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DO COMPETITION AND OWNERSHIP AFFECT ENTERPRISE EFFICIENCY IN THE ABSENCE OF MARKET INSTITUTIONS? EVIDENCE AFTER PRIVATIZATION IN MONGOLIA.

February 1999

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Working Paper #220

This publication was made possible through support provided by the U.S. Agency for International Development, under Cooperative Agreement No. DHR-0015-A-00-0031-00 to the Center for Institutional Reform and the Informal Sector (IRIS) and administered by the Office of Economic and Institutional Reform, Center for Economic Growth, Bureau for Global Programs, Field Support and Research.

The views and analyses in the report do not necessarily reflect the official position of the IRIS Center or the U.S.A.I.D.

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Do Competition and Ownership Affect Enterprise Efficiency in the Absence of Market Institutions? Evidence after Privatization in Mongolia

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January 25, 1999

*The current affiliation of Anderson is the World Bank. We thank Berta Heybey for research assistance, Georges Korsun, our co-author on related projects, Bert Hofman for providing data; Batbold, Bathoyag, and Bailyhuu for generous help and advice; Gunpilmaa for translation and secretarial work; and the teams of researchers and accountants for collecting information with care and precision: Otgonchimeg and T. Batjargal, the team leaders, and Badarch, Batbold, Erdenesanaa, Gansuh, Ganzorig, Namsrai, Tungalag, Altansuh, D. Batjargal, Bayasgalan, Davaasuren, Hishigsuren, Idshinrinchin, Jigden, Lutdorj, Norjii, Nyamsuren and Tseesuren. We are indebted to the directors of some 250 Mongolian enterprises for their cooperation. We gratefully acknowledge the support of the World Bank and of the U.S. Agency for International Development under Cooperative Agreement No. DHR-0015-A-00-0031-00 to the Center on Institutional Reform and the Informal Sector (IRIS). The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.

Do Competition and Ownership Affect Enterprise Efficiency in the Absence of Market Institutions? Evidence after Privatization in Mongolia.

Abstract.

Mongolia's mass privatization program was implanted in a country that lacked the very basic institutions of capitalism. This paper examines the effects of competition and ownership on the efficiency of the newly privatized enterprises, using a representative sample of enterprises and controlling for possible selection biases. Competition has quantitatively large effects, perfectly competitive firms having nearly double the efficiency of monopolies. Enterprises with residual state ownership appear to be more efficient than other enterprises, reflecting an environment where the government was pressured to focus on efficiency and a institutions gave little voice to outsider owners.

Journal of Economic Literature Classification Numbers: P0, L1, L33, 012

Key words: privatization, competition, ownership, efficiency, institutions, Mongolia.

1. Introduction

Economists are rarely able to observe the results of clean, controlled experiments of significant scope, but the transition of the formerly socialist countries has taken us closer to this scientific ideal than ever before. One such experiment occurred in Mongolia. Until 1990, this country had only known nomadism and socialism, theocracy and communism. Then, a democratic revolution led to swift economic reforms. Following the *Zeitgeist* of those heady days, the reformers worried more about a future political economy than current economic conditions and more about breaking up the planning apparatus than building capitalist institutions. Their privatization program aimed at blocking interest groups from exerting their power, preventing future governments from reversing reforms, and involving the citizenry in the new capitalism. It was remarkably successful on its own terms--most of the old socialist enterprises are now in private hands and a majority of the population now owns shares.

This capitalism of the masses was implanted in a country that was lacking even the most rudimentary institutions of corporate capitalism. The corporate governance statutes were vague, inconsistent, and toothless. The law on securities and the accompanying regulatory institutions came several years after privatization and only then was secondary trading of shares allowed. The overburdened courts did not have the expertise to rule on the delicate issues of the new property regime. Banks were in no position to play a significant role in restructuring defaulting debtors. The domestic human and financial capital needed for the creation of a financial sector was unavailable and this country was too remote for foreigners to play a substitute role as has been the case elsewhere.[1]

What happens when an enterprise sector is subjected to such an experiment? Despite the poverty of the general institutional environment, which can be expected to have deleterious consequences (Murrell, 1992 and Blanchard and Kremer,1997), there are two benign forces. First, there is competition: "Most people believe that competition is a good thing...[This] belief does not simply reflect the well-known result

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[1] The use of Mongolia in the title of a recent article says everything about its comparative institutional status: "Need to get money to Mongolia fast? A New Jersey company has connections." (Platt, 1997)

that a competitive economy generates an efficient allocation of resources. It is far more general. It is a belief that competition exerts a downward pressure on costs, reduces slack, provides incentives for the efficient organization of production and even drives innovation forward...." (Nickell 1996, pp. 724-5). With the privatized firms exposed to real competition for the first time in their history, this is surely a time when the forces of creative destruction can exert a critical influence on enterprise performance.

Indeed, we will argue in Section 6 that the transition experience above all should give decisive evidence on the importance of competition in promoting efficiency within firms. Such evidence has significance outside the transition context because: "[The] general belief in the efficacy of competition exists despite the fact that it is not supported either by any strong theoretical foundation or by a large corpus of empirical evidence in its favor." (Nickell, 1996, p.725) Indeed, even in the transition context, results to-date provide mixed evidence on the effects of competition (Earle and Estrin 1998, Li 1997, Konings 1997, Jones, Klinedinst and Rock 1998).

The second factor that might affect enterprise efficiency is the new structure of ownership. However, in Mongolia, the poverty of the institutional environment was echoed in the narrow range of ownership types created by privatization, in contrast to a more variegated structure of ownership in Eastern Europe and Russia (Frydman, Pistor, and Rapaczynski, 1996, Earle and Estrin 1997; Frydman, Gray, Hessel and Rapaczynski, 1998). Moreover, until almost the end of the period covered by our data, there were no opportunities for share retrading so that the concentration of ownership that was possible elsewhere (Claessens, Djankov, and Pohl 1997) could not influence the performance measures that we examine. Thus, Mongolian privatized enterprises had only two types of private owners, insiders and dispersed outsiders, in addition to residual state ownership. A staple argument in the literature is that these kinds of owners cannot be relied upon to spur increases in enterprise efficiency.

An open question is whether insiders and dispersed owners would produce better performance in the short-term than the state. An answer to this question is important in gaining a fuller understanding of the

costs and benefits of privatizing before any of the pertinent institutions of capitalism have been developed.[2] Fortunately, we can undertake the pertinent analysis for Mongolia, because the state retained ownership in a significant share of privatized enterprises. The paper also addresses a second ownership question, whether insiders or dispersed owners would produce superior short-run performance. An answer to this question is critical in assessing insider privatization, in view of the fact that privatizing to insiders is thought to slow the movement to efficient ownership in the long run (Aghion and Blanchard, 1996).

We examine these questions using data from a survey of nearly half of the enterprises that passed through Mongolia's comprehensive voucher privatization program for large enterprises. Since our sample comprised a universe of privatized enterprises in a sub-set of Mongolia's regions, the paper provides an unusually complete picture of the development of the formerly socialist enterprise sector. Moreover, using historical information collected from a variety sources, we are able to employ instrumental variables methods to eliminate the possibility of endogeneity bias in our estimates.[3]

Looking ahead to the results, we find that competition exerts a decisive force on enterprise performance, estimating that a perfectly competitive firm has a total factor productivity that is 60%-90% greater than that of a monopolist. We do not find private ownership effective at boasting enterprise performance and in some cases we find that state ownership leads to significantly higher productivity than private ownership. We interpret these results prosaically: a government forced to focus on economic performance can do better than insiders and dispersed outsiders when the task is the relatively simple one of pressuring inefficient enterprises and when the private owners receive no help from the institutional environment.

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2. Murrell and Wang (1993) and Rapaczynski (1996) discuss the sequencing of privatization and institutional construction.

3. For discussion of the importance of such bias, see Marcin n and van Wijnbergen (1997), Frydman, Gray, Hessel and Rapaczynski, (1998), Claessens, Djankov, and Pohl (1997), Earle (1998), and Earle and Estrin (1998).

The paper proceeds as follows. The next two sections summarize the main features of the Mongolian environment and the data. Section 4 presents estimates of the aggregate economic performance of the privatized sector. Sections 5 and 6 describe the equations to be estimated and the variables that are used as determinants of enterprise performance. Sections 7 and 8 contain the empirical estimates of the equations explaining the determinants of enterprise productivity, also providing information on the instruments used to counter the possibility of selection bias. A final section summarizes and interprets the results.

2. Mongolian Reforms and the Institutional Environment[4]

A peaceful revolution in 1990 led to sweeping reforms. The establishment of democracy was swift and, in retrospect, irreversible. After the mid-1990 election, the old communist party, the Mongolian People's Revolutionary Party (MPRP), formed a broad coalition government with the new parties. The next two years saw strong economic reform. The 1992 elections gave the MPRP an overwhelming majority in parliament, the new parties left the coalition, and the MPRP governed alone for four years. During this time, economic reforms proceeded less swiftly, but the general direction was maintained. This paper reports on the evolution of enterprise performance during this period of MPRP rule, since our data on enterprise performance runs through the end of 1995.

Formal liberalization of the economy was announced in early 1991, but actual liberalization proceeded more slowly, with many lingering interventions. The process was essentially completed in the last half of 1992 and the first half of 1993 with the dismantling of the last vestiges of the old state distribution and foreign trade system, the renunciation of price controls, and the introduction of convertibility (World Bank 1994).[5] By the end of 1995, market competition was firmly in place. In this paper's sample of enterprises,

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4. This section provides only the information necessary for an understanding of the issues most pertinent to this paper. For further detail, see Boone (1994) on stabilization, Murrell, Dunn, and Korsun (1996) on price liberalization, and Korsun and Murrell (1995) on privatization.

5. Of course, interventions continued, just as in any normal economy. But after mid-1993, these interventions could be viewed as deviations from a free market rather than attempts to maintain the past.

77% faced competition from 2 or more domestic enterprises and 73% faced import competition, leaving only 3% claiming that they faced no competition. Enterprises reported that an average of 7% of sales were mandated by the government, rather than being negotiated on the free market.

Initial attempts at stabilization failed, but by the end of 1993 runaway inflation no longer threatened, an expectation bolstered by the universal acceptance within the country that the IMF and western aid donors would play a significant role for many years. Nevertheless, from 1993 to 1996, the government struggled to maintain fiscal balance and monetary control, inflation remaining above 50% in 1995 and 1996. Growth resumed in mid-1993, after a relatively mild (for transition countries) fall in GDP of 20%. However, there was a catastrophic drop in living standards as a result of the withdrawal of Soviet aid, which during the 1980's had been as high as 30% of GDP.

The centerpiece of economic reforms was privatization, which consisted of three different programs, for small enterprises, for large enterprises, and in agriculture. Our data are for enterprises that passed through the large-enterprise mass-privatization program, which began in March 1992 and ended in mid-1995. 470 enterprises went through this program: 55% in 1992, 30% in 1993, 12% in 1994, and 3% in 1995. These enterprises would have always been privately owned had they been in a developed market economy. They are in manufacturing, distribution, and service sectors in which competition is eminently feasible. They are not in activities in which special regulatory regimes often apply. Airlines, railroads, telecommunications, and utilities are not among them.

All large enterprises went through the same privatization process: preparation of a plan, including the determination of the residual state share, corporatization, and the sale of shares for the vouchers that had been issued to every citizen. Markets, in which vouchers were exchanged for shares, determined the structure of an enterprise's ownership. Thus, while insiders and their families own 34% of the average enterprise, this insider ownership was not a result of concessions, as in Russia for example, but rather a consequence of the choices individual citizens made during the sale of shares for vouchers. Outsiders own

45% of shares. Of the enterprises in our sample, 41% had lingering state ownership, the state ownership share averaging 20%. Although the size of state ownership varies across the spectrum, the state share is 51% in over half the enterprises with residual state ownership.

After the chaos of the early years of reform had passed, the state was not a passive owner (Anderson, Korsun, Murrell, 1997). When answering our survey questions, fully 91% of the directors of the enterprises with state ownership identified a specific government entity when asked which specific authority exercised the state's ownership rights. Moreover, 65% of these directors met with this authority at least once a month, rather frequently in view of the sometimes formidable difficulty of such meetings in this poor, vast country. 89% of enterprises with majority state ownership had governmental representatives on their boards of representatives (i.e., board of directors), while only 17% of enterprises without government ownership had such representation. These figures suggest both that governmental involvement in corporate governance was pronounced and that it was at least partially channeled through the new mechanisms of governance.

Non-state, dispersed outsider owners require institutional support to be able to exert their influence and this support was not available. The first corporate statute, the Economic Entities Law of July 1, 1991, was poorly drafted and gave few protections to outsider shareholders, apart from those that could be won by forming a cohesive majority. The successor statute, the Partnership and Company Law of May 1995, constituted a substantial improvement in terms of definitions of responsibilities and power, but it did not strengthen the rights of minority shareholders. Had the laws been better framed, it would still be doubtful whether outsider shareholders would be better represented. The institutional capacity for enforcement of the laws is extremely weak: the courts are overburdened and the Securities Commission weak, with access to few sanctions (World Bank, 1997). In this situation it is not surprising that our survey revealed that 61% of enterprises were in transparent violation of at least one element of the corporate laws.

Mechanisms for concentrating outsider ownership were almost absent, at least until the end of our sample period. Vouchers were non-tradeable. They could be assigned to government-owned mutual funds, but these funds were little used and played a significant role only in a small number of enterprises.[6] Secondary trading of shares began in August 1995, only five months before our accounting data ends. It was only at this time that outsiders could concentrate shares and that free entry of private mutual funds was possible. Hence, by mid-1996 only 13% percent of enterprises reported the presence on their corporate boards of individuals representing mutual funds or large outsider shareholders.

In contrast, insider owners can easily influence corporate matters. Insider shareholding often resulted from concerted efforts on the part of employees to ward off threats to their power. The existing general directors and workers usually controlled the newly established governance mechanisms, which were brought into existence even before shares were sold. They were able to perpetuate this control because outsiders could not enforce their rights. Thus, those enterprises in which outsiders hold a majority of shares are the most frequent violators of corporate governance statutes. Even if the rules are followed, insiders can secure advantages for themselves: shareholder meetings are held in the enterprise in 74% of cases, which leaves insiders in numerical dominance and able to intimidate outsiders.

3. The Data

The core data come from a mid-1996 survey of approximately one-half of the enterprises that had passed through Mongolia's mass privatization program for large enterprises. The survey collected both quantitative accounting information and qualitative information, the latter from general directors using an instrument comprising close-ended questions. The accounting information reflects performance to the end of 1995. The survey covered all privatized enterprises in the capital, Ulaanbaatar, plus those in the

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[6] These funds were created by the State Privatization Commission but were little favored by the reformers, who wanted to involve the citizenry more directly in the people's capitalism. Free entry of mutual funds was not possible during the privatization process, in contrast to the situation in Russia or Czechoslovakia, for example.

regional centers of eight of the remaining twenty-one administrative districts of the country. The sampling of a sub-set of regions was dictated by the costs of data collection in this vast country.

To create the list of enterprises to be sampled, we used the official records of the privatization program. Thus, our sample design included a universe of enterprises in the sampled regions. The response rate for the survey was above 95%. The reasons for losing enterprises from the sample were predominantly benign: the temporary absence of the pertinent enterprise official in an enterprise so remotely located that our surveyors had but one chance for success. There was only one case of bankruptcy that prevented data collection. Thus, the set of enterprises included in our study can be considered representative of the universe of large privatized enterprises.

In examining the effects of ownership, it is particularly useful to supplement current data with historical information, which can be used to counter selection bias. Our historical information comes from two sources. First, the official records of the Government Privatization Commission and the Stock Exchange provide rudimentary information on all privatized enterprises. Second, basic financial information on enterprises appeared twenty-one days before privatization in public announcements, which we collected through an exhaustive search of the official news media.

The variables used in this study are listed in Table 1, together with basic summary statistics. Further details are provided at the appropriate juncture as each variable is introduced into the analysis. Table 2 summarizes the regional, ownership, and sectoral composition of the sample. For those who have worked with data from less-developed transition economies, it will not come as a surprise that there is missing information on many variables included in the analysis. Four factors in particular are responsible. First, after a spin-off or merger, there is usually no usable historical information on basic production data. Second, accounts are not consistent between enterprises, leading to missing values for some accounting categories. Third, some of our regressions require 1993 production data, which was already lost in some enterprises. Fourth, the non-survey historical data are less complete than our survey data since lapses in

official record-keeping could only be partially counteracted by our own detective work. Even so, the smallest number of observations used in any of our regressions still constitutes two-thirds of our original sample and one-third of all privatized large enterprises. We cover a higher proportion of the country's privatized enterprises than in any other study of which we aware.

4. The Aggregate Economic Performance of the Privatized Sector

For a smaller set of enterprises than is used in the regressions, the accounting data reach back to 1990. These data allow us to build an approximate picture of the aggregate performance of the enterprises included in the large privatization program.

Table 3 lists the absolute levels of performance measures of the median enterprise in 1992 and index numbers showing changes in those measures from 1990 to 1995. The index number is based on "chained samples": for example, the change between 1990 and 1991 is based on the sample of enterprises for which we have information in both 1990 and 1991, while the change between 1991 and 1992 is based on a different set of enterprises for which the pertinent data are available.[7] Hence, the sample size varies widely across cells of this table, a necessity given the number of gaps in the data in the early years.

The performance of the privatized sector should be viewed in the context of the ebb and flow of exogenous shocks and policy developments. During 1991-2, the demise of the CMEA and the precipitate withdrawal of Russian aid led to disruptions in trade with the Soviet Union (and then Russia), shortages of intermediate products, and a decline in demand for traditional products. High levels of inflation and haphazard liberalization combined to leave producers scurrying for inputs.

In last half of 1992 and the first half of 1993, the large shocks tailed off. By this time, democracy was cemented, the CMEA was dead and buried, liberalization was essentially complete, barriers to trade were low, small enterprise and agricultural privatization were finished, and over 75% of the large enterprises

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7. Excluding, of course, enterprises that had spin-offs or mergers that affected the comparability of data in the two years.

slated to be privatized had been sold for vouchers. The new more conservative government made it obvious that it would continue with reforms, albeit at a slower pace, accepting the tutelage of the IMF on macroeconomic issues, The period from 1993 to 1995 was tranquil compared to the maelstrom of the previous three years.

The aggregate data match this succession of events. The median enterprise saw value added per employee drop by 75% between 1990 and 1993, while employment declined by 30%. Different groups of enterprises were affected at different times. For example, those enterprises destined to be completely privately owned after privatization saw profits fall before those enterprises in which the state would later retain ownership. This reflects the ambition of the government to help a specific group of enterprises early in the transition process, an ambition that was abandoned when the full reality of the crisis became apparent. With policy enterprise-specific at this time and with the bewildering succession of events enumerated in the previous paragraphs, it would be impossible to disentangle the various determinants of enterprise performance during this early period.

The years 1993-1995 present a different picture despite a continuing aggregate deterioration of performance. (The growth in the overall economy during 1993-1995 occurred in agriculture, mining, and in new private businesses, all outside the scope of our study.) The rate of decline slows dramatically. Success is now possible: 45% of enterprises saw an increase in value added per employee between 1993 and 1995. This suggests that the phase of system collapse was over by 1993. After that year, it would be easier to parse the determinants of enterprise performance.

Finally, Table 3 provides a warning on the possibility of selection biases in estimating the effects of ownership. For example, those enterprises destined to become majority outsider-owned had much higher sales per employee than average in 1992, suggesting that the "better performers" might have fallen into this category. But the effects of selection are not as easily ascertained as this observation would suggest. During 1992-93, sales per employee in the same group of enterprises fell more than in other enterprises

suggesting that they are "worse performers." Thus, the direction of selection bias is not clear, alerting us to the dangers of an approach to selection bias that relies simply on using a measure of past performance.

5. Determinants of Enterprise Performance

Market Share

The general faith in the efficacy of competition referred to in this paper's introduction was probably one of the most potent elements in the determination of policies in transition countries (Nickell 1996, p. 724). This belief that competition would be especially important in transition countries suggests that they should be a particularly fertile ground to examine its effects. There is certainly reason to think so. The transition economy is an experiment on enterprises. Each sector of the economy is randomly assigned a level of competition, which results from some adventitious features of the past (Brown and Brown, 1998). In contrast, the level of competition facing a firm in a settled market economy is endogenous, reflecting technology, the political economy of regulation and international trade policy, and the practices of competition authorities.[8] This endogeneity diminishes the econometrician's ability to determine the effects of competition in developed economies.

It is not surprising, therefore, that several studies have sought to estimate the effects of competition using transition data. Ickes, Ryterman, and Tenev (1995) focus on qualitative indicators of enterprise adjustment, showing that some competition is salutary but that too much will discourage adjustment.[9] Earle and Estrin (1998) examine the productivity of Russian enterprises, concluding that competition does not increase enterprise productivity. Jones, Klinedinst and Rock (1998) find that competition is negatively related to productive efficiency in the very early years of post-communism in Bulgaria. Konings (1997) obtains mixed results when examining the effect of competition on sales in Hungary, Romania, and

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8. See, for example, Baldwin (1995, Chapter 12).

9. Their results, focusing on qualitative measures of restructuring, are not directly comparable to those presented here.

Slovenia. In contrast to these findings on the European transition countries, the Chinese results seem stronger. Li (1997) concludes that decreases in market power are associated with increases in productivity in the 1980's. Groves et al. (1995) detect the effect of increasing competition in the managerial labor market on enterprise performance, suggesting that product-market competition helped to stimulate the managerial labor market.

One factor that might be promoting this variance in results is the dynamics of the effects of competition as transition progresses. Competition has two opposing effects on measured enterprise productivity, spurring productivity and reducing prices. (It is virtually impossible in a cross-sectional setting to purge the productivity measures of enterprise-specific price variations.) The price effect will occur much quicker than the productivity effect and probably will dominate during the very early years of transition. This is consistent with the results of Brown and Brown (1998, Tables 3 and 4) who find that competition has a stronger price-depressing effect in 1992 than in later years. Consistently, Konings (1997) finds that long-run competitive pressures have a positive effect on enterprise productivity in Hungary, a weak effect in Slovenia, and none in Romania, the strength of these effects mirroring the length of time that these countries have been undergoing major post-communist reforms. This suggests that the results of Earle and Estrin (1998) and Jones, Klinedinst and Rock (1998) reflect the price-depressing effect of competition during the early years of transition.

The market share variable was derived from the survey, since independent data on market concentration are not available. The survey asked enterprises to estimate their percentage share of the national market. Obviously, there are intrinsic problems of endogeneity in using this variable, better economic performance leading to a higher market share (Nickell, 1996, p. 730). To counter this problem, we used the survey data to construct a measure of market share that is completely exogenous to the enterprise. We assigned a 2-digit classification to each enterprise's major product. Then, for each enterprise in succession, we dropped that enterprise from the data set and ran an OLS regression of

reported market shares on product and regional dummies. Predicted values from this regression were used as proxies for market share. By construction, there is no direct information from the enterprise's report of its own market share in this variable, which we call *predicted market share* to indicate its provenance.

Ownership

Examination of the effects of different types of owners has become a staple of the transition literature and therefore we refrain from discussion of the background theory. Frydman, Gray, Hessel and Rapaczynski (1998), Claessens, Djankov, and Pohl (1997), Earle (1998), and Earle and Estrin (1998) provide systematic discussions in an empirical context. Indeed, the ownership issue in Mongolia is much simpler than in most other countries precisely because the lack of institutions has led to a much less variegated structure of ownership.

The main distinction in Mongolia is between state, insider, and outsider ownership. State ownership was determined before privatization and remained fixed throughout the period under study. The variable *state ownership* measures the proportion of enterprise shares owned by the state. Administration of the state ownership share is assigned either to the central or to the local government. We use the term "centrally controlled" and "locally controlled" to designate which level of government administers state ownership.

Insider ownership measures the proportion of shares owned by employees and their families. Since families usually consolidated their vouchers and bought shares in the enterprise in which a family member was employed, we count such family purchases as insider ownership. Because vouchers were non-tradeable, the managerial share ownership that resulted from privatization was small and very highly correlated with overall insider ownership. Since secondary share trading began only five months before the period covered by our data, it is unlikely that the proportion of insider shares owned by managers could have any effect on performance and therefore our analysis does not differentiate between worker and managerial holdings.

Outsider ownership is the proportion of shares not owned by the state or insiders. During privatization, nearly all outsider-owned shares fell into the hands of individuals. The mutual funds played a role, but only in a small number of enterprises. Concentration of shares was not possible until five months before the end of our sample period and therefore it seems appropriate to treat these outsider share-holders as an homogenous group of dispersed owners.

Nevertheless, from the beginning of privatization, outsiders did have a role in some enterprises. A few enterprises had mutual funds holdings and fund officials played a role in governance. In some cases, managers looked beyond the enterprise and invited outsiders onto the boards even before any individuals had a chance to consolidate more than a few shares. In the case of rural enterprises, shares were most often bought by individuals in the locality and prominent local citizens performed the role of the outsider on the board. Decisions to place outsiders on the board were taken with the expectation that outsiders would be able to accumulate blocks of shares as soon as the much-postponed secondary trading began. Therefore, we use the variable *outsider share of board*, which measures the proportion of members of the board that are representatives of large outsider shareholders or of mutual funds.[10]

This variable is measured at the time of our survey, after the end of the period in which we measure enterprise performance. This obviously raises doubts about its use. We can, however, quickly dismiss one possible source of doubt: that outsiders might have accumulated shares in the better performing enterprises and voted their representatives on the board. First, outsiders were increasing their shareholdings of the more poorly performing enterprises when secondary trading in shares began (Anderson, Korsun, and Murrell 1999).[11] Second, survey evidence shows that new shareholders were not the primary force behind the presence of outsiders on the board. These board members either were present before secondary trading

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10. In the literature on developed countries, there seems to be no general link between board composition and enterprise performance, although the presence of outsiders does seem important when enterprises are experiencing failures (Klein, 1998).

11. This would be consistent with the finding of Earle and Estrin (1997) for Russia, that the perceived effect of outsider blockholders increases when selection bias is removed.

of shares began or the shareholders were not the instigating force behind the inclusion of these outsiders on the board. One source of these outsiders on the board is mutual funds. The more common scenario is probably the one discussed above, that the outsiders were brought onto the board by management early on in the transition process with the expectation that they would accumulate shares when this became possible.[12] Some managers were positioning themselves to work with expected future outside-owners.

Production Variables

We used enterprise accounts to obtain measures of *value added, sales, employment, capital,* and *costs of raw materials*. The most unreliable of these measures is surely fixed capital since a significant component of capital results from the socialist era and is measured in book values, uncorrected for inflation. Moreover, a part of this socialist capital lies unused, useless for production in a market economy.[13] Employment is measured by the number of workers, since wage data are unreliable in this economy, where worker-owners receive a large share of dividends and where, following the old practices, insiders can divert profits for the social activities of workers. Value added, sales, and the costs of raw materials were all deflated using sector-specific price indices created by the authors of World Bank (1997). There is not enough information on price movements to use different deflators on the cost and output sides of the accounts.

When estimating the production function, there is the possibility of endogeneity in the capital, labor, and raw materials variables. For lack of suitable instruments, we cannot address this issue. Nevertheless, this is probably a second-order problem. First, the estimates of the parameters of the production function

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12. In support of this conjecture, current managerial shareholdings are significantly and positively correlated with the presence of outsiders on the board. Moreover, those enterprises in which outsiders on the board were in place before the beginning of secondary trading had higher than average amounts of trading of their shares when this became possible, consistent with the notion that these enterprises were ones where well-positioned outsiders were increasing their positions.

13. Data on fuel usage, or some similar proxy for capital utilization, is not available for a large enough number of enterprises to be used in the analysis.

fall in conventional ranges. Second, the qualitative results of interest are consistent in the production functions and performance regressions.

Other variables

A central goal of reforms is to reduce the prevalence of soft budget constraints, in order to induce enterprises to restructure. One mechanism to reduce soft budgets is privatization and therefore the ownership variables listed above might suitably capture this element of the policy environment. Indeed, Anderson, Korsun, and Murrell (1998) find that state ownership, and in particular centrally controlled ownership, is the dominant explanation for the presence of soft budgets in Mongolia. Nevertheless, we include measures of soft budgets in the regressions in order to examine the robustness of the results on competition and ownership. This is also a check that our main qualitative results are not a reflection of distortions in the accounting statistics caused by subsidies or other government help.

We use two measures of governmental interactions with the enterprises. One of our survey questions elicited expectations of the likelihood that an enterprise would receive state aid should it encounter hard times, asking to what degree the state would make up lost revenues if losses threatened the enterprise's ability to maintain its employment level.[14] The answers were on a scale from 0-10 and are reflected in the variable *perception of soft budget*. The survey also elicited information on whether direct governmental subsidies were paid to the enterprises in 1995, and this information is captured in the dummy variable *subsidy*.

Mongolia is a country of disparate regions and therefore regional dummies are added to the regressions. Additionally, sectoral dummies are used to take into account the fact that the adjustment from

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[14]. The question on the survey was as follows: "Suppose that unfortunate market conditions resulted in a sudden drop in your enterprise's revenues, so that you might have to lay off workers. How likely is it that the government (either national or local) would help your enterprise out, so that it would not be forced by its financial situation to layoff workers? Please indicate your expectation of the likely government reaction by choosing a point on a scale from 0 to 10 — a "0" means that you think that the government would do absolutely nothing to help out and a "10" means that you think that the government would completely make up for the decline in revenues in some way, and a "5" means the government would make up half the decline in revenues. Choose any number between 0 and 10, indicating your expectation concerning the extent to which government would help out."

markets to central planning varies greatly across sectors. Moreover, the use of such dummies mitigates problems due to the inadequacies of the sector-specific deflators that we use. Information on the sectoral and regional structure of our sample is included in Table 2.

6. The Equations to be Estimated

In the existing empirical literature on the effects of reforms in transition economies, there are two basic approaches to the examination of production data. The first is to estimate total factor productivity in a production function framework, using measures of reform (e.g. ownership, competition, etc) as explanatory variables alongside the usual inputs (Svejnar 1990, Li 1997, Groves et al. 1994, Smith, Cin, and Vodopivec, 1997). Usually, the focus is not on adjustment from some previous level of performance, but rather a comparison of how absolute levels of productivity vary with reform variables.[15]

The second approach explains cross-sectional variations in a "performance" variable using measures of reform (Claessens, Djankov, and Pohl 1997; Earle and Estrin 1998; Earle 1998; Weiss and Nikitin 1998; Roberts, Gorkov, and Madigan, 1998; Djankov 1998; Frydman, Gray, Hessel and Rapaczynski, 1998; Frydman, Hessel and Rapaczynski, 1998). The performance variables usually involve various combinations of value added, sales, profits, and employment. These studies usually focus on adjustment from some previous level of performance, either through the use of a growth measure as the dependent variable or by including a lagged value of the level of economic performance as an explanatory variable.

We pursue both types of analyses as complementary exercises. By searching for results that are consistent between the two approaches, we provide a picture of the effects of competition and ownership in Mongolia that is not affected by problems peculiar to either form of analysis. We use both OLS and instrumental variables techniques in order to assess the effect of selection biases on parameter estimates.

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15. Li (1997) focuses on productivity change.

Cobb-Douglas production functions are estimated on 1995 data, using measures of competition and ownership to explain variations in productivity across enterprises. The basic equation is:

$$\log(\text{sales in '95}) = \beta_0 + \beta_1\log(\text{employment in '95}) + \beta_2\log(\text{costs of raw materials used in '95}) + \beta_3\log(\text{capital in '95}) + \beta_4(\text{market share}) + \beta_5\text{ownership} + \beta_6 X + \text{error}$$

where the β_i are parameters, β_5 and β_6 being vectors whose dimensions vary according to the number of ownership and other exogenous variables (X) included in the analysis.

In the second analysis, we examine the 1995 levels of two performance variables value added per employee and sales per employee. One critical element in the determination of the specification of the estimating equation is whether to use the rate of growth or the level as the dependent variable. For example, Weiss and Nitikin (1998, p. 9), in criticizing the approach of a series of papers on Czech privatization, state that "The most serious shortcoming is that performance was usually measured in levels rather than changes in levels." Unfortunately, the existing theoretical literature on the restructuring of enterprises is hardly instructive here. Thus the choice of specification in the burgeoning literature varies: Djankov (1998), Frydman, Gray, Hessel and Rapaczynski (1998), Frydman, Hessel and Rapaczynski (1998) and Roberts, Gorkov, and Madigan (1998) use growth, while Claessens and Djankov (1997), Claessens, Djankov, and Pohl (1997), Earle (1998), and Earle and Estrin (1998) use levels.

In fact, the issue can be decided within the estimation. As Earle (1998) and Earle and Estrin (1998) make clear, by using levels and including the lagged value of the level as an explanatory variable one can nest the two approaches and let estimation decide the issue. If the coefficient on the lagged value is significantly different from one, then a growth specification would not be correct. Indeed, virtually all existing results point to the inappropriateness of the growth specification, the estimated coefficients on the lagged value centering on one-half and estimated precisely enough to reject the value of unity.[16] Thus, this

[16] See, for example, Claessens and Djankov (1997), Claessens, Djankov, and Pohl (1997), Earle (1998), and Earle and Estrin (1998).

paper uses the levels specification, its results confirming those of previous studies on the inappropriateness of the growth specification.

The question then arises concerning which year to use for the lagged dependent variable. We chose 1993 for three reasons. First, our previous discussion shows that 1993 is the year in which exogenous and policy shocks finally abated and the permanency of market reforms was settled. From this time on, enterprises could reasonably begin to construct a strategy for the future, whereas before 1993 variations in enterprise performance would be dominated by factors external to the enterprise. Second, the sample size increases considerably when 1993 is used rather than a prior year, the chaos of the early years of transition being reflected in the absence of coherent accounts for many enterprises. Third, as the previous section's discussion of the temporal variation in the effects of competition suggests, the lagged dependent variable should measure enterprise performance after the initial price adjustments consequent on liberalization. The earliest such time in Mongolia is 1993.

Thus, the basic estimating equation for the second mode of analysis is:

$$\log(\text{performance in '95}) = \alpha_0 + \alpha_1 \log(\text{performance in '93}) + \alpha_2(\text{market share}) + \alpha_3 \text{ownership} + \alpha_4 X + \text{error}$$

where performance is measured either by value added per employee or by sales per employee, the α_i are parameters, with α_3 and α_4 vectors whose dimensions vary according to the number of ownership and other exogenous variables (X) included in the analysis.

7. The Instruments for Ownership

The possibility of selection bias in the estimation of ownership effects is a much noted feature in studies of the effects of ownership after privatization (Marcin n and van Wijnbergen (1997), Frydman, Gray, Hessel and Rapaczynski, (1998), Claessens, Djankov, and Pohl (1997), Earle (1998), and Earle and Estrin (1998)). We counter this bias by using a set of instruments for the various ownership variables. Our intention here is not a full explanation of ownership patterns, but rather the identification of

instruments for use in accurately estimating the effects of ownership. As a result, the presentation is kept brief.

The set of instruments are listed in Table 1. Three basic themes are reflected in these instruments. First, there is size of the enterprise in relation to the number of insiders. Because insiders were constrained in the number of vouchers that they could use, the proportion of the enterprise that could be bought by insiders was a function of employment, the number of shares in the enterprise, and the total stock market capitalization. These variables reflect institutional constraints on ownership imposed by the privatization process and therefore have the explanatory (for ownership) and exogeneity (for future performance) properties sought in instruments.

A second set of variables captures the attachment of the state to certain types of enterprises, because they had some cachet under the old socialist system, because they are more venerable, or because of their centrality in the old distribution system. A third theme is the timing of the privatization process, capturing secular trends. Those not employed in a large enterprise would prefer, other things equal, to buy shares early to gain access to dividend payments rather than holding non-income-bearing vouchers. Those employed in a large enterprise and wanting to become insider-owners waited for their own enterprise to be privatized. Since the insider ownership share varies inversely with outsider demand for a particular enterprise, insider ownership would be larger in enterprises privatized later.

Table 4 presents regressions of the ownership variables on the instruments, using a consistent sample size across these regressions.[17] Diagnostic statistics in this and subsequent tables show the appropriateness of the choice of instruments. There are significant F-statistics for the tests of whether the IV's explain ownership, except in the case of local government ownership, for which the instruments are

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17. Since these equations are the first stage equations of a 2SLS procedure rather than structural equations, we use OLS rather than some limited-dependent variable method.

unsatisfactory.[18] The Davidson-MacKinnon tests for overidentifying restrictions in Tables 5-7 are all far from significance, indicating that the instruments have the desired exogeneity properties.

8. Empirical Estimates of the Determinants of Enterprise Productivity

The paper's results appear in Tables 5-7. The construction of all three tables is virtually identical, responding to three goals. First, the qualitative nature of the results can be easily compared across the tables, allowing an assessment of robustness. Second, moving across the columns of each table, the progression of inclusion of the various ownership variables reflects the main questions that arise in understanding the effects of ownership, given the characteristics of Mongolia and its privatization. Third, by including OLS and instrumental variable (IV) estimates side-by-side, using identical samples for both, one can clearly understand the effects of selection-bias on the ownership coefficients. The following discussion focuses on Table 5 in order to develop the primary lessons provided by the analysis.

The market share variable is included in all regressions and is consistently significant. No other paper on transition economies has shown such a strong effect of competition in promoting productivity. The results in Table 5 imply that a perfectly competitive enterprise would have a total factor productivity that was 60%-90% larger than that of a monopolist. This stands in contrast to the findings of Nickell (1996, 741, italics in original) for UK firms "...that a 25 percent increase in market share leads to a 1 percent fall in total factor productivity in the *long run*."

The competition variable reaches only borderline significance in the sales per employee regressions in Table 7, in contrast to the other tables. This is natural. The residual in a production function and value added per employee approximate efficiency more closely than does sales per employee. A plausible story about the effect of competition is that it can pressure enterprises to focus on the reduction of inefficiencies,

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[18]. These F-statistics vary between analyses in Tables 5-7 because of varying samples and because of variations in the set of included exogenous variables.

but that such pressure is less likely to result in increased sales, which depends more on entrepreneurship (Frydman, Hessel and Rapaczynski, 1998).

Columns (1) and (2) of Tables 5-7 examine the effects of state residual-ownership, for the moment treating insiders and outsiders as a homogenous comparison group. The state share coefficient is positive always, and it is significant in the production function regressions, on the borderline of significance in the sales per employee regressions, and not significant in the value added per employee regressions. The coefficients on state ownership in IV regressions are larger than the corresponding coefficients in the OLS regressions suggesting that the state maintained ownership in the enterprises that were in worse shape.

Although the positive, or at least non-negative, effect of state ownership is somewhat counter-intuitive, there is nothing mysterious in this result.[19] Insiders do not necessarily have efficiency as a goal. Outsiders were dispersed and could not generally be relied upon to be a force for change. The only outside element that might enforce discipline was the government. As discussed above, the government did not ignore its role as an owner. Moreover, the government was acting under great constraints from the international donor community. Interviews with government officials indicate that they felt these constraints deeply and needed to pressure enterprises to pursue efficiency.[20] Survey evidence provides consistent information. The directors of state-majority-owned enterprises were more likely to have written employment contracts than those in other enterprises, their income was more likely to be directly tied to enterprise performance, and when there was such a link, their income was more likely to depend on profits or share price. Directors of state enterprises were as likely to be fired as directors of other enterprises.

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19. Indeed, our results are consistent with others in the transition literature. Frydman, Gray, Hessel and Rapaczynski (1998) and Weiss and Nikitin (1998) also find that enterprises in which the state has retained a share after privatization have above average performance. Djankov (1998) finds no ownership effects in the CIS.

20. Shleifer and Vishny (1994) show that the tightening of governmental budget constraints can induce a government to become more efficiency-oriented in its relations with enterprises.

In Mongolia, the supervision of state-owned enterprises is assigned either to the central or to the local government, and these two have very different concerns and constraints. This suggests separating the effects of the two different forms of state ownership, which we do in columns (3) and (4). In all three tables, the size of the local coefficient is larger than that of the central coefficient once selection biases have been taken into account. This result resonates with those on China, where local government owned enterprises have been more successful than those owned by the central government (Walder, 1995). However, we have only very weak instruments for local control in Mongolia. Moreover, the two ownership types do produce qualitatively similar results, both in terms of the effect on productivity and in terms of the direction of the correction for selection-bias. It therefore seems prudent to re-combine the two forms of state ownership for the remaining steps of the analysis.

We now consider whether the differentiation between outsiders and insiders is of any significance, the results appearing in columns (5) and (6). None of the tables indicate any such significance. (Since state, insider, and outsider ownership sum to 1, the coefficient on insider ownership can be interpreted as the effect of transferring ownership from insiders to the omitted form of ownership, outsiders.) Given that Mongolian outsiders are predominantly individuals, these results are consistent with those of other papers, which show that individual ownership does not improve enterprise performance (Earle and Estrin, 1997; Frydman, Gray, Hessel and Rapaczynski, 1998) and that concentration of ownership is important (Earle and Estrin, 1997; Claessens, Djankov, and Pohl, 1997).

In the interpretation of the forgoing results, we have conjectured that the state ownership effect originates in a government able and willing to make efficiency an enterprise objective, while the lack of an outside-ownership effect reflects the fact that dispersed owners have no real means of influencing enterprise decisions. There is some evidence that can be brought to bear on this interpretation. Outsiders did have a role in some enterprises, a role that we capture in our variable *outsider share of board*, which is added to the regressions in columns 7 and 8. The coefficient on this variable is positive, significant in half of the

regressions, and similar in magnitude to the coefficient on the state ownership variable. (Outsider-share-of-the-board and state-ownership are both measured in proportions and therefore have comparable units.) Note also that variations across the tables in the magnitude and the level of significance of outsider-share-of-board mirror those of state-ownership. These results support our contention that the difference between the state and outsider effects is due to the differential ability of these owners to exert their corporate power.[21]

Nevertheless, the results from the *outsider share of board* variable must be treated with caution. We have not been able to find adequate instruments for this variable and it is measured after the end of the period in which performance is measured. In Section 5, we have discussed our interpretation of this variable, that it captures the small influence of mutual funds and of outsiders who positioned themselves for ownership before the secondary trading of shares. But this is somewhat conjectural and therefore the results for this variable must be treated with caution.

The last variables to be included in the tables are the perception of soft budget and subsidy variables. The coefficients on these variables do not approach significance in any of the tables. This is consistent with the results that Earle and Estrin (1999) obtain for Russia.

9. Summary

This paper uses a sample of Mongolian privatized enterprises to gain insight into the determinants of enterprise performance after an ambitious mass-privatization scheme. Because the sample is based on pre-privatization records and covers a large proportion of privatized enterprises, it is highly representative and does not have problems of sample attrition due to enterprise failure. The paper uses a variety of measures of enterprise performance, which evidence a consistent set of results on the effects of competition and

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21. Also, the outsiders on the boards could have brought significant new human capital into the enterprise and therefore our results are consistent with findings on the effects of new human capital in Barberis et al. (1996) on privatized Russian shops, Claessens and Djankov (1997) on Czech enterprises, and Roberts, Gorkov, and Madigan, 1998 on Kyrgyz enterprises.

ownership. The possibility of selection bias is countered by using historical information generated during the privatization process.

The country under study, Mongolia, is at the extreme end of the spectrum of transition economies. It is one of the poorest and most isolated from Western sources of human and financial capital. It has had virtually no historical experience of capitalism and is currently only beginning the process of development of a capitalist infrastructure. In contrast to the situation in many other transition countries, there were few wealthy individuals or financial organizations that would promote new forms of ownership during the privatization process. With some exaggeration, we have described this environment as one with an absence of formal market institutions.

In this environment, the enterprises with residual state ownership performed better than those with other owners. The explanation for this is quite straightforward. Communism bequeathed a set of inefficient enterprises. Crude pressures to perform could work on these enterprises. The government exerted these pressures because it, in turn, was under great pressure to staunch the economic decay and relatively constrained by its commitments to international donors and its precarious political position. The insider-owners apparently were not so focused on efficiency. The dispersed outsiders did not have the ability to influence the enterprises.

Despite this prosaic interpretation, the results do have some significance for more general discussion of privatization. A common argument in the early of years of transition was that speedy privatization should be implemented even before the institutional environment possessed any complementary mechanisms. One assumption behind this reasoning was that the post-communist state was disinterested in its own enterprises and unable to enforce any discipline on them. Our results suggest that this argument was not correct in Mongolia, at least.

This paper's strongest result is that on the effects of competition on efficiency, one whose importance goes beyond the study of transition economies (Nickell, 1996). The quantitative effect of competition on

efficiency that we find is by far the largest one of which we aware. The effect is certainly larger than those found in previous studies on Eastern Europe and the former Soviet Union. Two reasons suggest themselves. First, our data reflect a time when transition was past its early noisy phase and enterprises knew that they had to adjust in order to avoid becoming a casualty of creative destruction. Second, the government looming in the background of our study was probably much more interested in letting competition work than the one relevant to Earle and Estrin's (1998) study of 1994 Russian data.

Do our results suggest that the privatization process was irrelevant? We think not. In the longer run, as market institutions develop and as outsider share owners begin to exert their influence, it is entirely plausible that the effects of private ownership would begin to show. In the shorter run, the privatization process reduced the number of enterprises that were under the control of the state, probably making it easier for the government to pay attention to those that remained under its tutelage and to be an active agent of restructuring. Possibly, the government's focus on efficiency was enhanced by the separation between state and enterprise implied by the formality of needing to work through the mechanisms of corporate governance. Moreover, the effect of competition was probably a concomitant of the decentralization inherent in privatization. These observations raise the intriguing possibility that a workable privatization in a environment of institutional-poverty might include a significant amount of residual state ownership. At the very least, they do suggest that the design of a mass privatization program and its sequencing in the context of other reforms has a very important influence on the productivity of enterprises even in the short-term.

References

Aghion, Phillipe and Blanchard, Olivier. "On Insider Privatization," *European Economic Review,* 40(1996), pp. 759-766.

Anderson, James H., Georges Korsun and Peter Murrell, 1997. "Enterprise-state relations after mass privatization: Their character in Mongolia." *MOCT-MOST* 7, 81-99.

Anderson, James H., Georges Korsun and Peter Murrell, "Which enterprises (believe they) have soft budgets after mass privatization? Evidence from Mongolia." University of Maryland, 1998.

Anderson, James, H. Georges Korsun and Peter Murrell, "Ownership, exit, and voice after mass privatization: Evidence from Mongolia." *Economics of Transition,* forthcoming 1999 .

Barberis, Nicholas, Maxim Boycko, Andrei Shleifer, and Natalia Tsukanova, "How Does Privatization Work?: Evidence from the Russian Shops." *Journal of Political Economy*, 104(4), August 1996, pp. 764-790.

Baldwin, John. *The Dynamics of Industrial Competition: A North American Perspective*. Cambridge University Press: Cambridge, 1995.

Blanchard, Olivier and Michael Kremer "Disorganization." *Quarterly Journal of Economics,* November 1997.

Boone, Peter (1994), 'Grassroots Macroeconomic Reform in Mongolia', *Journal of Comparative Economics*, 18(3), June, pp. 314-28.

Brown, Annette and David Brown, "Does Market Structure Matter? New Evidence from Russia." SITE Working Paper, No. 130, June 1998.

Claessens, Stijn, and Simeon Djankov, "Managers, Incentives, and Corporate Performance: Evidence from the Czech Republic," The World Bank, 1997.

Claessens, Stijn, Simeon Djankov, and Gerhard Pohl. "Ownership Structure and Corporate Performance: Evidence from the Czech Republic." The World Bank, 1997.

Djankov, Simeon. "Ownership Structure and Enterprise Restructuring in the Commonwealth of Independent States." The World Bank, July 1998.

Earle (1998), John S. "Post-privatization ownership structure and productivity in Russian Industrial Enterprises." SITE Working Paper No. 127, March 1998.

Earle, John S. and Saul Estrin. "After Voucher Privatization: The Structure of Corporate Ownership in Russian Manufacturing Industry" London Business School, June 1997.

Earle, John S. and Saul Estrin. "Privatization, Competition, and Budget Constraints: Disciplining Enterprises in Russia." SITE Working Paper No. 128, March 1998.

Frydman, Roman, Katharina Pistor, and Andrzej Rapaczynski (1996), 'Exit and voice after mass privatization: The case of Russia', *European Economic Review,* 40, pp. 581-588.

Frydman, Roman, Cheryl Gray, Marek Hessel, and Andrzej Rapaczynski. "When Does Privatization Work? The Impact of Private Ownership on Corporate Performance in the Transition Economies." Economic Research Report 98-32, C.V. Starr Center, New York University, October 1998.

Frydman, Roman, Marek Hessel, and Andrzej Rapaczynski. "Why Ownership Matters?: Politicization and Entrepreneurship in the Restructuring of Enterprises in Central Europe." Economic Research Report 98-14, C.V. Starr Center, New York University, April 1998.

Groves, Theodore, Yongmiao Hong, John McMillan and Barry Naughton. "Autonomy and Incentives in Chinese State Enterprises." Quarterly Journal of Economics. February 1994, pp. 183-209.

Groves, Theodore, Yongmiao Hong, John McMillan and Barry Naughton. "China's Evolving Managerial Labor Market." Journal of Political Economy. 1995, 103(41), pp. 873-892.

Ickes, Barry, Randi Ryterman, and Stoyan Tenev, "On Your Marx, Get Set, Go: The Role of Competition in Enterprise Adjustment," The World Bank, 1995.

Jones, Derek, Mark Klinedinst and Charles Rock. "Productive Efficiency during Transition: Evidence from Bulgarian Panel Data." *Journal of Comparative Economics*, Sept. 1998, pp. 446-464.

Klein, April. "Firm Performance and Board Committee Structure." Journal of Law and Economics, XLI(1), April 1998, pp. 275-303.

Konings, Jozef. "Competition and Firm Performance in Transition Economies: Evidence from Firm Level Surveys in Slovenia, Hungary, and Romania," CEPR. Discussion Paper, No. 1770, 1997.

Korsun, Georges and Peter Murrell, The politics and economics of Mongolia's privatization program, *Asian Survey* 35-5, 472-486, 1995.

Li, Wei. "The Impact of Economic Reform on the Performance of Chinese State Enterprises, 1980-1989." *Journal of Political Economy*. vol. 105, no.5, 1997, pp. 1080-1106.

Marcin n, Anton and Sweder van Wijnbergen. "The Impact of Czech privatization methods on enterprise performance incorporating initial selection-bias correction." *Economics of Transition*, 5(2), pp. 289-304, November 1997.

Murrell, Peter "Evolution in Economics and in the Economic Reform of the Centrally Planned Economies," in Christopher C. Clague and Gordon Rausser, eds. *Emerging Market Economies in Eastern Europe*, Cambridge, Mass.: Basil Blackwell, 1992.

Murrell, Peter and Yijiang Wang "When Privatization Should Be Delayed: The Effects of Communist Legacies on Organizational and Institutional Development", *Journal of Comparative Economics*, 17(2), June 1993, pp. 385-406.

Murrell, Peter, Karen Turner Dunn, and Georges Korsun 'The Culture of Policy Making in the Transition from Socialism: Price Policy in Mongolia', *Economic Development and Cultural Change*, pp. 175-194, 1996.

Nickell, Stephen J. "Competition and Corporate Performance," *Journal Of Political Economy*, 104(4), pp. 724-796, 1996.

Platt, Gordon. "Need to get money to Mongolia fast? A New Jersey company has connections." *Journal of Commerce*, 413(29054) September 10, 1997.

Rapaczynski, Andrzej. "The Roles of the State and the Market in Establishing Property Rights." *Journal of Economic Perspectives*, Spring 1996.

Roberts, Bryan, Yevgeny Gorkov, and Jay Madigan. "Is Privatization a Free Lunch? New Evidence on Ownership Status and Firm Performance." University of Miami, 1998.

Shleifer, Andrei, and Vishny, Robert W., "Politicians and Firms," *Quarterly Journal Of Economics*, November 1994.

Smith, Stephen, Beom-Cheol Cin, and Milan Vodopivec, "Privatization Incidence, Ownership Forms, and Firm Performance: Evidence from Slovenia," *Journal of Comparative Economics*, 25(2), 1997, pp. 158-179.

Svejnar, Jan. "Productive Efficiency and Employment." In William Byrd and Lin Qingsong, eds. *China's Rural Industry: Structure, Development, and Reform.* Oxford University Press, New York 1990.

Walder, Andrew G. "Local Government as Industrial Firms: An Organizational Analysis of China's Transitional Economy", *American Journal of Sociology*, 101(2), September 1995, pp. 263-301.

Weiss, Andrew and Georgiy Nitikin, "Performance of Czech Companies by Ownership Structure," Boston University, 1998.

World Bank, *Mongolia Country economic memorandum : priorities in macroeconomic management.* The World Bank, 1994.

World Bank, *Mongolia Country economic memorandum : policies for faster growth* The World Bank, 1997.

Table 1. Summary Statistics

Category	Variables	Units	n	mean	st. dev.	min	max
Production (in 1995)	Sales	1,000 1990 tugs	179	8280.16	25316.61	33.87	265982
	Employment	workers	176	170.35	214.80	10.00	1436
	Raw materials	1,000 1990 tugs	163	3553.44	13462.57	0.38	130453
	Capital	1,000 1995 tugs	173	6816.95	15884.68	1.90	139662
Performance (in 1995)	Sales per employee	1,000 1990 tugs	171	29.52	39.52	0.58	292.93
	Value added per employee	1,000 1990 tugs	172	10.51	18.48	-9.26	176.20
	Profit per employee	1,000 1990 tugs	175	5.05	17.55	-17.49	196.03
Ownership	State ownership share	proportion	211	0.21	0.25	0.00	0.92
	- centrally controlled	proportion	211	0.10	0.22	0.00	0.92
	- locally controlled	proportion	211	0.11	0.20	0.00	0.60
	Insider ownership share	proportion	210	0.34	0.28	0.00	1.00
	- workers	proportion	209	0.24	0.23	0.00	0.96
	- managers	proportion	209	0.11	0.15	0.00	0.70
	Outsider ownership share	proportion	210	0.45	0.31	0.00	1.00
	Large outsider shareholders as proportion of board	proportion	202	0.05	0.14	0.00	1.00
Competition	Predicted market share of enterprise	proportion	205	0.19	0.23	-0.22	1.00
Relationship with the government	Enterprise receipt of subsidy	dummy	211	0.10	0.31	0.00	1.00
	Perception of budget softness	0 to 10	209	1.20	2.48	0.00	10.00
Potential determinants of ownership	Employment at time of privatization	workers	193	295.95	386.19	17	3316
	Month of corporatization	Jan. 1990=1	211	33.00	11.63	14	72
	Number of shares (= privatized book value)	1000's	209	405.84	890.39	28.36	7801.13
	Age of firm	years	210	26.95	17.59	3.00	75.00
	Stock market value at privatization	mill. voucher tugs	205	48.00	235.00	0.17	3180.00
	LT debt/(LT debt+stock value) at privatization	proportion	190	0.0002	0.0006	0.0000	0.0057
	State orders as a share of sales in 1993	proportion	211	0.20	0.34	0.00	1.00
	Dividend forecast in privatization announcement	dummy	211	0.71	0.45	0.00	1.00
	Accounting year of privatization announcement	year	190	91.49	0.79	91	94

Note: LT = long-term; "tugs" = the local currency, variously , variously translated into English as tugs, togrogs, tugriks, etc.

Table 2. Distribution of Surveyed Firms by Ownership, Sector and Location

Panel A: Distribution of firms by Majority Ownership in 1995

Majority owned by ..	Number of firms	Percent of the sample
State, central or local	69	32.70
Insiders	55	26.07
Outsiders	75	35.55
None	12	5.69
Total	211	100%

Panel B: Distribution by Sector

Industry	Number of firms	Percent of the sample
Heavy industry	34	16.11
Light industry	51	24.17
Agricultural processing	16	7.58
Construction	46	21.8
Transportation	23	10.9
Service	15	7.11
Distribution	26	12.32
Total	211	100%

Panel C: Distribution by Location

Location	Number of firms	Percent of the sample
Arvaiheer	11	5.21
Zunmod	9	4.27
Choibalsan	16	7.58
Darhan (Industrial city)	22	10.43
Erdenet (Industrial city)	10	4.74
Ulaangom	9	4.27
Hovd	9	4.27
Olgii	8	3.79
Ulaanbaatar (capital city)	117	55.45
Total	211	100%

Table 3. Changes in Performance and Employment by Ownership in 1995
Medians, pairwise comparison between two adjacent years

Variables	Ownership	Median 1992	Changes over time in median (1990=100)					
			1990	1991	1992	1993	1994	1995
Value added per employee	All	13.9	100.0	77.1	50.4	25.4	23.6	22.9
	Majority state-owned	14.8	100.0	85.9	54.6	38.0	31.3	25.7
	Majority insider-owned	8.0	100.0	64.0	36.2	27.4	22.4	25.6
	Majority outsider-owned	16.1	100.0	85.3	61.8	22.8	23.1	15.5
Profit per per employee	All	4.4	100.0	51.6	44.4	17.7	17.2	15.8
	Majority state-owned	6.2	100.0	62.5	36.5	16.4	16.6	12.7
	Majority insider-owned	1.9	100.0	23.8	20.4	12.7	13.7	15.0
	Majority outsider-owned	9.2	100.0	20.3	21.9	3.8	1.7	1.6
Sales per employee	All	36.8	100.0	68.5	64.1	50.6	37.2	33.6
	Majority state-owned	37.3	100.0	59.3	59.1	56.3	38.0	33.0
	Majority insider-owned	19.3	100.0	67.9	47.2	44.3	33.8	29.4
	Majority outsider-owned	42.7	100.0	55.1	42.6	29.0	26.5	24.4
Employment	All	129	100.0	95.2	79.0	69.8	61.1	50.1
	Majority state-owned	124	100.0	95.3	92.7	80.7	70.3	62.7
	Majority insider-owned	117	100.0	87.7	60.6	47.2	38.7	30.7
	Majority outsider-owned	173	100.0	74.8	63.0	55.2	50.5	44.5

Notes:
Ownership status is at the time of our survey.
The 1992 median value is measured in '000s of 1990 tugs.
Enterprises with no majority owners are included in the "All" category but not in the three ownership categories.
The number of enterprises on which the information is based varies across cells, depending on the availability of data. For example, in the "All" category for value added per employee, 92 enterprises are used for the comparison between 1990 and 1991, 94 for 1991 to 1992, 159 (1992 to 1993), 189 (1993 to 1994) and 197 (1994 to 1995)

Table 4. Ownership Regressions

Dependent variable is proportion of enterprise shares owned by the specific owner

	State				
	(1) All	(2) Central	(3) Local	(4) Insiders	(7) Outsiders
log (employment at privatization)	-0.084**	-0.063**	-0.02	0.141**	-0.057#
	(0.027)	(0.023)	(0.024)	(0.031)	(0.036)
log (number of shares at privatization)	0.091**	0.099**	-0.008	-0.118**	0.027
	(0.029)	(0.025)	(0.025)	(0.032)	(0.038)
log (stock market value at privatization)	0.042**	0.024#	0.018	-0.097**	0.054**
	(0.019)	(0.016)	(0.016)	(0.021)	(0.025)
month of corporatization (Jan. 90=1)	0.001	0.003	-0.002	0.007**	-0.008**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
log (age of the firm)	0.066**	0.052**	0.013	-0.012	-0.054*
	(0.021)	(0.018)	(0.018)	(0.024)	(0.028)
state orders as a share of sales in 1993	0.149**	0.038	0.111**	-0.021	-0.128**
	(0.046)	(0.039)	(0.040)	(0.052)	(0.061)
LTD/(LTD + stock market value) at priv.	31.006	26.163	4.843	-35.381	4.375
	(26.242)	(22.396)	(22.853)	(29.516)	(35.053)
dividend forecasted?	0.067#	0.109**	-0.041	-0.027	-0.04
	(0.051)	(0.044)	(0.045)	(0.058)	(0.069)
accounting year of privatization publicity	-0.016	0.029	-0.046#	-0.05	0.066#
	(0.037)	(0.032)	(0.032)	(0.042)	(0.049)
Constant	0.050	-4.115#	4.165#	6.930*	-5.980#
	(3.362)	(2.869)	(2.928)	(3.781)	(4.491)
Number of observations	184	184	184	184	184
Adjusted R square	0.342	0.308	0.187	0.392	0.286
F statistic for test of significant effect of the nine variables listed above	7.07**	7.27**	1.43	8.53**	2.66**

[a] Industry and location dummies are included as regressors but not reported.
Standard errors in parentheses; #, *, ** indicate 20%, 10%, 5% level of significance, respectively.
Note: LTD = long-term debt; priv. = privatization

Table 5. Cobb-Douglas Production Function Regressions with Ownership and Competition Effects on Technical Efficiency

Dependent variable is log(sales)

	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV	(9) IV	(10) IV
log(employment)	0.61**	0.60**	0.61**	0.59**	0.61**	0.59**	0.62**	0.63**	0.64**	0.62**
	(0.09)	(0.10)	(0.09)	(0.11)	(0.09)	(0.10)	(0.10)	(0.10)	(0.11)	(0.11)
log(capital)	0.17**	0.14**	0.17**	0.15**	0.17**	0.14**	0.20**	0.17**	0.16**	0.17**
	(0.04)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
log(raw materials)	0.24**	0.24**	0.24**	0.23**	0.24**	0.24**	0.23**	0.22**	0.22**	0.22**
	(0.03)	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)
Predicted market share	-0.92**	-0.76**	-0.91**	-0.73*	-0.89**	-0.77**	-0.84**	-0.64*	-0.59#	-0.64*
	(0.31)	(0.34)	(0.31)	(0.38)	(0.32)	(0.38)	(0.32)	(0.38)	(0.41)	(0.39)
State-ownership share	0.42*	1.25**			0.48**	1.22*	0.66**	1.63**	1.81*	1.62**
	(0.23)	(0.53)			(0.24)	(0.71)	(0.25)	(0.73)	(0.94)	(0.74)
locally controlled			0.28	2.21**						
			(0.29)	(1.02)						
centrally controlled			0.56**	1.09*						
			(0.28)	(0.60)						
Insider-ownership share					0.130	-0.030	0.230	0.290	0.300	0.280
					(0.21)	(0.48)	(0.21)	(0.51)	(0.53)	(0.52)
outsider share of board							0.77**	1.05**	1.03**	1.04**
							(0.38)	(0.48)	(0.49)	(0.49)
Perception of soft budget									-0.03	
									(0.04)	
Subsidy										0.01
										(0.16)
Constant	1.38**	1.55**	1.40**	1.52**	1.26**	1.57**	1.01**	1.13*	1.14*	1.14*
	(0.37)	(0.40)	(0.37)	(0.44)	(0.41)	(0.54)	(0.42)	(0.59)	(0.60)	(0.60)
Number of observations	156	156	156	156	156	156	152	152	152	152
Adjusted R square	0.843	0.827	0.842	0.789	0.842	0.827	0.846	0.827	0.820	0.826
Economies of scale	1.02	0.98	1.02	0.97	1.03	0.97	1.05	1.01	1.02	1.01
Davidson & Mackinnon OIR test										
Test statistics		6.34		3.74		6.35		4.21	4.27	4.25
5% χ^2 critical value		15.51		14.07		14.07		14.07	14.07	14.07
p-value		0.61		0.81		0.50		0.75	0.75	0.75
The first stage regression										
Central/all gov't										
- Adj. R^2		0.32		0.32		0.32		0.36	0.43	0.36
- F statistic for IVs=0		3.70**		6.00**		3.70**		3.91**	2.49**	3.88**
Local gov't control										
- Adj. R^2				0.19						
- F statistic for IVs=0				1.71						
Insider ownership										
- Adj. R^2						0.39		0.38	0.40	0.38
- F statistic for IVs=0						6.66**		6.03**	5.41**	5.95**

[a] Industry and location dummies are included as regressors but not reported.
Standard errors in parentheses; #, *, ** indicate 20%, 10%, 5% level of significance, respectively.

Table 6. Performance Regressions: The Effects of Ownership and Competition on Value Added per Employee

Dependent variable is log (value added per employee)

	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV	(9) IV	(10) IV
Log(va per emp in '93)	0.57**	0.53**	0.56**	0.52**	0.58**	0.53**	0.52**	0.51**	0.55**	0.51**
	(0.08)	(0.10)	(0.08)	(0.10)	(0.08)	(0.10)	(0.08)	(0.11)	(0.12)	(0.11)
Predicted market share	-0.81**	-0.76**	-0.81**	-0.73*	-0.76**	-0.77*	-0.82**	-0.85**	-0.95**	-0.87**
	(0.36)	(0.37)	(0.36)	(0.39)	(0.37)	(0.41)	(0.37)	(0.42)	(0.44)	(0.42)
State-ownership share	0.04	0.38			0.13	0.35	0.43#	0.39	-0.21	0.47
	(0.26)	(0.58)			(0.29)	(0.76)	(0.31)	(0.97)	(1.24)	(0.98)
locally controlled			-0.110	0.790						
			(0.33)	(1.21)						
centrally controlled			0.140	0.420						
			(0.30)	(0.61)						
Insider-ownership share					0.190	-0.030	0.250	0.110	-0.050	0.170
					(0.25)	(0.59)	(0.25)	(0.66)	(0.70)	(0.66)
Outsider share of board							0.61#	0.59	0.39	0.61
							(0.42)	(0.62)	(0.65)	(0.62)
Perception of soft budget									0.02	
									(0.04)	
Subsidy										-0.19
										(0.18)
Constant	0.71**	0.68**	0.72**	0.66**	0.60*	0.70#	0.53*	0.610	0.74#	0.580
	(0.27)	(0.28)	(0.27)	(0.29)	(0.31)	(0.46)	(0.31)	(0.52)	(0.55)	(0.52)
Number of observations	131	131	131	131	131	131	127	127	127	127
Adjusted R square	0.619	0.613	0.617	0.592	0.617	0.609	0.613	0.612	0.597	0.613
Davidson & Mackinnon OIR test										
Test statistics		0.854		0.637		0.849		6.558	5.944	6.669
5% χ^2 critical value		15.507		14.067		14.067		14.067	14.067	14.067
p-value		0.999		0.999		0.997		0.476	0.546	0.464
The first stage regression										
Central/all gov't										
- Adj. R^2		0.34		0.358		0.34		0.41	0.46	0.406
- F statistic for IVs=0		2.96**		6.45**		2.96**		2.54**	1.81	2.51**
Local gov't control										
- Adj. R^2				0.198						
- F statistic for IVs=0				1.48						
Insider ownership										
- Adj. R^2						0.411		0.404	0.422	0.399
- F statistic for IVs=0						4.15**		4.07**	3.90**	4.06**

[a] Industry and location dummies are included as regressors but not reported.
Standard errors in parentheses; #, *, ** indicate 20%, 10%, 5% level of significance, respectively.
Note: "va per emp in '93" = value-added per employee in 1993.

Table 7. Performance Regressions: The Effects of Ownership and Competition on Sales per Employee

Dependent variable is log (sales per employee)

	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV	(9) IV	(10) IV
log(sales per emp in 93)	0.44**	0.41**	0.44**	0.40**	0.46**	0.41**	0.42**	0.38**	0.42**	0.38**
	(0.07)	(0.08)	(0.07)	(0.09)	(0.07)	(0.08)	(0.07)	(0.08)	(0.09)	(0.08)
Predicted market share	-0.69*	-0.60#	-0.69*	-0.59#	-0.62*	-0.56#	-0.59#	-0.56#	-0.63#	-0.55#
	(0.37)	(0.38)	(0.37)	(0.40)	(0.37)	(0.41)	(0.38)	(0.41)	(0.41)	(0.41)
State-ownership share	0.41#	0.94*			0.56**	1.06#	0.81**	1.13#	0.62	1.12#
	(0.25)	(0.55)			(0.27)	(0.71)	(0.30)	(0.80)	(0.90)	(0.82)
locally controlled			0.15	1.09						
			(0.33)	(1.35)						
centrally controlled			0.59**	0.95*						
			(0.29)	(0.56)						
Insider-ownership share					0.33#	0.15	0.37#	0.22	0.16	0.21
					(0.24)	(0.55)	(0.25)	(0.58)	(0.57)	(0.58)
Outsider share of board							0.60#	0.74#	0.64	0.74#
							(0.43)	(0.56)	(0.55)	(0.56)
Perception of soft budget									0.04	
									(0.03)	
Subsidy										0.04
										(0.19)
Constant	0.97**	0.99**	0.96**	1.00**	0.76**	0.90**	0.77**	0.88*	0.85*	0.88*
	(0.29)	(0.30)	(0.29)	(0.30)	(0.33)	(0.45)	(0.33)	(0.45)	(0.45)	(0.46)
Number of observations	143	143	143	143	143	143	139	139	139	139
Adjusted R square	0.564	0.549	0.566	0.537	0.567	0.546	0.559	0.550	0.562	0.547
Davidson & Mackinnon OIR test										
Test statistics		1.34		1.29		1.25		6.15	4.66	6.16
5% χ^2 critical value		15.51		14.07		14.07		14.07	14.07	14.07
p-value		0.995		0.989		0.990		0.52	0.70	0.52
The first stage regression										
Central/all gov't										
- Adj. R^2		0.33		0.33		0.33		0.40	0.43	0.40
- F statistic for IVs=0		3.74**		7.18**		3.74**		3.69**	2.75**	3.60**
Local gov't control				0.17						
- Adj. R^2				1.14						
- F statistic for IVs=0										
Insider ownership										
- Adj. R^2						0.42		0.42	0.44	0.42
- F statistic for IVs=0						5.53**		5.49**	5.19**	5.46**

[a] Industry and location dummies are included as regressors but not reported.
Standard errors in parentheses; #, *, ** indicate 20%, 10%, 5% level of significance, respectively.