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Depreciation and Russian Corporate Finance: A Pragmatic Approach to Surviving the Transition*

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Abstract

Are Russian firms being allowed to clean the slate with respect to the Soviet legacy of obsolete capital stock? If estimates of capital productivity and firm-level efficiency in Soviet industry are correct, enterprise managers in Russia's emerging market economy will lobby for high depreciation rates in order to write off as quickly as possible the obsolete capital stock which they inherited. Policy makers, seeking to maintain or expand tax revenues to finance the transition, may resist pressure to allow market forces to value capital and continue to set depreciation rates similar to those in the former Soviet economy. This paper utilizes firm-level data in 1992 and 1995 to investigate the extent to which depreciation rates vary across industries and regions by the size of the firm's capital stock, the intensity of capital use, the size of the firm's workforce, the firm's ownership structure, and whether or not the firm exports any portion of its output. The results indicate that in both 1992 and 1995, state-owned firms reported significantly higher average depreciation rates, and thus faced a lower tax burden, ceteris paribus, than joint ventures, leased firms, joint stock companies, and privately-owned firms. While pragmatic from the policy maker's perspective of maintaining a broad tax base, this result highlights the disproportionate burden imposed on the "engines of transition." Moreover, while economic rationale might explain the higher depreciation rates for exporting firms in 1992, economic rationale is unsatisfactory in explaining why firms in the Central region, particularly those located in Moscow, reported higher depreciation rates in 1995.

JEL Classification: G32, P42, P52
Key Words: depreciation, transition, Russia, corporate finance

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Summary

Firm-level data colleced in 1992 and 1995 are utilized here to examine the impact of transition on depreciation rates in Russian industry. The objective first is to assess the extent to which Russian firms are being allowed to clean the slate with respect to the Soviet legacy of obsolete capital. This is done by analyzing average reported depreciation rates over time. The second objective is to determine whether non-state-owned firms or exporting firms, the "engines of transition," are shouldering a disproportionate burden of the transition.

From the summary statistics, it is evident that the policy of central authorities adjusting capital values in response to inflationary conditions has over-valued the capital stock relative to the output it produces, where output is valued under market conditions. The similiarity in average reported depreciation rates for Russian industry as a whole in 1992 and 1995 reflects the absence of change in the tax codes regarding depreciation, and does not necessarily rule out greater managerial autonomy in reporting depreciation rates over time.

Regression analysis indicates that for these civilian manufacturing firms, average reported depreciation rates in 1992 varied inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size. When ownership differences were significant, state-owned firms reported higher depreciation rates. For all industry combined, as well as for each industry individually, regional variation was evident, but not uniform; that is, regional variation in depreciation rates was industry-specific. Overall, exporting firms in 1992 typically reported higher depreciation rates than non-exporting firms. In 1995, neither the size of the firm's capital stock nor the intensity of capital use explained the variaion in average reported depreciation rates. Ownership structure rarely was significant; when significant, it was the case that privately-owned firms and joint ventures reported lower average depreciation rates than state-owned firms. Firms in the Central region, particularly Moscow, reported significantly higher depreciation rates, ceteris paribus. With the exception of firms in the fuel industry, export experience had no significant effect.

Depeciation and Russian Corporate Finance: A Pragmatic Approach to Surviving the Transition

If estimates of capital productivity and firm-level efficiency in Soviet industry are correct,[1] enterprise managers in Russia's emerging market economy will lobby for high depreciation rates in order to write off as quickly as possible the obsolete capital stock which they inherited. Policy makers, seeking to maintain or expand tax revenues to finance the transition, may resist pressure to allow market forces to value capital and continue to set depreciation rates similar to those in the former Soviet economy. That is, in Soviet industry it was not unusual for physical capital to be utilized for years, if not decades, longer than in comparable firms in developed market economies. Consequently, the average age of Soviet capital stock was nearly twice that of Japan, Germany, and the United States.[2] Moreover, the value of capital in Soviet industry was established by planners in accordance with their preferences for expanding defense-related sectors. Unlike market-determined prices, the price of Soviet machinery and equipment reflected neither its relative scarcity nor its quality (potential productivity). Instead, capital prices were set low relative to consumer durables with comparable input requirements.[3] This fact caused Russian policy makers to revalue the capital stock prior to the privatization program in 1992, and even then, given the ruble-dollar exchange rate at the time, the total value of Russia's capital stock was less than the operating revenues of a number of major international corporations. Introducing market-based capital valuation in one fell swoop would most likely have resulted in a complete write-off of the inherited book value of any given firm's capital stock (Gregory 1997, p. 15).

To date, no study of Russian industry in transition has examined in any detail how policy makers and managers are coping with the reality of an obsolete capital stock. At best, estimates emerge regarding the probable magnitude of expenditures on capital renovations needed in Russia industry; for example, an amount equal to two times the federal budget in 1995 (Blasi et al 1997). In large part the

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[1] See, for example, Escoe (1995 1996), Rosefielde (1990 1994), Thornton (1970), Whitesell (1994).

[2] For summary of literature, see Thornton and Linz (1988). Facing an out-dated capital stock, Russian managers between 1992 and 1995 adopted a Mardi Gras approach to finance and investment: "Throw me something, mister;" holding out their hands for subsidies, credits, foreign aid and foreign investment. See Ernst et al (1996), Ickes and Ryterman (1993), Thornton (1996), and Jeffries (1996), for example, for discussion of Russian firms' financial and investment conditions.

[3] For a concise description, see Ericson (1997).

lack of detailed analyses stems from the paucity of firm-level data on investment, capital values, and depreciation rates in Russian statistical handbooks and other published sources. The aggregate nature of the available data (by sector, industry or region for select years, for example), and the lack of explanation regarding changes made to take into account the inflationary trends in the economy since 1992, have made systematic analysis impossible.

Numerous surveys of Russian firms have been completed in the past five years that are now eliminating some of the lacunae regarding the impact of the transition on individual manufacturing firms. In particular, we now have insider information about post-privatization ownership structures (Buck et al 1994, Buck et al 1996, Earle et al 1995, Earle and Estrin 1995 1997, Nelson and Kuzes 1994), production and employment strategies adopted in response to declining demand and supply disruptions (Commander et al 1996, Krueger 1995, Lieberman and Nellis 1994, Linz 1996, Linz and Krueger 1996, Standing 1994 1994a), top-level management turnover (Blasi et al 1997, Clarke 1995), pricing strategies and financial conditions (Dolgopyatova 1995, Filatotchev et al 1996, Linz 1997), regional and industry variation in firms' strategies and performance (Clark 1996, Clarke et al 1991, Linz 1996, Pechenegina 1996, Webster and Charap 1994). Yet, even in the largest surveys (Blasi et al 1997), the information provided about the role capital valuation and depreciation in firms' survival strategies is sketchy, at best.

In particular, no study has addressed the extent to which managers accurately report capital values. While tax codes govern capital valuation procedures and depreciation rates, firms have considerable discretion over the capital stock actually reported, and the rate at which the capital stock of the firm depreciates. Indeed, strategic behavior in this regard has the potential to reduce the firm's tax burden and thus free up financial resources for restructuring. Nor have studies addressed the extent to which policy makers are targeting particular types of firms to carry a disproportionate share of the burden of transition. It is clear from the tax codes that policy makers did not elect to facilitate the restructuring of Russian manufacturing firms by raising straight-line depreciation rates, nor did they allow accelerated depreciation before 1996. Perhaps they perceived the short-run cost of raising or accelerating depreciation rates, that is, lower tax revenues available to finance the transition, as more significant than the cost associated with impeding the transition process itself by delaying the restructuring of Russian industry. While there is no evidence in the codes regarding differences in depreciation rates across ownership structures, strategic behavior by policy makers might target firms

most likely to be profitable (leased, privately-owned, joint ventures, for example) to carry a disproportionate share of the cost of transition. By not changing the depreciation rate or allowing for accelerated depreciation, these firms face a higher tax burden.

Firm-level data collected in 1992 and 1995 are utilized here to examine the impact of transition on depreciation rates in Russian industry. The objective first is to assess the extent to which Russian firms are being allowed to clean the slate with respect to the Soviet legacy of obsolete capital. This is done by analyzing average reported depreciation rates over time. The second objective is to determine whether non-state-owned firms or exporting firms -- the "engines of transition" -- are shouldering a disproportionate burden of transition.

Part one of the paper offers a brief analysis of Russian corporate finance in transition, with particular focus on mechanisms managers use to reduce their tax burden. The information utilized here was obtained from in-depth interviews with top-level managers in Moscow, St. Petersburg, Volgograd, Rostov, Taganrog and Novosibirsk between 1993 and 1996. Part two describes the data and methodology used to analyze variation in depreciation rates in Russian industry. Data compiled from a business directory which lists 21,756 civilian manufacturing firms in sixty-two provinces in all eleven regions in Russia in 1992,[4] and a similar listing of 12,658 firms in twenty-six provinces in six regions in 1995 are used to characterize differences in capital values and depreciation rates over time. Accounting practices suggest that the firm's average depreciation rate will vary inversely with the size of the capital stock.[5] Economic theory dictates that the firm's average depreciation rate will vary directly with the intensity of capital use and workforce size. The focus of this paper is whether average depreciation rates in Russian industry in 1992 and 1995 also vary significantly by ownership structure or export experience.

Part three presents the empirical results. In 1992, average reported depreciation rates for these civilian manufacturing firms varied inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size. When ownership differences were significant, state-owned firms reported higher depreciation rates. For all industry combined, as well as for each industry individually, regional variation was evident, but not uniform; that is, regional variation in depreciation

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[4] Detailed description of industry by region is available in Linz (1997a).

[5] That is, firms with large capital stock values tend to be associated with multiple buildings and other long-lived, slowly depreciating equipment. Under the straightline method utilized between 1992 and 1995, this would result in a low average depreciation rate.

rates was industry-specific. Overall, exporting firms in 1992 typically had higher depreciation rates than non-exporting firms, although for several industries this result did not hold because of the paucity of exporting firms. In 1995, neither the size of the firm's capital stock nor the intensity of capital use explained variation in average reported depreciation rates. Ownership structure rarely was significant: when significant, it was the case that privately-owned firms reported lower average depreciation rates than state-owned firms. Firms in the Central region, particularly Moscow, reported significantly higher depreciation rates, ceteris paribus. With the exception of firms in the fuel industry, export experience had no significant effect in 1995.

Section four offers concluding remarks and directions for further work. In particular, by matching firm-specific registration numbers in 1992 and 1995 to construct a panel data set, it would be possible to test several hypotheses about differences in average depreciation rates over time. For example, average depreciation rates may be higher in firms where the percentage reduction in the volume of production, or workforce size, between 1992 and 1995 is below the industry average. The impact of privatization on average reported depreciation rates also would be clarified.

I. Russian Corporate Finance in Transition

In-depth interviews with hundreds of Russian managers between 1992 and 1996 highlight numerous formal and informal financial mechanisms that firms use to survive (Blasi et al 1997, Krueger 1995, Linz and Krueger 1996, Linz 1997). The paper starts from the premise that while tax codes ultimately guide information provided by firms to central authorities, firms and policy makers in Russia's transition and post-transition economy are likely to function much differently than they did in the centrally planned economy. In the Soviet economy, planners directed production, employment and distribution activities, as well as investment and technological advance. Prices of material and labor inputs, output, and capital were centrally determined, not to reflect relative scarcities, but rather to reflect planners' preferences. Incentive schemes and other institutions were adopted to motivate firms to implement planners' preferences, which were revealed to be the maximization of output. Firms responded to the incentives and institutional environment in ways that ultimately brought about the collapse of the economic system: failure to innovate and poor quality production relative to world standards (Berliner 1976, Dallago and Mittore 1996, Ernst et al 1996, Gaddy 1996, Granick 1987,

Gregory and Stuart 1997).

In the Russian economy, policy makers are responsible for creating the institutions and environment for a successful transition from plan to market. To date, this has included a legal structure that introduced property law, bankruptcy law, contract law, new labor codes, and the like, although implementation and enforcement remain problemmatic (Rutland 1997). It also has included creating a commerical banking system and capital/financial markets, as well as a mechanism for replacing part of the the social safety net previously provided by firms to employees. Once the transition from plan to market is complete, surviving firms will function in ways much like firms in developed market economies; that is, guided by short-term and long-term profitability considerations (Aslund 1995, Brada 1996, Earle and Estrin 1997, Katz and Owen 1995, Lieberman and Nellis 1995).

Currently, however, Russian firms face tax codes that appear punitive in nature.[6] For example, in a survey of Russian firms conducted in Moscow in 1995, more than a dozen taxes were described by managers; some based on property valuations, some based on profits, some based on the firm's wage bill, and others arbitrarily set by central or local authorities (the waste tax, education tax, tax for road maintenance, tax for housing maintenance, and the local community goals tax, for example).[7] If firms were to pay all tax obligations, ***more than two-thirds of the firm's total revenues*** would be owed to the state (Blasi et al 1997, Linz 1996 1997).[8]

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[6]At the beginning of the transition from plan to market, Russia adopted new tax codes to be applied to enterprises and organizations. In this 1992 tax law, the federal tax rate on firms was established at 13% of adjusted gross profit (on casinos, the rate was set at 70%), with regions given to right to add on another 25% (maximum, unless the organization is a bank or insurance company, then the maximum regional addition is 30%). The adjusted gross profit measure, used to define the taxable base, would more accurately be called a revenue (not profit) measure. That is, adjusted gross profit includes both monetary and in-kind income from the sales of goods (services), exclusive of VAT and excise taxes, as well as income received from the distribution (sale) of capital assets and other property, exclusive of VAT. Adjusted gross profit also includes income the firm receives from the sales of shares, from leasing assets or property, from issuing securities, and from patents or inventor's certificates. From this taxable base, the firm deducts expenditures, many of which are limited by central authorities. For example, the firm cannot deduct labor costs that exceed 6 times the Federal minimum wage; in fact, if the firm pays such an "excess" wage, those monies are taxed at a rate of 35% (the excess wage tax was dropped in 1996). Moreover, the firm cannot deduct interest payments more than 3% higher than the Central Bank rate.

[7] Further discussion of the Russian tax codes is found in Hanson (1995), Freinkman and Titov (1994) and Wallich (1994).

[8] To illustrate the burden Russian firms face, consider the following: if a firm buys a vehicle for whatever reason, it must pay 20-40% of the value in order to register the vehicle (all vehicles must be registered). Each year, the firm must pay to update the registration -- the rate varies by the type and engine size of the vehicle. To run the vehicle, the firm pays an 18% federal tax and 7% local tax on the oil and lubricants used by the vehicle. All firms must pay a road tax: 0.8% of sales (turnover) for most firms; 0.06% of sales (turnover) for retail organizations.

Managers employ several strategies to reduce their firm's tax burden. For example, according to a 1992 presidential decree, if a firm's workforce is composed of at least 75% women, youths, or handicappers, the firm is obliged to pay only half of the standard profits tax rate. Managers describe responding to this decree in two ways. A cardboard container company removed obsolete equipment from one of its production lines, replacing the equipment with handicappers. Not only was tax burden reduced, but energy requirements (costs) also were lower. More typical were descriptions of employing women, youths or handicappers to work part-time in a cleaning, or workplace maintenance, capacity.

Discussions related to the financial conditions of a firm focused on rather broad topics; managers were reluctant to reveal any financial details. They did agree, in principle, however, about how a financial balance sheet for their firm would be prepared. That is, from sales revenue and other income would be deducted the costs of materials and energy, costs of special equipment, wages (including bonuses and other payments to workers), taxes based on the size of the wage bill (28% to the pension fund, 2.2% to special fund for current employees, 5.4% for social insurance, 3.6% for health insurance, 1% for transport tax, 1% for education tax), costs associated with training of workers or managers, depreciation, and other expenses related to the operation of the company. From this sum, referred to as adjusted gross profit or operating profit, firms pay a police tax, a property tax, and a local tax. The balance is called taxable profit. Taxable profit is subject to the profits tax: 35% for most firms, 45% for insurance and financial companies (firms based on commissions), and 70-90% for casinos. It is this profits tax that is reduced by half if the firm employs handicappers. From what is left after paying the profits tax, firms subtract their lease payments (rent for using property or equipment) and any bank payments (loans, interest due). Net profits are then distributed between two funds: one for production/investment (accumulation fund) and one for employees (consumption fund).

Depreciation appears in two places in the firm's financial flow: first, as a direct cost subtracted from revenues and other income, where the rate is set by central authorities for different categories of capital; second, as a component of input or material costs. That is, when asked to describe components of input costs, managers (with the assistance of their chief bookkeeper) discussed the cost of raw and auxiliary materials, the cost of fuel and energy, and the cost of "low value, quickly depreciating materials" such as gloves, and other protective and production materials. These materials are depreciated at rates ranging from 75-100%. Thus, when firms report their average depreciation rate, the

figure can easily exceed the highest rate levied on capital equipment.

Managerial autonomy in reporting depreciation rates, particularly to reduce tax burden, is the focus of this study. Depreciation is viewed from three perspectives. In accounting or financial analyses, depreciation allows the owner of the capital to assign the original cost of acquiring the long-lived asset to the production process to which it contributes. That is, in an accounting or financial framework, depreciation is a process of allocation, not valuation. Tax laws dictate the rate at which the nominal cost of the capital can be deducted from the firm's income. If policy makers want to promote investment and the expansion of productive capacity, depreciation rates would be set relatively high. If policy makers want to generate additional tax revenues, depreciation rates would be lowered.

In the production process, depreciation reflects the wear and tear on the capital stock, and thus the change in a firm's productive capacity. Physical depreciation is a function of the volume of production, rising proportionately or exponentially with the intensity of use.

Economic depreciation reflects a decline in the value of the capital stock that may stem either from use (physical depreciation) or from technological change which introduces a more productive or cost-effective substitute. Economic depreciation is positively related to the volume of production and to the pace of technological advance. Measures of economic depreciation typically come from secondary markets; used car markets and "blue book" values measure economic depreciation for automobiles, for example. While similar markets exist for farm and construction machinery, as well as some standard manufacturing and processing equipment, secondary markets for physical capital are not well-developed. Firms tend to hold the equipment for its entire productive life. Consequently, the paucity of available data precludes analyses of economic depreciation across industries or over time.

Has the transition process had any impact on the role of depreciation in the Russian economy? Firm-level data collected in 1992 and 1995 are used here to investigate not only the ways in which greater enterprise autonomy in the transition economy have affected depreciation rates in Russian industry, but also whether the effect has been uniform across ownership structure and export experience.

II. Data and Methodology

The data used to evaluate whether greater enterprise autonomy in Russia's transition economy coincide with an increase in average reported depreciation rates over time were drawn from Goskomstat

listings of civilian manufacturing firms in Russia in 1992 and 1995. Published in directory-form by a privately-owned company in Moscow,[9] the objective was to provide basic location (company name, address, phone, fax, director's name), production (volume, main assortment, export experience) and employment information to buyers and sellers, both domestic and foreign, about potential buyers and sellers in Russia. Previously, such information had been considered a state secret and thus unavailable to domestic or foreign firms. Basic financial information (profits, revenues, costs, debt) is not provided in either listing.

In each directory, civilian manufacturing firms are listed by province within a given region (Far East, Eastern Siberia, Western Siberia, Urals, Volga, North Caucasus, Volga-Vyatka, Central, Black Earth, Northern, Northwestern) according to industry. The industry categories coincide with standard SIC codes.[10] In both years, *output* is measured as the current ruble value of the firm's volume of production. This figure need not coincide with the firm's sales. In fact, in 1992, it was standard practice for Russian firms to produce for the warehouses, much like what state-owned firms governed by red executives did in the Soviet economy (Granick 1961).

Capital, reported as the *residual cost of capital assets,* is taken to mean current book value of the firm's assets; that is, the initial cost of capital adjusted for depreciation and inflation. In 1992, new capital valuation guidelines were established by Goskomstat. The revaluation process was completed to facilitate the privatization process (Frydman et al 1993). Firms targeted for privatization were required to use the revised capital asset value in all documents relating to the privatization process (Linz 1994a).

It is clear that firms retained some discretion over the capital stock actually included in the privatization process; capital could easily "disappear" if it happened to benefit the strategic interests of the firm. In many instances, the strategic interests of the firm tended to revolve around creating opportunities for employee buyout (Buck et al 1994). For example, based on a sample of 1085 firms

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[9] See *BusinessMap 93: Industry in Russia* vols 1-18, and *Biznes-Karta 95*, vols 1,3, 7,9, 10, 13-17 (Moscow: Business Information Agency).

[10] Two exceptions are noted: the Miscellaneous industry category includes, for example, firms producing mica; firms producing concrete panels, ceramic wall tiles and welded electrodes; firms producing souvenirs; firms providing computer software, construction design services, and trade services; and firms producing paints and varnishes, tableware and kitchen articles, glass mirrors and other consumer goods. In the 1992 listing, the Consumer Services industry includes firms producing footwear, funeral services, and special-purpose furniture; firms providing hairdessing services, funeral services and small appliance repair; and firms producing crocheted apparel, custom footwear, clothing repair, and furskins.

targeted for privatization in 1993, in less than 10% of the cases did firms set an initial asking price-to-capital asset ratio greater than one. More than 70% set their initial asking price-to-asset ratio less than one (Linz 1994a). At least 80% of the firms selected the privatization option that permitted employee buyout (Nelson and Kuzes 1994).

Recent evidence suggests that a secondary, albeit informal, market for shares has emerged, with managers and/or outsiders acquiring majority control of the firm (Blasi et al 1997, Earle and Estrin 1997). Anecdotal evidence has managers deliberately not paying wages in order to persuade employees to sell their shares at the generous price offered by the managers of the firm. Outsiders have been equally likely to try to buy shares in "profitable" companies, as well as in companies that are not routinely paying wages (wage payments are reported to be delayed in 25% of all manufacturing firms).

Given the development of formal and informal capital markets, there is no a priori reason to believe that central authorities still establish the book value of capital assets. However, it is not clear from the directories how the capital valuation figure reported by the firms in 1995 was determined. It is known that firms receive official inflation indices each year to use in their capital valuation/depreciation calculations. When inflation is rising rapidly, as was the case in 1992 and 1993, official indices tend to understate actual price level changes by a significant amount. In the Russian economy, however, where initial capital values were not determined by market forces, arbitrary increases in the price of capital may tend to overstate its value. This works to the detriment of the firm by not changing its tax burden in line with its changing financial situation.

Labor is measured by the number of employees reported to local authorities by each firm. Firms report "full-time equivalents." That is, if the firm employs two part-time workers, where each is working one-half of the normal work week, the firm reports a single worker. A similar calculation is made when job-sharing includes more than two workers. In effect, this standardizes for the normal 40-hour work week. Consequently, the increasing use of part-time workers in 1995 as compared to 1992 (Linz 1997b) does not bias the results.

In the directories, *depreciation* is reported as a percent, with no further explanation offered. However, according to the Russian tax codes in effect between 1992 and 1995, firms were obliged to utilize straight-line depreciation, where the expected useful life of capital is defined as 20-83 years for buildings, 5-10 years for vehicles, and 8-17 years for office equipment. For production machinery and

equipment, the depreciation rates are not specified in the tax code, but rather in charts given to individual firms. For intangible assets, such as patents, inventor's certificates, and the like, the depreciation rate is determined by the taxpayer, or shortest of 10 years or life of the company. For "low value, quickly depreciating materials" the rates range from 75-100%. Thus, the single number reported by each firm reflects an average across all categories of capital and materials.

Where the *ownership* structure of the firm is designated, firms are categorized as state-owned, leased, cooperative, collective, joint stock, joint venture, and a final category for private and other.[11]

Information about whether and what a firm *exports* also is provided. In particular, the volume of exports of each type of product is listed. For the purposes of this analysis, export experience was given a value of one, because it was impossible to calculate the firm's volume of exports (measured in physical units) as a percentage of the firm's total output (measured in current rubles).

Tables 1a and 1b summarize the data available for this analysis. Several features are worthy of note. First, in 1992, the average value of output by industry is uniformly higher than the average value of the capital stock (see Table 1a). As seen in Table 1b, this same observation is not true for 1995; in all industries except metallurgy the average value of capital exceeds that of output. The relatively low value of output in comparison to capital value stems from a situation where market valuation occurs for output, but capital valuation is centrally determined. Consequently, these data suggest Russian manufacturers are using expensive equipment to produce goods that no one wants. It is not surprising to discover that more than one-in-four industrial firms in Russia in 1995 is characterized by Goskomstat, the State Committee for Statistics, as a loss-maker.[12] Second, mean workforce size tends to be lower in 1995 than in 1992; in metallurgy this result is most striking. Significantly smaller workforce size stems from new labor codes adopted in 1992 which permit firms to release redundant workers. The reduction in mean workforce size tends to mask managers' strategies to employ a greater fraction of part-time workers in

[11] In December 1990, Russia passed a Law on Enterprises and Entrepreneurial Activity which allowed for sole proprietorships, partnerships, open and closed joint stock companies, and private and state-owned corporations. Previously, Soviet law allowed for limited private labor activity (November 1986), leased firms (January 1988), joint ventures (November 1987), and cooperatives (May 1988).

[12] In a table provided by Goskomstat on the internet (http://www.region.rags.ru/table10.htm) which summarizes the financial results of enterprise activity in 1994 and 1995, 27% of the industrial firms in Russia in 1995 are identified as loss-makers; for the Far East, the percentage reaches 42%, ranging from a low of 38% in Khabarovsk to a high of 67% in Kamchatka.

1995 relative to 1992 and to extend the fraction of workers engaged in unpaid leaves.[13] Third, the proportion of state-owned firms falls from 84% in 1992, to 31% in 1995. In Tables 1a and 1b, ownership has been collapsed into a dummy variable which equals one if the firm is state-owned, and zero otherwise. Fourth, export experience is not any greater in 1995 than in 1992.

Finally, for the civilian manufacturing firms in 1992 included in this analysis, the average depreciation rate was 39.3%, ranging from 35.1% in the food industry to 47.1% in the chemicals industry (see Table 2). The 1995 data generate similar results with respect to average depreciation rates by industry. Overall, the depreciation rate in 1995 was only one percentage point lower than in 1992. The food industry continues to have the lowest average depreciation rate; the chemicals industry maintains its position of having the highest average depreciation rate. Table 3 summarizes depreciation rates by ownership structure. State-owned firms report average depreciation rates of 40% in both 1992 and 1995. While joint ventures and privately-owned firms report much lower average deprecation rates in 1992: 27% and 24%, respectively, the number of firms reporting tend to be too small to make these results reliable. Interestingly enough, cooperatives, which appeared to be a lightning rod for confiscatory planner behavior during perestroika (Jones and Moskoff 1989), emerge with the lowest average depreciation rates, 30%. The Soviet legacy of making cooperatives pay in full for their success appears to have continued into the Russian transition economy. By 1995, ownership differences in average reported depreciation rates are much smaller, although state-owned firms continue to have the highest rate.

Table 4 maps out regional differences in average reported depreciation rates in both 1992 and 1995. At the beginning of Russia's transition from plan to market, regional variation is not evident. Only the Black Earth and Western Siberia regions report rates below the norm in 1992. Rather surprisingly, in all regions in 1992, only a relatively small proportion of firms have been successful in writing off more than 75% of their capital. The Russian Far East is an outlier in this regard. By 1995, more regional variation is evident; perhaps a reflection of the growing regional disparities in the Russian economy (Freinkman and Haney 1997, Hanson 1997).

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[13] These strategies have resulted in the share of part-time employees increasing from less than 3% to more than 9% of the workforce for Russia as a whole between 1992 and 1995. The share of employees in "forced vacations," or unpaid leaves rose from 8.6% in 1993 to 13.5% in 1994. For a regional breakdown of these data, see Gostkomstat (http://www.region.rags.ru/table7.htm).

Regression analysis is used to evaluate the relative importance of select variables in explaining differences in depreciation rates in Russian industry. In particular, the analysis is governed by five hypotheses. If standard accounting practices and market forces are governing the ability of Russian managers to write-off their obsolete capital stock, depreciation rates will vary inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size.[14] Depreciation will vary by region in accordance with the pace of liberalization and transition; that is, average depreciation rates will be higher where liberalization is proceeding quickly (Moscow, Nizhny Novgorod, for example), and lower where liberalization is proceeding slowly (Volgograd, for example).[15] Finally, if market forces are governing Russian managers' ability to write-off their obsolete capital stock, depreciation rates will be higher in firms with export experience.

Dummy variables were created for each region[16] and industry[17] included in this analysis. In both years, the Volga region was selected for comparison purposes and machine building is used as the comparison industry. Dummy variables also were created for each ownership structure, with state-owned firms used as the comparison group. Export experience is treated as a dummy variable, where the value equals one of the firm reports any exports.

Regressions were run on the full set of firms available in 1992 and 1995. Separate regressions then were run for each industry in both years. The results are described below.

III. Factors Influencing Depreciation Rates in Russian Industry

This paper starts from the premise that Russia's transition from plan to market contributed to significant reductions in industrial production and employment, and near-hyper-inflationary conditions, between 1992 and 1995 (Aslund 1995, Ericson 1997, Ernst et al 1996, Gregory 1997, Gregory and Stuart

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[14] While we expect depreciation rates will be higher in industries where the capital stock was known to be out-dated prior to transition, the lack of information on the age of the firm's capital stock make such calculations impossible using these data.

[15] Several different measures will be used to gauge the pace of transition across regions in Russia: proportion of elected regional officials not from the ranks of the Soviet nomenklatura; pace of privatization by region; regions with high concentrations of joint ventures, for example.

[16] In 1992, 75 provinces from all eleven regions are included in the analysis; in 1995, 26 provinces in the Far East, Western Siberia, North Caucasus, Volga, Central and Northern regions are included.

[17] Firms in consumer services were not included in the 1995 listing.

1997). Manufacturing firms amassed staggering debt burdens before switching to a pre-payment regime. To survive, many firms resorted to barter arrangements involving two or more firms to successfully conclude a single transaction; for example, to sell steel pipes involved not only the metallurgical company, but also the butcher, the baker, and candlestick maker. In this three-year period, more than three-quarters of Russia's civilian manufacturing firms successfully completed the privatization process, where, in most cases, ownership was transferred from the state to the firms' employees (Boycko et al 1996, Rutland 1997).

Firms successful in reducing their tax burden have a greater chance for surviving the transition. Discretion over reporting the average depreciation rate is one mechanism firms have to reduce their tax obligations. Whether managers are successfully employing this strategy may be evident from regression analysis of the factors influencing depreciation rates in Russian industry over time. That is, holding output, capital stock, workforce size and managerial quality constant, there should be no significant difference in reported average depreciation rates across firms within a given industry by ownership structure. It may be, however, that planners/policy makers would like to shift the cost of transition to non-state-owned firms. This was not done explicitly by altering the tax codes with regard to depreciation. However, monitoring more closely the financial records, or more frequent site inspection visits to non-state-owned firms effectively reduces their managerial autonomy with regard to accurately reporting their firm's capital stock. Moreover, tax revenues are likely to be highest among profit-making firms; thus planners have little incentive to maintain high depreciation rates (thus lowering taxable profit) for these firms. It may be that this informal planner behavior contributes to lower depreciation rates in non-state-owned firms.

Factors influencing the variation in average reported depreciation rates for all industry in 1992 and 1995 are presented below. Both accounting and economic measures are included as dependent variables. That is, tax codes and thus accounting measures require that Russian manufacturing firms utilize a straightline depreciation method. Consequently, the average reported depreciation rate is likely to vary inversely with the size of the firm's capital stock. The economic measure of depreciation, the intensity of capital use, is proxied by the firm's output-capital ratio. The objective here is to evaluate whether average depreciation rates within industries or regions vary significantly by ownership structure or export experience.

All industry

The average depreciation rate reported by each firm is regressed on logged values of the firm's capital stock and output-capital ratio, and on dummy variables created for industry, ownership structure, workforce size and region (see Table 5). In both 1992 and 1995, the comparison group for industry is machine building; for ownership structure, state-owned; for workforce size, firms employing 200-1000 workers; and for region, the Volga region is used for comparative purposes.

In 1992, where 17,280 civilian manufacturing firms provided sufficient information to be included in the analysis, average depreciation rates vary inversely with the value of the capital stock, and directly with the intensity of capital use and workforce size. There are significant variations in average depreciation rates by industry. That is, relative to machine building, depreciation rates are higher in power, fuel, ferrous/nonferrous metallurgy, wood/paper, chemicals and construction materials; depreciation rates are significantly lower in food, light industry, and printing. In 1992, state-owned firms reported significantly higher depreciation rates than that reported by leased firms, cooperatives, collectives, joint stock companies, joint ventures, and private firms. In comparison to the Volga region, average depreciation rates are higher in the Far East, Eastern Siberia, the Urals, Northern Caucasus, the Central region, and the Northern and Northwestern regions.

The explanatory power of these variables falls when 1995 data are employed. While the coefficient on the size of the capital stock is still negative and significant, the coefficient on capital intensity is positive, but not significant. That is, the accounting dimension remains strong in explaining variation in average reported depreciation rates, but the economic dimension appears no longer as relevant. Industry variations appear less frequently; although, firms in the food industry continue to report average depreciation rates below that in machine building, firms in ferrous/nonferrous metallurgy report significantly higher depreciation rates than machine building. In 1995, leased firms, joint stock companies, and joint ventures reported average depreciation rates not unlike state-owned firms. Worker collectives and privately-owned firms reported signficantly lower depreciation rates than state-owned firms in 1995. Firms employing more than 10,000 workers reported significantly lower depreciation rates than firms employing 200-1000 workers, holding industry, ownership, and region constant. Firms employing 1000-5000 workers in 1995 reported significantly higher depreciation rates. In comparison to firms in the Volga region, firms in Central and Northern regions reported higher depreciation rates; firms

in the North Caucasus region reported lower depreciation rates.

When export experience is included in the specification, export experience emerges with a positive and signficant coefficient in 1992; that is, depreciation rates are significantly higher for these firms.[18] In 1995, export experience has no significant impact on average depreciation rates reported by these civilian manufacturing firms.

Do these data support the hypothesis that depreciation rates vary by region in accordance with the pace of transition? The pace of transition across regions is roughly measured using election results provided by Slider (1996) and privatization results and joint venture formation data provided by Hanson (1995). Transition is defined as occurring more rapidly in regions where: (1) less than 50% of the elected officials belong to the former (Soviet) nomenklatura (Slider 1996, pp. 245-246), (2) the privatized fraction of firms targeted for privatization exceeded 50% in 1994, and (3) joint ventures tend to be concentrated (Hanson 1995). Based on these three criteria, transition is proceeding more rapidly in the Far East, Eastern Siberia, North Caucasus, Central and Northern regions.[19] The match with regions which in 1992 reported high average depreciation rates is nearly one-to-one. In 1995, firms in the Central and Northern regions continue to report high depreciation rates. While no direct test is possible, these firm-level data are not inconsistent with the proposition that depreciation rates are higher in regions where transition is proceeding more rapidly than for the country as a whole.

Power

For firms included in the regression analysis, 320 in 1992 and 111 in 1995, average reported depreciation rates in the power industry fell from 46% in 1992 to 39% in 1995. Depreciation rates in the power industry in 1992 varied inversely not only with the size of the capital stock, but also, surprisingly, by the size of the workforce (see Table 5, panel A). The coefficient on capital intensity was not significant. Since the vast majority of firms in the power industry in 1992 were state-owned, there is little possibility for examining the effect of ownership structure on average reported depreciation rates. The results indicate little regional variation in depreciation rates in 1992: in comparison to the Volga

[18] When export experience is included, the Northern region, because it has no exporting firms, is dropped from the analysis. When results related to export experience are described, they refer to a regression which excludes the Northern region. The coefficient on the export variable does not vary signficantly if the Northern region is combined with the Northwestern region.

[19] The regions do not change if "number of commerical banks per 1000 people" is used as the measure.

region, only firms supplying power in Eastern Siberia, the Black Earth and the Northwestern regions report significantly lower rates. Export experience in 1992 was statistically insignificant in explaining the variation in average reported depreciation rates for the power industry as a whole: five firms in the power industry reported export experience in 1992.

The only significant result emerging from the 1995 data is the higher reported average depreciation rate among power firms in Central region. This result is even more pronounced when Moscow is included directly in the regression. That is, the coefficient on the Moscow variable (where city and oblast are combined) is large, and statistically significant.[20]

Fuel

Average reported depreciation rates for firms in the fuel industry in 1992 (n = 470) vary inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size (see Table 5, panel B). In seven regions (Eastern Siberia, Western Siberia, Urals, Black Earth, Central, Northern and Northwestern), depreciation rates are significantly lower than in the Volga region, holding ownership and firm size constant. Like the power industry, the vast majority of firms in the fuel industry were state-owned in 1992, thus no significant variation by ownership structure was detected. Also like the power industry, the only significant coefficient in 1995 was the higher depreciation rates associated with the Central region. In neither year was export experience influential in explaining differences in reported depreciation rates for firms in the fuel industry.

Ferrous/Nonferrous Metallurgy

Average depreciation rates reported by firms in ferrous/nonferrous metallurgy in 1992 (n=327) vary inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size (see Table 2, panel C). Less regional variation is evident. Only in Siberia, the Urals and the Northern region is the average reported depreciation rate higher than that for the Volga region. In 1992, seventy-five metallurgical firms reported export experience. Indeed, export experience had a significant effect on average reported depreciation rates in the ferrous/nonferrous metallurgy industry.

Using data available for 1995 (n=445), average reported depreciation rates vary inversely with the size of the capital stock; the coefficient on the intensity of capital use also is negative, but not significant. Workforce size has little effect on reported depreciation rates. Joint ventures have

[20] In this specification, regional dummies are excluded; only the Moscow dummy is included.

significantly lower depreciation rates than state-owned firms. Firms in the North Caucasus region report significantly lower depreciation rates than those in the Volga region, holding ownership and firm size constant.

Machine Building

Firms in machine building account for one-in-six firms in the 1992 data set; over 11% of the machine building firms reported export experience. Average depreciation rates reported by machine building firms in 1992 varied inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size (see Table 5, panel D). State-owned firms in 1992 (about 40% of the total) reported the highest average depreciation rates, although the difference between depreciation rates reported by state-owned firms and joint stock companies, while statistically significant, is rather small. These results indicate very little regional variation in depreciation rates among machine building firms in 1992: only firms in the Northern, Central, and North Caucasus regions report higher depreciation rates than in the Volga region. Export experience had a significant, albeit rather weak, effect on average depreciation rates reported by machine building firms; that is, depreciation rates were higher among exporting firms, ceteris paribus.

In 1995, firms with higher capital intensity report significantly higher average depreciation rates, but size of capital stock is not significant, nor is workforce size. Leased firms and privately-owned firms report significantly lower depreciation rates than state-owned firms; the result emerges for joint ventures, but is not strong. Firms in the North Caucasus region report lower depreciation rates than firms in the Volga region, ceteris paribus; firms in the Central and Northern regions report significantly higher average depreciation rates. Export experience was not significant in explaining the variation in reported average depreciation rates in machine buidling firms in 1995.

Chemicals

In 1992, there was no significant regional variation in average depreciation rates reported by firms in the chemicals industry (n = 461). Depreciation rates did vary directly with intensity of capital use and workforce size, and inversely with the size of the capital stock (see Table 5, panel E). Depreciation rates were significantly lower in joint stock companies, as compared with state-owned firms. A total of eighty-six firms reported export experience in 1992; the coefficient on export experience was positive, and significant (at 10%), indicating that these firms had signficantly higher

depreciation rates.

The same specification has a lower explanatory power in 1995 (n = 329). Ownership and region may be influential in explaining differential depreciation rates reported by firms in the chemicals industry: collectives and privately-owned firms reported signficantly lower depreciation rates than state-owned firms; chemical firms in the central region (Moscow, in particular) reported significantly higher depreciation rates. Export experience was not significant in explaining the variation in average reported depreciation rates in the chemical industry in 1995.

Wood/Forestry/Paper

Firms in the forestry/wood/paper industry in 1992 (n = 2880) reported average depreciation rates that varied inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size (Table 5, panel F). Cooperatives and leased firms reported significantly lower depreciation rates than state-owned firms. Firms in the Far East, Urals, North Caucasus, Volga-Vyatka, and the Northwestern region reported significantly higher depreciation rates than comparable firms in the Volga region. Firms in the Black Earth region reported significantly lower depreciation rates. Some 159 firms reported export experience in 1992; the coefficient on export experience was positive and significant (at 5%).

In 1995, size of capital stock remains signficant in explaining variation in average reported depreciation rates (n = 969). Firms in the Central region, as well as the Northern region, report significantly higher depreciation rates. Firms at the upper and lower end of the workforce size spectrum (employing less than 200, more than 10,000 workers) reported significantly lower depreciation rates in 1995. The coefficient on export experience was not significant.

Construction Materials

Regional variation in reported depreciation rates by firms in construction materials in 1992 (n = 1725) was almost non-existant (see Table 5, panel G). Only firms in eastern Siberia reported significantly higher average rates than firms in the Volga region. Average depreciation rates did vary by size of capital stock (the coefficient is negative and significant), and by intensity of capital use (the coefficient is postive and significant). Ownership played a prominent role in explaining variation in depreciation rates by firms in construction materials: privately-owned firms, cooperatives, joint stock companies, and worker collectives reported significantly lower depreciation rates than state-owned firms,

ceteris paribus. Workforce size appears to have influenced average depreciation rates -- firms employing fewer than 200 workers reported significantly lower depreciation rates than the comparison group (firms employing 200-1000 workers); firms employing 1000-5000 reported significantly higher depreciation rates. Less than 2% of the firms in the construction materials industry reported export experience in 1992. Not surprisingly, the impact of export experience on depreciation rates was insignificant.

Regional variation is significant in the construction materials industry in 1995 (n = 625): firms in Central and Northwestern regions reported significantly higher depreciation rates than comparable firms in the Volga region; construction materials firms in the North Caucasus reported significantly lower rates. Ownership structure, firm size, and capital intensity are not signficant, nor is export experience.

Light

Workforce size plays little role in explaining the variation in average reported depreciation rates of firms in light industry in 1992 (n = 1647). Firms employing 1000-5000 workers report significantly higher depreciation rates than firms employing 200-1000 workers, but all other workforce size coefficients are insignificant (see Table 5, panel H). Average reported depreciation rates do vary significantly by size of capital stock (positive) and by intensity of capital use (negative). Ownership structure also explains the variation in average reported depreciation rates by firms in light industry: in particular, state-owned firms, which in 1992 accounted for 80% of the firms in light industry, report significantly higher rates than cooperatives, worker collectives, joint stock companies, and privately-owned firms. Light industry firms located in the Central (Moscow) and Northern regions reported significantly higher depreciation rates; firms in Northwestern (St. Petersburg) region reported significantly lower average depreciation rates. Although just over 5% of the light industry firms reported export experience in 1992, the coefficient on this variable was positive and significant (at 1%).

In 1995, firms in light industry (n = 893) reported higher average depreciation rates if they were located in Central, Western Siberia or Northern regions; and significantly lower depreciation rates if they were located in the North Caucasus region. Export experience was not significant in explaining the variation in average reported depreciation rates in light industry in 1995.

Food

Firms in the food industry in 1992 (n = 4865) reported average depreciation rates that varied inversely with the size of the capital stock, and directly with the intensity of capital use and workforce

size (see Table 5, panel I). Rather surprisingly, joint ventures reported significantly higher depreciation rates than state-owned firms; cooperatives reported significantly lower average depreciation rates. In comparison to food industry firms in the Volga region, firms in all regions except the Urals and the Volga-Vyatka region reported significantly higher average depreciation rates. The number of food industry firms reporting export experience in 1992 was less than 2%; the coefficient on this variable was not significant in explaining the variation in average reported depreciation rates in the food industry.

Based on 1995 data (n = 1692), region remains significant in explaining the variation in average reported depreciation rates for firms in the food industry: in comparison to the Volga region, rates are significantly higher in the Central and Northern regions, and significantly lower in the North Caucasus. Not surprisingly, privately-owned firms in the food industry reported significantly lower average depreciation rates in 1995 than did state-owned firms.

Printing

State-ownership dominates the printing industry in 1992 and 1995. Firms employing more than 5000 workers did appear in either listing. The result that depreciation varies inversely with the size of the capital stock and directly with the intensity of capital use is robust in the printing industry in 1992 (where n = 921), as is the result that firms in the Far East, Eastern Siberia and the Northwestern regions reported significantly higher average depreciation rates than firms in the Volga region. Since it is possible to count on one hand the number of printing firms reporting export experience in 1992, export experince had no signficant impact on average reported depreciation rates in the printing industry.

In 1995, depreciation rates vary inversely with the size of the capital stock, but the intensity of capital use is not significant. Firms in the Central region report significantly higher average depreciation rates than firms in the Volga region.

Miscellaneous

Despite the catch-all nature of firms categorized as in the miscellaneous industry, the results are rather well-behaved. Average reported depreciation rates in 1992 (n = 700) vary inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size (Table 5, panel L). Regional variation is not significant, but ownership structure does play an important role. Privately-owned and joint ventures report significantly lower depreciation rates than state-owned firms, as do cooperatives. By 1995, ownership plays a less significant role in explaining the variation in reported

depreciation rates: worker collectives report lower average rates than state-owned firms, but all other differences disappear. Like other industries, firms located in the Central region that are included in the miscellaneous category report significantly higher average depreciation rates in 1995.

Industry Differences in Depreciation: 1992, 1995

In 1992, across virtually all firms in the industries included in this analysis, average reported depreciation rates varied inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size. That is, both accounting and economic dimensions of depreciation were relevant. In 1995, neither the size of capital stock nor the intensity of capital use explained variation in average reported depreciation rates.

Regional variation in depreciation rates was industry-specific. That is, region is significant in explaining variation in average repoted depreciation rates in both 1992 and 1995. The relative effect of region in 1992 varied by industry; in 1995, the regional effect was dominated by significantly higher depreciation rates reported by firms located in the Central region, regardless of industry.

When ownership differences were significant, it was virtually always the case, in all industries included in this analysis, that state-owned firms reported higher depreciation rates. Since state-owned firms had significantly higher average capital stock values in both 1992 and 1995, we would have predicted low rather than high depreciation rates on the basis of the accounting measure. Despite having a significantly large mean workforce size in both 1992 and 1995, production volume tended to be low across state-owned firms, thus we would expect to find relatively lower depreciation rates on the basis of the economic measure. Instead, in both 1992 and 1995, non-state-owned firms reported significantly lower average depreciation rates than state-owned firms.

Overall, exporting firms typically had higher depreciation rates than non-exporting firms in 1992. The result is consistent with the foreign trade policies in place at the time: firms were required to deposit all hard currency earnings in the state-owned bank; firms were required to sell at least half of their hard currency earnings to central authorities; firms were required to pay tax, in hard currency, on their hard currency profits. In 1992, the evidence suggests that policy makers were trying to maximize access to and control over hard currency earnings (Goldberg and Karimov 1995, Krupp and Linz 1997). Permitting depreciation rates to be higher among exporters would be consistent with this objective. By 1995, the confiscatory policies directed at export earnings were no longer in place. With the exception

of firms in the fuel industry, export experience had no significant effect on depreciation rates reported by these civilian manufacturing firms in 1995.

Ownership structure rarely was significant; when significant, it was the case that privately-owned firms reported lower average depreciation rates than state-owned firms. Across all industries included in this analysis, it was uniformly the case that firms in the Central region, particularly Moscow, reported significantly higher depreciation rates, ceteris paribus.

IV. Summary and Conclusions

Firm-level data collected in 1992 and 1995 are utilized here to examine the impact of transition on depreciation rates in Russian industry. The objective first was to assess the extent to which Russian firms are being allowed to clean the slate with respect to the Soviet legacy of obsolete capital. This was done by analyzing average reported depreciation rates over time. The second objective was to determine whether non-state-owned firms or exporting firms -- the "engines of transition" -- are shouldering a disproportionate burden of transition.

Four results are noteworthy. First, for the firms included in this analysis, the average value of output by industry is uniformly higher than the average value of the capital stock in 1992. This same observation is not true for 1995 (with the exception of the metallurgy industry). Nor does the result signify the outcome of massive investment in Russian industry to renovate the capital stock. Instead, it may signal the legacy of centrally determined price increases imposed on firms in valuing their capital stock during the inflationary years of the transition process. If so, all firms are paying the price of having output prices determined by market forces, and capital prices being determined by central authorities.

Second, there was no significant difference in the average depreciation rate reported by civilian manufacturing firms in 1992 and 1995: 39% compared to 38%. Nor was there any significant change in the pattern of depreciation rates by industry: the rank order of industries by depreciation rates, from high to low, remained the same between 1992 and 1995. Since these firms are not matched over time, this result may be an artifact of the data. However, the result was not unexpected because the tax codes did not change in any significant way in this regard. The similarity in average reported depreciation rates for Russian industry in 1992 and 1995 does not rule out greater managerial autonomy in reporting depreciation rates over time, and given the incentives firms have to reduce their tax burden, there is

every reason to think firms will find a way to clean the slate with regard to their obsolete capital stock. An easy way to pursue this strategy is to divide the firm into multiple entities, each reporting some subset of the initial capital stock.

Third, there was a significant change in the variables explaining average reported depreciation rates in 1992 and 1995. In 1992, it was typically the case that depreciation rates varied inversely with the size of the capital stock, and directly with the intensity of capital use and workforce size. Differences across industries and regions were large, and significant. State-owned firms consistently reported higher depreciation rates than non-state-owned firms. In 1995, differences in average reported depreciation rates across ownership structures are rarely significant. Across all industries, location in the Central region, particularly Moscow, coincides with significantly higher average reported depreciation rates.

Fourth, export experience emerges with a positive and significant coefficient in 1992, but in 1995, had no significant impact (except for firms in fuel industry).

These results are a first step in examining the impact of transition on capital value and average reported depreciation rates of Russian manufacturing firms. The second step involves constructing a panel of firms by matching firm-specific registration numbers in the 1992 and 1995 directories. Such a panel data set would make it possible to test four hypotheses about how individual firms are behaving over time with respect to reporting average depreciation rates. First, the average depreciation rate will be higher in firms where the percentage reduction in the volume of production between 1992 and 1995 is below the industry average. Second, the average depreciation rate will be higher in firms that in 1992 had above the industry average capital-output ratio. Third, the average depreciation rate will be higher in firms with below-industry-average workforce size reductions. Fourth, the average depreciation rate will be lower in state-owned firms than in leased, privately-owned *(de novo)*, or privatized (former state-owned) firms, ceteris paribus.

Table 1a: Civilian Manufacturing Firms in Russia: 1992
Descriptive Statistics

	Mean	Std. Dev.	Number of Firms
Power			
output (*million rubles*)	135.4	470.8	378
capital (*million rubles*)	121.8	360.5	418
labor (*number employees*)	1208.4	2674.5	463
depreciation (*percent*)[a]	45.9	16.4	405
state-own[b]	.99	.09	515
export[c]	.01	.10	488
Fuel			
output (*million rubles*)	146.2	418.2	583
capital (*million rubles*)	198.1	587.9	502
labor (*number employees*)	2208.4	5451.9	597
depreciation (*percent*)[a]	45.9	19.9	482
state-own[b]	.95	.22	609
export[c]	.09	.28	605
Ferrous/Nonferrous metallurgy			
output (*million rubles*)	448.7	418.9	372
capital (*million rubles*)	119.6	518.1	348
labor (*number employees*)	2945.7	6067.1	380
depreciation (*percent*)[a]	42.2	15.7	333
state-own[b]	.89	.31	416
export[c]	.19	.39	394
Machine Building			
output (*million rubles*)	57.8	264.5	3506
capital (*million rubles*)	24.9	187.7	3044
labor (*number employees*)	1414.6	5138.8	3608
depreciation (*percent*)[a]	39.5	16.2	2870
state-own[b]	.86	.35	3951
export[c]	.11	.32	3901
Chemicals			
output (*million rubles*)	223.6	1179.8	569
capital (*million rubles*)	53.4	181.2	493
labor (*number employees*)	1562.9	2503.8	578
depreciation (*percent*)[a]	47.1	17.4	466
state-own[b]	.86	.36	599
export[c]	.15	.35	587
Wood/forestry/paper			
output (*million rubles*)	28.6	177.4	3156
capital (*million rubles*)	8.9	46.9	3012
labor (*number employees*)	613.8	2458.9	3179
depreciation (*percent*)[a]	40.8	18.2	2901
state-own[b]	.89	.31	3230
export[c]	.05	.22	2976
Construction materials			
output (*million rubles*)	33.2	391.2	2109
capital (*million rubles*)	9.8	33.3	1875
labor (*number employees*)	651.4	6452.7	2119
depreciation (*percent*)[a]	39.2	18.8	1744
state-own[b]	.77	.42	2152
export[c]	.02	.15	2102

Table 1a (cont'd)

	Mean	Std. Dev.	Number of Firms
Light			
output (*million rubles*)	103.2	349.6	2059
capital (*million rubles*)	7.0	24.5	1781
labor (*number employees*)	791.5	1667.9	2075
depreciation (*percent*)[a]	37.6	17.4	1655
state-own[b]	.80	.40	2111
export[c]	.05	.23	2023
Food			
output (*million rubles*)	40.4	103.4	5400
capital (*million rubles*)	4.9	18.8	5020
labor (*number employees*)	334.2	994.7	5429
depreciation (*percent*)[a]	35.1	18.0	4895
state-own[b]	.82	.38	5541
export[c]	.02	.13	5362
Printing			
output (*million rubles*)	8.5	152.2	1094
capital (*million rubles*)	1.6	11.4	955
labor (*number employees*)	121.8	376.8	1109
depreciation (*percent*)[a]	47.1	20.7	919
state-own[b]	.99	.11	1144
export[c]	.004	.06	1119
Consumer Services			
output (*million rubles*)	25.2	279.7	221
capital (*million rubles*)	1.4	2.6	212
labor (*number employees*)	364.4	599.8	228
depreciation (*percent*)[a]	35.8	18.0	200
state-own[b]	.73	.44	236
export[c]	.008	.09	250
Miscellaneous			
output (*million rubles*)	54.1	369.1	981
capital (*million rubles*)	8.9	60.2	813
labor (*number employees*)	580.9	2117.0	1002
depreciation (*percent*)[a]	39.9	18.1	713
state-own[b]	.67	.47	1078
export[c]	.04	.20	1063
All Industry			
output (*million rubles*)	63.3	653.8	20428
capital (*million rubles*)	20.9	162.1	18471
labor (*number employees*)	799	3563.9	20767
depreciation (*percent*)[a]	39.3	18.4	17607
state-own[b]	.84	.36	21582
export[c]	.05	.22	20870

[a] The 10 firms reporting depreciation = 0, and depreciation > 100 were dropped from this calculation.
[b] If firm state-owned, value = 1, otherwise value = 0.
[c] If firm reports exports, value = 1, otherwise value = 0.

Table 1b: Civilian Manufacturing Firms in Russia: 1995
Descriptive Statistics

	Mean	Std. Dev.	Number of Firms
Power			
output (*billion rubles*)	21.58	58.97	166
capital (*billion rubles*)	12.54	344.16	193
labor (*number employees*)	1063.41	2758.14	263
depreciation (*percent*)	39.25	21.94	181
state-own[a]	.20	.40	263
export[b]	.02	.12	259
Fuel			
output (*billion rubles*)	14.56	47.49	155
capital (*billion rubles*)	674.90	5503.9	134
labor (*number employees*)	1811.35	5874.20	283
depreciation (*percent*)	41.36	25.59	183
state-own[a]	.45	.49	283
export[b]	.01	.10	280
Ferrous/Nonferrous metallurgy			
output (*billion rubles*)	120.13	2507.63	574
capital (*billion rubles*)	45.21	417.10	488
labor (*number employees*)	1128.74	3005.96	844
depreciation (*percent*)	42.24	19.25	593
state-own[a]	.25	.43	844
export[b]	.05	.22	825
Machine Building			
output (*billion rubles*)	19.75	508.06	1538
capital (*billion rubles*)	172.64	4511.75	1152
labor (*number employees*)	1323.36	9519.06	2316
depreciation (*percent*)	37.85	21.42	1353
state-own[a]	.29	.45	2310
export[b]	.02	.15	2238
Chemicals			
output (*billion rubles*)	22.35	154.04	477
capital (*billion rubles*)	50.75	525.13	375
labor (*number employees*)	1172.19	2614.55	677
depreciation (*percent*)	42.84	20.05	405
state-own[a]	.23	.42	670
export[b]	.06	.23	652
Wood/forestry/paper			
output (*billion rubles*)	5.79	68.74	1291
capital (*billion rubles*)	12.88	208.69	1080
labor (*number employees*)	457.82	1179.29	1946
depreciation (*percent*)	41.25	20.58	1341
state-own[a]	.45	.50	1940
export[b]	.03	.16	1872

Table 1b (cont'd)

	Mean	Std. Dev.	Number of Firms
Construction materials			
output (*billion rubles*)	6.88	54.15	793
capital (*billion rubles*)	9.42	53.04	671
labor (*number employees*)	678.96	2674.40	1110
depreciation (*percent*)	37.69	22.06	809
state-own[a]	.21	.40	1110
export[b]	.02	.15	1083
Light			
output (*billion rubles*)	4.08	28.02	1232
capital (*billion rubles*)	28.02	472.88	979
labor (*number employees*)	628.67	1351.56	1649
depreciation (*percent*)	39.91	22.42	1126
state-own[a]	.22	.41	1641
export[b]	.02	.13	1592
Food			
output (*billion rubles*)	4.11	21.10	2021
capital (*billion rubles*)	9.72	153.30	1777
labor (*number employees*)	255.60	652.34	2575
depreciation (*percent*)	32.00	20.13	2037
state-own[a]	.22	.42	2570
export[b]	.005	.07	2495
Printing			
output (*billion rubles*)	1.42	16.78	402
capital (*billion rubles*)	1.12	9.47	319
labor (*number employees*)	148.01	538.99	611
depreciation (*percent*)	40.42	25.13	415
state-own[a]	.80	.40	607
export[b]	.003	.06	580
Miscellaneous			
output (*billion rubles*)	6.87	36.61	255
capital (*billion rubles*)	20.07	185.93	196
labor (*number employees*)	1081.94	2745.22	383
depreciation (*percent*)	41.95	20.57	266
state-own[a]	.31	.46	383
export[b]	.04	.18	371
All Industry			
output (*billion rubles*)	16.22	672.79	8904
capital (*billion rubles*)	54.60	1951.51	7364
labor (*number employees*)	746.44	4479.60	1265
depreciation (*percent*)	38.12	21.58	8669
state-own[a]	.31	.46	12621
export[b]	.02	.15	12247

[a] If firm state-owned, value = 1, otherwise value = 0.
[b] If firm reports exports, value = 1, otherwise value = 0.

Table 2: Average Reported Depreciation Rate by Industry:[a] 1992, 1995 (percent)

	1992			*1995*		
	Mean	**st. dev.**	**Number of Firms**	**Mean**	**st. dev.**	**Number of Firms**
Power	45.9	(16.4)	405	39.2	(21.9)	181
Fuel	45.9	(19.9)	482	41.4	(25.6)	183
Metallurgy	42.2	(15.7)	333	42.2	(19.2)	593
Machine Bldg.	39.5	(16.2)	2870	37.8	(21.4)	1353
Chemicals	47.1	(17.4)	466	42.8	(20.0)	405
Wood/Paper	40.8	(18.2)	2901	41.2	(20.6)	1341
Const. Materials	39.2	(18.8)	1744	37.7	(22.1)	809
Light	37.6	(17.4)	1655	39.9	(22.4)	1126
Food	35.1	(18.0)	4895	32.0	(20.1)	2037
Printing	47.1	(20.7)	919	40.4	(25.1)	415
Cons. Serv.	35.8	(18.0)	200	--	--	--
Miscellaneous	39.9	(18.1	713	41.9	(20.6)	266
All Firms	39.3	(18.4)	17,607	38.1	(21.6)	12,621

[a] Firms reporting depreciation rates greater than 100 are not included in this analysis.

Source: Calculations from firm level data provided in vols 1-18, *Business Map 93: Russian Industry* (Moscow: Business Information Agency); *Biznes-Karta 95,* select volumes (Moscow: Business Information Agency).

Table 3: Average Reported Depreciation Rates in Russian Industry[a], by Ownership Structure: 1992, 1995 (percent)

1992	Mean	st. dev.	Number of Firms	Percent of Total Firms
State-owned	40.0	(18.3)	15,248	87.0
Leased	39.2	(17.2)	793	4.5
Cooperative	30.4	(18.5)	770	4.4
Collective	36.2	(19.5)	262	1.5
Joint Stock	35.5	(17.6)	455	2.6
Joint Venture	26.9	(28.8)	29	0.2
Private/Other	24.5	(24.5)	13	0.1

1995	Mean	st. dev.	Number of Firms	Percent of Total Firms
State-owned	40.3	(22.5)	2611	30.5
Leased	34.7	(23.8)	66	0.8
Cooperative	--	--	--	--
Collective	36.5	(21.8)	623	7.3
Joint Stock	34.4	(20.4)	4337	50.6
Joint Venture	20.5	(24.3)	21	0.2
Private/Other	33.8	(22.0)	913	10.6

[a] Firms reporting depreciation rates equal to zero or greater than 100 are not included in this analysis.

Source: Calculations from firm level data provided in vols 1-18, *Business Map 93: Russian Industry* (Moscow: Business Information Agency); *Biznes-Karta 95*, select volumes (Moscow: Business Information Agency).

Table 4: Regional Distribution of Average Reported Depreciation Rates in Russian Industry:[a] 1992, 1995 (percent)

1992	*All Firms* Mean	st. dev.	Number of Firms	*Firms Reporting Depreciation Rate > 75%* Mean	st. dev.	Number of Firms	%[b]
Far East	41.0	(20.9)	1007	84.5	(6.4)	62	6.1
E. Siberia	38.3	(19.3)	1663	86.8	(8.5)	68	4.1
W. Siberia	36.8	(18.0)	2220	82.2	(6.8)	50	2.3
Urals	41.2	(16.4)	1001	82.7	(5.5)	27	2.7
N. Caucasus	39.4	(18.9)	1775	83.8	(6.1)	74	4.2
Volga	37.8	(18.0)	2080	83.8	(6.7)	69	3.3
Black Earth	36.1	(17.0)	1160	84.9	(7.8)	23	2.0
Volga-Vyatka	38.9	(17.3)	1020	83.6	(7.1)	30	2.9
Central	40.6	(18.0)	3784	84.9	(6.8)	147	3.9
Northern	41.0	(19.2)	757	84.3	(7.9)	32	4.4
Northwestern	43.3	(18.4)	1145	85.6	(7.9)	50	4.5

1995	*All Firms* Mean	st. dev.	Number of Firms	*Firms Reporting Depreciation Rate > 75%* Mean	st. dev.	Number of Firms	%[b]
W. Siberia	37.2	(19.8)	290	84.5	(6.8)	14	4.8
N. Caucasus	27.4	(22.6)	1276	86.8	(8.9)	27	2.1
Volga	32.8	(21.9)	2068	84.6	(6.7)	71	3.4
Central	42.8	(19.9)	4511	84.4	(6.2)	216	4.8
Northern	44.9	(18.2)	528	81.1	(5.4)	15	2.8

[a] Firms reporting depreciation rates greater than 100 are not included in this analysis.
[b] Percent of total number of firms in region reporting depreciation rate greater than 75%.

Source: Calculations from firm level data provided in vols 1-18, *Business Map 93: Russian Industry* (Moscow: Business Information Agency); *Biznes-Karta 95* select volumes (Moscow: Business Information Agency).

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
All Industry						
lnK	-4.489*	(.138)	-32.39	-.525*	(.202)	-2.59
lnQ/K	3.138*	(.129)	24.26	.136	(.203)	0.67
Power	21.464*	(1.049)	20.45	-1.322	(2.062)	-0.64
Fuel	14.038*	(.874)	16.06	1.961	(2.128)	0.92
Metallurgy	5.717*	(1.015)	5.63	2.434**	(1.171)	2.08
Chemicals	7.398*	(.869)	8.51	4.785*	(1.306)	3.66
Wood	3.086*	(.470)	6.56	.338	(.944)	0.36
Constr mat	4.469*	(.534)	8.36	-.168	(1.049)	-0.10
Light	-8.194*	(.552)	-14.84	-.461	(.956)	-0.48
Food	-4.897*	(.456)	-10.74	-5.486*	(.873)	-6.28
Print	1.589**	(.727)	2.18	1.194	(1.475)	0.81
Consumer	-7.236*	(1.285)	-5.63	--	--	--
Misc	-3.029*	(.737)	-4.11	1.497	(1.689)	0.89
Lease	-2.066*	(.632)	-3.26	-4.905	(3.039)	-1.61
Cooperative	-6.843*	(.657)	-10.41			
Collective	-5.067*	(1.079)	-4.69	-3.157*	(1.114)	-2.83
Joint stock	-4.671*	(.833)	-5.61	.794	(.654)	1.21
Joint venture	-10.099*	(3.294)	-3.06	-11.804	(6.843)	-1.72
Private/other	-28.426*	(4.751)	-5.98	-4.227*	(.948)	-4.46
< 200 wkrs	-8.436*	(.384)	-21.95	1.473**	(.675)	-2.18
1-5000 wkrs	10.090*	(.487)	20.72	2.547*	(.903)	2.82
5-10,000 wkr	18.464*	(1.186)	15.56	1.868	(2.117)	0.88
>10,000 wkrs	22.886*	(1.638)	13.97	-11.702*	(3.198)	-3.66
Far East	5.110*	(.665)	7.69	--		
E. Siberia	1.916*	(.572)	3.35	--		
W. Siberia	.968	(.532)	1.82	3.371	(3.474)	0.97
Urals	2.780*	(.665)	4.18	--		
N. Caucasus	2.515*	(.558)	4.51	-5.976*	(.796)	-7.51
Black Earth	.231	(.632)	0.37	--		
Volga Vyatka	1.073	(.660)	1.62	--		
Central	2.249*	(.473)	4.75	10.506*	(.618)	16.99
Northern	3.165*	(.739)	4.28	15.049*	(1.178)	12.78
Northwestern	4.823*	(.644)	7.48	--		
constant	70.794	(1.328)	53.32	36.841	(1.165)	31.617
N = 17,280				N = 6,647		
Adj R^2 = .2109				Adj R^2 = .1267		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

A. Power

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-4.893*	(.729)	-6.71	-1.699	(1.567)	-1.08
lnQ/K	.527	(.358)	1.47	-2.735	(1.749)	-1.56
Lease	-18.579	(11.492)	-1.62	-17.155	(24.431)	-0.70
Cooperative	--			--		
Collective	--			-12.169	(24.484)	-0.50
Joint stock	--			-11.029	(7.068)	-1.56
Joint venture	--			--		
Private/other	--			21.336	(20.428)	1.04
<200 wkrs	-13.019*	(3.119)	-4.17	-8.427	(6.480)	-1.30
1-5000 wkrs	7.178*	(2.95)	2.43	-2.484	(7.770)	-0.32
5-10000 wkrs	9.546	(6.285)	1.52	1.980	(13.222)	0.15
>10000 wkrs	14.504*	(5.892)	2.46	11.772	(24.408)	0.48
Far East	-6.104	(3.800)	-1.60	--		
E. Siberia	-7.321*	(3.112)	-2.35	--		
W. Siberia	7.174	(5.075)	-1.41	--	--	
Urals	5.412	(5.187)	1.04	--		
N. Caucasus	-1.544	(3.694)	-0.42	7.672	(8.345)	0.92
Black Earth	-10.488**	(4.827)	-2.17	--		
Volga Vyatka	-1.480	(5.334)	-0.27	--		
Central	-.897	(3.203)	-0.28	19.052*	(6.161)	3.09
Northern	-11.183**	(5.056)	-2.21	18.021	(10.815)	1.67
Northwestern	-.764	(4.048)	-0.19	--		
constant	100.749*	(7.941)	12.687	31.702*	(12.283)	2.581
N = 320				N = 111		
Adj R^2 = .1967				Adj R^2 = .1918		

B. Fuel

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-4.253*	(.620)	-6.86	-1.392	(1.361)	-1.02
lnQ/K	6.098*	(.657)	9.28	.249	(1.764)	0.14
Lease	-1.256	(3.599)	-0.35	-12.977	(22.233)	0.58
Cooperative	--			--		
Collective	--			15.234	(12.985)	1.17
Joint stock	-11.579	(11.228)	-1.03	7.894	(5.057)	1.56
Joint venture	--			--		
Private/other	--			8.378	(8.269)	1.01
< 200 wkrs	-14.821*	(2.495)	-5.94	-4.063	(5.526)	-0.74
1-5000 wkrs	9.113*	(1.981)	4.60	8.059	(7.461)	1.80
5-10000 wkrs	7.777	(4.268)	1.82	14.943	(22.953)	0.65
>10000 wkrs	15.426*	(4.332)	3.56	-9.916	(10.089)	-0.98
Far East	.519	(3.799)	0.14	--		
E. Siberia	-16.693*	(3.912)	-4.27	--		
W. Siberia	-12.061*	(2.668)	-4.52	--		
Urals	-11.983*	(4.294)	-2.79	--		
N. Caucasus	3.325	(4.449)	0.74	-9.513	(8.569)	-1.11
Black Earth	-22.440*	(7.060)	-3.18	--		
Volga Vyatka	-9.210	(5.168)	-1.78	--		
Central	-9.562*	(3.105)	-3.08	29.763*	(6.697)	4.44
Northern	-29.393*	(8.187)	-3.59	41.279*	(12.771)	3.23
Northwestern	-15.961*	(4.329)	-3.69	--		
constant	96.579*	(6.959)	13.88	28.393	(8.49)	3.34
N = 470				N = 103		
Adj R^2 = .3961				Adj R^2 = .3379		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

C. Ferrous/Nonferrous Metallurgy

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-3.283*	(.959)	-3.42	-1.661*	(.634)	-2.62
lnQ/K	3.018*	(.909)	3.32	-.929	(.601)	-1.55
Lease	-4.857	(3.377)	-1.44	-9.886	(17.725)	-0.56
Cooperative	--			--		
Collective	--			-5.646	(3.859)	-1.46
Joint stock	-2.374	(5.648)	-0.42	-1.996	(2.161)	-0.92
Jint venture	-22.736	(15.033)	-1.51	-38.947*	(12.687)	-3.07
Private/other	--			-3.934	(3.206)	-1.23
< 200 wkrs	-12.496*	(2.677)	-4.67	-5.967*	(2.122)	-2.81
1-5000 wkrs	4.529	(2.715)	1.67	.144	(2.728)	0.05
5-10000 wkrs	11.926*	(4.296)	2.78	-6.056	(4.722)	-1.28
>10000 wkrs	14.411*	(5.327)	2.70	-5.489	(7.826)	-0.70
Far East	1.616	(3.848)	0.42	--		
E. Siberia	6.226**	(3.043)	2.05	--		
W. Siberia	12.558*	(3.172)	3.96	-2.137	(5.419)	-0.39
Urals	8.681*	(2.782)	3.12	--		
N. Caucasus	4.193	(4.495)	0.93	-21.562*	(3.291)	-6.55
Black Earth	.223	(4.305)	0.05	--		
Volga Vyatka	-1.209	(4.519)	-0.27	--		
Central	-2.409	(2.844)	-0.85	-.392	(2.291)	-0.17
Northern	3.941	(4.758)	0.83	2.189	(3.682)	0.59
Northwestern	14.342*	(4.114)	3.49	--		
constant	66.752	(8.724)	7.65	53.542*	(3.601)	14.87
N = 324				N = 445		
Adj R^2 = .1982				Adj R^2 = .1305		

* Significant @ 1%. ** Significant @ 5%.

D. Machine Building

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-3.481*	(.331)	-10.53	.581	(.492)	1.18
lnQ/K	3.552*	(.324)	10.96	1.322	(.490)	2.70
Lease	-.409	(1.279)	-0.32	-12.530**	(5.973)	-2.10
Cooperative	-7.524*	(2.561)	-2.94	--		
Collective	-8.804*	(2.147)	-4.10	2.269	(3.014)	0.75
Joint stock	-3.153**	(1.655)	-1.90	1.907	(1.573)	1.21
Joint venture	-35.237*	(6.033)	-5.84	-21.075	(14.353)	-1.47
Private/other	-41.399*	(14.786)	-2.80	-8.696*	(2.529)	-3.44
< 200 wkrs	-5.338*	(.864)	-6.18	4.293*	(1.736)	2.47
1-5000 wkrs	8.160*	(.893)	9.14	3.264	(1.874)	1.74
5-10000 wrks	16.290*	(1.985)	8.21	2.804	(3.647)	0.77
>10000 wkrs	20.557*	(2.635)	7.80	-11.293**	(5.446)	-2.07
Far East	3.160	(1.752)	1.80	--		
E. Siberia	2.625	(1.407)	1.87	--		
W. Siberia	1.681	(1.216)	1.38	9.406	(10.193)	0.92
Urals	2.115	(1.335)	1.58	--		
N.Caucasus	2.647**	(1.218)	2.17	-5.561*	(1.855)	-3.00
Black Earth	.441	(1.416)	0.31	--		
Volga Vyatka	-1.303	(1.622)	-0.80	--		
Central	2.233**	(1.068)	2.09	8.645*	(1.534)	5.63
Northern	1.386	(1.934)	0.72	13.007*	(3.370)	3.86
Northwestern	4.619*	(1.260)	3.66	--		
constant	61.734	(3.125)	19.75	35.693*	(2.344)	15.23
N = 2,766				N = 1,016		
Adj R^2 = .2009				Adj R^2 = .1075		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

E. Chemicals

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-1.510**	(.776)	-1.95	.674	(.801)	0.84
lnQ/K	3.162*	(.715)	4.42	-.117	(.884)	-0.13
Lease	-7.223	(4.180)	-1.73	-36.773	(19.751)	-1.86
Cooperative	-13.889	(8.446)	-1.64	--		
Collective	-4.303	(12.040)	-0.36	-12.619*	(4.896)	-2.58
Joint stock	-14.064*	(4.539)	-3.10	-1.201	(2.881)	-0.42
Joint venture	--			--		
Private/other	--			-10.722**	(4.785)	-2.24
< 200 wkrs	-6.087*	(2.422)	-2.51	1.537	(3.158)	0.49
1-5000 wkrs	6.654*	(2.310)	2.88	2.039	(2.994)	0.68
5-10000 wkrs	12.846*	(3.656)	3.51	6.092	(5.587)	1.09
>10000 wkrs	16.494**	(7.132)	2.31	5.591	(14.472)	0.39
Far East	.531	(4.602)	0.11	--		
E.Siberia	1.611	(3.709)	0.43	--		
W.Siberia	-.051	(2.978)	-0.02	-9.039	(11.557)	-0.78
Urals	-2.935	(4.050)	-0.72	--		
N.Caucasus	-.518	(3.150)	-0.16	2.006	(3.276)	0.61
Black Earth	-3.160	(4.129)	-0.76	--		
Volga Vyatka	-4.270	(3.762)	-1.14	--		
Central	-.066	(2.573)	-0.02	8.985*	(2.687)	3.34
Northern	.513	(5.548)	0.09	3.963	(6.079)	0.65
Northwestern	3.571	(3.364)	1.06	--		
constant	54.802	(7.942)	6.90	34.227*	(4.518)	7.58
N = 461				N = 329		
Adj R^2 = .1346				Adj R^2 = .0725		

F. Wood/Forestry/Paper

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-5.012*	(.403)	-12.41	-1.083**	(.555)	-1.95
lnQ/K	3.560*	(.368)	9.67	-.848	(.557)	-1.52
Lease	-6.134*	(1.737)	-3.51	.025	(10.069)	0.003
Cooperative	-10.557*	(3.828)	-2.76	--		
Collective	2.546	(5.149)	0.49	.868	(2.578)	0.34
Joint stock	-2.938	(1.948)	-1.51	1.756	(1.576)	1.11
Joint venture	-12.708**	(6.463)	-1.97	--		
Private/other	-10.712	(12.067)	-0.89	-1.257	(2.669)	-0.47
< 200 wkrs	-11.048*	(1.009)	-10.95	-5.166*	(1.741)	-2.97
1-5000 wkrs	11.449*	(1.228)	9.32	.656	(2.406)	0.27
5-10000 wkrs	20.816*	(3.884)	5.36	-8.777	(7.807)	-1.12
>10000 wkrs	25.752*	(5.467)	4.71	-22.727**	(11.732)	-1.94
Far East	3.554**	(1.605)	2.21	--		
E. Siberia	1.078	(1.304)	0.83	--		
W. Siberia	.619	(1.384)	0.45	-28.923	(20.201)	-1.43
Urals	3.657**	(1.722)	2.12	--		
N.Caucasus	5.376*	(1.859)	2.89	-5.276**	(2.562)	-2.06
Black Earth	-3.993**	(1.996)	-2.00	--		
Volga Vyatka	4.232*	(1.587)	2.67	--		
Central	.529	(1.338)	0.40	11.405*	(1.622)	7.03
Northern	10.658*	(1.543)	6.90	18.429*	(2.531)	7.28
Northwestern	2.454	(1.905)	1.29	--		
constant	78.546*	(3.598)	21.83	34.509*	(2.447)	14.10
N= 2,880				N = 969		
Adj R^2 = .2054				Adj R^2 = .1135		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

G. Construction Materials

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-4.168*	(.483)	-8.63	.579	(.778)	0.74
lnQ/K	6.311*	(.484)	13.02	.971	(.734)	1.32
Lease	-.881	(1.385)	-0.64	-4.152	(8.567)	-0.48
Cooperative	-4.185**	(1.875)	-2.23	--		
Collective	-9.560*	(3.336)	-2.87	-3.096	(4.014)	-0.77
Joint stock	-5.252**	(2.391)	-2.20	1.396	(2.452)	0.57
Joint venture	9.313	(9.460)	0.98	--		
Private/other	-72.468*	(16.449)	-4.40	-5.415	(3.231)	-1.68
< 200 wkrs	-6.014*	(1.153)	-5.22	-1.148	(2.334)	-0.49
1-5000 wkrs	7.356*	(1.159)	4.64	.718	(3.195)	0.22
5-10000 wkrs	9.190	(6.804)	1.35	4.959	(11.121)	0.45
> 10000 wkrs	25.996	(16.473)	1.58	-21.596**	(10.268)	-2.10
Far East	3.339	(1.946)	1.72	--		
E. Siberia	4.415*	(1.805)	2.45	--		
W. Siberia	-2.422	(1.566)	-1.55	-13.818	(11.194)	-1.23
Urals	3.366	(2.014)	1.67	--		
N. Caucasus	.629	(1.494)	0.42	-8.845*	(2.510)	-3.52
Black Earth	.424	(1.838)	0.23	--		
Volga Vyatka	1.063	(2.146)	0.50	--		
Central	2.078	(1.381)	1.50	13.905*	(2.220)	6.26
Northern	1.211	(2.596)	0.47	14.409*	(4.298)	3.35
Northwestern	2.451	(1.959)	1.25	--		
constant	70.290*	(4.587)	15.324	34.539*	(3.732)	9.25
N = 1,725				N = 625		
Adj R^2 = .2635				Adj R^2 = .1683		

* Significant @ 1%. ** Significant @ 5%.

H. Light

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-2.565*	(.488)	-5.26	-.148	(.637)	-0.23
lnQ/K	3.994*	(.481)	8.30	.444	(.656)	0.68
Lease	-.433	(1.891)	-0.23	2.439	(6.489)	0.38
Cooperative	-7.772**	(3.744)	-2.08	--		
Collective	-8.268*	(2.882)	-2.87	-2.486	(2.782)	-0.89
Joint stock	-9.934*	(2.445)	-4.06	1.140	(1.934)	0.59
Joint venture	-2.000	(10.848)	-0.18	-12.638	(21.901)	-0.58
Private/other	-42.337*	(13.298)	-3.18	-4.376	(2.782)	-1.58
< 200 wkrs	-.893	(1.394)	-0.64	-1.337	(2.033)	-0.66
1-5000 wkrs	6.501*	(1.572)	4.14	.951	(2.422)	0.39
5-10000 wkrs	6.554	(4.493)	1.46	-5.766	(8.009)	-0.72
>10000 wkrs	16.834	(13.464)	1.25	-30.700**	(15.487)	-1.98
Far East	3.398	(2.952)	1.15	--		
E. Siberia	.202	(2.500)	0.05	--		
W. Siberia	1.358	(2.074)	0.65	24.085**	(10.977)	2.19
Urals	1.513	(2.555)	0.59	--		
N. Caucasus	.877	(2.025)	0.43	-6.832*	(2.434)	-2.81
Black Earth	1.726	(2.431)	0.71	--		
Volga Vyatka	1.842	(2.398)	0.77	--		
Central	3.116**	(1.589)	1.96	10.576*	(1.883)	5.62
Northern	-8.319*	(2.412)	-3.45	7.766**	(3.980)	1.95
Northwestern	7.339*	(2.100)	3.49	--		
constant	45.123	(4.694)	9.61	36.493*	(2.754)	13.25
N = 1,647				N = 893		
Adj R^2 = .1474				Adj R^2 = .0859		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

I. Food

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-5.664*	(.285)	-19.84	-.379	(.406)	-0.93
lnQ/K	2.931*	(.254)	11.55	.590	(.386)	1.53
Lease	-.722	(1.452)	-0.50	-3.037	(7.372)	-0.41
Cooperative	-6.721*	(.824)	-8.15	--		
Collective	-2.998	(2.076)	-1.44	-1.968	(2.326)	-0.85
Joint stock	-3.372	(2.163)	-1.56	.185	(1.262)	0.15
Joint venture	16.328**	(7.919)	2.06	8.611	(9.710)	0.89
Private/other	-2.737	(8.784)	-0.31	-3.052**	(1.599)	-1.91
< 200 wkrs	-9.738*	(.742)	-13.13	.056	(1.252)	0.04
1-5000 wkrs	12.619*	(1.442)	8.75	1.125	(2.980)	0.38
5-10000 wkrs	24.921*	(3.834)	6.50	--		
>10000 wkrs	30.612*	(6.743)	4.54	13.398	(13.681)	0.98
Far East	8.856*	(1.240)	7.14	--		
E. Siberia	2.348**	(1.153)	2.04	--		
W. Siberia	3.344*	(.999)	3.35	2.337	(7.916)	0.29
Urals	2.213	(1.384)	1.60	--		
N. Caucasus	4.711*	(.996)	4.73	-3.322*	(1.389)	-2.39
Black Earth	2.910*	(.1046)	2.78	--		
Volga Vyatka	1.512	(1.252)	1.21	--		
Central	3.681*	(.902)	4.08	10.592*	(1.124)	9.43
Northern	3.060**	(1.481)	2.07	18.252*	(2.264)	8.06
Northwestern	6.258*	(1.309)	4.78	--		
constant	74.095*	(2.811)	26.36	31.168*	(1.951)	15.98
N = 4,865				N = 1,692		
Adj R^2 = .1958				Adj R^2 = .0974		

* Significant @ 1%. ** Significant @ 5%.

J. Printing

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-5.971*	(.553)	-10.79	-3.327*	(1.167)	-2.85
lnQ/K	4.628*	(.695)	6.66	-2.184	(1.238)	-1.76
Lease	-11.287	(8.751)	-1.29	--		
Cooperative	23.989	(17.306)	1.39	--		
Collective	40.133**	(17.288)	2.32	-6.629	(10.154)	-0.65
Joint stock	--			-1.359	(6.457)	-0.21
Joint venture	--			--		
Private/other	--			-2.268	(12.202)	-0.19
< 200 wkrs	-12.689*	(2.787)	-4.55	-2.203	(5.627)	-0.39
1-5000 wkrs	17.070*	(4.361)	3.91	15.193	(10.452)	1.46
5-10000 wkrs	--			--		
> 10000 wkrs	--			--		
Far East	5.810**	(2.453)	2.37	--		
E. Siberia	6.396*	(2.332)	2.74	--		
W. Siberia	3.419	(2.486)	1.38	--		
Urals	5.056	(2.898)	1.74	--		
N. Caucasus	1.026	(2.549)	0.40	-10.190	(5.792)	-1.76
Black Earth	-1.180	(2.873)	-0.41	--		
Volga Vyatka	1.181	(2.604)	0.45	--		
Central	1.367	(1.915)	0.71	14.293*	(3.058)	4.67
Northern	2.608	(4.056)	0.63	25.558**	(10.790)	2.37
Northwestern	7.023*	(2.821)	2.49	--		
constant	81.403*	(5.333)	15.26	30.676*	(5.889)	5.21
N = 921				N = 291		
Adj R^2 = .3453				Adj R^2 = .1294		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

K. Consumer Services

	1992		
	Coefficient		**t-statistic**
lnK	-5.124*	(1.550)	-3.30
lnQ/K	5.556*	(1.451)	3.83
Lease	6.830	(8.500)	0.80
Cooperative	-17.469	(10.896)	-1.60
Collective	-10.429	(10.952)	-0.95
Joint stock	-2.130	(3.402)	-0.63
Joint venture	--		
Private/other	--		
< 200 wkrs	-8.453	(3.226)	-2.62
1-5000 wkrs	.302	(5.244)	0.06
5-10000 wkrs	15.187	(15.435)	0.98
> 10000 wkrs	--		
Far East	--		
E. Siberia	-1.276	(5.760)	-0.22
W. Siberia	1.552	(4.187)	0.37
Urals	--		
N. Caucasus	-2.460	(4.616)	-0.53
Black Earth	-2.355	(7.675)	-0.31
Volga Vyatka	--		
Central	--		
Northern	--		
Northwestern	8.311	(5.623)	1.48
constant	64.986*	(11.614)	5.60

N = 198
Adj R^2 = .3359
* Significant @ 1%. ** Significant @ 5%.

L. Miscellaneous

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-3.218*	(.687)	-4.69	.135	(1.327)	0.10
lnQ/K	1.572**	(.687)	2.29	.780	(1.421)	0.55
Lease	-3.699	(2.852)	-1.30	31.108	(20.710)	1.50
Cooperative	-11.346*	(2.891)	-3.92	--		
Collective	-3.715	(2.587)	-1.44	-11.031**	(5.343)	-2.06
Joint stock	-1.856	(3.481)	-0.53	4.024	(3.832)	1.05
Joint venture	-24.200**	(12.347)	-1.96	--		
Private/other	-37.919*	(10.223)	-3.71	-7.590	(7.130)	-1.06
< 200 wkrs	-6.169*	(1.822)	-3.39	.389	(4.302)	0.09
1-5000 wkrs	4.626	(2.594)	1.78	1.719	(4.560)	0.38
5-10000 wkrs	23.104*	(8.055)	2.87	8.152	(8.650)	0.94
> 10000 wkrs	25.650**	(10.549)	2.43	-45.957**	(20.591)	-2.23
Far East	2.793	(3.364)	0.83	--		
E. Siberia	5.586	(3.119)	1.79	--		
W. Siberia	-3.878	(3.149)	-1.23	--		
Urals	5.345	(3.317)	1.61	--		
N. Caucasus	1.388	(3.041)	0.46	-1.695	(5.054)	-0.34
Black Earth	-3.808	(3.873)	-0.98	--		
Volga Vyatka	1.892	(3.056)	-0.62	--		
Central	2.248	(2.570)	0.87	12.712*	(4.411)	2.88
Northern	-5.392	(3.757)	-1.44	5.380	(7.257)	0.74
Northwestern	3.200	(5.273)	0.61	--		
constant	64.458*	(6.420)	9.73	36.010*	(6.301)	5.72

N = 700
Adj R^2 = .1136

N = 173
Adj R^2 = .0942

* Significant @ 1%. ** Significant @ 5%.

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Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

A. Power

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-4.893*	(.729)	-6.71	-1.699	(1.567)	-1.08
lnQ/K	.527	(.358)	1.47	-2.735	(1.749)	-1.56
Lease	-18.579	(11.492)	-1.62	-17.155	(24.431)	-0.70
Cooperative	--			--		
Collective	--			-12.169	(24.484)	-0.50
Joint stock	--			-11.029	(7.068)	-1.56
Joint venture	--			--		
Private/other	--			21.336	(20.428)	1.04
<200 wkrs	-13.019*	(3.119)	-4.17	-8.427	(6.480)	-1.30
1-5000 wkrs	7.178*	(2.95)	2.43	-2.484	(7.770)	-0.32
5-10000 wkrs	9.546	(6.285)	1.52	1.980	(13.222)	0.15
>10000 wkrs	14.504*	(5.892)	2.46	11.772	(24.408)	0.48
Far East	-6.104	(3.800)	-1.60	--		
E. Siberia	-7.321*	(3.112)	-2.35	--		
W. Siberia	7.174	(5.075)	-1.41	--	--	
Urals	5.412	(5.187)	1.04	--		
N. Caucasus	-1.544	(3.694)	-0.42	7.672	(8.345)	0.92
Black Earth	-10.488**	(4.827)	-2.17	--		
Volga Vyatka	-1.480	(5.334)	-0.27	--		
Central	-.897	(3.203)	-0.28	19.052*	(6.161)	3.09
Northern	-11.183**	(5.056)	-2.21	18.021	(10.815)	1.67
Northwestern	-.764	(4.048)	-0.19	--		
constant	100.749*	(7.941)	12.687	31.702*	(12.283)	2.581
N = 320				N = 111		
Adj R^2 = .1967				Adj R^2 = .1918		

B. Fuel

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-4.253*	(.620)	-6.86	-1.392	(1.361)	-1.02
lnQ/K	6.098*	(.657)	9.28	.249	(1.764)	0.14
Lease	-1.256	(3.599)	-0.35	-12.977	(22.233)	0.58
Cooperative	--			--		
Collective	--			15.234	(12.985)	1.17
Joint stock	-11.579	(11.228)	-1.03	7.894	(5.057)	1.56
Joint venture	--			--		
Private/other	--			8.378	(8.269)	1.01
< 200 wkrs	-14.821*	(2.495)	-5.94	-4.063	(5.526)	-0.74
1-5000 wkrs	9.113*	(1.981)	4.60	8.059	(7.461)	1.80
5-10000 wkrs	7.777	(4.268)	1.82	14.943	(22.953)	0.65
>10000 wkrs	15.426*	(4.332)	3.56	-9.916	(10.089)	-0.98
Far East	.519	(3.799)	0.14	--		
E. Siberia	-16.693*	(3.912)	-4.27	--		
W. Siberia	-12.061*	(2.668)	-4.52	--		
Urals	-11.983*	(4.294)	-2.79	--		
N. Caucasus	3.325	(4.449)	0.74	-9.513	(8.569)	-1.11
Black Earth	-22.440*	(7.060)	-3.18	--		
Volga Vyatka	-9.210	(5.168)	-1.78	--		
Central	-9.562*	(3.105)	-3.08	29.763*	(6.697)	4.44
Northern	-29.393*	(8.187)	-3.59	41.279*	(12.771)	3.23
Northwestern	-15.961*	(4.329)	-3.69	--		
constant	96.579*	(6.959)	13.88	28.393	(8.49)	3.34
N = 470				N = 103		
Adj R^2 = .3961				Adj R^2 = .3379		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

C. Ferrous/Nonferrous Metallurgy

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-3.283*	(.959)	-3.42	-1.661*	(.634)	-2.62
lnQ/K	3.018*	(.909)	3.32	-.929	(.601)	-1.55
Lease	-4.857	(3.377)	-1.44	-9.886	(17.725)	-0.56
Cooperative	--			--		
Collective	--			-5.646	(3.859)	-1.46
Joint stock	-2.374	(5.648)	-0.42	-1.996	(2.161)	-0.92
Jint venture	-22.736	(15.033)	-1.51	-38.947*	(12.687)	-3.07
Private/other	--			-3.934	(3.206)	-1.23
< 200 wkrs	-12.496*	(2.677)	-4.67	-5.967*	(2.122)	-2.81
1-5000 wkrs	4.529	(2.715)	1.67	.144	(2.728)	0.05
5-10000 wkrs	11.926*	(4.296)	2.78	-6.056	(4.722)	-1.28
>10000 wkrs	14.411*	(5.327)	2.70	-5.489	(7.826)	-0.70
Far East	1.616	(3.848)	0.42	--		
E. Siberia	6.226**	(3.043)	2.05	--		
W. Siberia	12.558*	(3.172)	3.96	-2.137	(5.419)	-0.39
Urals	8.681*	(2.782)	3.12	--		
N. Caucasus	4.193	(4.495)	0.93	-21.562*	(3.291)	-6.55
Black Earth	.223	(4.305)	0.05	--		
Volga Vyatka	-1.209	(4.519)	-0.27	--		
Central	-2.409	(2.844)	-0.85	-.392	(2.291)	-0.17
Northern	3.941	(4.758)	0.83	2.189	(3.682)	0.59
Northwestern	14.342*	(4.114)	3.49	--		
constant	66.752	(8.724)	7.65	53.542*	(3.601)	14.87
N = 324				N = 445		
Adj R^2 = .1982				Adj R^2 = .1305		

* Significant @ 1%. ** Significant @ 5%.

D. Machine Building

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-3.481*	(.331)	-10.53	.581	(.492)	1.18
lnQ/K	3.552*	(.324)	10.96	1.322	(.490)	2.70
Lease	-.409	(1.279)	-0.32	-12.530**	(5.973)	-2.10
Cooperative	-7.524*	(2.561)	-2.94	--		
Collective	-8.804*	(2.147)	-4.10	2.269	(3.014)	0.75
Joint stock	-3.153**	(1.655)	-1.90	1.907	(1.573)	1.21
Joint venture	-35.237*	(6.033)	-5.84	-21.075	(14.353)	-1.47
Private/other	-41.399*	(14.786)	-2.80	-8.696*	(2.529)	-3.44
< 200 wkrs	-5.338*	(.864)	-6.18	4.293*	(1.736)	2.47
1-5000 wkrs	8.160*	(.893)	9.14	3.264	(1.874)	1.74
5-10000 wrks	16.290*	(1.985)	8.21	2.804	(3.647)	0.77
>10000 wkrs	20.557*	(2.635)	7.80	-11.293**	(5.446)	-2.07
Far East	3.160	(1.752)	1.80	--		
E. Siberia	2.625	(1.407)	1.87	--		
W. Siberia	1.681	(1.216)	1.38	9.406	(10.193)	0.92
Urals	2.115	(1.335)	1.58	--		
N.Caucasus	2.647**	(1.218)	2.17	-5.561*	(1.855)	-3.00
Black Earth	.441	(1.416)	0.31	--		
Volga Vyatka	-1.303	(1.622)	-0.80	--		
Central	2.233**	(1.068)	2.09	8.645*	(1.534)	5.63
Northern	1.386	(1.934)	0.72	13.007*	(3.370)	3.86
Northwestern	4.619*	(1.260)	3.66	--		
constant	61.734	(3.125)	19.75	35.693*	(2.344)	15.23
N = 2,766				N = 1,016		
Adj R^2 = .2009				Adj R^2 = .1075		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

E. Chemicals

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-1.510**	(.776)	-1.95	.674	(.801)	0.84
lnQ/K	3.162*	(.715)	4.42	-.117	(.884)	-0.13
Lease	-7.223	(4.180)	-1.73	-36.773	(19.751)	-1.86
Cooperative	-13.889	(8.446)	-1.64	--		
Collective	-4.303	(12.040)	-0.36	-12.619*	(4.896)	-2.58
Joint stock	-14.064*	(4.539)	-3.10	-1.201	(2.881)	-0.42
Joint venture	--			--		
Private/other	--			-10.722**	(4.785)	-2.24
< 200 wkrs	-6.087*	(2.422)	-2.51	1.537	(3.158)	0.49
1-5000 wkrs	6.654*	(2.310)	2.88	2.039	(2.994)	0.68
5-10000 wkrs	12.846*	(3.656)	3.51	6.092	(5.587)	1.09
>10000 wkrs	16.494**	(7.132)	2.31	5.591	(14.472)	0.39
Far East	.531	(4.602)	0.11	--		
E.Siberia	1.611	(3.709)	0.43	--		
W.Siberia	-.051	(2.978)	-0.02	-9.039	(11.557)	-0.78
Urals	-2.935	(4.050)	-0.72	--		
N.Caucasus	-.518	(3.150)	-0.16	2.006	(3.276)	0.61
Black Earth	-3.160	(4.129)	-0.76	--		
Volga Vyatka	-4.270	(3.762)	-1.14	--		
Central	-.066	(2.573)	-0.02	8.985*	(2.687)	3.34
Northern	.513	(5.548)	0.09	3.963	(6.079)	0.65
Northwestern	3.571	(3.364)	1.06	--		
constant	54.802	(7.942)	6.90	34.227*	(4.518)	7.58
N = 461				N = 329		
Adj R^2 = .1346				Adj R^2 = .0725		

F. Wood/Forestry/Paper

	1992			1995		
	Coefficient		t-statistic	Coefficient		t-statistic
lnK	-5.012*	(.403)	-12.41	-1.083**	(.555)	-1.95
lnQ/K	3.560*	(.368)	9.67	-.848	(.557)	-1.52
Lease	-6.134*	(1.737)	-3.51	.025	(10.069)	0.003
Cooperative	-10.557*	(3.828)	-2.76	--		
Collective	2.546	(5.149)	0.49	.868	(2.578)	0.34
Joint stock	-2.938	(1.948)	-1.51	1.756	(1.576)	1.11
Joint venture	-12.708**	(6.463)	-1.97	--		
Private/other	-10.712	(12.067)	-0.89	-1.257	(2.669)	-0.47
< 200 wkrs	-11.048*	(1.009)	-10.95	-5.166*	(1.741)	-2.97
1-5000 wkrs	11.449*	(1.228)	9.32	.656	(2.406)	0.27
5-10000 wkrs	20.816*	(3.884)	5.36	-8.777	(7.807)	-1.12
>10000 wkrs	25.752*	(5.467)	4.71	-22.727**	(11.732)	-1.94
Far East	3.554**	(1.605)	2.21	--		
E. Siberia	1.078	(1.304)	0.83	--		
W. Siberia	.619	(1.384)	0.45	-28.923	(20.201)	-1.43
Urals	3.657**	(1.722)	2.12	--		
N.Caucasus	5.376*	(1.859)	2.89	-5.276**	(2.562)	-2.06
Black Earth	-3.993**	(1.996)	-2.00	--		
Volga Vyatka	4.232*	(1.587)	2.67	--		
Central	.529	(1.338)	0.40	11.405*	(1.622)	7.03
Northern	10.658*	(1.543)	6.90	18.429*	(2.531)	7.28
Northwestern	2.454	(1.905)	1.29	--		
constant	78.546*	(3.598)	21.83	34.509*	(2.447)	14.10
N= 2,880				N = 969		
Adj R^2 = .2054				Adj R^2 = .1135		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

G. Construction Materials

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-4.168*	(.483)	-8.63	.579	(.778)	0.74
lnQ/K	6.311*	(.484)	13.02	.971	(.734)	1.32
Lease	-.881	(1.385)	-0.64	-4.152	(8.567)	-0.48
Cooperative	-4.185**	(1.875)	-2.23	--		
Collective	-9.560*	(3.336)	-2.87	-3.096	(4.014)	-0.77
Joint stock	-5.252**	(2.391)	-2.20	1.396	(2.452)	0.57
Joint venture	9.313	(9.460)	0.98	--		
Private/other	-72.468*	(16.449)	-4.40	-5.415	(3.231)	-1.68
< 200 wkrs	-6.014*	(1.153)	-5.22	-1.148	(2.3[illegible])	-0.49
1-5000 wkrs	7.356*	(1.159)	4.64	.718	(3.195)	0.22
5-10000 wkrs	9.190	(6.804)	1.35	4.959	(11.121)	0.45
> 10000 wkrs	25.996	(16.473)	1.58	-21.596**	(10.268)	-2.10
Far East	3.339	(1.946)	1.72	--		
E. Siberia	4.415*	(1.805)	2.45	--		
W. Siberia	-2.422	(1.566)	-1.55	-13.818	(11.194)	-1.23
Urals	3.366	(2.014)	1.67	--		
N. Caucasus	.629	(1.494)	0.42	-8.845*	(2.510)	-3.52
Black Earth	.424	(1.838)	0.23	--		
Volga Vyatka	1.063	(2.146)	0.50	--		
Central	2.078	(1.381)	1.50	13.905*	(2.220)	6.26
Northern	1.211	(2.596)	0.47	14.409*	(4.298)	3.35
Northwestern	2.451	(1.959)	1.25	--		
constant	70.290*	(4.587)	15.324	34.539*	(3.732)	9.25
N = 1,725				N = 625		
Adj R^2 = .2635				Adj R^2 = .1683		

* Significant @ 1%. ** Significant @ 5%.

H. Light

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-2.565*	(.488)	-5.26	-.148	(.637)	-0.23
lnQ/K	3.994*	(.481)	8.30	.444	(.656)	0.68
Lease	-.433	(1.891)	-0.23	2.439	(6.489)	0.38
Cooperative	-7.772**	(3.744)	-2.08	--		
Collective	-8.268*	(2.882)	-2.87	-2.486	(2.782)	-0.89
Joint stock	-9.934*	(2.445)	-4.06	1.140	(1.934)	0.59
Joint venture	-2.000	(10.848)	-0.18	-12.638	(21.901)	-0.58
Private/other	-42.337*	(13.298)	-3.18	-4.376	(2.782)	-1.58
< 200 wkrs	-.893	(1.394)	-0.64	-1.337	(2.033)	-0.66
1-5000 wkrs	6.501*	(1.572)	4.14	.951	(2.422)	0.39
5-10000 wkrs	6.554	(4.493)	1.46	-5.766	(8.009)	-0.72
>10000 wkrs	16.834	(13.464)	1.25	-30.700**	(15.487)	-1.98
Far East	3.398	(2.952)	1.15	--		
E. Siberia	.202	(2.500)	0.05	--		
W. Siberia	1.358	(2.074)	0.65	24.085**	(10.977)	2.19
Urals	1.513	(2.555)	0.59	--		
N. Caucasus	.877	(2.025)	0.43	-6.832*	(2.434)	-2.81
Black Earth	1.726	(2.431)	0.71	--		
Volga Vyatka	1.842	(2.398)	0.77	--		
Central	3.116**	(1.589)	1.96	10.576*	(1.883)	5.62
Northern	-8.319*	(2.412)	-3.45	7.766**	(3.980)	1.95
Northwestern	7.339*	(2.100)	3.49	--		
constant	45.123	(4.694)	9.61	36.493*	(2.754)	13.25
N = 1,647				N = 893		
Adj R^2 = .1474				Adj R^2 = .0859		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

I. Food

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-5.664*	(.285)	-19.84	-.379	(.406)	-0.93
lnQ/K	2.931*	(.254)	11.55	.590	(.386)	1.53
Lease	-.722	(1.452)	-0.50	-3.037	(7.372)	-0.41
Cooperative	-6.721*	(.824)	-8.15	--		
Collective	-2.998	(2.076)	-1.44	-1.968	(2.326)	-0.85
Joint stock	-3.372	(2.163)	-1.56	.185	(1.262)	0.15
Joint venture	16.328**	(7.919)	2.06	8.611	(9.710)	0.89
Private/other	-2.737	(8.784)	-0.31	-3.052**	(1.599)	-1.91
< 200 wlrs	-9.738*	(.742)	-13.13	.056	(1.252)	0.04
1-5000 wkrs	12.619*	(1.442)	8.75	1.125	(2.980)	0.38
5-10000 wkrs	24.921*	(3.834)	6.50	--		
>10000 wkrs	30.612*	(6.743)	4.54	13.398	(13.681)	0.98
Far East	8.856*	(1.240)	7.14	--		
E. Siberia	2.348**	(1.153)	2.04	--		
W. Siberia	3.344*	(.999)	3.35	2.337	(7.916)	0.29
Urals	2.213	(1.384)	1.60	--		
N. Caucasus	4.711*	(.996)	4.73	-3.322*	(1.389)	-2.39
Black Earth	2.910*	(.1046)	2.78	--		
Volga Vyatka	1.512	(1.252)	1.21	--		
Central	3.681*	(.902)	4.08	10.592*	(1.124)	9.43
Northern	3.060**	(1.481)	2.07	18.252*	(2.264)	8.06
Northwestern	6.258*	(1.309)	4.78	--		
constant	74.095*	(2.811)	26.36	31.168*	(1.951)	15.98
N = 4,865				N = 1,692		
Adj R^2 = .1958				Adj R^2 = .0974		

* Significant @ 1%. ** Significant @ 5%.

J. Printing

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-5.971*	(.553)	-10.79	-3.327*	(1.167)	-2.85
lnQ/K	4.628*	(.695)	6.66	-2.184	(1.238)	-1.76
Lease	-11.287	(8.751)	-1.29	--		
Cooperative	23.989	(17.306)	1.39	--		
Collective	40.133**	(17.288)	2.32	-6.629	(10.154)	-0.65
Joint stock	--			-1.359	(6.457)	-0.21
Joint venture	--			--		
Private/other	--			-2.268	(12.202)	-0.19
< 200 wkrs	-12.689*	(2.787)	-4.55	-2.203	(5.627)	-0.39
1-5000 wkrs	17.070*	(4.361)	3.91	15.193	(10.452)	1.46
5-10000 wkrs	--			--		
> 10000 wkrs	--			--		
Far East	5.810**	(2.453)	2.37	--		
E. Siberia	6.396*	(2.332)	2.74	--		
W. Siberia	3.419	(2.486)	1.38	--		
Urals	5.056	(2.898)	1.74	--		
N. Caucasus	1.026	(2.549)	0.40	-10.190	(5.792)	-1.76
Black Earth	-1.180	(2.873)	-0.41	--		
Volga Vyatka	1.181	(2.604)	0.45	--		
Central	1.367	(1.915)	0.71	14.293*	(3.058)	4.67
Northern	2.608	(4.056)	0.63	25.558**	(10.790)	2.37
Northwestern	7.023*	(2.821)	2.49	--		
constant	81.403*	(5.333)	15.26	30.676*	(5.889)	5.21
N = 921				N = 291		
Adj R^2 = .3453				Adj R^2 = .1294		

* Significant @ 1%. ** Significant @ 5%.

Table 5: Factors Influencing Depreciation Rates in Russian Industry, 1992 and 1995

K. Consumer Services

	1992		
	Coefficient		**t-statistic**
lnK	-5.124*	(1.550)	-3.30
lnQ/K	5.556*	(1.451)	3.83
Lease	6.830	(8.500)	0.80
Cooperative	-17.469	(10.896)	-1.60
Collective	-10.429	(10.952)	-0.95
Joint stock	-2.130	(3.402)	-0.63
Joint venture	--		
Private/other	--		
< 200 wkrs	-8.453	(3.226)	-2.62
1-5000 wkrs	.302	(5.244)	0.06
5-10000 wkrs	15.187	(15.435)	0.98
> 10000 wkrs	--		
Far East	--		
E. Siberia	-1.276	(5.760)	-0.22
W. Siberia	1.552	(4.187)	0.37
Urals	--		
N. Caucasus	-2.460	(4.616)	-0.53
Black Earth	-2.355	(7.675)	-0.31
Volga Vyatka	--		
Central	--		
Northern	--		
Northwestern	8.311	(5.623)	1.48
constant	64.986*	(11.614)	5.60

N = 198
Adj R^2 = .3359
* Significant @ 1%. ** Significant @ 5%.

L. Miscellaneous

	1992			1995		
	Coefficient		**t-statistic**	**Coefficient**		**t-statistic**
lnK	-3.218*	(.687)	-4.69	.135	(1.327)	0.10
lnQ/K	1.572**	(.687)	2.29	.780	(1.421)	0.55
Lease	-3.699	(2.852)	-1.30	31.108	(20.710)	1.50
Cooperative	-11.346*	(2.891)	-3.92	--		
Collective	-3.715	(2.587)	-1.44	-11.031**	(5.343)	-2.06
Joint stock	-1.856	(3.481)	-0.53	4.024	(3.832)	1.05
Joint venture	-24.200**	(12.347)	-1.96	--		
Private/other	-37.919*	(10.223)	-3.71	-7.590	(7.130)	-1.06
< 200 wkrs	-6.169*	(1.822)	-3.39	.389	(4.302)	0.09
1-5000 wkrs	4.626	(2.594)	1.78	1.719	(4.560)	0.38
5-10000 wkrs	23.104*	(8.055)	2.87	8.152	(8.650)	0.94
> 10000 wkrs	25.650**	(10.549)	2.43	-45.957**	(20.591)	-2.23
Far East	2.793	(3.364)	0.83	--		
E. Siberia	5.586	(3.119)	1.79	--		
W. Siberia	-3.878	(3.149)	-1.23	--		
Urals	5.345	(3.317)	1.61	--		
N. Caucasus	1.388	(3.041)	0.46	-1.695	(5.054)	-0.34
Black Earth	-3.808	(3.873)	-0.98	--		
Volga Vyatka	1.892	(3.056)	-0.62	--		
Central	2.248	(2.570)	0.87	12.712*	(4.411)	2.88
Northern	-5.392	(3.757)	-1.44	5.380	(7.257)	0.74
Northwestern	3.200	(5.273)	0.61	--		
constant	64.458*	(6.420)	9.73	36.010*	(6.301)	5.72

N = 700
Adj R^2 = .1136
* Significant @ 1%. ** Significant @ 5%.

N = 173
Adj R^2 = .0942