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Enterprise Adjustment and the Role
of Bank Credit in Russia:
Evidence from a 420 Firm's Qualitative Survey

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RÉSUMÉ

Ce travail repose sur la base de données primaires de l'enquête de conjoncture trimestrielle réalisée auprès des entreprises industrielles, depuis 1992, par le *Russian Economic Barometer*, publication de l'Académie des Sciences russe. Les questions sont de nature principalement qualitative, avec un nombre de modalités allant de deux à une dizaine, ces dernières prenant alors une certaine valeur ordinale. Les variables décrivent d'une part l'état présent et les performances récentes des entreprises, selon le jugement qu'elles portent sur elles-mêmes ; de l'autre elles indiquent leurs anticipations sur l'évolution de l'environnement et leurs projets à l'horizon de six ou douze mois. On a réuni en un seul échantillon tous les répondants de l'année 1996 (sans doublons), considérés ainsi comme une coupe temporelle unique. L'évolution agrégée à l'intérieur de l'année de certaines variables, notamment des variables nominales, a été contrôlée.

Une première partie, reposant sur une analyse factorielle, permet d'identifier les déterminants d'une probabilité élevée de profit, à partir d'une projection des variables discriminantes selon deux axes : l'un qui résume la performance productive des entreprises (évolution de la production, niveau d'utilisation des capacités, carnets de commande) ; l'autre qui reflète des variables plus financières – niveau de troc dans les échanges, présence ou non d'une dette, identification d'une contrainte financière à l'augmentation de la production. Il apparaît graphiquement qu'une probabilité élevée de profit est associée à de bonnes performances simultanées selon ces deux axes, ce qui semble refléter une des hypothèses de bases de microéconomie de la transition : l'ajustement et, si possible, le développement des entreprises, supposent qu'elles trouvent des marchés en croissance et qu'elles intègrent des contraintes financières dures. La première variable ressort plus fortement que la seconde. Cette relation est vérifiée ensuite économétriquement.

L'évolution comparée de la production et des effectifs montre que la productivité apparente du travail tend à baisser en moyenne, avec toutefois des différenciations significatives. Seules les entreprises dans une situation très mauvaise licencient massivement, mais sans parvenir à maintenir la productivité. Les meilleures performances se retrouvent plutôt parmi les entreprises intermédiaires ou bonnes ; toutefois, on constate une tendance nette des entreprises en croissance à augmenter leurs effectifs, si bien que leurs gains de productivité restent limités ou négatifs.

Dans les parties ultérieures de ce document, on a étudié les relations entre les performances des entreprises, leur demande *ex ante* de crédit et la distribution *ex post*, sur des périodes de six mois. On utilise pour cela la technique des Probit ordonnés qui permet de traiter des données qualitatives. La demande *ex ante* de crédit est fournie par les réponses à une question sur les intentions des firmes quant à l'évolution de leur encours de crédit au cours des six prochains mois (augmentation, stabilisation, diminution, absence d'endettement). Il ressort alors que les entreprises qui demandent du crédit sont, très généralement, celles qui ont des niveaux de production et de carnets de commande bas, des contraintes financières fortes, des anticipations défavorables quant à leur propre évolution future. Enfin, elles sont

massivement déjà endettées, alors que les entreprises qui ne demandent pas de crédit sont souvent non-endettées et présentent, de manière générale, des performances beaucoup plus favorables que les précédentes ; en particulier elles montrent une probabilité de profit beaucoup plus élevée.

Enfin, l'évolution de l'encours de crédit au cours des six derniers mois (sur un indice de base 100), permet de mesurer la distribution du crédit aux entreprises par les banques. Il ressort que les firmes qui reçoivent des crédits ont, très généralement, les mêmes caractéristiques que les entreprises qui indiquent une demande positive de crédit *ex ante*. Logiquement, celles qui n'en demandent pas, n'en obtiennent pas et, généralement, n'étaient pas endettées au départ. En d'autres termes, le crédit apparaît comme une variable nettement inertielle, associée à une très faible capacité de discrimination des banques qui semblent incapables de rationner les mauvaises entreprises, à défaut de pouvoir prêter aux bonnes.

SUMMARY

This paper is based upon the primary data collected by the enterprise survey realised since 1992 by the *Russian Economic Barometer*, published on a quarterly basis by the Russian Academy of Science. Questions are mainly of a qualitative nature, with a number of possible answers ranging from two to ten, as their scope takes a more cardinal nature in the latter cases. Variables describe on the one hand the present state and recent performances of enterprises, as reflected by their own judgement; on the other hand, they give indications on their expectations as regard the evolution of the economic environment as well as their intended behaviour over the next six or twelve months. All answers provided during the four surveys realised in 1996 have been pooled, so as to be considered as a single cross-section sample, though all respondents are represented only once.

A first part of the paper is based upon Multiple Choice Analysis and identifies the determinants of the probability of an enterprise declaring itself profitable, on the basis of a projection of discriminating variables along two orthogonal axis: one sums up the productive performance of the firms (recent change in the level of output, capacity utilisation, order books) and the other one reflects its financial or liquidity position - proportion of barter in current sales, indebtedness or non-indebtedness, identification of "financial constraints" as an impediment to an increase in output. It then graphically appears that a high probability of profit is associated with good performances along both axes. This actually confirms one of the most standard hypothesis on the microeconomy of transition: the adjustment and growth of enterprises require that they meet a growing demand for their goods and adjust to hard financial constraints. Here, the first set of elements comes out more strongly than the second one. This conclusion is then confirmed econometrically.

The parallel evolution of output levels and employment show that, on aggregate, labour productivity is on a downward trend, though with clear different patterns. Only enterprises in very bad relative situations lay off massively, but this generally does not prove enough to stabilise average productivity levels. The best performances are those of intermediate or good firms, though a tendency also exist among growing ones to increase their employment, so that productivity gains are small or negative.

The following parts of the paper focus on the relationship between enterprises performances, the *ex ante* demand for credit and its *ex post* distribution. Probit econometrics has been used in order to deal with qualitative data. The *ex ante* demand for credit is given by the answer to a question on the intentions of firms as regard the evolution of their indebtedness over the next six months (increasing, stable, decreasing, or non-indebted). It comes out that enterprises with a positive demand for credit are, strongly, those which had the worst recent performances in terms of output trend, level of order-books and inventory, identification of financial constraints, and negative expectations vis-à-vis their own evolution in the short run. Furthermore, these firms prove to be, on average, already indebted, while firm which do not mention a demand for credit are often

non-indebted and present, more generally, much more favourable performances, including a higher probability of posting profits.

Lastly, the evolution of credit over the preceding six months (on the basis of 100 index) provides a measure of the actual distribution of bank credit to enterprises. It turns out that firms which actually receive credits have, as a strong rule, the same characteristics as those which have a positive *ex ante* demand; on the other hand, those who do not demand credit do not receive any, and were generally not indebted beforehand. In other words, credit distribution appears as a strongly inertial variable, associated with a limited capacity by banks to discriminate among potential borrowers: while they cannot lend to good enterprises, they appear unable to ration bad ones.

**ENTERPRISE ADJUSTMENT AND THE ROLE OF BANK CREDIT IN RUSSIA:
EVIDENCE FROM A 420 FIRM'S QUALITATIVE SURVEY***

1. INTRODUCTION

The largest part of the micro-economic literature on transition is based, more or less directly, on Kornai's notion of a shift of regime, from soft to hard budget constraints. The soft budget constraint is best identified with the classical regime of soviet-type, centralized planification; but it can also be extended to all situations characterized by extended forms of revenue socialization, whether formal or not, as well as by widespread rent-seeking¹. Indeed, in most transition economies, where SBC are no longer associated with large shortages, it still persists, most notably under the form of a weak credit relationship between enterprises and banks, or pervasive accumulation of arrears (tax and wage payments, inter-enterprise credits, etc). To a large extent, the obstacles encountered in the hardening of financial constraints during transition rather reflects perverse forms of adjustment or resistance to management's constraints, while, as a rule, past behaviors and institutions directly linked to the centrally-planned regime have rapidly vanished².

In this paper we study the relative performances of Russian industrial enterprises, in relationship with the constraints they are facing and the adjustment strategies they show. We focus on their relationship with banks, because of its strategic importance in the restructuring process, as a source of funds and, potentially, of governance. We rely upon the firm level data collected in the quarterly surveys conducted since 1992 by the *Russian Economic Barometer*. The information provided by this source is hence mostly qualitative, with employment as the only absolute term information available. All other answers have a clear qualitative nature, although they may range from a set of up to eight possible modalities, down to simple 0-1 alternatives. The information provided by this survey also takes, in many cases, a strong subjective dimension: while firms may have a rather precise idea of the recent evolution of their output or inventories, other questions clearly asks them to assess their own present position, and give indication on their expectations vis-à-vis their future evolution and strategy. Conversely, this database presents none of the standard accounting figures³ that have recently been massively mobilized in large, cross-section

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¹ See for instance Stiglitz (1994, p.184), where the notion of soft budget constraint is extended to include situations where an insolvent bank invests in a project that is expected ex ante to be loss-making, although not with certainty.

² See Qian (1994), Dewatripont and Maskin (1995), Earle and alii (1996), Earle and alii (1997), Berglöf and Roland (1998), Bai and Wang (1998).

³ For an analysis of the shortcomings and measurement errors of the accounting data used in the literature, see Shaffer (1998, page 85).

surveys of firms⁴. In a context where the quality of the accounts provided by enterprises, as well as the actual constraints exerted by the structure of a balance sheet are still limited, a qualitative survey may actually offer a stronger appraisal of their actual behaviors.

Section two of the paper presents a brief description of the data base and the way it has been used here. The **third section** presents the main results of a Multiple Choice Analysis (MCA), which allows to establish strongly the internal consistency of the data base as well as a series of relationships between the different variables, including profit. This also makes possible the identification of four sub-groups of firms, with clearly differentiated performances and underlying behaviours. Probit estimates strengthen the econometric basis of a profit equation suggested previously by the MCA. We analyse then more precisely the dynamics of enterprise adjustment, within a two-period framework (**section 4**). The Ordered Probit procedure is mobilised in order to assess more precisely the relationship between enterprises and banks. A credit demand equation is estimated (**section 5**) on the basis of the answers provided to a question where firms declare their 'intentions' with regard to the evolution of their level of bank debt, during the next period. Finally, in **section 6**, we identify the determinants of the actual, ex post distribution of credit by banks, which appear to follow closely those identified in the previous, ex ante equation.

By and large, the main conclusions of the paper provide ground for a rather pessimistic assessment of the adjustment performances of Russian enterprises in 1996. Profit appears as a function of the capacity to limit financial or liquidity constraints, together with productive performances and with indebtedness playing a strongly as an inertial, scale variable. Then the demand for bank credit turns out as a function of a past debt, recent accumulation of inventories and poor expectations with regard to performances during the next period. Finally, credits actually allocated by banks appear to be strongly concentrated on the worst-off firms among the 420 large pool.

2. DESCRIPTION OF THE DATA-BASE

The *Russian Economic Barometer* (REB) has been making quarterly surveys of industrial firms since January 1992⁵. The survey asks firms to provide an assessment or a measure of their present position on three different levels: the recent trends in the levels of e.g. output, inventories or indebtedness; their present expectations as regard the short term evolution of the same type of variables; their judgement on their actual and future behavior, including the type of constraints they face. Some sets of answers are strongly cardinal, as for the current levels of output (*Prod0*), order book (*Ord*), capacity-utilization (*Utcap*) or the proportion of barter in their trade (*Barter*) where the responses are distributed among eight to ten quantitative modalities⁶. Other questions have a much more qualitative nature, as when firms are asked whether they intend to increase, stabilize or decrease their level of

⁴ See for instance de Boissieu and alii (1995).

⁵ Statistical analysis is published in the REB, on a quarterly basis (see Aukutsionek, 1996, 1997).

⁶ We have sometimes, particularly in order to simplify the graphical analysis, restrict the number of modalities at three.

credit (*Expected Debt*). Lastly, a set of questions provide only for a 0-1 answers, when they are being asked whether they have bank debt or not (*no-debt*); similarly, they also provide an assessment on whether their current level of production is limited by demand-side (*lim-dde*), financial (*lim-fin*), or access-to-input constraints (*lim-input*). The list of questions taken into account in this paper is in *Annex 1*.

Typically, 170 to 210 enterprises answer each quarter to the questionnaire dispatched by the REB to a total set of around 450 enterprises. The present paper is based on the survey of March, June, September and December of 1996. On this basis, a single, cross-section pool of firms has been built, providing that no enterprise is present more than once. A consequence of the pooling method is that the June survey is over-represented compared to the three others, but we do not expect this to have a tangible influence, as nominal variables did not experienced wide fluctuations in 1996. Change in the level of employment (*section 4*) has been calculated on the basis of a moving six months period, including 1996 and 1995 quarterly data. This allowed to build a sub-pool of 230 enterprises, while the total of all enterprises included in the overall data set is 420. However many firms refused to answer to some questions (e.g., whether they made profit) so that some econometric results presented hereunder have been obtained on the basis of a smaller number of firms.

The total number of enterprises included here provides some reassurance against the risk of poor representativity. The structure of the pool is also well diversified, both in sectoral and geographical terms. The average size of firms in the sample is smaller than that in the overall population on average in Russia, that's why econometric equations will include employment as an independent variable so as to control for the size effect. A more important bias is the large predominance of privatized firms, as opposed to new private enterprises: by early 1996, 18% of the answering firms were State-owned, 26% had mix-property structure and 56% were privatized former State-Owned Enterprises. The effect of property structure could not be controlled for in the econometric part of the research.

3. THE DISTRIBUTION OF THE FIRMS' PERFORMANCES: REAL PERFORMANCES AND FINANCIAL CONSTRAINTS

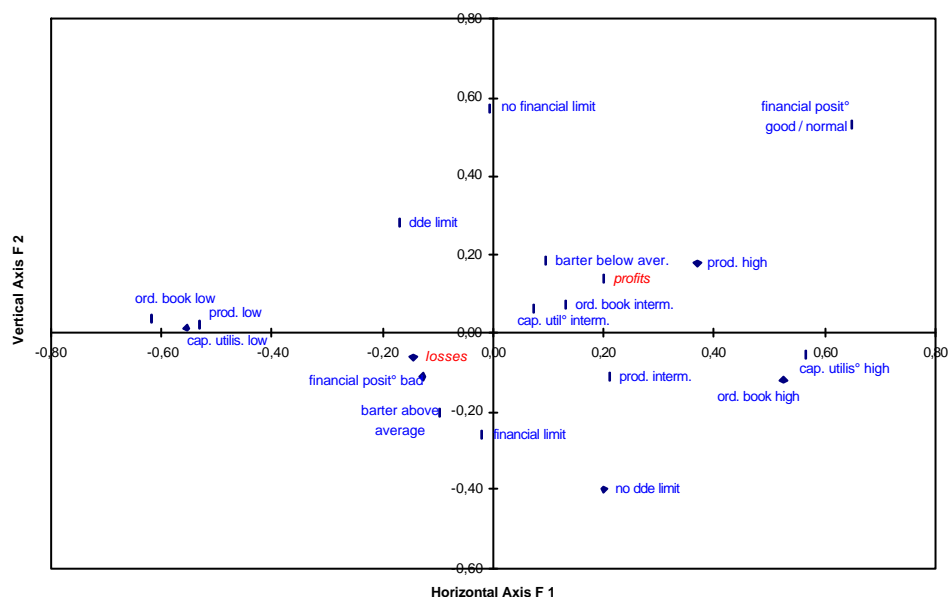
In this section we analyze the probability that firms declare making profit or being even, as opposed to their declaring losses. We start with a Multiple Choice Analysis (MCA), which allows to identify some rough statistical relationships while providing a useful, descriptive typology of the overall enterprise pool. On this basis, using Probit econometric, we calculate a more precise, explicit profit equation.

Factor analysis, specifically Multiple Choice Analysis, is a potent, preliminary tool in order to establish the consistency of a set of qualitative variables and to identify some basic relationships between them. It thus proves especially useful in the present case, where most variables have a strong qualitative dimension.

MCA is especially relevant when there is some ground to believe that the matrix of explanatory variables, even if it is full rank, is characterized by a substantial collinearity, and by the fact there is a limited number of independent sources of variation in the dependant

variable⁷. This analysis helps to check the internal consistency of the database and to extract principal components from the set of economic indicators. **Graph 1** reflects the results of an MCA analysis made on a sub-set of eight explanatory variables with a total of nineteen modalities (amongst these nineteen modalities, only seventeen are active⁸, see annex 1 for description of data).

Graph 1: Multiple Factor Analysis



The two first orthogonal axis of the MCA account respectively for 36% and 20% of the total variation in the set, that is a total of 56%.

The first principal component, represented by the horizontal axis of Graph 1, opposes enterprises with respectively low versus high relative recent changes in levels of production and order book, as in present levels of capacity utilization rate. The average real performance of firms increases while moving from the left-hand to the right hand side of the graph.

The vertical axis mostly reflects financial or liquidity variables: other things being equal, enterprises at the upper end of the axis will show low relative levels of barter and a high probability not to have debt; few among them identify financial constraints as a serious impediments to production; they also tend to characterize their present financial position as 'good' or 'normal'. Conversely, firms in the lower part of the graph will identify financial

⁷ See Greene (1997), 423-427.

⁸ Profit is passive, and will appear as endogenous variable in section 3.

resources as an important limit to growth; they will tend to rely more heavily upon barter trade and to consider their current position as 'bad'⁹.

More information is obtained on real versus financial constraints, if the pool of firms is divided into a four-group typology, on the basis of their co-ordinates along the two axis of Graph 1, turning clockwise from the top-right quarter. This differentiation actually reflects closely the four quarters of the graph, though they are built to minimize intra-group variance, and maximize inter-group variance. The main characters of each group are summed-up in **Table 1**, which reflects the average answers provided by enterprises in each sub-group.

**Table 1 - Description of Economic and Financial Situation
of Different Types of Enterprises**

Group	Number of enterprises	Axis		Number of employees	Profit			Limit to production			No debt
		f1	f2		Positive	Null	Negative	Demand	Financial	Inputs	
1	91	0.4	0.6	581	70%	16%	14%	87%	16%	22%	32%
2	144	0.5	- 0.3	834	39%	25%	37%	23%	96%	23%	24%
3	88	- 0.3	- 0.3	884	28%	31%	42%	37%	99%	34%	22%
4	95	- 0.7	0.2	612	18%	30%	52%	97%	54%	11%	19%

Group	Rate of capacity Utilization	Order book	Stocks				Variation of production	
			Increase	Stable	Decrease	No stocks	6 months	1 month
1	66.8%	82.9%	22%	44.5%	23.5%	10%	+ 1%	- 1%
2	72.7%	87.9%	21%	40.5%	23.5%	15%	- 2%	0%
3	36.6%	51.5%	17%	39%	33.5%	10.5%	- 10%	- 18%
4	30.5%	29.7%	32%	37%	20%	11%	- 13%	- 22%

Enterprises of the top right quarter (group 1) correspond in principle to the better-off, as good real performances and limited financial constraints apparently contribute to a high probability of profit: 70% of group 1 enterprises are profitable, against an average of 39% of the whole pool. This group shows a smaller average size (581 employees in average) and indebtedness is also low, with a high proportion of firms having no debt at all. Firms in group 2 (bottom-right quarter), as in the previous ones, benefit from relatively sustained

⁹ Lim-dde, lim-input and lim-fin are not mutually exclusive answers to a single question: firms may identify more than one type of obstacle to growth, as is reflected in Table 1.

levels of output but they fail to transform this advantage into a comparable probability of profit: the group is evenly shared between profit- and loss-makers. All indices of financial or liquidity problems are higher: the proportion of indebted enterprises (76%), as well as that of enterprises facing financial obstacles to growth (96%). On the other hand, only 23% declare a demand-side constraint to growth, which suggest that their relatively favorable position along the horizontal axis owes less to internal adjustment than to exogenous characteristics: this group includes, *inter alia*, a large proportion of firms belonging to the energy sector.

Groups 3 (bottom-left quarter) and 4 (top-left quarter) show the worst economic conditions. They have the lower productive performances in the pool and are characterized by decreasing relative levels of activity, low capacity utilization, and so on. Consequently, only 28% and 18% of enterprises respectively declare positive profits. Group 4 faces comparatively higher levels of demand-constraint while for 99% enterprises in group 3, shortage of financial resources is identified as an obstacle to higher levels of production. Enterprises in group 3 are also experiencing access-to-input constraint, which suggest that their access to real-good market is constrained, for one reason or another¹⁰.

While not providing an exact measure of the relationship between each variable, Graph 1 offers insights into the statistical information included in the database; that is, some clues for further, more focused analysis. First, this graph demonstrates that whatever the occasionally missing answers, the arbitrariness of pooling four quarterly surveys, or the actual attention given to answering the questionnaire, the overall data base presents a strong degree of internal consistency. Then, it clearly allows for a sharp differentiation between productive and financial performances, into two orthogonal axis. More important this suggests that the behavior of Russian firms in 1996 might be interpreted, to some extent, in the broad Kornai-type framework. A striking feature is indeed that, the probability of declaring profit appears graphically as a function of both real growth and financial discipline - or limited financial and liquidity constraints, as reflected by the components of the vertical axis. Profit-making firms tend to have rather better than average productive performances, lower levels of barter, and they apparently adjust more easily to financial constraints.

The descriptive, statistical analysis in **Table 2** indeed confirms that the lower the decline in production (or the higher its increase, in the best cases), the higher the probability of declaring positive profit. The same is true with smaller occurrences of financial limits to production. Another remarkable point is that the distribution of the 'limit-variables' shows that firms in the upper half of Graph 1 tend to face constraints deriving mostly from the real good markets - demand-side constraints for most of them and access-to-input for the worst in this sub-pool. Conversely, the overbearing influence of the financial constraints in the lower half is statistically associated with a rather low occurrence of real good market constraints. In a well-regulated market economy, we would expect the lack of demand to be associated with financial problems. But in the Russian context, firms which are financially

¹⁰ As argued in Schaffer (1998), one reason could be that despite what is commonly believed, firms apply hard budget constraint to each other in transition economies.

constrained do not identify the lack of demand as an impediment to production, which probably mirrors the persisting soft budget constraints.

Table 2 - Profit and Economic Versus Financial Performances

	Number of Enterprises	Variation of production (% over 6 months)	Order book (%)	Capacity Utilization rate (%)	Non indebted (% of enterprises)	Financial limits to production (%)
Profit positive	71	- 5.4%	72.5	63.6	40.8	54.5
Profit null	45	- 11%	59.3	50.5	15.5	76.2
Losses	65	- 13.2%	54.9	44.5	21.5	74.6

In order to consolidate these first graphical and descriptive evidences (**Graph 1 and Table 2**), we now test a profit equation. It appeared very rapidly that direct regressions of the dependant variable on potentially explanatory variables do not produce any significant results, if only primary series are utilized (such as capacity utilization, barter, limits to production, etc). This is due mostly to problems of multicollinearity. This is where the results already obtained from the MCA become very useful. On the one hand, MCA helped identifying some variables, which give some indication on the enterprises' behavior, as on their current situation. On the other hand, it produced two synthetic variables -the coordinates of each firm along axis $f1$ and $f2$ - which are continuous and orthogonal, by construction, and incorporate a large fraction of the information present in the data set. Moreover, as already underlined, the first axis incorporates mostly real, productive variables, while the second is built mostly with financial and/ or liquidity types of variables. We thus test the following two profit models:

- Model 1: $Loss = \text{function}(\text{capacity-utilization}, f2, \text{no debt}, \text{labor})$;
- Model 2: $Loss = \text{function}(f1, f2, \text{nodebt}, \text{labor})$.

Variable *Loss* takes value 0 when the enterprise declares to be profitable or to break even and 1 when it makes losses.

If the relationship suggested in graph 1 is to be econometrically validated, higher real productive performances ($f1$) should be associated with a higher probability of posting profits. However, a regime of soft budget constraints may also allow loss-making firms to build up inventories, thus supporting their level of output. Hence we also expect that a higher coordinate along axis $f2$ will increase the probability of profit, as a higher proportion

of financial constraints on growth, or barter, are interpreted as reflecting the difficulties of firms to adjust to a regime of hard, or harder budget constraints.

The variable *nodebt* equals 1 when the firm declares to have had some bank debt in the past period, whatever its size, and 0 otherwise. This variable thus differentiates the enterprises which adjustment capacities may be hampered by accumulated bank credits, at a time (1996) when high overall interest rates in the country may have been an independent cause for posting losses. *Nodebt* can be interpreted as well as an inertial variable in the equation: 83% of enterprises declaring debt at one moment declare again to be indebted, six months later.

The variable *capacity-utilization* is substituted to *f1* coordinates in model 1. The *labor* variable is a size variable.

In order to get unbiased coefficients when the dependent variable is binary, we used Probit methodology. Probit does not allow for missing variables, which reduces the total number of observations from 420 to 177. **Table 3** provides the results for the *Loss* equations, calculated first on the whole sample, then on pairs of the sub-groups derived from the MCA analysis. The reported coefficients are directly the marginal effects of each explanatory variable on the estimated probability of being profitable (non-profitable).

Table 3 - Loss Equations

A: Total Sample								
Explanatory Variables	f1	Capacity-Utilization ^a	f2	No-debt	Labour	Khi(2)	Pseudo R2	Nb.
Model (1)		-0,006 (-4,15)	-0,35 (-3,90)	-0,29 (-3,22)	-0,000089 (-2,00)	43,60	0,1849	177
Model (2)	-0,339 (-4,50)		-0,319 (-3,56)	-0,26 (-2,81)	-0,000088 (-2,05)	47,26	0,2004	177
B: Sub-groups 1 & 2 (right-hand half of Graph 1)								
Explanatory Variables	f1	Capacity-Utilization ^a	f2	No-debt	Labour	Khi(2)	Pseudo R2	Nb
Model (1)		-0,005 (-1,88)	-0,47 (-3,77)		-0,00014 (-2,19)	30,79	0,2269	98
Model (2)	-0,46 (-2,22)		-0,45 (-3,69)	-0,36 (-3,11)	-0,00016 (-2,46)	32,29	0,2379	98
C: Sub-groups 4 & 3 (left-hand half of Graph 1)								
Explanatory Variables	f1	Capacity-Utilization ^a	f2	No-debt	Labour	Khi(2)	Pseudo R2	Nb
	-0,37 (-2,27)		-0,09 (-0,73)			5,54	0,0650	80

^a: In order to compare the *capacity-utilization* and *F1* coefficients, one has to multiply the former by 100: -0,006 becomes -0,6 (minus 60 per cent). While *F1* indeed varies linearly between -2 and +2, *Capacity-utilization* takes 11 values ranging 15 to 105 and has to be scaled (divided by 100), in order to be roughly comparable to *F1* coefficient; the estimated coefficient is then multiplied by 100.

Table 3 shows that *f1* is significantly and negatively correlated with *Loss*, which means that the worse the real performances are (i.e. the lower the co-ordinate on *f1* axis), the higher the probability of making losses exists, and *vice versa*; the same applies also when *capacity-utilization* is substituted to *f1*. Variable *f2* appears as well to be negatively correlated with *Loss*: a higher probability of making profit is significantly associated with a higher co-ordinate on the *f2* axis, i.e. with better financial situation, as reflected by a lower occurrence of financial constraints and lower levels of barter.

The marginal effect of *no-debt* on the estimated probability of making losses is equal to -0,26 (respectively, -0,29 in Model 2), which means that a discrete change in this variable from zero to one (no indebtedness situation to indebtedness situation) increases the probability of making loss by 26 per cent (respectively 29 per cent).

The equations have then been run separately on the right-hand and left-hand halves of Graph 1 (resp. tables 3B and 3C). The same results as in the overall pool then come out strongly in the case of enterprises with the better productive performances. By contrast, in the left-hand half (*Table 3C*), pseudo R2 is equal to only 6,5 percent, the *Chi (2)* statistics is very low, while *f1* variable (as *capacity-utilization*, in model (2)) shows more significant coefficient, and *f2* is not significant at all. In other words, adjustment to financial or liquidity constraints, as reflected in the position along the *f2* axis, does not improve substantially profit chances when the underlying real performance is comparatively bad. This suggests that the relationship between the adjustment to financial constraints and the overall stabilization of the firms' position, as reflected in their capacity to brake even, does not work equally over the whole pool of enterprises. One interpretation of this may be that the worst-off firms, in the left-hand half of the graph should have already been closed since they apparently do not show strong capacities to adjust. An alternate option would rather see in this differentiation a reflection of differentiated sets of constraints and incentives.

One strong limit in this part of our analysis is however, that it only describes the distribution of enterprises at a given moment. We now analyze more precisely the dynamics of their adjustment. We first present descriptive results derived from a two-period framework. We then analyze the demand for credit of firms and, finally, the actual distribution of credit.

4. ENTERPRISES ADJUSTMENT STRATEGIES: SOME DESCRIPTIVE INDICATIONS

A sub-sample was built which allows to compare the answers provided by the same enterprise to the same question, at a six months interval. When the behavior of profit-makers and loss-makers are being compared, the most immediate adjustment variables included in the data base highlights very different patterns of microeconomic adjustment (*Table 4*). The better off tend to reduce sharply their level of indebtedness and rely to a

much smaller extent than others upon barter trade. If levels of employment are compared over time, the differentiation is also quite strong although a full appreciation of the enterprises adjustment strategy vis-a-vis labor costs would have to take into account the evolution of real wages as well as of wage arrears. However, a remarkable point is that a substantial proportion of firms (31.5% of the sub-sample) has increased their headcount, most often marginally but in many cases by substantial magnitude. Enterprises which lay off are indebted enterprises, which use more barter and have suffered a strong reduction of their production. Profitable enterprises don't take advantage of their rather good situation to restructure: evolution of productivity is similar whatever the economic situation of firms (it decreases between 3 to 5%).

Table 4 - Profit and Enterprises Adjustment Behavior

	Barter (% of trade)	Labour variation (%, over 6 months)	Indebtedness variation (%, over 6 months)
Positive profit	29.5	+ 0.1	- 17.7
Zero profit	40.4	- 2.3	- 14.7
Losses	43.9	- 6.4	+ 7.9

The same findings can be derived from the typology. The variation in employment over six months shows that the largest lay-off (around 10% on average, on the half left-hand of the graph 1) are observed when production falls the most, that is at the far-left end of the graph; but this adjustment do not wholly counterbalance the substantially fall of production. Firms in the right-hand side of the graph, with constant or slowly increasing levels of output, tend to stabilize or sometimes to increase employment, which translates into grossly constant levels of productivity, whatever the group of firms may be.

Table 5 - Economic Situation and Enterprises Adjustment

Group	6 month variation			Barter (% of trade)	% of enterprises which lay off
	Production	Credit	Labour		
1	+ 1%	- 41.6%	+ 3%	24.5%	57.1
2	0%	- 7.9%	0%	38.1%	63.5
3	- 18%	+ 2.9%	- 11%	43.4%	76.9
4	- 22%	+ 5.5%	- 7%	36.2%	80.4

These partial findings thus reflect the much commented contrast between the bad performances of the Russian economy, in terms of labor productivity growth, when compared to the very rapid increases observed in Central Europe since the early 1990's. More precise conclusions on the enterprise adjustment strategies vis-à-vis labor costs would require the inclusion in the analysis of the level of real wages as of wage arrears.

Micro-economic analysis (Alfandari & Schaffer, 1996; Lehmann and al, 1998) and anecdotal evidence suggest indeed that delays in the payment of wages has been a dominant form of labor market adjustment in Russia¹¹. However, if one takes into account the widespread hidden unemployment witnessed in Soviet firms, their poor overall efficiency and often-backward technology, the limited labor productivity gains reflected here may be taken as an indication that industrial restructuring and technological change remain very limited. Another suggestion is that, in an environment where bank credit and the equity market remain extremely weak, productivity gains are apparently not considered as a strong, potential financing source, even by relatively good firms.

While the information available on labor policies in the REB questionnaire is partial, it allows for a rather precise analysis of the working of the credit market: the expected-indebtedness variable indeed provides a direct, albeit qualitative indication on the implicit demand for credit by enterprises.

5. ENTERPRISES ADJUSTMENT STRATEGIES : THE DEMAND FOR CREDIT

In order to assess the *ex ante* demand for credit by firms, we rely upon the expected-indebtedness variable which can take four modalities. As with other variables in the questionnaire, they do not provide a quantitative measure of the demand for credit but a qualitative indication on the direction in which they expect their stock bank debt to evolve in the next six months.

However, on an aggregate level, shifting from one modality to the next (i to i+1) reflects a falling level of credit demand:

- 1: anticipated indebtedness increases;
- 2: remains stable;
- 3: decreases;
- 4: not indebted and not going to be.

We then test the following credit demand model:

$$\text{Expected-debt} = \text{function}(fl, \text{exp-prod}, \text{inventory}, \text{no-debt}).$$

In any economy with intermediate finance, the *ex ante* demand for credit by enterprises can typically be explained by real performance indicators reflecting both their present management constraints and their expectations vis-à-vis future performances. Among these, the REB enterprise survey a consistent series of standard, potentially explanatory variables:

- *fl* axis provides a broad measure of the firms performance in terms of output over the recent period;

¹¹ Delays in payment wages grew from 43 percent in 1994 to 62 percent in 1997 of all individuals according to data from the Russian Longitudinal Monitoring Survey.

- *inventory* gives a complementary information on the nature of recent growth. While in all market economies, inventories shows strong cyclical components, which bear on the firms short term demand for funds, transition economies have also shown more perverse patterns: access to soft finance have regularly played a strong role in sustaining firms with low actual level of demand. Here *inventory* reflects changes over the past six months;
- *exp-prod* is an indication of the firms' present expectation vis-à-vis future output levels, which may bear on their demand for external financing;
- *no-debt* works more as an inertial variable: at a time of low or still falling production levels, servicing an existing stock of debt may prove difficult for enterprise which capacity to raise cash-flow may be limited.

Since Ordered Probit¹² does not allow for missing variables, the total number of observations was reduced from 420 to 349. **Table 6** reports the significant results for the *expected-debt* equations, calculated first on the whole sample, then on pairs of the sub-groups derived from the MCA analysis (see typology, above). Table 6B and 6C provides the results obtained for enterprises located in the upper and lower halves of graph 1.

**Table 6 - Expected Debt
(Ordered-Probit)**

A: Total Sample

Explanatory Variables	f2	No-debt	Inventory	Exp-prod	Labour	Khi(2)	Pseudo R2	Nb
	0,3270 (2,294)	1,51 (9,273)	-0,0026 (-2,496)	0,0097 (2,476)	-0,0001289 (-2,203)	123,68	0,1310	349

$$\mu(1)=-0,0246082 ; \mu(2)=0,9753209 ; \mu(3)=1,550933$$

B: Sub-groups 1 & 4 (upper half of Graph 1)

Explanatory Variables	f2	No-debt	Inventory	Exp-prod	Labour	Khi(2)	Pseudo R2	Nb of obs.
	0,6007 (2,076)	1,70 (6,602)	-0,0027 (-1,844)	0,011 (1,949)		61,63	0,1474	159

$$\mu(1)=0,4994222 ; \mu(2)=1,426513 ; \mu(3)=1,827084$$

C: Sub-groups 3 & 2 (lower half of Graph 1)

Explanatory Variables	f2	No-debt	Inventory	Exp-prod	Labour	Khi(2)	Pseudo R2	Nb.
		1,41			-0,0001705	62,96	0,1123	206

¹² As standard Probit estimation cannot be used for multivariate variable, we used Ordered-Probit procedure.

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	(6,742)		(-2,63)
$\mu(1)=-0,8110828 ; \mu(2)=0,205696 ; \mu(3)=0,8811422$			

A first important information is that the horizontal axis $f1$, reflecting productive performances, does not come out, in any estimates, as a significant explanatory variable (and is thus not shown in the Table 6). In other terms, the demand for bank credit by firms is not linked to recent changes in output levels. However, *Expected production* comes out significantly in the overall sample as in two sub-groups. The probability of shifting from one modality of *expected-debt* to the next one (i to $i+1$), implying a smaller implicit demand for credit, or no demand at all, increases as the output levels are expected to rise. So it appears that the lower the anticipated production is, the higher the demand for credit appears. A significant, negative link comes out between *expected-debt* and present inventories: the probability of shifting from one modality of *expected-debt* to the previous one, implying more *ex post* demand for credit, is linked to past increases in inventories. The co-ordinates of firms along axis $f2$ is positively correlated with the left-hand variable: a smaller demand for credit is associated with a limited financial constraint and low level of barter.

No-debt is strongly and positively correlated to *expected-debt*. The probability of increasing debt raises with the fact that the enterprise was indebted in the past (in all the groups). *Nodebt* thus appears as a strong inertial component in the credit-demand equation. This can be interpreted as an indication that a disproportionate share of the demand for bank credit is coming from already indebted enterprises, with potential difficulties in servicing their existing stock of liabilities. This hypothesis is probably especially strong in the lower half of the Graph 1 where indebted enterprises represent a much larger proportion of the total than in the other half of the pool. Table 6C shows that the demand for credit is here only inertial.

The results of the credit demand equation show that, on average, the probability that firms will have a larger *ex ante* demand for credit is positively linked to four main variables: bad recent performances (inventories and existing debt), poor short term prospect in terms of levels of output and limited capacity to adjust to financial or liquidity constraint ($f2$).

The estimated coefficients in each sub-sample allow calculating the probabilities of each modality of *Expected-Debt*. The probability of each modality appears significantly different from one sub-sample to another (Table 7). The probability that there will be no indebtedness in the future [$P(\text{Expected-Debt}=4)$], is lower in the left-hand side group, where real performances are relatively worse, while it is higher in the complementary side, where real performance are better. This probability is lower in the lower half group, where the main impediment to production is the financial shortages, and higher in the upper half group, where there is no financial shortage and where the main impediment to production turns out to be the lack of demand.

Table 7 - Estimated Probabilities of *Expected-Debt*

	$P(\text{Expected-}$	$P(\text{Expected-}$	$P(\text{Expected-}$	$P(\text{Expected-}$
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	<i>Debt=1</i>): probability of an increase in indebtedness	<i>Debt=2</i>): probability that indebtedness remains the same	<i>Debt=3</i>): probability of an decrease in indebtedness	<i>Debt=4</i>): probability of no being indebted and not going to be
Lower half	20,38%	31,59%	20,40%	27,63%
Upper half	24,47%	27,82%	11,85%	35,86%
Right-hand half	18,58%	31,80%	15,16%	34,46%
Left-hand half	33,82%	27,45%	16,93%	21,80%
Total sample	21,99%	30,56%	17,02%	30,43%

Conversely, the probability that indebtedness will increase [$P(\text{Expected-Debt}=1)$] is higher (lower) in the left-hand side (right hand side), and higher (lower) in the lower side (upper side).

A switch from the left to the right-hand side of the map decreases the probability of *Expected-Debt* to be equal to « 1 » (increase in indebtedness) by 15 points (33 minus 18), and increases the probability of *Expected-Debt* to be equal to « 4 » (not indebted and not going to be) by 13 points (34 minus 21).

6. THE ACTUAL DISTRIBUTION OF BANKING CREDIT

The previous section has helped identifying the determinants of the demand for bank credit by enterprises and has shown that it can be linked to bad recent performances and limited capacities to adjust to the constraints borne by the overall environment. We now turn to the actual, ex post distribution of credit by banks: typically, banks could either serve passively this low-quality demand, or at least a fraction of it, or they could opt for large-scale rationing of bad firms while serving the residual demand expressed by good firms.

For describing an indebted enterprise, we use the variable *no-debt*, set equal to one when the enterprise is (was) not indebted now (in the past). Then it turns out that in 1996, two third of the enterprises declare they are indebted. These indebted enterprises are much bigger: the number of employees is twice as big as in the non-indebted firms. As already mentioned in section 4, the credit is granted towards loss makers (only 37% of indebted firms are profitable, versus 57% amongst the non-indebted enterprises), and tends to finance the decrease in sales, as well as the accumulated inventories. The level of barter is also higher when the enterprises are indebted (37% versus 26%), which suggests that the barter transactions are a means of adjustment.

In order to analyze the ex post distribution of credit by banks, we study the determinants of variable *debt0*, which is set equal to 100 six months ago and corresponds to the level of indebtedness to banks. Hence, the aim is now to analyze the credit distribution behavior, in as much as *debt0* describes the credit allocation over the past six months.

In 1996, the credit has overall been decreasing for 53% of the sample, it has been increasing for 36%, and has been stable for the remaining 11%. An increase in indebtedness (of 80% in average) is associated with a 14% decrease in production, and with a 2% rise in inventories. Conversely, enterprises with a decrease level of indebtedness are characterized by a sharp decrease in inventories (-25%), a higher level of utilization capacity rate and of order book. Barter represents only 33% of their sales, against 44% for the enterprises whose indebtedness increases.

The previous relationships are tested with an Ordered-Probit procedure, which takes into account the fact that *debt0* is a qualitative variable having ten modalities. The estimation in **Table 8** shows that credit is allocated towards enterprises that do produce for inventories, have bad real and financial performances, and are faced with shortage of financial resources.

The variable *inventory* is significant and positive: the higher the unsold production and inventories, the higher the supply of credit. *f1* is also significant, and its sign is negative: the higher the co-ordinate on the horizontal axis, reflecting a higher capacity utilization rate, level of order book, index of current production, the lower the supply of credit. Finally, the higher the co-ordinate on the *f2* axis, e.g. the more the enterprise is faced with financial limit, the higher the level of barter transactions and the higher supply of credit.

Table 8 - *Debt0*, Ordered-Probit

Explanatory Variables	f1	f2	Inventory	Lim-fin	Khi (2)	Pseudo R2	Number of obs.
	-0,3511 (-2,786)	-0,9943 (-4,114)	0,00484 (4,066)	-0,6645 (-2,859)	32,66	0,0320	241

$\mu(1)=-0,0246082$; $\mu(2)=0,9753209$; $\mu(3)=1,550933$; $\mu(4)= -0,1625199$; $\mu(5)=0,0915447$;
 $\mu(6)=0,4268684$; $\mu(7)= 0,874704$; $\mu(8)= 1,588062$; $\mu(9)= 2,185503$; $\mu(10)= 2,278701$; $\mu(11)= 2,394325$

Lim-fin is a scale variable. It is set equal to one when the main impediment to production is identified as being the shortage of financial resources: a discrete change in this variable from zero to one decreases the probability of being indebted.

The previous table provides evidence that in Russia bank lending is still providing firms with soft budget constraint.

7. CONCLUSIONS

This paper relies upon the results of an industrial survey of the performance and own-judgement of 420 Russian enterprises in 1996, as on their actual intentions and expectations vis-à-vis the short-term future. The qualitative nature of most variables has made necessary the use of specific econometric instruments, namely multiple-choice analysis and ordered Probit. Although, by its very nature, the quality and internal consistency of the data base provided by the *Russian Economic Barometer* was difficult to check beforehand, the results presented here leave few doubts: the behavior and performance of the surveyed enterprises

are indeed sharply differentiated and show clear structural relationships. These give important insights on the type of constraints which Russian firms are facing as well as on their adjustment strategies.

Three main conclusions have been drawn. First, profit is a function of real productive performances, of the capacity to adjust to financial and/ or liquidity constraints, and of past indebtedness, which works as an inertial variable. Second, the spontaneous responses of firms to constraints prove at best uneven. On the one hand, while the total number of employees may be sharply reduced by enterprises in the worst position, any clear trend towards increasing labor productivity seems to vanish once the situation becomes roughly stabilized¹³. On the other hand, enterprises in the best situation are clearly reluctant to hold or to increase bank debt, so that the implicit demand for credit derives mostly from enterprises with losses, growing inventories and poor short-term prospects. A third conclusion is that the determinants of the *ex post* distribution of credit by banks are very close to the determinants of the *ex ante* demand for credits by firms. In other words, Russian banks show limited capacities to discriminate between borrowers and to limit their exposure to declining, loss-making firms¹⁴.

Whatever national experiences, it was shown that enterprise performances, as reflected in their probability of braking even, can be differentiated in Russia with the same type of variables as in growing Central European economies. The adjustment to hard budget constraint and a progressive recovery in output are the two main variables in any viable microeconomic strategy during transition. However, analyse of dynamic adjustment trajectories (employment and indebtedness behavior) shows only limited signs of growth-oriented strategies in Russia, even among the profit-making enterprises. Hence the importance of inertial variables, such as past indebtedness or, more implicitly, sectoral characteristics of each firm and of environmental variables as weak market institutions, limited market competition or demonetization of transactions.

For sure, the very negative, broader conclusions which could be derived from this, should also take into account one important element: since the end of the high inflation period which characterised the first phase of Russian reforms (1992-1996), the overall capacity of the financial system to drain domestic savings and allocate financial resources in the economy has remained extremely limited. In 1996, total domestic credit to the economy represented only 8% of GDP, while a large part of the banks' available funds was invested either in the public bond market or in stakes in the privatised industry. Hence, widespread adverse selection by banks could not have as large a negative impact on the enterprises sector, as would have been the case in highly-leveraged economies (see Asia). Conversely, the financial crisis which started to surface at the end of 1997, and became generalised during spring 1998, was doomed to have only a limited direct impact on the real sector, unless it extended to the foreign exchange or to inflation.

¹³ A moving from the left-hand (lower) to the right hand (upper) side of the Graph 1 does not reflect an internal adjustment but rather some exogenous characteristics of the sample.

¹⁴ These phenomena are generated in a model of soft budget constraint in Berglof and Roland (1994).

The main underlying question in the above-mentioned conclusions rather brings back to the issue of the adjustment of Russian firms, when confronted with a new, more constraining overall economic environment. An early conclusion, reflected in the Multiple Choice Analysis, was in some sense reassuring. Although practical experiences may vastly differ, success in adjustment, as reflected in a high probability of braking even, apparently responded to the same set of variables as in growing, Central European economies: the adjustment to hard budget constraint and a progressive recovery in output are the two main engines of any sustainable microeconomic strategy during transition. Graph 1 provided a graphic evidence of this. But the image became much more blurred in the latter part of the paper: employment and indebtedness variables pointed rather in the direction of very passive, inertial behaviours, even among the best enterprises. Only limited signs of growth-oriented strategies emerged in this part of the sample, while there were strong indications that a good proportion of the remaining enterprises should probably have been closed for a long time.

Hence the following proposition: although, from a static point of view, the distribution of enterprises, between 'roughly stabilised' ones and shrinking ones, reflects the expected, conventional approach of microeconomic adjustment during transition, the underlying determinants of this distribution appear not to translate into consistent, dynamic adjustment trajectories. In other words, Graph 1 would indeed reflect the main determinants of the probability of making profit, but this would be a set of given, 'frozen' parameters, rather than adjustment variables on which the managers' strategies would actually be able bear. Hence the importance of inertial variables, such as past indebtedness or, more implicitly, the sectoral characteristics of each firm.

Hence, apparently, the actual determinants of the distribution of the firms' present performances then makes it difficult to explain their low strategic capacities by hypothetical internal failures. In other words, there would not be such thing as the 'nature' of Russian firms, which would make them definitively adverse to change. Their poor dynamic performances should be considered rather as the consequence of an adverse microeconomic environment which slows down, or may even block the firms' capacity to devise dynamic, medium term strategies, comparable to those which emerged in Central Europe, already by 1991-1992. Under this respect, though this issue clearly falls outside of the reach of this article, one can suggest at least three directions.

First, the opacity of real-goods markets may severely limit the effect of profit-incentives, contrary to the situation witnessed in more successful, emerging or transition economies. As long as the information content of the price structure, monopolistic positions, non-competitive access to distribution networks will make it difficult to translate into business initiative the identification of a potential, unsatisfied demand, the adjustment of the supply structure of the economy will be severely hampered.

A second structural constraint would then derive from the on-going demonetisation of economic transactions, reflected i.a. in the increasing proportion of trade being conducted in barter. Indeed, medium term, pro-active strategies require that the firms' managers rely upon a consistent, reliable accounting structure, as a basis for measuring and anticipating the

impact of given management decision. Even such basic information such as total revenue, added value or profits become extremely difficult to appraise without a monetised accounting framework. Under this respect, the progressive brake-down of cash transactions in Russia raises two dangerous obstacles. First it steadily reduces the internal capacity of firms to develop any form of rational microeconomic calculation, so that any medium term project is doomed to remain very speculative. Monetary transactions, based upon a roughly reliable price structure, are indeed necessary in order to measure economic flows and stocks in a market economy, and their weakening inevitably reduces the agents' capacity to rationalise microeconomic decisions.

Thirdly, demonetisation makes more difficult the actual mobilisation of wealth and financial resources into a consistent financing strategy, which requires that *liquid* assets are allocated to a given set of investment priorities. For instance, a self-financed growth strategy, by an implicitly profitable enterprise, will not work unless the manager is actually able to liquidate existing assets against cash, or derive a monetary cashflow from its current operations. If this is not possible, investment and the reallocation of capital resources will remain very difficult. In this sense, while the limited size of the credit and capital markets is a common feature to all transition economies, which makes more difficult the reallocation of resources between firms and sectors, the Russian economy present an even more rigid situation: even the adjustment of the productive structure on the basis of reinvested cashflows has become more and more difficult. Hence, the implicit conclusion of the present paper: adjustment works only negatively, via the very slow demise of the most unviable firms.

Opaque real goods markets, the limited "calculability" of microeconomic decisions and the difficulty to liquidate assets and goods against cash, in order to reallocate resources, would then explain why profit incentives and harder budget constraints have failed so far to deliver in Russia the dynamic results witnessed in Central Europe. Reducing the effect of these constraints would then be a precondition in order to 'de-freeze' the static distribution of enterprises performances identified in this paper, so as to open more room, on the microeconomic level, for dynamic, medium term growth strategies.

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ANNEX

Name of Variables	Definition
<i>Prodm1</i>	Output over the last month
<i>Cred</i>	Conditions of credits' access over the last month 1: improved 2: remained the same 3: decreased
<i>Inv1</i>	Stocks of finished products over the last month 1: increased 2: remained the same 3: decreased 4: no stocks
<i>Utcap</i>	Capacity utilization rate (usual monthly level: 100)
<i>Inv2</i>	Stocks of finished products (usual monthly level: 100)
<i>Ord</i>	Order-books' level (usual monthly level: 100)
<i>Barter</i>	Share of barter in trade (%)
<i>Fin</i>	Financial conditions over the last month 1: good 2: normal 3: bad
<i>Proda3</i>	Output in three months, anticipated (usual monthly level: 100)
<i>Expected Debt</i>	Indebtedness to banks in three months, anticipated 1: increase 2: remain the same 3: deteriorate 4: not indebted and not going to be
<i>Lim-dde</i>	Limits to production: insufficient demand yes: 1; no: 0
<i>Lim-input</i>	Limits to production: shortage of raw materials and semi-finished products yes: 1; no: 0
<i>Lim-fin</i>	Limits to production: shortage of financial resources yes: 1; no: 0
<i>Prod0</i>	Real output in current month (6 months ago level: 100%)
<i>Profit</i>	Financial results for half a year 0: Profit 1: Losses
<i>No-debt</i>	Indebtedness to banks 1: no indebtedness, now and earlier;
<i>Labour</i>	Number of employees

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