	-.0091	.0300	-.0091	.0300
<i>STATE</i>	-.0529	.0390	-.0517	.0378	-.0516	.0379
<i>CONC</i>	.0578*	.0297	.0570**	.0289	.0569**	.0289
<i>SIZE</i>	.0019	.0115	-.0004	.0127	-.0006	.0126
<i>OLDCAP</i>	.0893	.0766	.0876	.0759	.0874	.0760
<i>COST</i>	.2018***	.0650	.2007***	.0648	.2006***	.0649
<i>CONSTR</i>	.0822***	.0319	.0837***	.0322	.0838***	.0322
<i>RETAIL</i>	.4430***	.1148	.4427***	.1143	.4426***	.1144
<i>SERVICES</i>	.0484	.0456	.0494	.0457	.0495	.0457
Constant	-.0749	.0884	-.0616	.0889	-.0604	.0888
R-squared	0.7826	-	0.7826	-	0.7826	-

F-statistics	F(11,820) =108.00 P=0.0000	-	F(11,820) = 106.04 P=0.0000	-	F(11,820) =105.76 P=0.0000	-
F-test of significance of IVs in the 1 st stage regressions	n/a	-	F(1, 820) = 421.19 p=0.0000	-	F(3, 818) = 146.99 p=0.0000	-
RESET statistics	F(2, 818) =13.37 p=0.0000	-	n/a	-	F(2, 818) =0.0950 p=0.9094	-
Hausman statistics	n/a	-	$\chi^2(1)=0.1234$ p=0.7253	-	$\chi^2(1)=0.1524$ p=0.6963	-
Overidentifying restrictions test	n/a	-	n/a	-	$\chi^2(2)=.5384$ p=.7640	-

Observations = 832; ***, (**), (*) - statistically significant at 1%, (5%), (10%) level

¹ Instrumented: $\ln(STC_{98})$

Instruments: $\ln(STC_{97}) + NS/TA_{97} PRIV \dots SERVICES$

² Instrumented: $\ln(STC_{98})$

Instruments: $\ln(STC_{97}), LIQ, LEV_{97} + NS/TA_{97} PRIV \dots SERVICES$

Overidentifying Restrictions Test applied to model specification (3) with overlapping vector of instruments fails to reject the hypothesis about validity of the used instruments for the subsamples of both SMEs large enterprises. For SMEs $\chi^2_{OR} = 0.75$ with p-value = 0.69, for large firms $\chi^2_{OR} = 0.54$ with p-value = 0.76 (see Tables 8 and 9). Thus, we can conclude that the vector of instruments used in IV estimation is valid in both for subsamples.

Moreover, in order to check the robustness of the received results we perform a similar estimation procedure for the whole sample by including a new dummy variable (SMALL) and interactive terms of this variable with all other explanatory variables in order to distinguish their impact on net sales to assets performance proxy of SMEs and large enterprises. The results are presented in Table A11. As it can be seen they provide very close results to ones obtained in separate estimations of the two subsamples and confirm our claim about the robustness of the main results. The obtained results are discussed in more detail in the next section.

4.4 Discussion of Results

The estimation results of presented in Tables 8 and 9 allow us to make the following conclusions:

- (i) There is a positive statistically significant relationship between SMEs net sales to assets performance proxy and the amount of external finance. Different model specifications show rather robust estimates of this relationship. As shown in Table 8 presenting the instrumental variables estimation results for SMEs subsample, a 1% increase in the amount of external finance in the form of short-term bank loans leads to 0.07% increase in their net sales to assets ratio. The long-run effect of the external finance on the performance of Ukrainian SMEs seems to be even greater. A 1% increase in amount of short-term bank loans leads to 0.1% increase of SMEs performance in the long-run. We should emphasize that the received result is economically significant. It means that an increase in credits by 100%, or simply doubling the amount of short-term credits is going to lead to a 7% increase in net sales to assets ratio of SMEs within a year.

At the same time the data do not show any significant effect of external finance in the form of short-term bank loans on net sales to assets ratio of large enterprises. This can be explained by the fact that short-term lending may not be sufficient for improvement of the performance of large enterprises. Large firms may use other sources of finance, both internal and external, for example long-term bank credits and equity, to meet their investment expenditures.

- (ii) The estimation fails to show a significant relationship between ownership type and concentration and SMEs performance. The relationship between ownership structure and performance in case of large enterprises is more interesting. While ownership type (state-controlled vs. non-state controlled)

fails to have any significant relationship with net sales to assets ratio of large enterprises, ownership concentration is positively related with the performance of large enterprises. One of the possible explanations of the former result is that the data may be biased to reflect true population relationship between ownership and SMEs and larger enterprises' performance. The later result, nevertheless, is consistent with corporate governance literature stating the better performance for enterprises with existence of at least one shareholder with blocking stake of shares. However, we should emphasize that since the main purpose of this work is the investigation of *the impact of external finance on performance of Ukrainian SMEs*, we just controlled for the ownership type and concentration dummies. No causal quantitative conclusions about the impact of ownership structure on enterprise performance should be drawn from our estimation, since the data do not allow us to solve the endogeneity problem for privatized firms as performance itself can be a factor of privatization. The data do not allow us to distinguish between privatized firms and *de novo* created open joint stock companies.

- (iii) The next interesting result is that there is a strong positive relationship between the performance of all enterprises (small, medium and large ones) and their performance in the previous year. This might be explained by the presence of rigidity in the performance characteristic, i.e. one year might be too short a period for under-performers to significantly improve and for over-performers to get worse. But, of course, in case of SMEs this rigidity should be smaller because of their higher flexibility. This conclusion is supported by estimation results. Thus, the impact of the previous year's performance on the next year's net sales to assets ratio is almost three times greater for large enterprises than for SMEs.

- (iv) As for the quality characteristics and industrial controls we find a significant positive relationship between “material” intensity of production – costs of the intermediate goods used by firms in the production process - and net sales to assets ratio for both SMEs and large enterprises. At the same time, there is no significant relationship between either the proxy of capital depreciation or the size of the firm and enterprise net sales to assets performance in both subsamples.
- (v) Finally, firms in retail industries in case of SMEs and in retail and construction industries in case of large enterprises tend to have higher performance in terms of net sales to assets ratio compared to the reference category of manufacturing and agricultural firms.

Limitations of Research and Suggestions for Further Analysis. Unfortunately, there is a set of limitations of the performed analysis that are worth discussing.

We think that it is worthwhile to conduct the same kind of analysis using time series data. First, this will allow investigation of the dynamic impact of the external finance on the performance of Ukrainian SMEs in contrast to large enterprises. It is argued by Pistor *et al.* (2000) that levels of external finance in transition economies are still far away from a market economy equilibrium and consequently are determined by starting points or initial imbalance. The dynamic formulation of the model would allow one to test the impact of changes of external finance on enterprise performance, controlling for initial levels. But, in this case, given the discovered endogeneity, the usage of the lagged values of short-term credits as instruments is not satisfactory, leading to the violation of the assumption about correlation of explanatory variables with error terms. Consequently, an attempt should be made to identify the new vector of instruments.

Availability of time series data also allows for controlling of unobserved characteristics of the firms that are almost immeasurable such as quality of the management or employees. As is well known, cross-section estimation fails to solve the problem of unobserved heterogeneity. Only time series estimation procedures can account for omitted and immeasurable variables using firm-specific coefficients and relying on the assumption about time invariance of omitted variables.

It might be claimed that there is a limitation of the analysis due to selection bias in the case of SMEs. Since the SME lending is considered to be much riskier than lending to large enterprises, only the best SME performers may have non-zero entries in their short-term bank credits balance sheets rows. But we tried to solve this problem by including both firms with positive bank credits and with no bank credits into SMEs subsample. At the same time, we do not observe enterprises that may have stopped their operation because of the lack or overhang of external finance. If indeed such a phenomenon occurred, exclusion of such firms may have introduced a downward bias in our estimates. Including the non-survivors could only have strengthened the result we found.

Chapter 5

CONCLUSIONS AND POLICY IMPLICATIONS

Based on the analysis presented in Chapter 4, the most important finding of the empirical part of this paper is that there is a positive significant relationship between performance of Ukrainian SMEs and the amount of external finance they acquire.

Unfortunately, according to the results of different surveys conducted in Ukraine on the state of SME sector, managers/owners of SMEs complain that their growth and development are constrained by lack of external finance. Thus, according to the results of the survey²³ carried out by the Institute for Economic Research and Policy Consulting (IERPC), only 8% of sample enterprises use short-term bank loans on a permanent basis. The claim about the limited access to bank credit by SMEs is supported by the following figures: only 22.5% of sample SMEs ever applied for bank credit, and 51.1% that applied were refused. The main reasons for not even starting the loan application were (Oleksiv, 2001):

- (i) the absence of the required collateral (41.9% of the respondents);
- (ii) too high interest-rates (40.6% of the respondents).

Turning to the characteristics of the data, the empirical part of this paper is based on, there were only about 15% of the subsample SMEs that used short-term bank credits in 1997/98 in contrast to almost 43% of large firms that relied on such credits.

²³ The survey developed by IERPC in the fall 2000 consists of sample of 210 Ukrainian enterprises employing up to 100 workers located in three major Ukrainian cities: Kyiv, Harkiv, Donetsk.

The origin of SMEs credit constraint problem in Ukraine has both demand-side and supply-side aspects. In applying for loan, SMEs may be constrained by a higher cost of credit in comparison to large enterprises, the lack of collateral, and high loan interest. At the same time, commercial banking industry is reluctant to SME lending because of the high credit risks associated with this segment of the Ukrainian market.

However, commercial banks are mainly responsible for the major part of both micro enterprise and small business finance throughout the world according to the study conducted by Jenkins (2000), who used a sample of 220 banks representing 78 countries of different development levels. And the most important finding of this study is that 67% of banks serving SME sectors reported their commercial interest in SME lending. Among the main reasons of making micro and small enterprises loans they state:

- (i) profitability of such loans (49% of the respondents);
- (ii) and changing market conditions and increasing competition in lending to large/medium enterprises (44% of the respondents).

At the same time, it is found that reliance on high collateral in SME lending is positively related with average levels of loan arrears, i.e. existence of collateral causes banks to adversely select or poorly evaluate their borrowers. Moreover, the highest SMEs loan arrears are reported for the weakest financial economies, including Ukraine and other Former Soviet Union countries. Consequently, the study by Jenkins (2000) suggests that SMEs bank lending may be possible and quite efficient given that it is driven by commercial reasons ensuring the best monitoring and evaluating efforts.

The empirical results shown above, combined with the fact of limited access of many Ukrainian SMEs to external financing, suggest that Ukrainian authorities should foster the implementation of the market-oriented policies directed at reducing the exposure of banks and credit transaction costs of SME lending (Hallberg, 1999). Such a strategy should include the following:

- (i) Improvement of Ukrainian legislation in the sphere of SME sector regulation. First of all, the category of “medium enterprise” should be finally legally defined in Ukrainian. Second, the laws directed at the reduction of banks’ exposure are to be adopted or improved. Among them are:
 - improvement of SMEs operational activity regulation in order to make their operation more transparent;
 - improvement of institutions governing the effectiveness of contract enforcement and creditors rights protection. According to the study by Pistor *et al.* (2000), almost all transition countries including Ukraine are well above the world average of the LLSV index, which is developed by La Porta *et al.* (1997) to characterize the level of creditors rights protection defined in laws of different countries. At the same time, Ukraine has one of the lowest *effectiveness* and *enforcement* indexes developed to measure the effectiveness of legal institutions in transition countries (Pistor *et al.*, 2000). Thus, Ukraine should overcome the institutional constraints in the development of its financial market;
- (ii) Simultaneous strengthening of the expertise of Ukrainian financial institutions in evaluating credit risks of SMEs and, consequently, encouraging the expansion of lending to the SME sector;

- (iii) Reduction of credit transactions costs by encouraging the implementation of new lending technologies associated with reduction of credit application, monitoring, and payment costs;
- (iv) Development of “relationship banking” – the way to overcome asymmetric information problem that banks have about SME businesses by getting closer to them;
- (v) Promoting the development of alternative financial facilities, such as (i) private facilities - venture-capital funds and small equity investments, leasing and foreign direct investment, international credit lines, and (ii) public facilities – credit-guarantee programs and government credit lines (Homna, 1999). As for the private lending facilities, the regulation should ensure the existence of the market environment to let them be profitable. Public lending, in contrast, has its advantages and disadvantages, and should be implemented very cautiously²⁴.

²⁴ For more detailed discussion see Homna (1999).

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APPENDIX TABLES

Table A1

The Distribution of Sample Enterprises by Ownership Type

	The subsample of SMEs		The subsample of large enterprises	
Joint stock companies with more than 50% of stock owned by state (state dominated firms)	74	8.7%	101	12.2%
Joint stock companies with less than 50% of stock owned by state (mixed firms)	182	21.4%	185	22.2%
Joint stock companies owned by Ukrainian or foreign physical or legal entities (private firms)	596	69.9%	546	65.6%
TOTAL	852	100%	832	100%

Source: author's calculations

Table A2

The Distribution of Sample Enterprises by Ownership Concentration

	The subsample of SMEs		The subsample of large enterprises	
Enterprises with the existence of at least one shareholder with more than 25% of firm stock	396	46.5%	382	45.9%
Enterprises with diffused ownership	456	53.5%	450	54.1%
TOTAL	852	100%	832	100%

Source: author's calculations

Table A3

**Distribution of Short-term Bank Credits in Subsample of SMEs by
Ownership Type**

	Short-term bank credits in 1997		Short-term bank credits in 1998	
	number	% of total	number	% of total
Joint stock companies with more than 50% of stock owned by state (state dominated firms)	7	4.4 %	4	3.9 %
Joint stock companies with less than 50% of stock owned by state (mixed firms)	32	20.3 %	17	16.7 %
Joint stock companies owned by Ukrainian or foreign physical or legal entities (private firms)	119	75.3 %	81	79.4 %
TOTAL	158	100 %	102	100 %

Source: author's calculations

Table A4

**Distribution of Short-term Bank Credits in Subsample of SMEs by
Industries**

	Short-term bank credits in 1997		Short-term bank credits in 1998	
	number	% of total	number	% of total
Manufacturing, agriculture, wood industry	86	54.4 %	52	50.9 %
Construction	7	4.4 %	4	3.9 %
Retail industries	46	29.1 %	34	33.3 %
Services	19	12.1 %	12	11.9 %
TOTAL	158	100 %	102	100 %

Source: author's calculations

Table A5

Distribution of Short-term Bank Credits in Subsample of Large Enterprises by Ownership Type

	Short-term bank credits in 1997		Short-term bank credits in 1998	
	number	% of total	number	% of total
Joint stock companies with more than 50% of stock owned by state (state dominated firms)	53	12.6%	42	14.1 %
Joint stock companies with less than 50% of stock owned by state (mixed firms)	95	33.6 %	60	20.2 %
Joint stock companies owned by Ukrainian or foreign physical or legal entities (private firms)	272	64.8 %	195	65.7 %
TOTAL	420	100 %	297	100 %

Source: author's calculations

Table A6

Distribution of Short-term Bank Credits in Subsample of Large Enterprises by Industries

	Short-term bank credits in 1997		Short-term bank credits in 1998	
	number	% of total	number	% of total
Manufacturing, agriculture, wood industry	317	75.5 %	232	78.1 %
Construction	38	9 %	22	7.4 %
Retail industries	29	6.9 %	18	6.1 %
Services	36	8.6 %	25	8.4 %
TOTAL	420	100 %	297	100 %

Source: author's calculations

Table A7

**Average Performance of Credited and Non-Credited Sample Enterprises
by Ownership Type (Net Sales to Total Assets Ratio, %)**

	SMEs					
	Total average		Credited		Non-credited	
	1997	1998	1997	1998	1997	1998
Private	45.7%	44.2%	68.5%	75.3%	40.0%	39.3%
Mixed	36.5%	39.2%	58.4%	57.6%	32.0%	37.5%
State-dominated	28.7%	36.3%	31.8%	80.4%	28.4%	33.8%
All	42.3%	42.5%	64.9%	72.5%	37.1%	38.4%
	Large enterprises					
	Total average		Credited		Non-credited	
	1997	1998	1997	1998	1997	1998
Private	69.7%	66.1%	73.2%	71.3%	66.0%	63.2%
Mixed	48.6%	52.0%	54.2%	59.4%	42.7%	46.5%
State-dominated	49.2%	50.0%	55.6%	59.2%	42.1%	42.9%
All	62.4%	60.7%	66.5%	67.0%	58.2%	57.1%

Source: author's calculations

Table A8**Description of Variables**

Endogenous variables	
NS/TA_{98}	Net sales to total assets ratio in 1998
STC_{98}	Short-term bank credits in 1998, in 1,000 UAH
Exogenous variables	
<i>Financial characteristics:</i>	
STC_{97}	Short-term bank credits in 1997, in 1,000 UAH
NS/TA_{97}	Net sales to total assets ratio in 1997
LIQ	Liquidity ratio: high liquid assets/short-run liabilities
LEV_{97}	Leverage ratio: total debt/equity in 1997
<i>Governance characteristics:</i>	
PRIVATE	One if company stock is owned by private legal and/or physical domestic and/or foreign entities; zero otherwise (excluded from the regressions as the case)
MIXED	One if less than 50% of company stock is owned by state; zero otherwise
STATE	One if over 50% of company stock is owned by state; zero otherwise
CONC	One if at least one shareholder owns more than 25% of company stock; zero otherwise
<i>Industry characteristics:</i>	
CONSTR	One if the firm is in construction industry; zero otherwise
SERVICES	One if the firm is in services industry; zero otherwise
RETAIL	One if the firm is in retail industry; zero otherwise
OTHERIND	One if the firm is in other industries; zero otherwise (excluded from the regressions as the base case)

Control variables:

SIZE	The number of employees in the firm
OLDCAP	The ratio of current cost to initial cost of capital
COST	The ratio of intermediate goods costs to the total production costs
SMALL	One if firm is in SMEs subsample; zero otherwise

Table A9

Summary Statistics of Variables Used in Empirical Model for Subsample of 852 SMEs

Variable	Mean	St. Deviation	Minimum	Maximum
<i>NS/TA₉₈</i>	.4245649	.6650729	0	11.525
<i>ln(STC₉₈)</i>	.5046638	1.485666	0	10.02612
<i>NS/TA₉₇</i>	.4225975	.8846121	0	19.23904
<i>PRIVATE</i>	.6995305	.4587315	0	1
<i>MIXED</i>	.213615	.4100988	0	1
<i>STATE</i>	.0868545	.2817871	0	1
<i>CONC</i>	.4647887	.4990516	0	1
<i>CONSTR</i>	.0974178	.2967001	0	1
<i>RETAIL</i>	.1701878	.3760184	0	1
<i>SERVICES</i>	.2007042	.4007625	0	1
<i>OTHERIND</i>	.528169	.4994991	0	1
<i>SIZE</i>	96.5493	49.70086	2	200
<i>OLDCAP</i>	.5132876	.1725986	0	1
<i>COST</i>	.3621112	.2363401	0	.9971794
<i>ln(STC₉₇)</i>	.7928225	1.788582	0	8.720363
<i>LIQ</i>	.1968189	1.357851	0	34.89901
<i>LEV₉₇</i>	.2698953	4.188322	-115.1306	20.71848

Table A10

**Summary Statistics of Variables Used in Empirical Model for Subsample
of 832 Large Enterprises**

Variable	Mean	St. Deviation	Minimum	Maximum
<i>NS/TA₉₈</i>	.6066894	.7450958	0	5.153443
<i>ln(STC₉₈)</i>	2.01875	2.974781	0	11.9
<i>NS/TA₉₇</i>	.6244353	.8386588	0	5.436155
<i>PRIVATE</i>	.65625	.4752446	0	1
<i>MIXED</i>	.2223558	.416079	0	1
<i>STATE</i>	.1213942	.3267813	0	1
<i>CONC</i>	.4591346	.498627	0	1
<i>CONSTR</i>	.0973558	.2966199	0	1
<i>RETAIL</i>	.0600962	.2378079	0	1
<i>SERVICES</i>	.1538462	.3610182	0	1
<i>OTHERIND</i>	.6887019	.4633029	0	1
<i>SIZE</i>	1383.854	2690.302	202	26059
<i>OLDCAP</i>	.5218036	.1373464	0	.9730291
<i>COST</i>	.4869484	.2247088	0	.998767
<i>ln(STC₉₇)</i>	2.874414	3.117658	0	11.62499
<i>LIQ</i>	.1217171	.7042408	0	17.22825
<i>LEV₉₇</i>	.5291485	2.331881	-14.01107	57.32907

Table A11

Weighted Regression Results for the Whole Sample of 1684 Enterprises.
Dependent Variable: Net Sales to Assets Ratio

Explanatory variable	OLS (1)		IV(exact identification) ¹ (2)		IV (overidentification) ² (3)	
	Coefficient	Robust St. Error	Coefficient	Robust St. Error	Coefficient	Robust St. Error
<i>SMALL</i>	-.1098	.1773	-.0789	.1773	-.0820	.1766
<i>ln(STC₉₈)</i>	.0002	.0052	.0020	.0073	.0022	.0073
<i>Small*ln(STC₉₈)</i>	.0342	.0347	.0707*	.0408	.0689*	.0396
<i>NS/TA₉₇</i>	.7427***	.0446	.7422***	.0449	.7421***	.0449
<i>MIXED</i>	-.0095	.0303	-.0091	.0230	-.0091	.0230
<i>STATE</i>	-.0529	.0390	-.0517	.0378	-.0516	.0379
<i>CONC</i>	.0578**	.0297	.0570**	.0289	.0569**	.0289
<i>ln(SIZE)</i>	.0019	.0115	-.0004	.0127	-.0006	.0126
<i>OLDCAP</i>	.0893	.0764	.0876	.0759	.0874	.0760
<i>COST</i>	.2018***	.0650	.2007***	.0648	.2006***	.0649
<i>CONSTR</i>	.0822***	.0319	.0837***	.0322	.0838***	.0322
<i>RETAIL</i>	.4430***	.1148	.4427***	.1143	.4426***	.1144
<i>SERVICES</i>	.0483	.0456	.0494	.0457	.0495	.0457
<i>Small*NS/TA₉₇</i>	-.4441***	.1364	-.4490***	.1335	-.4487***	.1336
<i>Small*MIXED</i>	-.0022	.0540	.0087	.0546	.0082	.0547
<i>Small*STATE</i>	.0220	.0769	.0359	.0762	.0351	.0765
<i>Small*CONC</i>	-.0175	.0622	-.0236	.0618	-.0233	.0620

¹ Instrumented: $\ln(STC_{98})$, $small * \ln(STC_{98})$
Instruments: $\ln(STC_{97})$, $small * \ln(STC_{97})$ + $small$, NS/TA_{97} ... $small * COST$

² Instrumented: $\ln(STC_{98})$, $small * \ln(STC_{98})$
Instruments: $\ln(STC_{97})$, $small * \ln(STC_{97})$, LIQ , LEV_{97} , $small * LIQ$, $small * LEV_{97}$ + $small$,
 NS/TA_{97} ... $small * COST$

Table A11 (continued)

**Weighted Regression Results for the Whole Sample of 1684 Enterprises.
Dependent Variable: Net Sales to Assets Ratio**

<i>Small*SIZE</i>	.0091	.0617	.0036	.0610	.0042	.0608
<i>Small*OLDCAP</i>	.0451	.1796	.0115	.1788	.0132	.1796
<i>Small*COST</i>	.5274**	.2423	.5129**	.2378	.5137**	.2384
<i>Small*CONSTR</i>	-.1009**	.0490	-.0929*	.0494	-.0934*	.0492
<i>Small*RETAIL</i>	-.0743	.1485	-.1009	.1468	-.0997	.1473
<i>Small*SERVICES</i>	.0002	.0676	.0001	.0677	-.00002	.0677
Constant	-.0750	.0884	-.0616	.0889	-.0604	.0888
R-squared	0.5751	-	0.5721	-	0.5723	-
F-statistic	F(23,1660) =61.13 P=0.0000	-	F(23,1660) =60.56 P=0.0000	-	F(23,1660) =60.49 P=0.0000	-
Overidentifying restrictions test	n/a	-	n/a	-	$\chi^2(4)= 1.372$ p=.8490	-

Observations = 1684;

***, (**), (*) - statistically significant at 1%, (5%), (10%) level

TECHNICAL APPENDIX

Hausman Specification Test. This test has been developed by Hausman and is used to test for model misspecification “...using the result that under the null hypothesis of no misspecification an asymptotically efficient estimator must have zero asymptotic covariance with its difference from a consistent but asymptotically inefficient estimator...” (Hausman, 1978, p. 1251).

The developed procedure can be applied to test the null hypothesis about consistency of OLS estimators against the alternative hypothesis about inconsistency of OLS estimators. The IV estimators are consistent but nevertheless less efficient under both hypotheses, of course in case of availability of a valid vector of instruments. It has been shown that the statistic

$$\mathbf{x}_H = (\hat{\mathbf{a}}_{IV} - \hat{\mathbf{a}}_{OLS})' (\text{var}(\hat{\mathbf{a}}_{IV}) - \text{var}(\hat{\mathbf{a}}_{OLS}))^{-1} (\hat{\mathbf{a}}_{IV} - \hat{\mathbf{a}}_{OLS}) \quad (\text{a})$$

has an asymptotic Chi-squared distribution with K degrees of freedom²⁵. If the computed statistics is greater than its critical value than the null hypothesis is rejected. It means that OLS estimates are inconsistent and inferences about the estimation results are to be drawn on the basis of IV estimated model specifications.

Overidentifying Restrictions Test. This test has been developed to test the validity of used instruments in case the number of instruments is greater than the number of instrumented variables. It can be shown that statistic

$$\mathbf{x}_{OR} = \left(\sum_{i=1}^N \hat{\mathbf{e}}_i z_i \right)' (\mathbf{S}^2 \sum_{i=1}^N z_i z_i')^{-1} \left(\sum_{i=1}^N \hat{\mathbf{e}}_i z_i \right) \quad (\text{b})$$

has an asymptotic Chi-squared distribution with R - K degrees of freedom²⁶ (Verbeek, 2000). The key point of this test is to check whether the moment

²⁵ Where K is the number of regressors in equation suspected to be endogenous. In our case K = 1 because of endogeneity of external finance variable STC₉₈.

²⁶ Where R is the number of instruments in the vector Z_i and K is the dimension of the instrumented vector X_i.

conditions for the overidentified elements in matrix of instruments Z_i are sufficiently close to zero, i.e. all moment conditions $(1/N) \sum \hat{e}_i z_i = 0$ are satisfied. If the computed statistics is greater than its critical value, then the null hypothesis that all used instruments are jointly valid, i.e. all R moment conditions hold, is rejected. This test fails if:

- (i) there is a correlation between proposed instruments and error terms of the instrumented equation and;
- (ii) the proposed instruments must be putted themselves into the instrumented equation as independent explanatory variables.