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**Russian Farm Enterprise Performance and Restructuring:  
A Debt Problem or a Profitability Problem?**

by

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Working Papers are published without a formal review within the Department of Applied Economics.

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## **Russian Farm Enterprise Performance and Restructuring: A Debt Problem or a Profitability Problem?**

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The use of debt financing is commonly viewed as a normal part of a business management strategy for improving financial performance. However, the problems associated with managing existing farm debt in Russia may have created problems due to the major transitions which have been occurring in the economic framework of farm input and commodity markets and changing farm structure. This paper empirically investigates the relationship between existing debt, financial performance (e.g., profitability), and the process of restructuring the agricultural enterprises in Russia during 1994. The analysis uses accounting and farm survey data.

### *1.1. Financial Problems in Russian Agriculture*

Shocks in the Russian economy such as unexpectedly sharp increases in the rate of inflation and higher than expected interest rates in conjunction with pre-existing debt are expected to have created two forms of financial performance problems for the agricultural sector: *operational problems* and related financial stress due to the inadequacy of cash flow and profits to cover operating and financing expenses, and *farm restructuring problems* due to delays in the process of restructuring the assets and debts of the agricultural enterprises (Brooks and Lerman). The result is a nexus of financial and restructuring problems which are potential barriers to the breaking up of enterprise assets and paying off the old debts (see Figure 1). The implication is for a slower pace of sectoral adjustment and an altered direction of change in agricultural sector competitiveness.

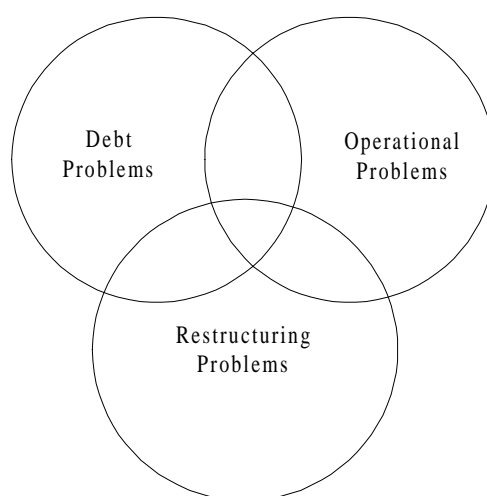


Figure 1. The Nexus of Financial Problems in Russian Agriculture

Operational problems are reflected by low profitability and may derive from several sources: decreases in operating receipts, increases in the cost of purchased inputs, and increases in the cost of credit. They could also derive from a lack of tools to manage cash flows adequately through the operating cycle of the farm business. The factors which cause costs to rise may lead farmers to: reduce their use of purchased inputs, increase their use of barter transactions, and/or delay their cash disbursements (e.g., payment of workers, debt repayments, etc.).

Farms in Russia may also lack the tools to effectively manage the normal seasonality of cash flows (let alone unexpected variability). For example, appropriate deposit instruments may not be readily available

to manage the flow of internal savings of the farm and/or household unit. Similarly, commodity storage facilities may be lacking, so that the farmer is forced to sell crops at lower prices at the time of harvest or to use them in barter transactions. Furthermore, access to short-term credit may be lacking, which reduces the use of external sources of working capital.

Restructuring problems are expected to arise when the distribution of assets of the agricultural enterprises is delayed because the distribution of the underlying debts is not acceptable to the workers. Although there are several potential reasons for this, one major reason is that the workers may anticipate that the debts could not be repaid from the revenues generated by the assets. Thus, the restructuring process may be constrained by excessive pre-existing debt and/or the expected lack of profitability.

### *I.2. Objectives*

The above financing problems lead to the following objectives for this study of Russian farm financial performance:

to evaluate the financial performance of agricultural enterprises and private farms and the severity of the “debt problem” in Russian agriculture, and

to evaluate the linkage between pre-existing debt and the results of enterprise restructuring.

Conducting an analysis of farm financial data with both descriptive and analytical aspects attains these objectives. The descriptive component of the study involves the development of indicators (ratios) of farm financial position and performance. The analytical component involves decomposing the problem of financial stress and relating financial performance (e.g., profitability and debt-servicing capacity) to capital structure, size, location, operating characteristics, and other factors. The analysis links data from individual farm and enterprise survey responses to the financial performance data.

## **II. Description of the Financial Data**

The financial database includes approximately 206 agricultural enterprises operating collective and state farms (hereafter, *enterprises*) during 1994. The data also include 114 private farms in 1993 and 887 private farms in 1994 (hereafter, *farms*).<sup>1</sup> The enterprises and farms are located in several provinces in western Russia, south and east of the Ural Mountains. They include Rostovskaia (bordering on the Ukraine), Saratovskaia, Orlovskaja, and Pskovskaia. One of the provinces (Novosibirskaja) is located east of the Urals.

Enterprise data includes: two balance sheets at the end of calendar year 1993 (CY93) and the end of calendar year 1994 (CY94) and supplemental balance sheet data, and an Income and Use of Profit Statement for CY94 and supplemental income statement data. Farm data includes two income statements for CY93 and CY94. Although the number of farms increased significantly from 1993 to 1994, income and expense data is available on just 110 farms for both years.

### *II.1. Identification of Performance Indicators*

The indicators of financial performance can be categorized as: asset structure, asset management, solvency and liquidity, debt structure and management, profitability and operational efficiency, and cash flow measures. Among these indicators, the debt management, profitability and efficiency, and cash flow ratios are the primary measures of the effects of financial stress on performance.

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<sup>1</sup> Odening suggests that the development of performance measures for farms in the transition economies can end in frustration due to the problems encountered in evaluating financial statements. These and other problems associated with using Russian farm accounting data are discussed briefly in Annex A.

*Asset structure* indicators are used primarily to describe the liquidity of assets. *Asset management* indicators describe the rate at which the assets of the business are converted to sales (i.e., asset turnover). *Solvency and liquidity* indicators are used to describe the ability of the business to liquidate assets to meet debt obligations. *Debt structure* indicators provide a summary of the maturity composition of liabilities. *Debt management* indicators relate liability levels to sales and/or profits. *Profitability and operational efficiency* indicators measure the ability of the business to generate profits from normal sales activities. Net profit/total assets (the rate of return on assets) and net profit/total equity (rate of return on equity) are commonly used measures. *Cash flow* indicators provide evidence of the profitability of the business in cash terms.

Each of these categories of financial performance is useful in gauging the distribution and severity of financial stress among agricultural enterprises and farms in Russia. However, since a high annual rate of inflation is a particularly important characteristic in Russia during 1993-94, it is useful to consider the fact that some of the above indicators of financial performance will be sensitive to high rates of inflation. In particular the ratios which include measures of current and fixed asset values (e.g., the asset structure, asset management, solvency and liquidity ratios), but also the profitability ratios, which include assets in the calculation, will be influenced by inflation.<sup>2</sup> That does not negate the usefulness of financial ratio analysis, but the interpretation of some enterprise performance comparisons across years becomes more complex. In this study it is assumed that a relatively uniform asset revaluation was made across all the enterprises, so that meaningful financial performance comparisons can be made between enterprises within the same year. Correspondingly, less emphasis is placed on year-to-year comparisons.

### **III. Agricultural Enterprise Performance**

Profitability is identified as the primary criterion for evaluating enterprise performance. For that reason three alternative profitability indicators could be used to classify enterprises into performance quartiles. Those three indicators are; gross profit/sales, net profit/total assets, and net cash income/total revenue. The results of the gross profit/sales evaluation are reported here, since the results from using the other measures are qualitatively quite similar.

Two forms of comparison are made of the financial ratios: those between enterprises at different levels of profitability (i.e., inter-quartile comparisons) and those between enterprises and groups of farms in Minnesota and the U.S. in the same year. The latter comparisons are done only selectively because the Russian and U.S. accounting systems are quite different.<sup>3</sup> In order to control for farm size and type, the financial performance comparisons for 1994 are made with farms located in southern Minnesota. Farm accounting records are available for those farms and the necessary balance sheet adjustments can be made for land using Southwestern Minnesota Farm Business Management Association records (Olson et al.). The U.S farm comparisons are made with farms reporting \$250,000 - \$499,000 in annual sales in 1994, using information derived from the farm costs and returns survey (USDA). The U.S. farms in that sales size group are comparable with Russian enterprises (which reported mean annual sales of about 863 million rubles in 1994).<sup>4</sup>

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<sup>2</sup> The effects of inflation on these ratios can be offset by restating the balance sheet if the inflation adjustment is known. However, in this study the inflation adjustment in 1994 is not known.

<sup>3</sup> To make valid comparisons of financial performance indicators, it is desirable to compare farms of similar size and type. It is assumed that enterprises are diversified crop and livestock operations and that comparisons with similar crop-livestock farms are appropriate. The issue of farm size is more problematic, since size can be defined in a number of ways. Enterprises may operate quite large land holdings, yet have relatively smaller annual sales than U.S. farms with comparable land holdings. Since the emphasis is on profitability indicators, annual sales is used as the factor for identifying comparably sized U.S. farms.

<sup>4</sup> The mid-range of sales for U.S. farms in the \$250,000 - \$499,000 class is \$375,000. When converted at the average ruble/\$ exchange rate of 2,200 for 1994, a comparably sized enterprise has about 826 million rubles in annual sales.

### *III.1. Fixed Assets and Enterprise Asset Structure*

The asset structure ratios for 1993 and 1994 indicate that current assets have become a more important part of enterprise assets in 1994 than in 1993, but that fixed assets still dominate the balance sheet.

Enterprise balance sheets are relatively more heavily dominated by fixed, nonland assets (primarily buildings, machinery and equipment) than farms in the U.S. On average the Russian enterprises carry about 40% more of these nonland assets in their asset structures than U.S. farms. The general tendency is for “high profit” enterprises to have higher current assets, lower net fixed assets, and higher accounts receivable than “low-profit” enterprises.

It is also observed that enterprise liquidity (working capital assets) increases sharply and solvency decreases slightly in 1994. The higher liquidity positions could be interpreted as a response to the uncertainty of commodity and input market conditions and/or low levels of use of, or lack of access to, short-term credit and the decision to manage the working capital position internally. The overall working capital position of Russian enterprises appears to be similar to that of comparable farms in the U.S.

More importantly, the enterprises appear to carry relatively less debt and higher equity capital positions than comparable farms in the U.S. The average equity ratio is 0.81 among the sample of enterprises, while the U.S. farm ratio is closer to 0.65.

### *III.2. Inefficiency of Asset Turnover*

The rate of turnover of enterprise assets (sales/current assets, sales/fixed assets and sales/total assets) provides an important clue concerning the relatively low level of profitability and operational efficiency of the enterprises. The average fixed asset turnover among enterprises is 0.18 times in 1994. The corresponding total asset turnover ratio in 1994 is about 0.14 times. The data indicate that the average rate of asset turnover among the enterprises in 1994 is quite low. Over half of the enterprises (those with low profitability) are observed to have turnover rates, which imply that it would take about 10 years to replace their nonland assets. This exceeds the expected useful life of those assets, and confirms the existence of the inefficiency problem.

The turnover of assets at different levels of profitability indicates that turnover increases at higher levels of enterprise profitability (Table 1). High-profit enterprises exhibit significantly faster turnover of assets than low-profit enterprises. The differential in turnover is large for both the current asset turnover and the fixed asset turnover ratios.<sup>5</sup>

**Table 1. Low- and High-Profit Enterprise Turnover Ratios (ranked using gross profit/sales)**

<b>Turnover Ratios</b>	<b>Low-Profit Enterprises</b>	<b>High-Profit Enterprises</b>
Sales/Current Assets (average)	0.83	1.72
Sales/Current Assets (ending)	1.11	2.33
Sales/Net Fixed Assets	0.08	0.32
Sales/Total Assets	0.06	0.24

Enterprises that are more efficient at generating sales from using assets productively increase both their gross profit margin and their return on assets. A major profitability problem among the enterprises appears to derive directly from their low level of sales relative to the level of their fixed asset investments (i.e., a lack of fixed asset productivity). Other important differences exist between high-profit and low-

<sup>5</sup> The sales/current assets ratio is computed in two ways (based on the average value and the end-of-year value) due to the effect of inflation on the values of current assets reported on enterprise balance sheets.

profit enterprises in the efficiency with which they turn over their current assets (inventories, receivables, and other working capital assets).

The asset turnover of the enterprises is significantly below that of Minnesota and U.S. farms (Table 2). The average current asset turnover of the enterprises in 1994 is 1.22 (times) compared with 1.61 times among the sample of Minnesota farms. A comparison of fixed asset turnover ratios provides an even more dramatic illustration of the lack of financial efficiency among Russian enterprises. The fixed asset turnover ratio of Minnesota farms (excluding land) is about 1.17 (times) compared with about 0.18 (times) among the enterprises. The total asset turnover ratio is similarly higher at 0.68 (times) for Minnesota farms (when land is excluded), compared to 0.14 (times) among the enterprises.

These financial comparatives generally point to low efficiency of asset utilization by the enterprises. This characteristic has implications for the pace of restructuring of the enterprises. The new owners of enterprise assets may expect that the assets being distributed will not generate a sustainable turnover of sales. They may anticipate that profitability will be low and the ability to service the debts associated with those assets will also be low, leading to future debt management problems.

**Table 2. Enterprise Turnover Ratio Comparisons**

Turnover Ratios	Minnesota Farms		
	Minnesota Farms	(less land)	Russian Enterprises
Sales/Current Assets	1.61	1.61	1.22
Sales/Net Fixed Assets	0.53	1.17	0.18
Sales/Total Assets	0.40	.68	0.14

### *III.3. Debt Repayment Problems*

There are several ratios that are of importance in understanding the ability of the enterprises to service their debts. Two of those ratios appear to be interrelated: employee liabilities/short-term liabilities and overdue loans/total loans. The ratio of mean employee liabilities fell from about 0.36 in 1993 to about 0.21 in 1994. In comparison the overdue loans ratio increased from 0.06 to about 0.12. This suggests that, on average enterprises could not (or decided not to) repay their loans and may have used their liquid assets to pay workers instead (either in cash or in kind). This assumes that they had an option to pay employees or to pay creditors.

Although the average level of debt is relatively low, debt management and repayment problems exist for some enterprises. This is revealed by the total liabilities/ sales and total liabilities/ net profit ratios. These ratios are alternative indicators of the number of years required to repay principal on the existing debt, based on the 1994 level of sales and net profits. The average total liabilities/sales ratio is 0.85 in 1994, and about 3/4 of all the enterprises (primarily those with higher profitability) have ratios, which are less than 1.0. The average total liabilities/net profit ratio (2.68) is less favorable, since over half of the enterprises have ratios, which are negative. Negative ratios imply that those enterprises will never be able to repay their liabilities based on 1994 profitability results.

The ratios for low profit enterprises indicates that they require about three times longer to repay their debts than the high-profit enterprises (1.42 years versus 0.44 years, respectively). Moreover, the total liabilities/ net profit ratios of the low-profit enterprises were -1.44 on average compared with just 1.73 years to repay total debts among the high-profit enterprises (Table 3).



**Table 3. Low- and High-Profit Enterprise Debt Management Ratios (ranked using gross profit/sales)**

<b>Ratio</b>	<b>Low-Profit Enterprises</b>	<b>High-Profit Enterprises</b>
Total Liab./Sales	1.42	0.44
Total Liab./Net Profit	-1.44	1.73

*III.4. Profitability and Expense Control Problems*

Profitability and operational efficiency ratios point to low average profits and a wide variation in profitability among enterprises in 1994. The average gross margin (gross profit/sales) and average rate of return on assets (net profit/total assets) for the enterprises in 1994 are -0.30 and -0.001, respectively. The data indicate that over half of the enterprises generated negative gross margins and negative rates of return on assets. The range of the gross margin and rate of return ratios reveals that there is a large variation in profitability among enterprises (Table 4).

**Table 4. Low- and High-Profit Enterprise Profitability Ratios (ranked using gross profit/sales)**

<b>Profitability Ratios</b>	<b>Low-Profit Enterprises</b>	<b>High-Profit Enterprises</b>
Gross Profit/Sales	-1.13	0.27
Net Profit/Total Assets	-0.066	0.068
Cost of Prod. Sold/Sales	2.13	0.74

One of the reasons for the difference in enterprise gross margins is in the ability to control production expenses. This variation may be largely due to differences in the ability to control the effects of inflation through the use of purchased inputs. Additional evidence of this factor can be found in the observed differences between the cost of products sold/sales ratios for low-profit enterprises and high-profit enterprises (which were 2.13 and 0.74, respectively, in 1994).

*III.5. Cash Flow Problems*

Enterprise cash flow may be positive or negative, depending on the ability of the enterprise to generate sales and/or profits. The net cash income/ total revenue ratio is an indicator, which is closely related to overall profitability. The net cash income/sales ratio (the "cash flow ratio") is another useful ratio for evaluating cash flow performance. The average net cash income/ total revenue ratio of the enterprises in 1994 is -0.15. In comparison, the average net cash income/ sales ratio is -0.16. This suggests that on average there is a significant cash flow problem and that financial stress exists among the enterprises. The data indicate that over half of the enterprises in the sample had negative cash flow positions in 1994. Overall, these results indicate that if an enterprise is generating low profits (due to low sales or high operating expenses), it also tends to experience relatively more severe cash flow problems.

*III.6. Enterprise Income Statements*

The Russian enterprise accounting system reports profit-making activities of the enterprise (those with positive net results) and loss-making activities (those with negative net results). Enterprises with positive net results report profits equal to 22% of total revenues. The corresponding average cost of sales is 76% of revenues. In contrast, enterprises with negative net results report losses equal to 48% of total revenues. The average cost of sales of these enterprises is 137% of revenues.

**IV. Decomposing the Enterprise Financial Problem**

While financial performance has been evaluated by examining farm profitability, solvency and liquidity ratios, it is also possible to decompose farm financial performance (i.e., the rate of return on equity) into

its income, financial leverage, and interest rate components (Featherstone, et al.). This decomposition requires the use of information from the balance sheet and income statement. Therefore, it is performed only on the 1994 enterprise data. Rates of return on equity (ROE) are calculated for all 206 enterprises and the decomposition analysis is applied to the 160 enterprises with negative ROE in 1994. Those are the enterprises, which are experiencing the most severe financial stress.

#### *IV.1. ROE Decomposition Results*

The ROE decomposition indicates that among the 160 enterprises with severe financial stress, 79 enterprises (49% of those with negative ROE) tend to have a “debt problem” (see Table 5). That debt problem is either due to the use of excessive financial leverage or due to the high interest rate paid on debt. In comparison, the remaining 81 enterprises (about 51% of the enterprises with negative ROE) have a “rate of return problem,” i.e., a low rate of return on assets. Those enterprises tend to generate losses and/or low levels of profitability from operations, which result in negative ROE.

**Table 5. General ROE Decomposition Results**

<b>Rate of Return on Equity a/</b>	<b>Leverage Problem</b>	<b>Interest Rate Problem</b>	<b>Return on Assets Problem</b>	<b>Return on Equity Problem</b>
Quartile 1	5 (3%)	35 (22%)	0 (0%)	40 (25%)
Quartile 2	0 (0%)	32 (20%)	8 (5%)	40 (25%)
Quartile 3	0 (0%)	7 (4%)	33 (21%)	40 (25%)
Quartile 4	0 (0%)	0 (0%)	40 (25%)	40 (25%)
Column Sum	5 (3%)	74 (46%)	81 (51%)	160 (100%)

a/ The rate of return on equity quartile ranges are based on all 160 financially stressed enterprises: Quartile 1 (-0.42 to -0.14), Quartile 2 (-0.14 to -0.08), Quartile 3 (-0.08 to -0.05), Quartile 4 (-0.05 to 0.00).

Among the 79 enterprises classified as having a debt problem, the 40 enterprises with the most severely negative ROE are located in quartile 1 (when ranked using the ROE measure). Thirty-five of the enterprises have debt problems because of the high interest rate they are paying on their debt. The remaining 5 enterprises in the category with a debt problem are clearly excessively leveraged. This suggests that the problem of high interest rates is quite prevalent among enterprises with large losses.<sup>6</sup>

In contrast enterprises experiencing a low ROA problem also have negative ROE, but the negative ROE ratio is of a smaller magnitude than that among the enterprises with a debt problem. For example, among enterprises experiencing operating losses, those losses are relatively small (in percentage terms) and it is likely that many of the enterprises could be made profitable by improving operating efficiency and asset utilization. Those enterprises are not facing the additional problem of needing to restructure (and reduce) their debts in order to become profitable.

<sup>6</sup> High interest rates lead to losses and the use of excessive financial leverage among some enterprises magnifies those losses. In the context of relatively large unexpected increases in interest rates, even modestly higher leverage positions can contribute to negative ROE.

#### *IV.2. Implications of the Decomposition Results*

An implication of the ROE decomposition analysis is that the most significant interventions for improving the financial performance of enterprises experiencing the greatest financial stress are those which jointly address the high interest rate problem and the low ROA problem.

The interest rate problem is one, which may be effectively dealt with by macroeconomic stabilization and efforts to reduce the rate of inflation. As inflation is reduced, the inflation premium is also expected to fall and nominal interest rates will gradually decline. The low ROA problem is likely to be a more systemic and chronic problem in Russian agriculture due to problems of past resource misallocation and the need for further enterprise restructuring. While the government could intervene temporarily to increase the rate of return in agriculture, that policy is not likely to be sustainable.

As a strategic approach to the low ROA problem, it is useful to consider that the level of ROA is a function of the profit margin generated and the rate of asset turnover. The profit margin may be quite low or negative for enterprises with negative ROE due to: the effect of inflation on the cost of purchased inputs, a lack of operational efficiency and cost control, and possibly poor management of the commodity marketing function. In addition the turnover of fixed and total assets is relatively low among all the financially stressed enterprises. The observed low turnover performance is due to low sales activity relative to the value of assets managed. Thus, some farm asset restructuring (liquidation and downsizing) may be the most effective way to deal directly with an extremely low ROA problem.

#### **V. Analysis of the Debt-Profitability Problem**

Regression models are developed to quantify the relationship between key financial performance indicators and various financial and nonfinancial characteristics of the enterprises in 1994. The regression strategy is structured around three submodels: a profitability submodel, a debt-servicing submodel, and a debt submodel. The profitability submodel is used to predict the rate of return on assets, the debt submodel is used to predict the financial leverage; and the debt-servicing submodel is used to predict the times-interest-earned of the enterprises.

##### *V.1. Description of Variables*

The regression variables fall into several general categories: financial ratios, enterprise size, the value of debt, assets, and asset shares, the workers and enterprise assets which left the enterprises through restructuring, provincial location, the existence of a financial problem, and whether the enterprise decided to reorganize. The regression analysis focuses on the data obtained from the 1994 survey of enterprise managers.

The indicators of enterprise size include land area (LAND), average total assets (ATA) and total sales (SALES). The indicator of debt is average total liabilities (ATL). The indicators of the value of asset shares are the average asset share per worker (ASPW) and the average asset share per hectare (ASHA). The indicators of assets leaving the enterprise are the number of workers leaving to start private farms (PRV) and the total value of assets going to private farms (TAPR). The indicator for location is a dummy variable (PROV) for the province in which the enterprise is located: Rostovskaia, Saratovskaia, Orlovkaia, Novosibirskaia, and Pskovskaia. The provinces are ranked to reflect the most agriculturally endowed province (Rostovskaia = 1) to the least endowed province (Pskovskaia = 5) in terms of several factors (soils, climate and proximity to markets). The decision to reorganize the enterprise is treated as a binary variable (RORG = 1 if yes, = 2 if no). The result of the ROE decomposition analysis is coded as a dummy variable (DECOM) with three possible outcomes: no financial problem (= 0), a low return on assets problem (=1), and a debt problem (=2).

## V.2. Profitability Submodel

The profitability submodel regressions indicate that several factors are significant in predicting the rate of return on assets (net profit/total assets). They include the value of sales (SALES), the value of asset shares per worker (ASPW) and per hectare (ASHA), the value of total liabilities (ATL), and the type of financial problem the enterprise is experiencing (DECOM).

In the net profit/total assets submodel, sales and total liabilities are both positively related to profitability (see Table 6 and Annex Table B.1). Both variables suggest that larger enterprises tend to generate higher profitability, even if they have more debt. Thus, the level of enterprise sales is important in creating profitability and the use of debt typically contributes to overall profitability as well. The negative sign on the dummy variable for the existence of a financial problem (DECOM) suggests that enterprises with low ROE due to either a debt problem or a low ROA problem generate significantly lower profitability. This result is expected and it confirms the earlier finding that enterprises with higher than average levels of debt fall into two groups - those that can generate profits and sustain above average debt levels and those that have difficulty generating profits and, consequently, have a debt problem. Based on these results, the underlying ability to generate sales is found to be a key factor in determining enterprise profitability. Finally, the asset share/hectare is inversely related to profitability. This result reflects differences in the dominance of fixed assets on the balance sheets of the enterprises. The higher the value of fixed assets of enterprises, the lower the profitability they derive from those assets.

**Table 6. Profitability Submodel Results**

<b>Independent Variable</b>	<b>Net Profit/Total Assets (NPTA) Submodel</b>	<b>Net Profit/Sales Submodel</b>	<b>Sales/Total Assets Submodel</b>
INTERCEPT	+	+	+ ***
SALES	+ ***		
ATL	+ *	+ ***	+ ***
ASHA	- ***	- ***	-
ASPW	-	-	+ ***
TAPR	-	-	- *
DECOM	- ***	- ***	- ***
PROV	+	-	-

The significance levels are: 1% level (\*\*\*), 5% level (\*\*), and 10% level (\*).

Because the level of sales is potentially a key factor in determining enterprise profitability, two additional submodels are estimated: net profit/sales and sales/total assets (see Table 6). The net profit/sales (net profit margin) submodel results suggest that the value of asset shares/hectare, total liabilities, and the type of financial problem faced by the enterprise are significant predictors of net profits. The net profit margin indicates how effectively the enterprise controls costs per unit of sales. Thus, it is a useful measure of enterprise efficiency. A higher asset share/hectare tends to result in a lower profit margin. Enterprises with large asset values (the result of high fixed asset values on their balance sheets) tend not to be as efficient in controlling their costs. A higher level of total liabilities results in a higher profit margin. Thus, enterprises with larger than average debt levels appear to perform relatively better than average. The DECOM variable suggests that enterprises with a financial problem tend to generate lower unit profit margins than the average enterprise, depending on the type and severity of the underlying problem they are facing. One implication of this regression is that the level of debt is not the problem for low profitability enterprises. Rather, it is the inability to generate profits on each unit of product sold. Higher direct materials expenses for purchased inputs may be a particularly important factor in determining the level of unit profits.

The asset turnover submodel (sales/total assets) results suggest that total liabilities, asset share per worker and the presence of a financial problem are predictors of asset utilization. Enterprises with above average total liabilities tend to generate higher levels of asset turnover and, therefore, greater profitability.

Conversely, enterprises with a financial problem tend to have lower asset turnover rates and lower profitability. The positive coefficient on the value of asset share per worker suggests that enterprises with higher asset shares generate higher sales relative to the value of assets employed, and that they exhibit greater operating efficiency.

### V.3. *The Debt-Service, Solvency and Privatized Assets Submodels*

The debt-servicing submodel (for times-interest-earned) indicates that land area, the value of sales, the value of asset share per worker, and the existence of a financial problem in the enterprise are significant determinants of the ability of the enterprise to service its debt obligation (see Table 7 and Annex Table B.2). The positive sign on the sales variable indicates that larger enterprises typically are better able to cover their interest expenses out of earnings. This is consistent with the view that higher sales imply higher turnover of assets, higher profitability, and a relatively lower interest expense. The land variable (like sales) is an indicator of enterprise size, thus the positive coefficient. The existence of a financial problem tends to lead to a lower coverage of interest expense, and the sign on the decomposition variable is negative.

**Table 7. Debt-servicing and Debt Submodels Results**

<b>Independent Variable</b>	<b>Times-Interest-Earned (TIE) Debt-Servicing Submodel</b>	<b>Total Liabilities/Total Assets (TLTA) Submodel</b>	<b>Privatized Assets (TAPR) Submodel</b>
INTERCEP	+ ***	+ ***	+
LAND	+ **	+	+
SALES	+ ***	+ ***	- ***
ASPW	- ***	- **	+ ***
ATL	-		+
DECOM	- ***	+ ***	- **
PROV	-	- **	+ *

The significance levels are 1% level (\*\*\*), 5% level (\*\*), and 10% level (\*).

The sign on the value of asset shares per worker in the debt-servicing submodel is negative. This negative sign suggests that the higher the value of assets per worker, the lower is the profitability of the enterprise relative to its interest expense (i.e., less debt-servicing capacity). This result requires some additional explanation, because the earlier regressions suggested that a higher asset share per worker implies a higher asset turnover (and potentially higher overall profitability). The important issue here is that a higher asset share per worker is associated with higher enterprise debt and, if profitability is relatively weak, a relatively lower interest coverage position. This result is indicative of the more complex interrelationship between asset shares of workers, sales, profitability, and the debt burdens of the enterprises.

The two remaining submodels are used to explain how solvency of the enterprise and the level of assets which were privatized, relate to characteristics of the enterprises and the presence of a debt or other financial problem. The solvency (total liabilities/total assets) submodel results indicate that sales, asset share per worker, the existence of a financial problem, and the location of the enterprise are significant predictors of the relative debt position in 1994. The positive sales coefficient indicates that enterprises with larger than average sales levels typically carry more debt relative to their total asset investment.

The privatized assets submodel predicts the level of assets leaving the enterprises in order to form private farming operations (i.e., asset restructuring as a part of reorganization). The regression results imply that the level of sales, assets per worker, the existence of a financial problem, and provincial location tend to be significant predictors of the level of asset restructuring which has occurred. The negative sign on the sales variable indicates that enterprises with above average sales tend to experience a lower level of assets leaving for private farming operations. This suggests that enterprises, which have been successful in

generating sales, have not experienced massive asset restructuring. The coefficient on asset share per worker is positive, implying that enterprises with larger share values lost more of their assets to private farming operations when the workers left.

The negative coefficient on the DECOM variable tends to support the hypothesis that enterprises with a financial problem (the most severe being a debt problem) tended not to restructure their assets. Thus, it is likely that excessive debt served as a constraint to the restructuring of these enterprises. This result is statistically important even though the level of debt (ATL) is not a predictor of asset privatization in the model. The interpretation is that debt *per se* does not inhibit asset restructuring and the process of farm reorganization. Rather, the existence of a debt problem (or even a low ROA problem) is the key financial characteristic which adversely affects the process. Finally, the positive sign on the province variable suggests that private farmers in the enterprises located in less agriculturally-endowed areas tended not to take as large assets with them when they left to start their private farming operations. This may reflect simply lower valued assets in those provinces, or it may imply that those provinces had other constraints on the asset restructuring and farm reorganization process than those reflected by the variables in the model.

#### V.4. The Debt Problem Model

The debt problem submodels are used to predict the likelihood that an enterprise is experiencing a debt problem due either to a high interest rate and/or too much debt (see Table 8 and Annex Table B.3). The results indicate that sales, liabilities, and the ability to cover interest charges are consistent indicators of the debt problem. Two alternative submodels are estimated to evaluate the sensitivity of the debt problem to provincial location.

**Table 8. Debt Problem Submodels**

Independent Variable	Submodel I	Submodel II
INTERCEPT	- ***	- ***
SALES	- ***	- ***
PRV	- *	-
ATL	+ ***	+ ***
LAND	+ **	+
TIE	- ***	- ***
TLTA	+ ***	+ ***
PROV		+ **

The significance levels are 1% level (\*\*\*), 5% level (\*\*), and 10% level (\*).

When sales increases, the probability that an enterprise is having a debt problem is significantly reduced. Similarly, if the enterprise is generating a sufficient level of net profits to cover its debt-servicing requirement, it is not as likely to have a debt problem. Thus, both factors point to the importance of profitability and turnover of assets as keys to reducing the incidence of debt problems in the enterprises. Enterprises experiencing a debt problem were more likely to have a smaller number of workers leaving to start their own private farms, as indicated by the negative sign on the PRV coefficient. Although the estimated coefficient on PRV is not highly significant in either submodel, the sign provides further evidence that the willingness and/or ability of workers to leave an enterprise and start their own private farms is retarded by the presence of a debt problem. Finally, the coefficient on PROV indicates that enterprises located in less agriculturally endowed provinces tend to have a higher average probability of debt problems.

## VI. Conclusions

This paper has empirically investigated the relationship between existing debt, financial performance (e.g., profitability), and the process of restructuring agricultural enterprises during 1994, using accounting and farm survey data. Financial performance of the private farms was also evaluated.

### *VI.1. Enterprise Performance*

Two major factors are identified as reasons for low enterprise profitability. First, variations in asset turnover are quite large. Second, unit profit margins are quite variable between enterprises. High turnover and profitability are jointly explainable, since the turnover ratio is part of the net profit/total assets indicator. However, the turnover indicator also increases with the gross margin, which implies that the enterprises which are generating higher turnover are also doing a better job at controlling operating expenses and marketing (and pricing) their products and services.

Second, there is relatively low debt in the enterprises, yet there appears to be a significant variation in the ability (or willingness) of the enterprises to repay that debt out of earnings and operating cash flows. Current liabilities relative to current assets indicate that the enterprises are in relatively strong working capital positions generally. In contrast, the level of total liabilities relative to the level of net profits is quite variable and indicates that many enterprises could not repay their debts due to negative profits in 1994. Thus, the evidence suggests that an "excessive debt burden" is not due to a liquidity problem per se, but due to the inability to generate profits which reflects both the higher unit costs of inputs and a lack of enterprise efficiency. Inflationary increases in direct materials expense is an area where there are large differences between enterprises and that factor has a large adverse effect on profit margins and, consequently, the ability to repay debts out of net profits.

The ROE decomposition results point out the relative frequency of these financial problems and tend to support the findings of the enterprise ratio analysis. About 77% of the 206 enterprises generated negative rates of return on equity capital in 1994, and could be considered as having financial stress problems. About half of those financially stressed enterprises were experiencing problems due to a low rate of return on assets. The problems of the other half of the enterprises were due to either high interest rates on debt or excessive use of leverage (i.e., too much debt in the capital structure). In the debt problem subgroup the most frequent problem was that of high interest rates paid on debt. Second, the decomposition analysis also indicates that debt problems experienced by the financially stressed enterprises are jointly the result of high interest rates and low profitability. The significance of low enterprise profitability, as a contributor to the debt problem, is reflected in both the ratio analysis and the decomposition analysis. Enterprises with debt problems exhibit lower unit profit margins and lower rates of asset turnover.

The regression model results provide a useful summary of the impacts of the individual enterprise characteristics on profitability, debt-servicing capacity, and solvency. In addition they indicate the relative importance of debt and other factors in the process of enterprise restructuring. The level of enterprise sales is a key predictor of enterprise profitability and, therefore, the ability to service debt, and progress in reorganizing the enterprises. While larger sales tend to favor profitability and progress toward restructuring, a larger land area is not a significant factor in determining profitability or the likelihood of enterprise restructuring. An increasing value of assets per hectare tends to reduce profitability, but appears not to have a strong effect on enterprise restructuring. The value of assets per worker reduces asset turnover and the ability to service debt, but it also increases the value of assets taken by worker to form private farming operations. The provincial location of the enterprise is not a consistently significant factor in explaining differences in enterprise profitability or the incidence of debt problems. The amount of debt tends to have a generally positive leverage effect on enterprise profitability. However, the presence of a debt problem (due to either relatively high proportions of debt in the capital structure or high interest rates on that debt) tends to reduce profitability, debt-servicing capacity, and the level of assets taken by

workers to form private farming operations. Thus, there is evidence that debt problems exist, and that they have a negative impact on enterprise restructuring.

### *VI.2. Private Farm Performance*

Profitability is also the primary criterion for evaluating the financial performance of the farms during 1993 and 1994. The farms are ranked and grouped into quartiles based on gross profit/sales and net cash income/total revenue. The performance evaluation is done by an inter-quartile comparison. Several categories of financial ratios are evaluated: activity, profitability and efficiency, interest and operating expense, cash flow, and sources (uses) of funds.

Generally, private farms experienced a significant decrease in profitability in 1994, as a result of a sharp increase in the cost of purchased inputs (direct materials expense) and an increase in interest expenses. This led to a liquidity problem for low-revenue, low-profit farms. Evidence of this problem is found for 25-50% of the farms in their gross profit and net profit margin ratios. Although the level of bank borrowings decreased for some farms and increased for others, interest expense increased at a faster rate than overall farm revenues in 1994. Slightly over 25% of the farms are found to have debt-servicing problems as a result, and many were forced to borrow in order to cover their cash flow requirements. Thus, among the low-profit quartile of farms, the debt burden and debt-service problems they face appear to be due to a combination of higher levels of short-term debt and higher interest rates. Cash flow ratios also confirm that the 25% of farms in the low-profit quartile were experiencing severe cash flow stress in 1994.

Loss-making farms accounted for about 43% of the private farms in the sample. A significant percentage of those farms reported losses due to a lack of sales. The other dominant reason for losses is the level of direct materials expense. The sum of direct materials expense and interest expense accounts about 110% of the total revenues on those farms. Since inflation is the primary reason for rising input costs and higher interest rates, loss-making farms are found to be particularly susceptible to the adverse effects of unexpected inflation.



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## **Annex A: Russian Farm Accounting Data Issues**

### *Potential Under-Reporting of Income*

The under-reporting of cash revenues and expenses may occur as a result of barter (noncash) transactions. It is common practice that barter transactions are reported as normal sales (purchases) would be. However, in barter transactions there is no recorded price, only an implicit price is established. Hence, the value of sales (purchases) may be stated at levels that are quite different from their corresponding market price levels. This form of under-reporting is expected to affect the analysis of farm financial performance in several important ways.

If revenues are understated, gross profit and “net results” of the farm may not be an accurate indicator of farm profitability. Similarly, the operating expenses incurred for production activities of the farms and enterprises may not reflect the true costs of materials and labor. The understating of labor expense will be due to farms paying their workers in-kind, rather than with cash wages. Labor expenses may be understated and the gross profit and net result figures may not accurately reflect farm profitability.

### *Revaluation of Assets and Equity Capital*

Asset revaluation is potentially quite a significant problem when calculating financial ratios, since no information is available on the values of assets prior to the revaluation that occurred in 1992, and again in 1994. The underlying reason for asset revaluation is inflation.

In addition to the revaluation problem agricultural enterprise balance sheets report some accounts on a market value basis while other accounts are stated on an historical (book value) basis. For example, accounts receivable, accounts payable, and inventories are restated at current prices. Other assets (e.g., fixed assets) appear to be restated using other repricing methods. The combination of book values and market values makes it difficult to measure equity capital of the agricultural enterprises with high levels of consistency and accuracy. As a consequence of these accounting practices, the equity (surplus) capital account may overstate the true equity capital position.

A major difference between Russian and Western farm balance sheets is that land is reported as real estate in the Western accounting system, but it is excluded from the balance sheet in the Russian system. Thus, comparisons between Western and Russian financial performance measures, which involve fixed assets or total assets in the calculation, will be measuring the performance of quite different asset portfolios. In the U.S., for example, farm real estate can comprise 60-70% of the total value of farm assets.

Two problems arise with respect to accumulated profits of the farms. First, the aggregate "cost of products (jobs and services) sold" excludes interest expense information for the agricultural enterprises. Second, to the extent that the enterprises generate losses on their operations and carry those losses on their balance sheets, the assets and equity of the enterprises are overstated. This second problem is readily corrected on the agricultural enterprise balance sheet by deleting the accumulated loss balance from both total assets and total equity.

## Annex B: Tables of Regression Results

Table B.1. Profitability Submodels

Independent Variable	Net Profit/Total Assets (NPTA) Submodel	Net Profit/Sales Submodel	Sales/Total Assets Submodel
INTERCEPT	0.0083 (0.90) a/ b/	0.0389 (0.30)	0.0716 (5.90)***
SALES	0.0241 (3.70)***		
ATL	0.0298 (1.87)*	0.6433 (4.40)***	0.0705 (5.13)***
ASHA	-3.6445 (-4.45)***	-54.0475 (-4.52)***	-0.7644 (-0.68)
ASPW	-0.0037 (-0.16)	-0.1211 (-0.54)	0.0966 (4.56)***
TAPR	-0.0525 (-0.88)	-0.6548 (-0.78)	-0.1341 (-1.70)*
DECOM	-0.0417 (8.12)***	-0.3782 (-6.35)***	-0.0272 (-4.86)***
PROV	0.0039 (1.59)	-0.0257 (-0.73)	-0.0003 (-0.10)
R-square statistic	0.66	0.35	0.39
F-statistic	48.5***	15.6***	18.7***

a/ Numbers in parenthesis are t-statistics. b/ The significance levels are: 1% level (\*\*\*), 5% level (\*\*), and 10% level (\*).

Table B.2. Debt-Servicing and Debt Submodels

Independent Variable	Times-Interest-Earned (TIE) Submodel	Total Liabilities/Total Assets (TLTA) Submodel	Privatized Assets (TAPR) Submodel
INTERCEP	2.2352 (5.06)*** a/ b/	0.0504 (4.96)***	0.0112 (0.96)
LAND	0.0582 (2.35)**	0.0003 (0.65)	0.0002 (0.37)
SALES	1.0093 (3.30)***	0.0224 (4.77)***	-0.0263 (-3.26)***
ASPW	-3.8470 (-3.50)***	-0.0508 (-2.13)**	0.1049 (3.62)***
ATL	-0.9436 (-1.16)		0.0328 (1.52)
DECOM	-1.2834 (-5.24)***	0.0298 (5.96)***	-0.0137 (-2.12)**
PROV	-0.1085 (-0.92)	-0.0064 (-2.39)**	0.0057 (1.85)*
R-square statistic	0.42	0.22	0.10
F-statistic	20.9***	9.9***	3.1***

a/ Numbers in parenthesis are t-statistics. b/ The significance levels are: 1% level (\*\*\*), 5% level (\*\*), and 10% level (\*).

**Table B.3. Debt Problem Submodels**

<b>Independent Variable</b>	<b>Submodel I</b>	<b>Submodel II</b>
INTERCEPT	-3.773 (21.8)*** a/ b/	-5.699 (17.71)***
SALES	-5.967 (17.60)***	-6.353 (16.89)***
PRV	-0.0213 (2.87)*	-0.019 (2.25)
ATL	9.255 (17.17)***	10.365 (17.50)***
LAND	.104 (4.65)**	.081 (2.56)
TIE	-1.248 (12.19)***	-1.211 (11.96)***
TLTA	35.80 (23.38)***	39.46 (21.62)***
PROV		0.489 (4.25)**
Log-likelihood ratio	137.9***	142.4***
Correct prediction (concordance)	93.1%	93.9%

a/ Numbers in parenthesis are Chi-square statistics. b/ The significance levels are: 1% level (\*\*\*), 5% level (\*\*), and 10% level (\*).