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Learning to Restructure:

Studies of Transformation in
the Russian Defense Sector

by
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LEARNING TO RESTRUCTURE: STUDIES OF TRANSFORMATION IN THE RUSSIAN DEFENSE SECTOR

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PREFACE

The papers collected here are the result of a much more ambitious project supported primarily with a grant from the John D. and Catherine T. MacArthur Foundation and assisted at later stages by the Bonn International Center for Conversion (BICC) and the Centre for Research into Communist Economies (CRCE, London). The overall purpose of the project was to examine the transformation in the Russian high-tech and defense industries, especially within the context of the broader economy-wide transition currently underway in Russia.

As presented here, these three papers and introduction represent a sampling of the work generated by the project and presented at a workshop held in Moscow, 25–26 November 1994 and funded by BICC. In the introductory section, project director Yevgeny Kuznetsov paints a broad landscape of the restructuring process and highlights some of the major findings of the project. In Part I, “Learning to Learn: Emerging Patterns of Enterprise Behavior in the Russian Defense Sector,” Kuznetsov then provides an industry-wide view of adjustment on the basis of studies of 24 enterprises and inferences drawn from their behavior. In particular, the dynamics of institutional learning throughout the restructuring process are examined. Igor Musienko follows in Part II with a look at an important economy-wide issue, the “Emerging Linkages Between Industry and Finance,” but from an industrial and regional perspective—that of the defense industry in Western Siberia. Lastly, in Part III Alexander Vorobyev isolates a specific sector of the economy—the aviation industry (which cuts across both defense and civilian markets)—and examines both the factors affecting its restructuring and the choices being made to ensure its survival.

The editor and the authors would like to thank Lisl Biggs-Davison of CRCE for the logistical support of the project and BICC’s director Herbert Wulf and research associate Joseph DiChiaro III for their support and assistance in the organization of the workshop. A list of workshop participants is provided in Appendix I.

LEARNING TO ADJUST: AN INTRODUCTORY SUMMARY

Yevgeny Kuznetsov

Perceptions of the Russian military–industrial complex, as they emerge from policy debates and academic literature, center around three major points. First, it is immense—the share of defense industry employment in overall industrial employment is about 25 percent. Among the industrialized economies, only Israel with its 10.3 percent share (estimate for the early 1980s; Ball, 1992) comes close to the former USSR in terms of the relative military burden. Second, the military–industrial complex used to be organizationally and technologically separate from the rest of the economy; this is the ‘dual economy’ hypothesis. Third, the managerial culture of enterprise directors was (and, by implication, still is) extremely conservative.

Whereas the first proposition is certainly true, the remaining ones are debatable. These disputes are still relevant not only from the economic history point of view, but also from the current policy perspective. Industrial restructuring in Russia would have been far less challenging if there had been a highly specialized military industry with well-trained, conservative bureaucrats. Then, one could have argued for closure of the majority of plants with military-specific assets and diversification of the remaining ones. Given the magnitude of defense cuts, heavy government involvement would have been warranted. The conservative managerial strata—unable to undertake even ‘defensive’ adjustment motivated by immediate survival—would have been replaced by more effective managers.

Unfortunately, the creation of a substantially reduced defense sector separated from the civilian economy with well-trained (but conservative) managers is one of the objectives of Russian defense industry restructuring, rather than the current state of affairs. The Soviet military–industrial complex was very heterogenous. Even in 1989, when the so-called defense industry conversion had just begun, more than 40 percent of military sector output was civilian. More importantly, managerial culture as it evolved in the 1970s and 1980s became increasingly sophisticated. The combination of technological challenges from the West (which often required substantial ingenuity on the part of managers) and elements of competition for the most prestigious contracts created a peculiar managerial culture labeled

here as ‘entrepreneurial rent-seeking,’ which in some respects resembles managerial behavior in the highly regulated economies of Latin America in times of import-substitution.

When dramatic demand cuts were announced at the beginning of 1992, many enterprise directors did not believe that these cuts would be politically or economically sustainable unless they were accompanied by an extensive safety net for the would-be unemployed. The immediate conclusion was that the system of input-output allocation would be replaced by some other type of allocation; indeed, after January 1992 the targeting of subsidies (under the guise of credit) defined the rules of the game. In principle, credits were supposed to be allocated according to performance—i.e., on the basis of progress in conversion. In reality, however, an impressive array of skills accumulated in the 1970s and 1980s was deployed to influence the allocation of the scarce resource (in this case, money). More fundamentally, the incentive structure of the Brezhnev years of public monopolies bargaining (conveniently called planning) favored short-term performance results to the detriment of long-run enterprise development. A number of tricks had been learned and were employed in 1992 to improve immediate performance, even though they did not make sense from a longer-term standpoint. Managerial sophistication of this type creates an ‘asymmetric information’ problem, which is insurmountable for both commercial lenders and the government.

The heterogeneity of military-related enterprises is only one side of the problem. The other side is that almost any strictly civilian enterprise was affected (although to a widely varying degree) by the constraints on product design and plant lay-out imposed by the requirements of the military. Civilian technologies were supposed to be designed in a way that guaranteed easy conversion to military manufacturing. Plants producing agricultural machinery were to be converted to the production of tanks and other heavy military equipment if necessary (this is one of the reasons why Soviet tractors were of excessive weight and capacity). Passenger planes were designed to be suitable for the transportation of military hardware. It is no wonder that agricultural machine-building in Russia and Ukraine (the most heavily militarized states) faced a decrease in production of 35–50 percent in 1992—similar to that of the defense sector itself. Significant negative externalities imposed by the military on the civilian part of the economy (to the extent that it can be neatly delineated at all) are the most important and lasting consequence of the Soviet version of military-led growth. If these

negative externalities are significant, the whole concept of comparative advantages becomes blurred. Are passenger planes uncompetitive on the world market because of inferior technologies and inadequate human skills, or because of the initial design? Are high costs due to inefficient technologies or the need to maintain mobilization capacities and abide by other military requirements? In many instances, the answers to these questions are far from obvious, illustrating the major point of this paper: the heritage of military-led growth influences every aspect of Russian economic restructuring. Thus, it does not make sense to separate the topic of defense industry conversion from the problems of industrial restructuring in general. At the same time, those concerned with the restructuring of civilian enterprises should be aware of linkages through which military-led growth affected (and still affects) the performance of the civilian sector.

This collection of papers was motivated largely by first-hand experience with defense industry downsizing in Russia in 1992–1994. As individual chapters will show, four conclusions were drawn; each of them somewhat contradicts conventional wisdom.

1. There is a significant heterogeneity in the productivity and technological levels of capital stock among defense enterprises.
2. The entrepreneurial potential of defense enterprise managers is just as diverse as physical capital stock. Many of them are brilliant Schumpeterian entrepreneurs ‘capable of getting things done’ even under the unfavorable conditions (institutional vacuum, monetary austerity) that followed price liberalization in Russia. Others, however, are unable to adjust to the realities of the nascent market and should be replaced.
3. In restructuring ventures, access to capital and inputs takes place not via formal economic institutions, but rather through personal networks that were traditionally very strong and are still functional in the military complex. Trust temporarily replaces institutions in assessing the risk of financing.
4. In cases in which defense diversification was reasonably successful, it was not necessarily achieved through export promotion. Import substitution seems to be an equally viable strategy, at least in the short term.

It is argued here that whereas the belief that Russian firms will be able to directly convert specific facilities and the labor force to commercial production is a chimera, the outlook for gradual transformation of certain segments of the Russian defense complex is not necessarily bleak. There are two contrasting views on the development potential of the defense complex of the former Soviet Union. The ‘only hope’ view portrays a cluster of the best physical and human capital—of which conversion, combined with a proper investment push, could provide a foundation for long-term Russian economic growth. The contrasting ‘omnipotent villain’ hypothesis asserts that, despite being the focal point of tremendous resources in the now-defunct Soviet economy, the complex has few comparative advantages—either static or dynamic—in the civilian world market. Both views and the related debates miss the point. Given the arbitrary price structure of Soviet industry, one can easily find ‘sound’ statistical evidence for any perspective. The central question raised by the two hypotheses concerns the extent to which welfare gains can be obtained from the military–industrial complex after so many years of resource drain, the magnitude of which is still unknown. Yet the real situation is that the successor states of the Soviet Union are plunging into a long period of (hopefully creative) destruction and industrial downsizing that will be accompanied by selective growth. In this economy-wide restructuring process, the defense industry’s identity will be lost and its technological processes will more often be shut-down rather than converted. Thus, an explicitly evolutionary perspective becomes appropriate.

Hirschman (1958) noted that “development depends not so much on finding optimal combinations for given resources and factors of production as on calling forth and enlisting for development purposes resources and abilities that are hidden, scattered, or badly utilized.” How can one incorporate the technological knowledge, managerial routines and human capital that are “hidden, scattered, or badly utilized” in the increasingly idle military sector?

In the following section, Yevgeny Kuznetsov discusses emerging patterns of enterprise adjustment in the Russian military complex. He notes that even in cases of relative success, investments in fixed capital stock were conspicuously absent. This implies that the very definition of adjustment success crucially depends upon time horizons: short-term illiquidity does not preclude long-term competitiveness. The major reasons for investment slumps are macroeconomic instability and a rudimentary system of financial intermediation. It appears

that almost all cases of adjustment-driven restructuring involved the creation of long-term relationships between enterprises and newly emerging commercial banks. Economic groups with interlinked real and financial assets appear to be effective financial intermediation mechanisms under the current Russian conditions.

This hypothesis is further explored by Igor Musienko in the section on emerging linkages between industry and finance. Two conclusions emerge: (1) one may be cautiously optimistic about the role of banks in investment recovery, but (2) there appear to be large regional variations in the process of economic group formation. Musienko indicates that Siberian banks lag behind their Moscow counterparts in both their capital base and their ability to assess investment projects. Rudimentary financial intermediation and the slow formation of new entrepreneurial networks have often led to the failure of regional conversion initiatives. Nonetheless, the rare cases of restructuring success may be attributed to the emergence of loosely held networks of enterprises, customers and suppliers of capital. In fact, the vital importance of informal networks and formal alliances—such as spontaneously emerging economic groups—is the major finding of this project. As there are simultaneous market and government failures in Russia, the mezo-level economic institutions (networks and economic groups) become the major vehicles of change.

An important facet of restructuring is learning to export—i.e., the acquisition of competitive advantage. The concluding section by Alexander Vorobyev explores this subject by examining the aviation industry.

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PART I

Learning to Learn: Emerging Patterns of Enterprise Behavior in the Russian Defense Sector, 1992–1995

Yevgeny Kuznetsov

1. Introduction

Learning is a process involving repetition and experimentation that enables tasks to be performed better and new production opportunities to be identified. It is the accumulation of competencies, or, more generally, the accumulation of intangible capital. On the basis of case studies of 24 enterprises, this paper explores the Russian defense sector's process of learning to restructure. Following Teece et al. (1994), it focuses on: (1) allocative competence—deciding what to produce and how to price it; (2) transactional competence—deciding whether to make or buy, and in which particular organizational configuration to proceed; and (3) administrative competence—deciding how to design organizational structures and policies to enable efficient performance.

In an economy with rudimentary market institutions, enterprise learning involves significant start-up costs to create quasi-market institutions, which are required for adjustment.

Institutions are defined broadly as any long-term explicit or implicit agreement about patterns of social behavior (formal or informal social contracts). For instance, in the absence of the provision of long-term leases and of laws regulating this activity, enterprises must venture into the leasing business themselves, inventing sophisticated barter schemes and ingenious forms of enforcement. The absence of market institutions entails an investment of already accumulated competencies (through managerial time and financial resources) to create an institution serving as a substitute for court-enforced leasing. From such a perspective, the adjustment of an enterprise in a transitional economy is somewhat similar to the growth of a firm in an economy with antiquated physical infrastructure or pervasive government regulation. In all of these cases, an entrepreneur incurs start-up costs:

- Capital to establish at least part of the required infrastructure (in the case of infrastructure deficiencies)
- Time and financial resources to manage the tangle of regulations that accompany the establishment of a firm (in the case of heavy government regulation; the ubiquity and magnitude of such start-up costs are documented in De Soto, 1990)
- Intangible capital and financial resources to adopt a new institution (in transition economies)

This paper treats adjustment as the emergence of new institutions with a variety of start-up costs, and intends to elaborate policies encouraging firm-level investment in learning. Section 2 outlines the economic situation in the Russian defense sector and briefly describes the sample of case studies. Section 3 presents empirical puzzles related to the wide variety of discretionary differences in enterprise behavior (i.e., those not explained by differences in economic fundamentals or economic policies). Section 4 provides a theoretical framework and presents examples of adjustment strategies, while Section 5 establishes an analogy between the failure to adjust at the enterprise level of economies in transition and the low-level equilibrium trap of developing economies. This analogy provides new insights into enterprise adjustment and economic behavior in the economy of the former USSR. Section 6 describes types of uncertainty in the Russian defense sector. Section 7 provides an explanation of the puzzles with a verbal model of enterprise adjustment, while Section 8 outlines observed patterns of learning and their evolution between 1992 and 1995. Implications for government policy are discussed in Section 9. Section 10 speculates on the future of the Russian defense sector and Section 11 draws some conclusions.

2. The economic situation in the defense sector: the sample¹

The defense sector is defined here as the enterprises under the auspices of the State Committee for Defense Industries, including all military-related plants, with the exception of nuclear facilities belonging to the Ministry of Atomic Energy. Because of the substantial share of civilian goods in its output, the Russian defense sector is a purely administrative entity; by the end of 1994, 80 percent of the output of the almost 2,000 enterprises of the complex consisted of civilian goods. Most of the conclusions of this paper are therefore likely to be valid for the Russian industry and enterprises in transition in general.

The output level of the military sector in 1994 was 61.4 percent of the 1993 figure, while employment was 83 percent. Compared to 1991 figures, in 1994 military output was 19.9 percent, civilian output was 52.6 percent, aggregate output was 39.2 percent, and industrial employment was 68 percent. Relative to other industrial branches, military hardware ranks first in output decreases, followed by light industry (20.5 percent of the 1991 output level) and machine-building (approximately 35 percent of the 1991 level). The average wage in the military sector in 1994 was 64 percent of the average wage in industry, and 87 percent of the average wage in the machine-building sector. At the same time, there is a substantial intra-sectoral gap within the military sector: the lowest average wage is in the electronics industry (44 percent of the average industrial wage), while the highest is in the ship-building industry (89 percent of the average industrial wage).

As these figures indicate, the economic situation in the defense sector parallels that in the machine-building sector. Nevertheless, the following circumstances create a difference. First, the financial situation of defense enterprises is unusually erratic due to the volatility of defense procurement. In 1994, the government procurement debt amounted to 38–50 percent of the accounts receivable and payable of the defense sector. Second, the maintenance of so-called mobilization capacities (which are not utilized, but must be serviced) remains a sizable financial burden. Although the government is supposed to reimburse enterprises for the full cost of this maintenance, such compensation never occurs. As a result, overhead costs remain prohibitive; they typically range from 200 to 400 percent, while in some cases they reach

¹ The aggregate statistics in this section were provided by the Russian Committee on Defense Industries.

1,000 percent of the total wages of a firm. Because of the government-induced illiquidity and high overhead costs, the scope for adjustment is smaller in the defense sector than in the majority of civilian enterprises.

The enterprises in the sample (24 companies from the radio, electronics, aviation, and ship-building industries; see Appendix II for a detailed description) reflect this scenario, with two important caveats. First, the official employment figures appear to overestimate actual employment. Enterprises must pay an excess wage tax if their average wage exceeds a certain threshold level. In order to avoid this, enterprises in the sample inflated employment figures by hiring labor ‘just for the record.’ The consequent low average wages do not eliminate the high wage differential, however—in 1994, the average wage in the sample ranged from 25 percent (at a radio plant in Siberia) to 150 percent (at an export-oriented manufacturer in Moscow) of the industrial wage. Second, the official output figures appear to underestimate the actual output level by 5–10 percent by not taking into account unrecorded economic activity. Such activity may take three forms: (1) shell firms created by the management to perform auto repair, certain construction services, and so on; (2) unrecorded activity related to the observation that up to 60 percent of payment flows in 1994 were on a cash-only basis; and (3) informal activity traditionally performed by socialist enterprises in which labor devotes a share of its time to producing goods (motorcycles, for example) for its own consumption.

Although the sample includes enterprises from all branches of defense industry and all major regions of Russia, it is biased in at least in three ways. First, half of the sample is drawn from the radio, communication and electronics branch, which is less asset-specific than such branches as tank manufacturing and thus has more favorable conditions for conversion and diversification. Table 1 outlines the diversity of defense enterprises by collapsing them into a matrix that combines asset specificity and the demand orientation of enterprises (export versus domestic demand). Second, almost half of the sample is located in Moscow, St. Petersburg and their metropolitan areas. Third, and most importantly, the sample represents more active (but not necessarily more successful) adjustment than appears to be the case in the industry as a whole. Information on non-adjustment cases—which are important for the study—was collected through regional administrations and less detailed interviews that did not cover the range of issues included in the case studies.

Table 1: Demand orientation and asset specificity of enterprises of the sample

Export-oriented, large system manufacturer with specialized capital stock (1)	Domestic demand, large system manufacturer with specialized capital stock (7)
Export-oriented, relatively universal capital stock (3)	Domestic demand, relatively universal capital stock (13)

3. Empirical puzzles

Puzzle 1: There are growing differences between companies belonging to the same industry, often located in the same town and having similar factor endowments. As they cannot be explained by differences in economic fundamentals, they are discretionary differences.

Following is a comparison of two medium-sized (about 5,000 employees) military enterprises that used to produce electronic control equipment. Both are located in the same town close to the Finnish border. Civilian production was once minimal for both of them, but in 1992 military procurement decreased by a factor of ten, relegating defense-related manufacturing to the marginal role. An adjustment cost has accompanied the transfer to civilian manufacturing; because the use of expensive ferrous and precious metals is critical to their production, a direct application of technologies to the civilian sphere was not possible. The tangible endowments of both enterprises can be divided into illiquid assets (fixed capital) and relatively liquid assets (input inventories such as ferrous and precious metals and funds to facilitate adjustment provided by the federal government).

The manager of one enterprise chose to adjust by engaging in transactions with liquid assets, using the proceeds to maintain high incomes for the top management and modest wages for employees, with no effort invested into enterprise restructuring. The adjustment strategy included five elements:

1. A number of shell firms owned by the top management were organized to deal with de facto real estate possessions and trade in ferrous metals. Profit from these firms becomes the income of their owners, and is not reinvested.

2. Simple consumer durables (such as unsophisticated electronic games) were manufactured to justify credit from the government.
3. Government funds, however small,² and any proceeds from plant operations were placed on the financial market. Financial experts were hired so that the company focused mainly on rents derived from financial transactions.
4. Portions of the plant's real estate were leased or sold to foreign or wealthy domestic customers.
5. Part of the proceeds from trade operations, financial and real estate transactions were allocated toward maintaining a modest wage for company personnel, in order to prevent unrest.

Because management interests lay outside the plant under this strategy, the plant was allowed to disintegrate: fixed assets that were not being maintained deteriorated and skilled labor left the plant due to low wages.

The manager of the second enterprise focused on adjustment in the real sphere: he believed that eventually the plant would export low-cost electronic microscopes in market niches targeted, for instance, to educational institutions. He therefore pursued a strategy consisting of the following steps:

1. *'Primary accumulation.'* The manager engaged in similar types of transactions as the first manager in order to obtain 'breathing time' to readjust technologies, with the expectation of becoming a subcontractor for Western (Swedish and Finnish) companies.
2. *Unrelated diversification.* To ameliorate the defense demand shock and to avoid the consequent labor separations, the manager acquired sewing machines; employees now manufacture intermediate parts for Finnish clothing producers. It was not social responsibility that motivated the manager to avoid lay-offs, but rather the awareness that unless social stability is maintained, the company's economic advance will be inhibited.
3. *Learning to export on the basis of transitional comparative advantage.* The plant began to focus on relatively unsophisticated subcontracting and manufacturing of intermediate output (electrical equipment for cars) for export, with the emphasis on the quality of

² In 1993, the average amount of conversion credit per enterprise was about US \$40,000.

output rather than cost. By the end of 1992, the average monthly wage was US \$25, and even though it approached US \$80 in 1994, labor costs had diminished to 10–15 percent of output cost. In 1992, energy prices were still a fraction of world market prices; thus, output costs were by definition much less than across the border. Output quality and the organizational ability to find and maintain relationships with suitable foreign partners were important.

4. *Investment in reputation.* The manager realized that his advantage in low-cost manufacturing was partly transitional and, with a certain increase in energy prices, would disappear. Modest investment was therefore shifted into more sophisticated manufacturing and, most importantly, toward ensuring timely and reliable delivery of the output for the foreign partner. Sources of investment were government credit and retained earnings from the previous stage.
5. *Rise of the foreign partner's commitment.* The reliability of the Russian manufacturer in the context of institutional turmoil and costly contract enforcement persuaded the foreign partner to disregard the otherwise uninviting Russian business climate and make investment commitments, starting with the long-term leasing of equipment.
6. *Measures to retain valuable employees.* Because of the cost structure, in which the labor share is small and the energy and materials share is substantial, the manager did not focus on the decrease of redundant employment. In order to preserve the core group of employees, however, he had to maintain large wage differentials. The installation of sewing machines was perceived as a symbol of the manager's loyalty to employees, allowing him to undertake unpopular measures.
7. *Export of microscopes.* The plant entered into servicing and marketing agreements with a Swiss partner that permit the company to export microscopes. In 1994, export revenue comprised 60 percent of all revenue of the plant; the remaining revenue came from increased military procurement.

Why did two plants with similar endowments pursue different adjustment trajectories? Why did the first manager choose private rent-seeking, focusing on financial transactions, while the other took advantage of geographical closeness to the border to raise exports? Intuitively, it is clear that the longer planning horizon of the second manager accounts for the difference, but what explains the disparity in planning horizons? Two important observations are relevant to all case studies. First, the comparison of these adjustment patterns does not imply

that one manager is more entrepreneurial than the other. Both of them exploit all profit opportunities they see—even as a quite successful exporter of civilian output, the second manager seizes the opportunity of acquiring a large defense contract. What is different is the trajectory of the search for new opportunities. Second, in the long run it is not clear which adjustment strategy is superior. The first plant continues to exist only as a social protection unit while the second exports high-tech output, yet exports of microscopes proceed entirely from a stockpile so huge that it will maintain exports for years. Since the once extensive R&D came to a halt, high-tech export strategy is clearly unsustainable. What is sustainable is a regime that provides employment but generates little added value.

Puzzle 2: With the accumulation of adjustment experience, more firms abandon efforts to adjust, while firms that continue adjustment are more likely to succeed.

On the basis of the case studies, one may suggest the following sequence of enterprise adjustment. The first phase, which immediately followed the demand shock and price liberalization (winter and part of spring of 1992), is *waiting*. The second phase is *experimentation*, in which every enterprise—subject to the range of its competencies and management’s entrepreneurial qualities—entered into a search for restructuring options (spring of 1992 to end of 1993). By 1993, in the second year of adjustment, it became clear that two major factors are responsible for the differences in adjustment strategies.

Table 2: Managerial incentives and types of adjustment

	Planning horizon of the management: long. There is a high probability that the current management will remain the effective owner of the enterprise after its privatization.	Planning horizon of the management: short ('fly-by-night' strategy).
Focus of the management's attention: certain viable segments of the enterprise. Manager is more a turn-around specialist than a conventional manager.	<i>Sustainable real adjustment.</i> Management perceives that: 1) certain segments of the enterprise are potentially quite competitive; 2) because of the pervasive scarcity of managerial expertise, it is bound to remain the effective owner of the enterprise even after privatization.	<i>Sophisticated rent-seeking.</i> Managers are motivated to extract high personal rents from certain lucrative segments of the enterprise and then either retire or set up a brand new private venture not necessarily related to the production line of the original enterprise.
Focus of the management's attention: the whole enterprise rather than its segments.	<i>Fragile real adjustment.</i> Management strategy is to maintain all technological and human capabilities of the enterprise, which is not financially feasible.	<i>Traditional rent-seeking.</i> A 'fly-by-night' strategy is used, with exclusive reliance on government assistance and favors.

The first is the planning horizon of the manager and the second is his organizational focus in restructuring—i.e., whether he aims to revitalize part of the plant ('turn-around specialist') or the whole enterprise. Combining those two factors, one observes four basic adjustment strategies (see Table 2):

- Sustainable real adjustment (long-term oriented turn-around)
- Fragile real adjustment (attempt to maintain all parts of the enterprise)
- Sophisticated rent-seeking (extraction of rents from enterprise assets)
- Traditional rent-seeking (reliance on the government)

In 1993, about two-thirds of the enterprises in the sample pursued fragile real adjustment—they actively searched for restructuring technologies and methods of financing them. The remaining enterprises were evenly distributed among the other three adjustment types. By the middle of 1994, however, the situation had changed. Some enterprises (about a quarter of the sample) developed into 'social protection units' that produced little and channeled all revenue from 'cash cows' within the enterprise toward maintaining social infrastructure and employment (although substantially reduced). The management of these plants virtually became part of the local government.

Private rent-seeking also became more apparent due to an emerging alliance between the banks interested in enterprise assets and the managers anticipating a take-over. Certain they would be replaced, the managers became eager to extract all possible rents while they could. Thus, the allocation of federal conversion credit changed. In 1992 and 1993, half of the sample channeled at least part of these funds toward investment purposes,³ but in 1994 and 1995, enterprises began to enter into agreements with banks that use these funds for high-return, low pay-back projects (such as trade operations) and to receive in return a negotiable interest rate that is often higher than the going market rate. Cash, if needed, was obtained by enterprises from commercial banks through market lending. In both cases (social protection and private rent-seeking), all pursuit of restructuring alternatives was abandoned.

At the same time, sustainable real adjustment has become more pronounced. Managers have become more active in lay-offs and have devoted a major share of their time to the search for strategic investors.

Thus, the experimentation stage of adjustment is also the phase in which companies diverge significantly. As a result, quite distinct adjustment trajectories are being pursued in the current *shake-up* stage, which is characterized by a struggle for control of the privatization process and the redistribution of companies' stock. The puzzle is that these changes in enterprise behavior cannot be explained by a variation in economic policy or in the macroeconomic environment. If anything, financial transfers to defense enterprises steadily diminished after 1993. It appears that adjustment dynamics have their own logic and inertia, quite independent from variation in both policy and the economic environment.

³ Use of funds for investment purposes is not always the best possible option. For instance, the Novosibirsk Aviation Production Association received one billion rubles (about a million US dollars) in 1993 to facilitate conversion; the money was used to finalize development and test preparations of a new commuter passenger plane. These funds would have been better placed in a bank account—through which the enterprise would have at least received an interest rate return—because this was a highly risky project in which the major markets were either disappearing (commuter air traffic in the major part of Russia), bankrupt (Northern Russia) or demanding and difficult to enter (foreign market).

4. Start-up costs of institutional creation: the portfolio principle in learning

As the examples of the previous section illustrate, learning to adjust may be viewed as the accumulation of either competencies or intangible capital. The latter includes the firm's technical and organizational know-how, its reputation (embodied in trademarks and otherwise), organizational and customer networks, the culture of the firm (e.g., its ability to change), and trade secrets. The accumulation of intangible capital may be incremental or, when a new institution is being created, may involve investment—implying fixed costs in terms of financial resources and/or the firm's competencies. For instance, firms wishing to attract foreign capital invariably find it necessary to switch to Western style accounting systems. This requires not only payments to subcontracting Western accounting firms, but also non-negligible learning on the part of the firm's employees in order to master the new system. In this way, the start-up costs of learning can be reduced by resorting to foreign expertise, but this option is not always available.

In Russia, funds for defense procurement were allocated to the final producer of weapons systems beginning in 1993. This was entirely new to the Russian defense industry, as funds had previously been routinely allocated by the military–industrial commission to every enterprise, regardless of whether it was a subcontractor or final manufacturer. Similarly to the switch to a new accounting system, organizational resources had to be expended to make the procurement headed by final producers (rather than central authority) function smoothly. Why should the final producer pay in time? What happens if it cancels the order after inputs have been already produced? As such issues cannot be settled in court—Russia currently has no enforceable business code—an *organizational network* of subcontractors had to be created to deal with these issues. Such a network implies the settlement of business disputes on the basis of personal reputation and the threat of expulsion in the case of non-compliance (Kuznetsov, 1995). Designated individuals within these networks—modern equivalents of law merchants—prepare settlements and make recommendations to the top management of enterprises in the network.

In a few cases, institutions that provide information about potential demand and customers to enterprises undergoing conversion were created. Thus, a defense enterprise in St. Petersburg

contributed space for the exhibition of civilian products manufactured by the defense sector. The exhibition has a database of specific outputs required by customers in the region. It is open to everyone, but in order to join, enterprises must provide a range of output, price and delivery data for the database. There were non-marginal start-up costs in terms of managerial time for the organizers; as in every cooperative effort, benefits and responsibilities had to be negotiated. Nonetheless, the database and exhibition have emerged as a cooperative effort of defense enterprises frustrated by the wasteful way in which they enter the civilian market, as opposed to an entrepreneurial strategy of perceiving and seizing an opportunity. In consumer durables manufacturing, for example, one can clearly observe the phenomenon of waves of excess competition emerging as a result of the lack of information about market demand; in 1993, when the market for refrigerators became profitable, no less than ten defense sector companies had not been aware that other firms also entered the market. The database was created with a modest objective: to avoid such situations. It has proven useful to the extent that a number of matches between customers and suppliers have been accomplished.

New institutions are invariably created when a firm begins to export. All relevant firms in the sample had to establish agencies dealing with the preparation of export contracts and service and customer networks abroad (with the help of Western consulting firms). Although investment was involved, it was in intangible capital rather than fixed assets.

The list of examples showing that serious adjustment involves the creation of new institutions requiring start-up costs can easily be extended. Nevertheless, it is important to note that, as in every situation involving increasing returns, the likelihood exists that such innovation will fail to appear. There are two basic reasons: (1) a lack of capital—the firm, as a result of capital market deficiencies, is unable to raise capital to undertake investment; and (2) an insufficient revenue stream (because of the lack of demand, for instance) to recoup the fixed costs. A lack of intangible capital (the company's competencies) is even more serious than a shortage of financial capital, as intangible assets are tacit and difficult to transfer. If a company's initial competencies are below a certain threshold, no amount of Western consulting will help it establish competitive marketing and service and customer networks abroad. Similarly, the benefits must be high enough to recoup investment into the establishment of a new institution, but the revenue stream from the frequently outdated fixed

assets of the Russian industry does not allow such replacement. As a result, adjustment normally proceeds as incremental learning rather than as the creation of new institutions.

More accurately, one may envision a portfolio of restructuring options that vary by the amount of start-up cost. Rather than adopting a Western-style accounting system, one can reorganize company accounting by adopting a system of double or triple bookkeeping—one level for the top management, to understand what really happens in the enterprise; one as the standard system; and the third for tax authorities and other outside observers. Another option is to computerize an existing system, thus improving the flow of information. The option with the lowest start-up cost is the one that is usually chosen. An export orientation has the indirect benefits of a regime change, in that options with negligible start-up costs are often unavailable and therefore export-induced learning must be quite intensive. Even if export attempts fail and the relevant fixed costs become sunk costs, the learning experience is still retained and can be applied later. Due to these learning-inducing externalities of export activity, the rationale for government support of export programs exists.

5. Was the Soviet economy averse to innovations? The low-level trap in learning

Industrial adjustment in an economy with rudimentary market institutions is similar to adjustment in a planned economy in the sense that in order to adjust effectively, one must be able either to create required institutions or to rapidly learn incrementally. This observation helps explain why many Soviet managers appeared to be quite entrepreneurial and adaptive in the post-1992 economic reality.

Consider a persistent problem of Soviet railroads: the unloading of agricultural fertilizers, which in winter used to freeze solid during rail shipping (Kuznetsov, 1989, 1993). To unload a car of such fertilizers, one had to keep it in a heated space for a number of days and even then one could only unload it manually. The technical solution to the problem was well known: producers needed to switch to granulated fertilizers, which simply do not freeze. The mechanisms of inducing producers to make such a switch were far less obvious, however. In the past, coordination problems of that type were solved through the interested party's establishment of an informal network of individuals, including: representatives of the agency

that could solve the problem (the producer), the party interested in seeing a solution (the consumer) and planning officials that would help negotiate the solution and later make it legitimate (through a decree of the Council of Ministers and/or the Central Committee of the Communist Party). To induce the producer to undertake relevant change, the consumer had to offer incentives, usually in the form of a transfer of its share of investment, construction capacities or other scarce resources or services to the producer. Thus, to solve the problem one had to establish an institution: an informal network capable of negotiating relevant exchange proportions (i.e., how much will be done and for what). This activity had to be based on personal trust to make the agreement endure. To establish such a network, one had to invest a tremendous amount of organizational talent and time; this explains why coordination between various branches of the Soviet industry usually failed.

In the case of the fertilizers, no one was willing to incur the fixed costs required to establish such a network—although the problem was important, there were more pressing ones—and the solution was found through incremental learning instead. The railway agency asked the defense sector to invent a technical device that allowed thawing and unloading of fertilizers that freeze during shipping. This device—a cheap and effective one—was invented and produced by one of the defense plants.

This example shows that it is erroneous to assert that a Soviet-type system was innovation-averse. Rather, it catered to special, imbalance-driven innovations, which frequently represented *allocatively inefficient* technical change. If this innovation had not appeared, one would expect that pressures mounting from both consumers and transporters would have eventually induced the producer to switch to the more efficient granulated fertilizers. After the technical innovation emerged, on the other hand, these pressures abated and a *low-level equilibrium trap*—in which the more efficient outcome became permanently locked out—was established. There are many facets of allocative inefficiency in Soviet-type economies, and technical change as a handicap rather than a promoter of socially efficient development is the most striking of them.

The current adjustment of defense enterprises proceeds in a similar manner. One is surprised by the diversity of incremental learning used to avoid the start-up costs of investment in the

creation of institutions. One enterprise in the Voronezh region institutionalized a pattern of part-time industrial employment by buying a failing agricultural cooperative near the city limits. The labor will now be employed on the facilities of the enterprise only in winter, early spring and late fall; the remainder of the time, the labor will be employed in dachas (summer plots) and in the newly acquired agricultural unit. The purchase of processing equipment is also being contemplated. The other enterprise in the same city, unable to sell its food-processing equipment, utilized it by venturing into the food processing business. Given the extreme inefficiencies of Russian agriculture, such ventures can be competitive; the question is for how long and at what cost. The problem is not the diversification per se, but rather the way in which it is accomplished. In both plants, workers and particularly engineers assemble and devise radio and electronic equipment for part of the time, and engage in agriculture-related activities at other times. Both managements need to choose new organizational configurations for the plants, but postpone such decisions not only because the conditions of pervasive uncertainty encourage delay of an irreversible decision, but also due to the inability to arrive at adjustment trajectories for the plants in question.

One result of incremental adjustment is the regional segmentation of national markets. Unlike in the past, enterprises no longer diversify before establishing the market for the output; rather, they determine the market first by sending letters with a description of prospective products to all enterprises in the region, making phone calls to potential customers and bringing samples to the most important ones through personal visits. Such visits are necessarily limited in distance, however, because of the cost of transportation; east of the Urals in particular, the market for new output seems to be limited to approximately 1,000 miles. At the same time, because many suppliers became increasingly unreliable or inputs procured from them became costly due to transportation expenses, many enterprises have chosen to manufacture inputs themselves rather than look for a new supplier. From the enterprise perspective, the advantages include not only the guaranteed supply, but also the provision of employment for its own workers. Such manufacture is hardly cost-effective, but enterprises that produce for the government (defense procurement) or maintain a regional monopoly are not always concerned with cost. As a result, defense enterprises notorious for their vertical integration before adjustment now tend to produce (rather than buy) even more inputs.

Sometimes the start-up investment to create a required institution is undertaken by a charismatic top manager; if he leaves, the once successful adjustment falters. Consider the case of a Siberian plant belonging to the aviation industry. In 1990–1992, it developed and began to produce cost-efficient and inexpensive lines of agricultural equipment that included grinding mills and other grain-processing equipment. Because of the initial focus on low-income farms as consumers, the plant holds a virtual natural monopoly on this type of equipment. As financial markets do not provide loans for agricultural producers and futures markets for their output do not exist, farmers are trapped in a classic low-level equilibrium. Their income is low because of low productivity, and they have no funds to finance the fixed costs of switching to more efficient technology. The general director of the plant in question established a grain-processing facility with a bread store partly to demonstrate the efficiency of the equipment, but mainly to monitor and select trustworthy farmers to ship the equipment produced free of charge in the expectation that they would pay for it later with a grain crop. After the general director suffered a second heart attack, he retired and all experiments with marketing, leasing, and so on stalled. This exemplifies the adjustment of the Russian defense-related enterprise: it is the story of a potentially successful, ingenious effort that fails because there is no management team to sustain it.

6. Types of uncertainty in the Russian defense sector

It is intuitively clear that one of the reasons that enterprise managers are reluctant to take serious steps toward enterprise restructuring is uncertainty: when sunk costs are involved, it may be rational to postpone adjustment until the situation is resolved. The following sections outline the most empirically significant sources of uncertainty, excluding the uncertainty caused by high inflation.

6.1 Uncertainty specific to the military sector

- *Volatility of defense procurement.* One-third of the enterprises in the sample experienced a 50–300 percent change in state defense orders in 1992–1994. The remaining two-thirds

expect significant variation in the future. When one cannot reasonably predict the utilization of assets, long-term adjustment becomes questionable.

- *Volatility of payment for defense procurement.* The most significant factor of uncertainty, uncertainty of payment, makes enterprises chronically illiquid. In 1994, for enterprises in the sample, the average time between the due date of the payment and actual payment was no less than four months. Also in 1994, government procurement debt ranged from 38 to 50 percent of the accounts receivable and payable of the defense sector.

6.2 Uncertainty specific to transition economies

The uncertainty related to privatization should be highlighted. Before the strategic owner of the enterprise emerges, one should not expect any commitment from either incumbent managers (who tend to spend most of their time maximizing their ownership stake in the enterprise) or outside investors. In a number of R&D institutes in Moscow and St. Petersburg, the competition for effective control has blocked not only adjustment but also day-to-day operations. It should therefore come as no surprise that half of the enterprises in the sample that were perceived as actively and successfully restructuring were state-owned enterprises that chose to delay privatization. In all cases, the decision to postpone was assessed as the rational one. At these companies, the management took full control of the situation and immediately adopted a long-term attitude (as there was no threat of dismissal). Delays in privatization also promise a more vibrant stock market and more sizable revenues from stock sales. One should note, however, that these were companies with attractive assets and thus with a considerable latitude for restructuring.

6.3 Exchange rate instability

This standard source of uncertainty is singled out because of its profound impact not only on export-oriented producers but also on the company's decision to undertake export activities or add new export-oriented lines of production. For instance, an export-oriented machine-building plant in Tomsk had secured a long-term credit abroad with an favorable interest rate and a guarantee of consumers in West and Southeast Asia. Given the risk of lending to Russia, the loan conditions were quite attractive. The company, however, did not take

advantage of the loan because it believed that if ruble appreciation accelerated, the loan would become unprofitable. In a number of other cases, the switch to exports clearly was not made because companies were reluctant to incur sunk costs should exporting become unprofitable.

6.4 Uncertainty due to trade liberalization

The output of consumer durables of the defense sector, which increased during 1992 and 1993, fell in 1994 by about 30 percent. The major reason was import competition. The response of enterprise managers, in particular those in Moscow and St. Petersburg, was to abstain from diversification into new manufacturing and focus instead on less-risky financial and real estate transactions. Thus, somewhat unexpectedly, exposure to competition resulted in a shortening of planning horizons.

7. Explanation of the puzzles: the verbal model of enterprise adjustment

The decision chain of managers regarding how to undertake adjustment may be described as a sequence of three steps. It is assumed that the revenue stream of the company depends on fixed capital and intangible capital (the managerial ability to perform turn-around). Revenue stream falls into two periods: before turn-around (modest, if any, revenues from production) and after turn-around (substantial income from production). To turn the company around and remain in control (i.e., to avoid being replaced in the process), a certain threshold level of managerial ability is required. The first decision the manager must make is whether or not he and the company will, given their estimate of the initial amount of intangible capital, be able to reach this threshold level. If the answer is negative, then the planning horizon of the manager will be short because he suspects that he is unlikely to survive the transition. If the answer is positive, the manager will anticipate a significant revenue stream after the turn-around; his planning horizon will therefore be long. The initial estimate of intangible capital is usually made on the basis of past experience, the manager's ability to respond to technological and organizational challenges before the shock and the adjustment phase (waiting phase) immediately following the shock.

Step 1: Selection of a planning horizon in the problem of maximization of the discounted revenue stream of the company (one may consider the real interest rate to be a discount factor).

Having chosen the planning horizon, the manager undertakes a search for feasible restructuring options by arranging a portfolio of adjustment alternatives. As the initial restructuring proceeds without investment in fixed capital and, more importantly, as the amount of this investment depends upon the manager's ability to raise capital, all restructuring options may be described in terms of intangible capital. This process is 'learning by doing'—an increase in intangible capital gained by adopting restructuring options from the available portfolio. These options (or organizational innovations) differ from each other by the amount of fixed costs and of their returns. Certain innovations (such as the creation of a customer network abroad) require significant initial learning—a substantial fixed cost—while others (such as perfection of rent-seeking) require no fixed costs at all. In sum, learning by doing in this formulation boils down to the growth of the company's intangible capital through its investment in the adoption of organizational innovations.

Step 2: Given his portfolio of options, an estimate of the initial value of intangible capital, an estimate of the relationship between company assets (fixed and intangible) and revenues, and the planning horizon, the manager chooses the restructuring option.

If the initial endowment of intangible capital is insignificant (i.e., the management is incapable), asset productivity is low or the planning horizon is short, then it does not pay to adopt organizational innovations with fixed costs; in other words, it does not make sense to resort to dramatic restructuring involving the creation of new institutions.

The parameters entering the maximization problem at Step 2 are no more than estimates or expected values. They must be constantly readjusted on the basis of new information. Correction of estimates, such as productivity of company assets and accumulated value of intangible capital, on the basis of company performance is another facet of learning—*learning in the incentive sense*. How well can I (the manager) perform a task? Should I start

doing it? How competitive is the company? Step 3 is therefore a recurrent step in the manager's calculation.

Step 3: The manager must learn in the incentive sense by re-evaluating the parameters of the problem on the basis of the previous outcome—i.e., the result of learning as a change in performance.

The interaction of these two major facets of learning—learning as performance improvement and learning in the incentive sense—explains the puzzles outlined in Section 3. More specifically, the decision-making sequence described above generates the following four features:

1. *Growing discretionary differences between firms.* Negligible differences in asset endowments generate diverging trajectories of asset dynamics. Interaction between the two facets of learning results in a virtuous circle, whereas trajectories diverge in a vicious circle. Suppose the manager makes an optimistic estimate about the competencies of the company. He is therefore likely to adopt a long-term attitude, and hence according to his calculations the fixed-cost technology will be rewarded. By definition, the adoption of fixed-cost technology implies productivity improvement; thus, progress in learning confirms the optimistic expectations. When he re-estimates these expectations and readopts a long-term planning horizon, he also invests significantly in intangible capital that continues to grow quickly. This is a virtuous circle. Suppose, however, that the manager experiences an initial failure in learning. He then readjusts his expectations downward and is likely to adopt a short-term planning horizon. In that case, serious learning (investment in fixed-cost innovations) is unlikely to be rewarded; hence, there is no productivity increase and intangible capital does not grow. This is a vicious circle.
2. *Variation of performance over time.* This variation is also explained by the possibility of virtuous and vicious circles. More specifically, in the aftermath of the shock of 1992 the majority of defense managers were overly optimistic. They considered the shock to be transitional and expected to remain in control after the transition. In consequence, it was rational to adopt a long-term planning horizon, macroeconomic instability notwithstanding. Nevertheless, their ability to operate in the market economy was poor;

the initial endowment of intangible capital was inadequate to adopt fixed-cost organizational innovations. As a result, productivity deteriorated and managerial expectations were readjusted downward. Due to repeated failures in adjustment, many realized that they were non-viable in the long run and adopted a short-term attitude. Hence, private and traditional rent-seeking flourished.

3. *If the manager is capable, he should be optimistic; if the manager is unsure about enterprise endowments, he should be more cautious and invest to discover them.* If initial endowments are large, then optimistic expectations provoke a virtuous circle. If, however, they are inadequate, optimism about the future is likely to result in a vicious circle of frustrated expectations, shortened planning horizons and stalled learning. This sheds light on why even the most entrepreneurial managers were reluctant to initiate dramatic adjustment: during the initial ‘waiting’ phase, they focused on learning in the incentive sense and on deciding the nature of their capabilities.
4. *There is an optimal intensity of the shock that maximizes restructuring.* Too strong a shock provides a mismatch between initial endowments and the magnitude of the restructuring. As a result, managers are more likely to adopt short-term planning horizons, which provokes a vicious circle of stalled learning. A manager then cannot find a restructuring option that pays off given his planning horizon. Consequently, expectations become self-fulfilling: “I believe that I am going to fail; therefore I do not invest in learning and in reality I do fail.”

8. Learning patterns

There is dramatic progress in managerial learning in the incentive sense. Lessons that managers learn in the process of adjustment are wide-ranging and often unexpected. The manager of a mechanical plant in Voronezh visited German firms for training courses on marketing and returned with a resolute belief that the company’s intentions to start exporting were futile—i.e., the expectations for exports were adjusted downwards. Three and a half years after the beginning of adjustment, the management now has more sober assessment of itself, the company and its economic future. Three years ago, the managers would have focused on high-tech output when contemplating diversification, while today the emphasis has been placed on more mundane products that meet market demand. There is a growing

awareness among both management and labor that without outside investment, all attempts to turn the company around are futile, and that outside investors are unlikely to appear unless the incumbent managers leave. In one case in the sample, the manager voluntarily stepped down to give way to a strategic investor. Table 3 summarizes the major components of real adjustment by enterprises and the progress in mastering them, in both the sense of performance improvement (learning by doing) and the incentive sense.

Table 3: Learning dynamics, 1992–1995

Strategies toward fixed assets	<i>Learning in the incentive sense</i>	<i>Learning by doing</i>
Export orientation	Growing awareness of sunk costs related to entry into export markets. More pessimistic attitude toward export promotion.	Accumulation of expertise in preparing export contracts, making an enterprise more transparent for foreign partners. Foreign consultant firms are used extensively.
Diversification to meet internal demand	Growing attention to ‘mundane’ output, including services and diversification into agriculture.	Ability to carve-up viable parts of the enterprise and create wage differentials to induce the unwanted labor separations
Downsizing with the preservation of main production lines	Awareness that without an outside investor, such a strategy is often doomed. Readiness to step down from the top management to clear the way for outside investors.	Marginal learning related to cooperation with banks and search for inputs from new suppliers.
Downsizing on the way to closure; enterprise is a social protection unit (the most widespread strategy)	Result of repeated failures in the past: no matter what I do, I am going to fail because of the unfavorable economic environment.	Marginal learning related to private rent-seeking (asset stripping) and traditional rent-seeking (lobbying the government).
Division of the enterprise into different parts	More permissive attitude toward such division due to the presumed ability to retain some control over split-offs.	Learning to create new organizational forms such as business groups and other networks of firms.

In addition to these two facets of learning, there is another, often overlooked aspect—learning to deal with inherited personal and social networks.⁴ Personal networks of industrial managers were of vital importance in times of extreme uncertainty following the shock of 1992. Network capital—one of the components of intangible capital—still facilitates input/output decisions as well as contract enforcement. There is a growing realization,

⁴ Network is viewed here as an informal institution in which the shared good is mutual trust and information (see Kuznetsov, 1995). Formal organizations such as industry associations are outside of the purview of this analysis.

however, that inherited personal and social networks are increasingly becoming unreliable and an impediment to adjustment. For instance, the general director of a large radio-electronic plant in St. Petersburg was skeptical that he could dramatically restructure the management structure of his company: “Because of implicit obligations to my deputies and to other staff, it is difficult for me. Someone from the outside must do it.” The same manager allowed certain units of his enterprise to split up, while using the parent company infrastructure and R&D. The start-up company had attractive assets, and the parent company management obtained a loan to acquire a controlling share of its stock during the share auction. There was an agreement—based on personal trust—that the start-up company would not redistribute shares without consulting the parent enterprise. The spin-off company broke the agreement, however, and the management of the parent company lost control as well as a share of its investment. Ultimately this is probably an efficient outcome, but it would never have occurred if the managers of the parent company had predicted it. One of the functions of a network is the provision of information and diffusion of learning experience; the failure of the ‘engineered spin-off’ thus became known to other enterprises and contributed to their negative attitudes toward similar actions.

Some enterprises with strong charismatic leaders now choose to alienate themselves from any networks and to therefore be free from relevant implicit and explicit obligations. The prevailing attitude, however, is to carve out new networks combining viable elements of the old ones with a closer association with banks, trading companies and other agents of the nascent private sector. Associations of graduates of elite Moscow colleges—such as Moscow Physics-Technical Institute, University Imeni Baymana, and the Aviation Institute—play an active role in the process. The major source of human capital for the defense industry in the past, they have now become major suppliers of skilled labor for the banking and trade spheres. Graduate associations, some of which are quite active, provide a cross-fertilization of expertise between reform-oriented directors and the new banking elite. New networks are thus being formed, primarily to provide and distribute information. Through such networks, for instance, banks obtain information about assets that are potentially competitive and thus worth including in emerging business groups.

Another process parallels the carving-out of restructuring-oriented networks: the formation of rent-seeking networks, which is particularly pronounced at the regional level. Managements of defense enterprises, many of which are single employers in their respective communities, have always been considered ‘shadow’ local governments with an authority exceeding that of the actual ones. Currently, as these enterprises collapse while becoming social protection units, local governments first resist any attempt to declare bankruptcy by the ailing plants and then seek subsidies for defense plants (which are actually subsidies to the plant’s social infrastructure) through their own channels. The manager of one large tank plant in Siberia begged the federal government to close the plant, as it had not received any defense orders; he had obtained some personal rents from its assets and wanted a safe retirement. The only government agency that actively supported the director’s proposal was the Ministry of Defense, while the local government threatened that if the manager stopped ‘fulfilling his social obligations’ (i.e., maintaining social infrastructure), it would engineer a comprehensive audit of the plant with the objective of revealing abuses of managerial authority. This is an example of the *forced managerial entrenchment* that accompanies the rapidly forming rent-seeking alliance between local government and enterprise management, which is generally unable to adjust.

Krueger (1974) emphasized that in addition to distortions imposed by rent-seeking, there are associated deadweight losses—anyone seeking rent will be willing to commit resources up to the amount of the rent (which is a deadweight loss for society). Rent-seeking is just one option in an enterprise’s portfolio of adjustment responses. When performed outside the lobbying group/rent-seeking network, it is not even particularly efficient. Our case studies revealed that often, more learning-intensive options are preferred. Once chosen, each adjustment strategy is perfected and improved, and becomes self-reinforcing. As the formation of rent-seeking networks advances, the switch to restructuring options becomes unattractive: rent-seeking crowds-out restructuring. On the other hand, once restructuring options are mastered, learning-intensive restructuring crowds out rent-seeking. Thus, because of the cumulative nature of learning, early choices determine long-term outcomes.

Two policy implications follow from this analysis. First, until substantial progress in learning-intensive restructuring is made, the government should abstain from discretionary

and in particular sectoral policies that are particularly prone to rent-seeking. This would encourage an early choice of restructuring options from a portfolio of adjustment responses. One criterion of such progress would be the presence of competitive enterprises that became viable without government subsidies. Second, the federal government should make more specific and transparent subsidies to the social infrastructure, thereby discouraging alliances between anti-reform enterprise managers and local authorities.

Table 4: Learning styles of the management

The number of enterprises from the sample belonging to the respective category are in parentheses

	Rudimentary learning: incremental improvement of rent-seeking skills	Individual learning: investment of top manager's time and company resources to master market routines	Creation of sustained organizational capabilities: investment into managerial team
External networks are small	'Fly-by-night' manager (2)	Entrepreneur—a business loner (7)	Chandler's (1990) profit-oriented management (1)
Networks are extensive and growing	Lobbying group, cronyism (1)	Charismatic leader with established reputation and extensive informal networks (3)	Growth-oriented management, often acts as catalyst for business group creation (2)

In making the distinction between rent-seeking and restructuring-oriented networks, the differences between rudimentary learning with little investment into the enterprise's intangible capital and the learning of new skills should be underlined. One can also make a distinction between (1) rudimentary learning, (2) fragile learning, in which restructuring depends upon the abilities of one (usually the top) manager, and (3) sustained learning, in which a managerial team is created with extensive organizational capabilities to respond to and manage change. In mapping this three-way distinction into a network dimension of learning, one obtains a classification of learning patterns (Table 4), although not all enterprises in the sample were classified. It is noteworthy that half of the enterprises that were subject to classification fell into the category of fragile adjustment driven by the top manager, who does not seek the benefits and obligations of network participation. This

observation may be interpreted in three different ways, with preference given to a mixture of the latter two:

1. Reform-oriented managers prefer a competitive industrial structure with no space for enterprise alliances and associations.
2. Managers mistrust institutionalized inter-enterprise obligations (formally through a business group, or informally through implicit contracts). This is a peculiar consequence of Soviet-type planning, in which these networks were typical of the manager's way of life. Having 'tasted freedom,' he maximizes decision-making authority, although this propensity will subside as time elapses.
3. The process of carving out new networks has just begun. In the future, reform-oriented networks are likely to become bank-led business groups, while rent-seeking networks will turn into corporate sectoral associations and lobbying groups. One should wait for the institutionalization of nascent tendencies.

9. Policy implications

The previous sections view adjustment as a portfolio of restructuring options varying by the amount of the fixed cost of learning. It was shown that larger fixed costs—in terms of investment in intangible capital, financial resources or managerial time—are accompanied by more profound restructuring and more efficient created market institutions. Government policies should therefore encourage an adjustment choice with the largest start-up cost possible. The view of adjustment as a portfolio of discrete choices corresponds to the view of government policies as a choice of policy regime. Transition from one regime to another implies a switch of restructuring response. When there is no distinct policy regime, economic agents relegate their response to incremental learning—avoiding investment of any kind because it becomes a sunk cost when the policies change.

The current policy regime in the defense sector is characterized by three basic characteristics:

1. *Long-term instability.* For the majority of enterprises, military procurement fluctuates from zero to a substantial share of capacity from year to year. Its volatility results from the lack of vision of long-term demand for military hardware.
2. *Short-term uncertainty.* Participation in military procurement does not guarantee timely payment for it.
3. *Allocation of government credits as a means of alleviating short-term uncertainty and illiquidity.* When the situation of particular enterprises becomes critical due to government-induced illiquidity or the unexpected withdrawal of defense orders, the Committee for Defense Industries allocates credits designed to alleviate the situation. Because of this built-in feedback, the current policy regime is robust—in other words, only a strong policy shock would change it. The following observations help to clarify the nature of such a policy shock.

When changing policies, aim at regime change but do not overshoot. There should be a match between the magnitude of a shock and the agent's ability to respond to it. If the shock is too strong, the rational response of an enterprise with insignificant competencies and the ability to learn is withdrawal from adjustment altogether. Thus, the strong negative demand shock that followed the 1992 liberalization inadvertently provoked rent-seeking from enterprises that perceived their adjustment capabilities to be small; they did not even try to adjust.

Before venturing into a regime, change the established credibility of less ambitious policy instruments. If an intended regime change is perceived to be short-lived, then the enterprise response is likely to oppose that of a permanent regime change and only exacerbate the problem. For instance, the abolition of preferential foreign trade treatment in the spring of 1995 was perceived as creating equal conditions for a new round of competitive rent-seeking, which only made it more acute.

Engineer organizational shock: disband or drastically reduce the personnel of the Committee for Defense Industries. Unless this is done, the current policy regime will remain stable and robust and there will be little pressure to change it.

Be aware that the unexpected consequences of policy actions may be more important than their immediate results. Is it not irresponsible to argue for elimination of the whole state agency, particularly if this measure will result in chaotic consequences? Given the accumulated organizational inertia of the Russian government, the real impact is likely to be small. Its unexpected consequences, such as the spurt of entrepreneurship at other government agencies performing similar functions, are more important. Entrepreneurial behavior is not uncommon in government officials; during organizational shocks and drastic regime changes, one may expect more entrepreneurial freedom in the government, which may result in the adoption of policy instruments considered unfeasible in the past.

Be pragmatic in matters of industrial policy and aware that in an economy with rudimentary institutions, the difference between sectoral and horizontal industrial policy is likely to be moot. Industrial policy is likely to be effective to the extent that it relies on the private sector. An example of a failed attempt to undertake meaningful industrial policy will clarify this principle. One of the reasons that the aviation industry experienced a 70 percent output decline between 1991 and 1994 was due to the absence of market institutions (trade credit and leasing). There are two ways to ameliorate the competitive disadvantages of producers of national capital goods that stem from institutional deficiencies. Such producers can be protected or subsidized—i.e., sectoral industrial policies—or, factor markets such as markets for long-term capital can be improved—i.e., horizontal industrial policies. Although horizontal policies are much more efficient than sectoral policies, they provide a significant impact only in the long run. Although the economic profession assumes a clear division between horizontal and sectoral industrial policy, in economies with embryonic market institutions this may not be the case.

A number of Russian banks put forward a proposal to establish a leasing agency, with half of the initial capital coming from the state and half from the banks. The involvement of the state was deemed necessary not only to offset the risks inherent in any long-term project, but also

to assure legal protection. At that time, laws regulating leasing had not been adopted and the agency was supposed to establish a legal precedent of leasing activity. Since the prospective agency was supposed to include all relevant capital goods—aircraft, ships, agricultural equipment, and so on—and thus enhance the factor market for capital goods, the proposal was supposed to belong to the realm of horizontal industrial policy. However, as initiators of the project came from the aviation industry, the project was bound to focus initially on the aviation industry and only later on spin-off to other capital goods sectors (although the proposal never did take off). This initial focus would have been unavoidable for two reasons. First, sector-specific and difficult-to-transfer expertise is involved in the organization of such an agency. Second, in the absence of reliable contract enforcement, initiators of the project would have had to rely on personal trust and personal networks inherited from the days of the planned economy. Since the Soviet economy was structured along sectoral lines, newly emerging institutions are therefore initially likely to focus on certain sectors at the expense of others. Through this reliance on trust within personal networks, path-dependency enters the post-socialist institutional formation.

One should be consistently liberal: do not block the formation of business groups on the micro-level. In an economy with infant market institutions, *project execution capability* is the most scarce resource. Organizations possessing it are likely to expand quickly. In Russia, this capability rests firmly within the banking sphere and manifests itself in the fact that major Russian banks resorting to the purchase of industrial sector stocks have created large business groups (Klimenko et al., 1995). Lacking its own project execution capabilities, the Russian government has had to resort to agents possessing those capabilities—i.e., spontaneously emerging Russian business groups.

10. Emerging patterns of evolution in the Russian defense sector

Although only a small number of enterprises undertake any investment as part of their restructuring, this section speculates on the future of investment-driven restructuring in the defense sector. Toward this end, one must outline the sources of competitiveness of the sector. In the Soviet times, weapons competitiveness of many enterprises was achieved through the following:

- *High level of R&D.* This R&D was performed partly inside but mainly outside enterprises in design bureaus.
- *Craftsmen quality of labor.* This permitted the manufacture of a small amount of samples (manufactured like crafts) despite often technologically inferior equipment.
- *Very high degree of vertical integration.* The majority of inputs were made rather than subcontracted, with the resulting low utilization of equipment, high unit costs and long production cycles. The plant lay-out was designed accordingly.

These features indicate that for the majority of plants, the prospects of becoming competitive in the high-tech area are bleak. This hypothesis is corroborated not only by the abrupt decrease of military and civilian R&D and investment equipment (disappearance of the first factor of competitiveness) and the massive ‘brain drain’ of skilled labor to the service sphere (disappearance of the second factor), but also by the growing amount of cases in which high-tech manufacturers are unable to procure high-quality inputs at any cost. Given the dramatically decreased demand, it is no longer profitable for downstream producers to supply a negligible amount of inputs. This is particularly true for high-quality materials from ferrous and non-ferrous metallurgy and composite materials.

Capital goods manufacturing, in which the defense sector is the most competitive, has experienced a negative demand shock due to the investment slump; while the switch to exports does occur, without foreign investment it is more a result of chance than something one could imitate. In the aftermath of stabilization, will the Russian defense sector experience an hysteresis—an irreversible loss of competitive advantage—so that the unfavorable conditions of the adjustment shock will persist even though the shock itself is gone?⁵ This possibility is of paramount importance for enterprises contemplating a long-term adjustment strategy.

⁵ The hysteresis effect under discussion is very similar to the one perceived to be a cause of the high European unemployment rate. Long-term unemployment is different from the transitional one because it perpetuates itself: once I lose my skills due to long-term unemployment, I am unlikely to be hired irrespective of my wage and the amount of time spent searching for a job.

The following framework should enable an answer to this question in the future. Table 5 maps emerging adjustment patterns in a matrix that juxtaposes three prospective sources of competitive advantage (R&D and high-technology; skills and human capital; low-cost manual labor) and the adjustment cost required to benefit from these competitive advantages. Six patterns of development resulting from this combination, as well as examples of enterprises that exemplify them, are provided. The following caveats must be mentioned on the basis of available evidence. First, penetration of the Western market is virtually impossible without a partnership (in one form or another) with foreign companies. On this road, high-tech enterprises will discover the unpleasant surprise that their inclusion in the division of labor is dictated by the logic of division of labor within the Western corporation rather than the intention to enhance the competitive advantages of the Russian enterprise, thus generating few backward and forward linkages with the Russian economy. Second, there is a growing number of cases in which investment exists to diversify the enterprise for internal demand. In these cases, enterprises lose their decision-making autonomy and become part of a loosely held business group. In other words, in their current organizational configuration defense enterprises will cease to exist: they are likely to be swamped by the expansion of domestic business groups originating outside the defense sector, to form alliances with foreign partners or, in the case of export-oriented producers, to expand themselves through the assimilation of other enterprises. An example of this tendency is the state-owned Moscow Aviation Production Association (MAPO), which recently assimilated a failing aviation design bureau.

Table 5: Likely patterns of growth in various segments of the Russian defense sector in the case of the resumption of growth

Competitive advantage	1) High technology with export potential	2) Human capital: educated labor and engineering staff	3) Low-cost manual labor
<p>Adjustment cost</p> <p>High adjustment cost: substantial investment is needed</p>	<p>a) High moral wear and tear of technology: large hysteresis effect—see column 2</p> <p>b) Small hysteresis effect</p> <p><i>Selective growth</i> Development of viable segments of companies via emergence of start-up firms—joint projects with foreign high-tech firms</p>	<p><i>‘Dependent (export-oriented)’ development</i> Specialization in technologically undemanding tasks within a multinational company</p> <p>Likely example: Permskie Motory</p>	<p><i>Start-up growth</i> Enterprise bankruptcy; scrapping of fixed assets; labor is utilized in activities totally unrelated to the original company</p>
<p>Relatively low adjustment cost</p>	<p><i>Unstable growth</i> Transfer of learning experience of the relevant enterprise via its diversification and formation of a business group. Maintenance of technological capabilities through reliance on foreign inputs and expertise</p> <p>Example: Moscow aviation production association (MAPO)</p>	<p><i>Stable growth (largely for domestic demand)</i> Turn-around and subsequent diversification as a result of the acquisition of relevant assets by the Russian business groups originating outside the military–industrial complex (in the financial sphere, gas and banking sector)</p> <p>Example: Radio plant (Berdsk), ‘Sputnik’ enterprise (Voronezh)</p>	<p><i>Assembly operations</i> Assembly operations as a result of turn-around investment performed by Russian or foreign capital</p> <p>Change of incumbent management</p>

11. Conclusion

Given that learning implies a consistent improvement in performance, does learning exist in the Russian defense sector, in which output and productivity are still declining? The answer is yes, because the results of learning are affected not only by the intensity of the effort but also by the economic environment. Due to macroeconomic instability and a string of other uncertainties, the adjustment of the Russian industry has been almost devoid of investment in fixed assets; no absolute winner—i.e., a company that is better off after restructuring—is likely to emerge in these conditions.

Adjustment proceeded through the waiting phase that immediately followed the shock to an experimentation phase—the defining feature of which is very active learning in the incentive sense (growing awareness of top managers of their capabilities)—and has just entered into a shake-up stage defined by the change of strategic owners and incumbent management. Even a certain degree of macroeconomic stability, one may expect *investment-driven restructuring*. In the course of this stage, the Russian defense sector is likely to change more profoundly than any other sector, both technologically and organizationally. As Stiglitz (1987) argued, the ability to learn must itself be learned. Particularly during the experimentation phase, restructuring in the defense sector thus far may be defined as ‘learning to learn’ in preparation for investment-driven restructuring. One of the positive outcomes of learning to learn is the weakening of managerial entrenchment: having learned that they are incapable of turning the company around, managers are stepping down to clear the way for outside investors. In many more cases, however, managerial entrenchment has been exacerbated by a growing alliance between incapable managers and local authorities.

In conclusion, although investment activity has been negligible to date, there is a growing diversity of adjustment patterns. Investment-driven restructuring will only bolster this diversity. One may expect not only the emergence of a few multinationals from the Russian defense sector, but also a number of companies and defense-dependent regions that will remain a fiscal burden.

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PART II

Emerging Linkages between Industry and Finance from an Industry Perspective: The Case of Western Siberia

Igor Musienko

1. Introduction

Over the last several decades, the military–industrial complex (MIC)—together with the fuel and power and extraction industries—was the backbone of Siberian industry. The unprecedented ordeals of years of economic reform have shaken this once privileged sector of economy to its foundation, however, and have given rise to regional problems due to high concentrations of enterprises in these industries.

The Novosibirsk region is a glaring example, although similar problems are characteristic of Omsk, Tomsk, Krasnoyarsk and other large MIC centers in Siberia. In the early 1990s, more than 50 percent of those employed in industry and R&D in the Novosibirsk region worked in the MIC. Approximately 230,000 employees—including 170,000 industrial personnel, 55,000 workers from R&D institutes and design bureaus, and the majority of the 25,000-strong research personnel of Novosibirsk Academgorodok—performed R&D or produced armaments. Nearly all branches of the MIC, excluding the ship-building industry, are represented in the region. About 50 percent of MIC enterprises' output was defense related; the remainder was civil production, including various consumer goods.

In 1992, government defense orders were reduced by 70 percent and continued to decline in 1993–1994, although the rate of the decline was lower. The specific share of military production dropped to 12 percent in 1992 and 10 percent in 1993. In January–October of 1994, only 7.6 percent of the nearly 3 trillion rubles worth of products of the Novosibirsk MIC consisted of orders from the Ministry of Defense. In 1994, it was expected that the total production of the MIC enterprises would constitute less than 40 percent of the pre-reformation level and the number of employees would be about 50 percent of its former level.

The portrait of change that has occurred over the last three years is not fully described by these figures, however. MIC enterprises have begun to manufacture mainly civil products and to actively search for new spheres of commercialization of their production potential. Lost state guarantees of material and financial supplies have been compensated to a significant extent by newly established contacts with industrial enterprises and financial institutions. Many enterprises have attempted to become self-dependent exporters for the first time. The majority of them have passed the initial stages of privatization. Some of the enterprises were taught the lessons of bankruptcy and are entering a period of struggle and external management.

With the hardships of the transitional stage that are currently characteristic of Novosibirsk armaments manufacturers, one can hardly fail to notice the considerable intensification of activities aimed at entering new Russian and foreign markets, at a radical re-evaluation of their possibilities and at a search for new strategic partners. These activities illuminate the MIC's gradual adaptation to change.

2. Strategies of adjustment in Novosibirsk

The economically strongest, large enterprises generally choose the strategy of production diversification, which increases their stability in rapidly shifting conditions. Joint-stock companies (JSCs) such as the Novosibirsk Plant of Chemical Concentrates (NZCC) and Electrosignal are good examples of such an approach.

In the recent past, NZCC worked exclusively on defense. Conversion began during the Soviet period, however, and continued during 1992–1994. Presently, NZCC is the largest Russian manufacturer and exporter of nuclear fuel for nuclear power plants and of metallic lithium. It has an extensive program of military production conversion, including R&D, development of original technologies and the establishment of production capacities. The results of this program are already obvious: in 1993, the first production line was commissioned for the manufacture of zeolite catalyzers for reprocessing casing-head gas into high-grade engine fuel. This is a joint development between NZCC and the Institute of Catalysis of the Siberian Branch of the Russian Academy of Sciences. On the basis of original technology—high-power electron beam irradiation of water solutions of polyethyleneoxide—a production facility for gel manufacturing was established; the gel will be utilized both in the perfume and pharmaceutical industries and in the

oil-processing and aviation industries. Considerable efforts are being put into expansion of the production of chemical power sources for watches and domestic electronic devices. Lithium products received the 'Brilliant Star' prize in Mexico and a number of Spanish prizes for their commercial success, quality and trade name. NZCC metallic lithium is the world's purest thanks to a unique production technology; it is used in space and other high-tech industries. The transition from the manufacture of lithium in the form of ingots to the manufacture of semi-finished lithium products—bands, foil, bars, granules, powders—has begun. The enterprise has also started to manufacture lithium-aluminum alloys that are used in storage batteries and in the space industry. Nevertheless, the key role in the NZCC investment program belongs to the modification of design and production technology for the manufacture of new fuel pins, due to the planned change of operational regimes of operating reactors in nuclear power production industry. R&D work and production technology development resulted in a newly designed fuel pin, with an increased life expectancy from two to three years. Finally, the possibility of establishing fuel pellets manufacturing is currently under study.

Electrosignal, one of the largest Russian producers of radio stations for civil and military aviation use (all USSR aircraft were equipped with Electrosignal radio stations), prepared the production of the fifth generation of Izumrud 61tts-5165 color TV sets during 1992–1994. This TV set, assembled from components produced in Russia and other former republics of the USSR and the Philips teletext microcircuit, is comparable to middle-class Orion and Funai sets, although the Electrosignal retail price offer is 30 percent lower. The first 20 sets were manufactured in October 1994, and the output was expected to remain at this monthly level until the end of 1994. The enterprise is also actively performing research on the market for another high-class model with a full set of service functions.

In the summer of 1994, Electrosignal and two other joint-stock companies, Novosibirsk Tin Combined Works (the main Russian producer and exporter of metallic tin) and Moscow-based Vimpelcom (designer of defense systems), established the Cellular Company in Novosibirsk. The goal of the new JSC is to create a city system of cellular telephone communications based on the 'Biline' cellular system established through the R&D efforts of Vimpelcom and Electrosignal. In mid-November 1994, the first stage of the project for 750 subscribers was commissioned.

Another adjustment strategy is based on in-depth market studies of one or two products with good sales prospects. The joint-stock company Novosibirsk Electrovacuum Works (NEVW), the largest Russian tungsten and molybdenum producer for vacuum tubes and electric bulbs and the second largest developer and manufacturer of LCDs, follows this strategy. NEVW completed preparations and in October 1994 produced the first 2,000 automobile rectifiers. These units, based on NEVW Zener diodes (NEVW is the sole Russian producer of this class of solid state devices), aroused significant interest in the Russian automobile industry—the quality is equal to Bosch devices, but the retail price is about half.

The strategy of cooperation with a foreign producer, which allows the utilization of idle production capacities and the gradual adaptation to new requirements, also has definite advantages. JSC Electroagregat, a manufacturer of chassis for military vehicles and for army mobile power plants, has become the co-founder of JSC Mercedes Benz-Siberia with 85 percent of the shares. The new JSC will assemble Mercedes Benz 308D minibuses from German components using Electroagregat production facilities. In accordance with a pre-contractual agreement signed, 150 minibuses were to be assembled in 1995, and in second half of 1995 Mercedes Benz-Siberia was to begin manufacturing body panels and some of the components. If the results prove to be a success, it may be possible to establish a joint venture (JV) with Mercedes Benz AG, with an annual production capacity of 4,000–5,000 minibuses.

The technology for electro-vacuum coating and the application of coatings of different colors to different surfaces—owned by State Enterprise Production Association (PA) Sever, the well known producer of control systems for complex technical objects—aroused serious interest in some German firms, which proposed the joint manufacture of consumer goods such as window fittings. The establishment of a maintenance station for German cars together with the Bosch company is planned; a number of mechanical and electric components will be manufactured using Sever production potential. In addition, the president of the US financial-industrial group Harbor Group, during his visit to Novosibirsk, announced plans to place orders for manufacturing at Sever, the JSC Berdsk Electromechanical Works, and Saratov Aviation Works with a total cost of US \$20 million. He named modern technology, availability of high-class specialists and reasonable prices at these MIC enterprises as the reasons for his decision.

Some MIC enterprises have begun to manufacture not only civil products, but also new military equipment. For instance, the Novosibirsk Aviation Production Association (NAPA) has manufactured and currently performs flight and ground tests for the Su-34, a combat-line bomber of the fourth generation that replaces the previously produced Su-24. The decision was made in 1986 by the Central Committee of the CPSU and the USSR Council of Ministers to develop the aircraft three years ahead of schedule. The flight performance of the new bomber supports the belief that it will be among the best aircraft of its type in the world. Simultaneously, the association has made the necessary preparations for international certification and serial production of a new two-engine turboprop multi-purpose civil aircraft, the An-38.

3. Investment for adjustment

The majority of the above-mentioned and other projects of the Novosibirsk MIC are still in the initial stages of implementation; substantial investment is needed to organize serial production. For instance, NZCC needs at least 100 billion rubles (in early 1994 prices; about US \$65–70 million) to begin the production of nuclear fuel pellets. The Cellular Company requires more than US \$4 million just to complete the first stage of its project. Huge investments are needed to reorganize manufacturing and pull production association Sibtextilemash (a producer of radio components) and other MIC enterprises out of bankruptcy. What are the potential sources of such investment? This issue has become a stumbling block for the majority of enterprises.

In 1992–1994, the investments of MIC enterprises were financed primarily from the federal budget. In accordance with data from the Department for Conversion of the Committee for Economics of the regional administration, the enterprises financed 20.3 percent of conversion investments in 1992 from their internal funds, 8.4 percent in 1993 and 16 percent in 1994. The share of credits received from commercial banks for this purpose constituted 11.7 percent in 1992, 22.2 percent in 1993 and 30.6 percent in 1994. The balance (from one-half to one-third) was covered by direct financing from the federal budget and by subsidized governmental credits, which had a 3 percent annual interest rate in 1992 and a 13 percent annual interest rate after 1993.

Currently, the investment flow from former sources has declined considerably. In order to better understand the situation, one must investigate each of the possible investment sources, both traditional and new for the MIC.

3.1 Federal and local budgets

In 1994, financing of conversion programs from the budget dropped abruptly not only relative to other financing sources, but also in absolute figures. From January to November, 11 MIC enterprises in Novosibirsk received only 5.2 billion rubles (or US \$2.5 million) worth of conversion credits, which constituted only 3.9 percent of the allocation promised by the government. For comparison, one should note that in 1992 only one Novosibirsk commercial bank, which is a partner of the Promstroybank of Russia for the distribution of governmental loans, gave conversion credits to 18 MIC enterprises for a total sum of 1.8 billion rubles (approximately US \$9 million).

MIC enterprises also received little real help from local authorities. Unlike in Moscow, where MIC enterprises can obtain some assets from the funds of the Moscow government, Novosibirsk city and regional budgets are subsidized from the fund of federal subsidies to regions and could give nothing to the regional MIC. Thus, by 1994 Novosibirsk producers of armaments had parted with the illusion of effective state investment support.

3.2 Internal funds of enterprises

Few enterprises can currently afford even partial financing of investments from internal funds. The growth of the share of this source in the 1994 total investment by the Novosibirsk MIC can be mainly attributed to NZCC, and is not characteristic of other enterprises. The rapid decline in the financial situation of practically all MIC enterprises of the Novosibirsk region has deprived them of the possibility to self-finance any capital investments.

The serious financial problems of MIC enterprises are to a considerable extent determined by external factors:

- The regular breach of the routine of payments to the enterprises by the Ministry of Defense
- Large, unproductive expenses associated with the maintenance of idle production capacities and the support of the social sphere
- Taxation rates in effect

By early November of 1994, the Ministry of Defense had received military products from Novosibirsk enterprises with a value of 214.4 billion rubles, but was indebted to them for 120 billion rubles—i.e., it had paid for only 44 percent of the military orders executed. In the third quarter of 1994, the government reduced the number of orders. Thus, expenditures from the internal funds of enterprises were wasted without any compensation (the Ministry of Defense pays in advance only in rare cases).

The enterprises must also bear expenses to support mobilization and provisionally idle (due to the lack of state orders) production capacities for the manufacture of military products, as well as to support the obligatory material stock. In accordance with Russian laws, an enterprise has no right to reject the execution of a state military order. At the same time, few enterprises have guaranteed orders for several years from the Ministry of Defense; the remainder must maintain excess production capacities in case a military order is placed.

In accordance with a Presidential Decree of the Russian Federation, local authorities were obliged to account for housing, power and water supply networks and some social and cultural objects from privatized enterprises, especially MIC enterprises, on their balance sheets even in 1993. Until recently, this issue was unresolved, and the transfer of these objects to the ownership of municipalities quite often resembles movement along a closed circle line. The enterprises bear huge, unproductive expenses and fail to earn profits, which reduces their contribution to local budgets. In turn, municipalities—due to acute budget deficits—cannot find sufficient money to support the social sphere and with all available means try to slow down the transfer of social objects to their ownership.

One can hardly find a more painful problem for Russian enterprises than taxation. Clearly, the fiscal character of the Russian taxation system arouses strong protests from practically all taxpayers. There are multiple aspects of this problem that directly reduce the possibility for investment, including the following:

- Russian accounting rules do not consider the possibility of systematic re-evaluation of material assets, and fixed capital re-evaluation was performed only twice during three years of reform.

- The VAT and special taxes imposed on investment—equal to 23 percent of investment—make capital investment more expensive and often impossible.
- The monthly review of accounting rules and taxation rates resulted in a serious disorganization of tax calculations at enterprises in 1992–1993. In reply to multiple requests from honest taxpayers, taxation authorities were unable to provide any reasonable explanation. At the same time, they impose huge penalties upon enterprises for the mistakes of past years, which often bring enterprises to the brink of bankruptcy.

There is no doubt that the external factor of a poor financial situation is further aggravated by the financial inexperience of the managers of enterprises. As was demonstrated by the “Report on the Causes of Insolvency of Enterprises and the Measures to Eliminate It,” presented by a commission established by governmental order, the sharp deterioration of the finances of enterprises can be caused by such factors as unjustified large-scale crediting of consumers and the withdrawal of assets from circulation due to investment in hard currency deposits and the stocks of non-financial and financial institutions. Nevertheless, it should be stressed that the only MIC enterprise of Novosibirsk that was reviewed by the commission—NAPA—was not found to be a malicious violator.

3.3 Direct investment from external, non-state sources

In 1993–1994, the majority of MIC enterprises were transformed into open JSCs and were privatized. Virtually all enterprise collectives chose the first variant of privatization, in which 25 percent of the shares (preference shares) are transferred to the workers' possession free of charge, while 10 percent and 5 percent of shares (ordinary shares) are sold to the members of the collective and to the management, respectively, on privileged terms. In order to ensure governmental control over these enterprises, packages exceeding 50 percent of voting shares were left in federal ownership for three years—i.e., 'golden shares' were issued. In spring and summer of 1994, a portion of the federal government's shares was sold at voucher auctions.

In accordance with Russian legislation, a privatized enterprise cannot issue new shares to be sold to external investors if the share of the state in the capital of the enterprise is equal to or exceeds 10 percent. Thus, MIC enterprises still have no right to attract external investors by offering new shares to them. Nevertheless, the following options are possible:

- Run an investment contest, in which the shares belonging to the state can be sold to a strategic investor
- Sell the shares that have already been issued and repurchased by the issuer in the secondary market to a strategic investor
- Establish a joint venture with a strategic investor

After the termination of voucher privatization, investment contests organized by state property funds seem to be one of the two most important methods of denationalization of state property (the second way is through monetary auction). Not a single package of shares of privatized MIC enterprises in Novosibirsk has been sold at investment contests, however. It should be noted that investment contests did not prove to be an efficient way to obtain investment due to the fact that a number of important legal and procedural issues are still unresolved.

In the case in which some of its shares belong to the state, an enterprise being privatized has the right to purchase up to 10 percent of its shares in the secondary market and to resell them. This approach has no precedent in Novosibirsk MIC, however, probably due to the fact that a 10 percent package of shares appears insignificant to strategic investors.

Most frequently, enterprises establish joint ventures with both Russian and foreign investors. The above-mentioned Cellular Company and the potential joint venture with Mercedes Benz AG are examples of such an approach. This form does not completely satisfy an enterprise when it needs to modernize its basic, but not peripheral, technological processes.

Under the present legislative and organizational arrangements, obtaining external (foreign) investment for the privatized MIC enterprises is not an easy or rapid process. Directors of these enterprises treat external investors with great caution, as they are afraid to lose their control. While the mechanism for the protection of the interests of the state as co-owner is still undeveloped, directors are often authorized to represent the state during meetings of the share holders, thus gaining unlimited power in a joint-stock company. Measures are being taken to influence the secondary circulation of shares already purchased from the state. For this purpose, affiliated financial companies and investment funds are being established. For instance, NZCC has an investment and financial company and a voucher investment fund, both under the name of Ermak, that have tried to become market-makers of the newly born market in enterprise shares. Some managers of enterprises even try to prohibit (often illegally) their own workers from selling shares 'outside,' although the experience of enterprises in the oil and especially aluminum industries demonstrates the low effectiveness of such preventive measures.

Some large enterprises from civil branches of industry that were privatized earlier than MIC enterprises are much more active in capital markets. For example, the JSC Novosibirsk Tin Combined Works, through its own brokers, actively speculates with the shares of the enterprise, has attracted a foreign strategic investor (the British company Armet), and is currently establishing its own financial-industrial group, Russian Tin. The JSC Elsib, one of the largest Russian manufacturers of power-generating machinery, has performed a secondary issue of shares, and the money earned was used to upgrade the production potential of the company. Jointly with two other power machine-building enterprises from Ekaterinburg and Barnaul, Elsib has established the financial-industrial group Energoblock—the second largest association of power machine-building enterprises after Power Corporation, which has united a number of enterprises in the European part of Russia. MIC enterprises thus may observe the development of these civil companies, which began experiments with privatization and attraction of investments long before 1992.

3.4 Financial leasing

This form of investing is still not widely known in Novosibirsk. In autumn of 1994, joint-stock commercial bank Sibirskiy Bank, after reaching relevant agreements with Commerzbank AG and Berliner Bank AG, proposed financial leasing operations to its clients, the majority of which are MIC enterprises. To the surprise of the bankers, the MIC enterprises did not reply to this proposal at all, while food processing, trading, health care, aviation and railway enterprises have demonstrated great interest in it. The bank itself explains the absence of MIC interest by its inertia and conservatism.

To be fair, one should mention that the attractiveness of leasing is considerably reduced by the terms of taxation and customs regulations in effect, in accordance with which the recipient of leasing must:

- Pay in full customs duties, VAT and special taxes (and, in case of leasing automobiles, excise duty) for customs clearance—i.e., pay the same as the purchaser of machinery and equipment
- Pay a percentage component of leasing payments and insurance payments (which are usually included into the terms of leasing agreements) from the profit after taxes are paid

3.5 Credit from commercial banks

Out of all possible sources of investment, credits are the most acceptable for MIC enterprises. This is probably associated with the fact that relations with Russian banks have a long history, that the behavior of banks in critical situations seems to be controllable, and that the risk of possible conflict with foreign investors is comparatively low. Though such considerations are rather illusory and reputable banks may demonstrate enough firmness in definite situations, the experience of cooperation of MIC enterprises with commercial banks encourages the former to develop this cooperation further.

Russian commercial banks usually give credit only to those enterprises that have current or convertible currency accounts there. Maintaining this widespread rule gives banks the opportunity to control the circulation of assets in the accounts of their clients and thus to reduce credit risks.

The only exceptions are the ‘pocket’ banks that usually provide credit to their main founders, which do not necessarily have accounts at such banks. In accordance with a Presidential Decree, an enterprise can have only one current bank account. Thus, enterprises have the real possibility of obtaining ruble credits only in their city and generally only at one bank. In turn, a bank that intends to give credit to a client from another city must establish a branch office in that city. Consequently, real possibilities of obtaining credit are determined to a considerable extent by the degree of development of banking institutions in a specific region or a city.

4. Crediting capacity of Siberian commercial banks

As of 1 March 1994, there were 254 independent banks and 452 branch bank offices in Siberia. The backbone of the banking community are the commercial banks, which were established on the basis of the now abolished regional administrations of former USSR specialized banks (USSR Promstroybank and USSR Zhilsotsbank): Omskpromstroybank, Tomskpromstroybank, Zapsibkombank (Tyumen), Sibirskiy Bank (Novosibirsk), Yenisei (Krasnoyarsk), Vostsibkombank and Irkomsotsbank (Irkutsk), Altaikreditprombank (Barnaul), and Kuzbassprombank and Kuzbas’sotsbank (Kemerovo). Eleven or twelve banks in Siberia, including all the above-mentioned banks, are among the hundred largest Russian banks. In the cities in which MIC enterprises are key components of the industrial structure (Novosibirsk, Omsk, Tomsk, Krasnoyarsk, Barnaul), these enterprises are usually the largest and most influential shareholders of the banks that are the successors of USSR Promstroybank.

Out of the hundreds of new banks, only a few have reached a scale of banking operations comparable with the above-mentioned banks. Practically all of them are situated in the Khanti-Mansiysk and Tyumen regions and were established for ‘oil money’ (for instance, the Yugorskiy and Kapital banks in Nizhnevartovsk, Surgutneftegasbank in Surgut, and Sibneftebank in Tyumen). The only exception among the largest banks—and a classic example of a new bank that was established on initiative and is not associated with the former banking system—is Sibirskiy trgovyi bank in Novosibirsk.

The majority of the rest of the banks are ‘pocket’ financial institutions of groups of industrial ore trade enterprises. Many of them lay within the sphere of interests of MIC enterprises, which actively participated in the establishment of these institutions during 1992–1993. One may

suppose that in most cases MIC investments into the banking sphere paid off, because right after garnering licenses from the Bank of Russia, the ‘pocket’ banks gave preferential credits to their founders. In Novosibirsk, some enterprises—including MIC enterprises—simultaneously hold the shares of five to seven banks.

The influence of the third component of the banking sector of Siberia—the subsidiaries of large Moscow commercial banks—is also growing. In 1992–1993, such subsidiaries were being established for the psychological effect of representing the presence of Moscow banks, and their role in practical banking operations was negligible. Only a few Moscow banks historically had strong positions in the regions. In 1994, however, Moscow’s influence continued to increase: the number of branch offices grew, the scale of their operations increased considerably, and direct contacts of parent banks with the most promising industrial enterprises became more active.

On any suitable occasion, key Siberian banks stress their role in the financial support of Siberian industry, including the financing of industrial investment. The analysis of bank balances demonstrates that long-term crediting of industrial enterprises does occur, although its contribution to operations and bank assets is rather small. In 1993, the sum of balances of clients’ debts for all credits given by Siberian banks increased six-fold; for long-term credits, it increased by a factor of 4.7 (from 16.6 to 78.1 billion rubles, or US \$40 to 62–63 million). The specific share of long-term credits in the credit portfolio of Siberian banks dropped from 3.2 percent to 2.5 percent in one year, while for Russian banks as a whole this figure dropped from 5.2 percent to 3.4 percent.

An overwhelming proportion of long-term credit investment by Siberian banks consists of subsidized governmental loans—both conversion and investment credit—from the federal budget. Another, significantly smaller portion of long-term investment credit was given by the banks on their own initiative, from the funds at their disposal. As such credits are generally given to the enterprises that are the main co-owners of the crediting banks, one might view long-term credit in its current form more as the self-reward of strong shareholders than as an important component of bank credit policy.

4.1 The investment climate

In the specific conditions of 1992–1993 Siberian commercial banks, as well as the banks of other regions of Russia, did not show significant interest in long-term credit, direct investments and other forms of investment financing on reasonable grounds. During the period of super-high inflation, the banks were earning high profits from short-term operations. Virtually all banks generated the lion's share of income from similar types of transactions:

- Short-term credit with percentage margins reaching 30 percent and more, which provided for huge profits even in the case of negative interest rates
- Money transactions such as ruble-to-hard-currency conversion, the commission for which was between 0.5 to 3 percent (and even higher)

Naturally, in such a financial market the interest in more complicated and long-term operations was low.

On the other hand, the intensification of competitiveness in the market for short-term banking services, the reduction of the potential of speculative operations and the strong desire of clients encouraged the banks to treat long-term investment in industry as a prospective activity—and in the future, as a priority—although few can cope with the related problems. The most important obstacles to the banks' financing of industrial investment are the shortage of their own capital and the unsatisfactory structure of attracted (deposit) funds from the viewpoint of the terms of repayment of commitments to clients. In accordance with the regulations of the Central Bank of the Russian Federation, a commercial bank has certain obligations:

- Its own capital must amount to a minimum of 50 percent of the long-term credits granted by the bank (with repayment periods longer than one year) and a minimum of 70 percent of the sums invested into enterprise shares.
- It cannot grant long-term credits exceeding 100–150 percent (depending on the category of the bank) of the amount of the bank's own capital and deposit liabilities and received credits with repayment periods of longer than one year.

At the same time, capital is acutely needed by the banks themselves for their own investment into modern bank technologies, building of offices and personnel training, which are preconditions for the implementation and development of the majority of banking operations. Massive reserves to compensate for growing losses due to short-term loans are formed at the expense of the banks' own capital. In 1994, these losses became a real disaster for the commercial banks of both Siberia and Russia as a whole.

4.2 Capital size differentials

Meanwhile, the capital of leading Siberian banks is small not only in comparison with international criteria, but also in comparison with large Moscow banks. According to data provided by the Agency of Bank Information (*Economics and Life*, No. 45, 1994) for July 1994, the capital of the eleven largest banks in Siberia varied from 52 billion rubles (Kuzbassprombank) to zero (Altaikreditprombank lost practically all of its capital, which had amounted to 25–30 billion rubles, due to heavy losses) and authorized capital varied from 10 billion rubles (Kuzbas'sotsbank) to 2 billion rubles (Krasnoyarsk bank Yenisei); in comparison, each of the 20 largest Moscow banks had capital of about 100 billion rubles. The total sum of the capital of all eleven large Siberian banks was equal to about 89 percent of the capital of Inkombank, 82 percent of that of Imperial bank and only 50 percent of that of Tokobank.

In 1994, some 15–20 Moscow banks—without pinning their hopes on evolutionary capital growth (resulting from undistributed profits)—initiated large-scale issuance of shares, through which their authorized capital will constitute several hundred billions of rubles by the end of the year. Thus, the lag of Siberian banks behind Moscow leaders will become even greater.

In 1994, only Tyumen Zapsibkombank and Sibirskiy torgovyi bank issued comparatively large amounts of shares (for 20 and 17 billion rubles, respectively). The majority of Siberian banks that are open joint-stock companies do not sell their shares to the public, but rather increase their capital through the capitalization of dividends. The largest shareholders (including MIC enterprises) insist on this way to capital growth because they are unable to make additional investments into bank shares, but do not want to decrease the share of their participation and increase the number of large shareholders. Currently, the growth of bank capital due to profits is insignificant due to the sharp drop in the profitability of Siberian banks. Many of them

(Altaikreditprombank, for instance) have sustained heavy losses, mostly due to the insolvency of major clients, non-repayment of credits, and the growth of money prices.

The limited amount of capital of banks of Siberia determines their relatively restricted possibility of granting credits. According to Bank of Russia data for 1 January 1994, all banks in Western and Eastern Siberia have granted credits in the amount of 3.1 trillion rubles (975 billion, or 31 percent, from centralized credit) to their clients, while only the five largest Moscow banks (International Moscow bank, Inkombank, Promstroybank of Russia, Mosbusinessbank and Russian Credit) have granted 4.545 trillion rubles worth of credit—i.e., 50 percent more than Siberian banks.

4.3 Terms of deposit and bank losses

Not only the shortage of capital, but also the predominance of demand deposits and deposits with repayment periods of less than one year in the composition of bank liabilities have raised a high barrier to long-term credit. In reality, personal savings, governmental credits and credits from foreign financial institutions may become the main source of funds for long-term financing of investments. Competition between banks for these sources is obviously growing, and Moscow banks have become more and more active in this. It seems that Siberian banks have lost this round of competition for these assets.

In 1993, many Siberian commercial banks, in strong competition for personal savings, proposed increasingly privileged terms of deposit of savings to their colleagues. In early 1994, the interest rate for short-term deposits by private persons reached a positive value (taking inflation into account) and continued to grow. Regional banks have obviously missed the inflation trend and, in a pursuit for ‘easy’ money, have exceeded the permissible level of interest rates for their liabilities. The spring of 1994 witnessed the culmination point. Excess payment of interest rates on personal savings and super-expensive inter-bank credits (including centralized credits), together with the storm wave of non-repayment of credits granted to enterprises, have sent banks to the verge of bankruptcy.

Novosibirsk exemplifies the situation. As the results of the first quarter of 1994 demonstrate, half of the self-dependent bank institutions registered in Novosibirsk had large losses—for a number

of banks, losses exceeded the amount of their own capital. The profitability of the rest of the banks was marginally low. Facing the approaching disaster, three major banks reduced interest rates on personal deposits, including previously made bank deposits. Smaller banks were quick to follow this example; in fact, some have stopped paying interest rates at all, resulting in serious protests from clients. The clients of Siberia mortgage bank and some other banks have even established public committees, demanding that the Central Bank of the Russian Federation withdraw their bank licenses.

In contrast, the Novosibirsk office of Mosbusinessbank has announced its intent to strictly limit itself to previous liabilities and not cover losses resulting from changes in the market environment at the expense of personal deposits. Only the Siberian branch of Inkombank and three small Novosibirsk banks have acted in the same way. The events of the spring of 1994 will have long-lasting consequences, as the behavior of Moscow banks was regarded positively against the background of the irresponsibility of regional banks.

4.4 Changes in the distribution of credit

There have also been changes in the distribution of long-term centralized credits. Moscow banks, as the agents of the Russian government in the distribution of centralized credits (Promstroybank of Russia, Konversbank, Aviabank), are dissatisfied with the situation of repayment of credits. Non-payment has become more acute due to the fact that regional banks granted credits to unreliable borrowers, did not monitor how the credits were utilized and did not track the economic condition of enterprises. As a result, the Moscow banks/agents actively began to establish their own regional net, with more and more governmental credits allocated through this net. For example, the majority of governmental credits currently come to Novosibirsk through a Promstroybank of Russia branch that was established in 1994.

The decisive role in the assessment of Siberian banks as potential recipients of foreign credits—and, in particular, of credits from international financial organizations—was played by experts from the World Bank and the European Bank for Reconstruction and Development (EBRD). With rare exceptions (Zapsibkombank is currently the only one), the largest Siberian regional banks were not assessed as worthy partners of foreign financial institutions. The most important factors of such assessments, as reported by EBRD experts, relate to the shortage of own capital (especially in hard currency), the absence of explicit forecasts and plans for development, unbalanced credit portfolios, the lack of attention to current and prospective risk estimates, and the undeveloped system for insuring risk. In consequence, one may expect that foreign credits will be brought to Siberia either via leading Moscow banks or directly from foreign financial institutions.

5. Other obstacles to adjustment financing

5.1 Lack of investment crediting technology

In addition to the poor crediting capacities of banks, the financing of industrial investments has been retarded by their insufficient knowledge of related technology, which is true for both Siberian banks and branches of Moscow banks. First, Siberian banks do not have sufficient objective and professionally analyzed information on the macroeconomic situation in Russia and on the economic situation in regions in which they are planning to finance investment projects. Only a few Siberian banks have appropriate analytical services able—either on the basis of

internal R&D work or external information sources—to provide an assessment of structural shifts and to determine future growth centers in which investments have significant chances for positive results. The rest of Siberian banks cannot perform even qualitative forecasts of the risks of financing hopeless enterprises, let alone make quantitative estimates.

At the same time, feasibility studies by enterprises are still performed on an inadmissibly low level. Unfortunately, the enterprises initiating the projects are unable to provide well-grounded investment solutions, while the banks cannot offer the enterprises relevant assistance. As a rule, the projects are well grounded from the viewpoint of an engineering concept, especially given the scientific, technical, technological and personnel potential available at the enterprises. Purely technical problems appear, however, in the purchase of foreign-made equipment. In such cases, insufficient information about supply in foreign markets occasionally results in far from the best choice, from both the economic and technical points of view.

The weakest parts of feasibility studies are those devoted to the evaluation of sales, prices, expenditures and, correspondingly, the financial results of the projects. Quite often these estimates are based on casual, unverified, unprofessionally processed or simply incorrect initial information, or on contradictory assumptions. The Achilles' heel of the majority of the projects presented for discussion is the absence of whole categories of capital and current costs. The projects do not take into account such factors as inflation and changes in exchange rates, which results in uncertain expectations; the time factor is also not taken into consideration in efficiency calculations. It is illustrative that the majority of enterprises that initiate projects do not even attempt to approach professional consultants, because the banks from which they try to obtain financing cannot formulate the requirements of the projects properly.

5.2 Determining the price of credit

A big problem, for both borrowers and banks, is to properly determine the price of long-term credit and ensure against the risk of interest rate variation. When the interest rate rises to a positive level, both parties to a credit agreement become very cautious. The instability of the macroeconomic situation in the country was stressed by the events of 11 October 1994 in the Moscow interbank currency exchange, which aroused inflation expectations: a branch of one of the largest Moscow banks granted two billion rubles worth of investment credits in August 1994 to enterprises in Omsk and Tomsk with a 65 percent annual interest rate.

The practice of using floating interest rates is still unusual in both Siberia and Moscow. The fact that there are no generally accepted interest rates in monetary markets prevents the determination of well-defined approaches to credit prices. It should be noted that neither the rate of refinancing of the Bank of Russia nor the recently designed mean interbank rates of the Moscow market—MIBID, MIBOR or INSTAR—can be treated as generally accepted rates.

Leading Moscow banks grant 50–90 percent of credits in convertible currency. In this case, the problem of the interest rate is resolved by binding it to LIBOR (London Inter-Bank Offered Rate), although this approach limits the circle of potential borrowers to the largest exporters.

Unfortunately, very few MIC enterprises are able to satisfy the high level of bank requirements for the recipients of credits in US dollars or Deutsche marks from the viewpoint of export income.

When discussing the issue of interest rates, one must also mention the problems of taxation. Regular ‘accounting innovations’ of the Ministry of Finance bring the enterprises that decide to finance investment at the expense of long-term credits to a deadlock. Only part of the interest rate can be included by the borrower in the cost of capital investments and written off through the depreciation of fixed capital. The interest over the rate of the central bank as well as the interest paid to the banks after the commissioning of basic assets are charged to after-tax profit.

5.3 Poor creditability of enterprises

The problem of creditability of the borrowing enterprises, which was rather acute in 1992–1993, has become the problem of survival for Siberian banks in 1994. For example, during the first half of 1994 the share of bad loans in the credit portfolios of half of the financial institutions in Novosibirsk was higher than 7 percent, while several ‘record-makers’ held up to 50–80 percent in bad loans. In the conditions of rapid change in accounting standards, of extremely unstable taxation and customs regulations, and of monetary and convertible currency control, the majority of banks were unable to create workable systems for financial situation monitoring and for proper assessment of creditability of enterprises. Often the workers in bank credit departments are unable to make the complex evaluation necessary to make a crediting decision despite possessing huge amounts of data on the financial situation of an enterprise. Meanwhile, some banks try to acquire objective information about borrowers using methods that are quite unusual in Russian conditions. For instance, Novosibirsk Sibekobank (the former ‘closed’ affiliate of USSR Promstroybank), which renders services to the enterprises of the nuclear industry, has established a specialized accounting center for the multifaceted analysis of the activities and investment needs of enterprises and, upon the request of enterprises, it can completely perform accounting work.

All banks urgently require the proper execution of liabilities by the recipients of investment credits. Problems that must be dealt with by both creditors and borrowers in order to find relevant financing of projects include the following: the absence of a sufficient legislation basis for mortgage crediting; the mess surrounding the registration of property rights for real estate; the absence of professional valuers; and the undeveloped market for industrial buildings and structures.

5.4 Consequences

It is obvious that only a large bank with sufficient capital to perform research and analytical activities and access to relevant funds, as well as a solid reputation in both industrial and banking circles, can afford to finance large-scale investment projects. MIC enterprises’ top management has come to understand this indisputable fact, whereas previously they recklessly participated in the campaign to establish a multitude of small banks.

The analysis of the events of 1994 enables the conclusion that the development of Siberian banks has approached a definite watershed: the largest industrial enterprises are quite serious in their compliance with financial requirements from banks, whereas the overwhelming majority of Siberian banks are unable to meet these standards. It is not merely chance that a financial-industrial group (power machine-building) established on the initiative of the JSC Elsib is planning to include a number of Moscow banks among its financial partners, despite the fact that Elsib is a shareholder of at least five Novosibirsk banks. In addition, a group of Omsk enterprises in the aviation and space industry that are attempting to establish a financial-industrial group invited Russian Credit bank to participate.

6. Conclusions

The Siberian defense industry, having lost its privileged position in 1992, has entered a new phase of transition to a new model of functioning and development. Despite a more than two-fold decline in production, the MIC has generally preserved its vital capacity—although its financial and economic situation remains unstable and continues to worsen. Nevertheless, institutional and economic changes have greatly influenced the MIC.

In actively marketing its new civil goods, the military industry does its best to demonstrate the considerable potential left idle due to the abrupt curtailment of defense orders. Enterprises with double application technologies and export potential find themselves in a more advantageous situation. On the contrary, enterprises that manufactured heavy military machinery and, in parallel, agricultural and textile machinery, are in the worst situation. The curtailment of military orders was more considerable for these enterprises than for other armaments producers, and it has coincided with deep depression in the civil industries, which has consumed their non-military products.

The demand for investment by many enterprises is not yet adequate for the conditions of the market economy. The majority of armaments producers would like—with the help of investment—to finalize the existing ‘design’ of an enterprise and to supplement it with commercially oriented links, although in a multitude of cases both primary and ‘parallel’ (civil) production facilities need to be fully reorganized and a new management system must be established.

No doubt MIC enterprises, especially the ones that have passed the first stage of privatization, have changed. Nevertheless, a miracle has not occurred. While these enterprises are in the sphere of national defense, the role of the state is the decisive one. Institutional changes alter the motivation of the top managers of MIC enterprises, but they cannot alter economic imperatives, which are predetermined by the policy of the state.

Clearly transformation in the MIC will require a long period of time. More sensible and constructive influence by the state, however, will result in a higher rate of transformation and more positive results. This relates to support of investment into the defense industry to a sufficient extent. The state should explicitly determine its policy relative to defense orders, because this policy is a vital prerequisite for the development of any MIC enterprise. An enterprise that has won the right to a military order should have absolute guarantees of its budget financing. As far as reserve production capacities for manufacturing of armaments are concerned (in addition to mobilization ones), if the state insists upon keeping these capacities idle for some time, then it should finance corresponding expenditures of an enterprise.

During the post-privatization period, the state should not only provide support to MIC enterprises, but also perform the role of an efficient co-owner. Currently the state-owned packages of shares, placed under the authority of the fund of state property, are actually idling. On one hand, this gives rise to an imbalance in the management process of defense industry joint-stock companies and an absence of control over the activities of the top management of the enterprises. On the other hand, formal influence of the state often means limitations in the development of an enterprise in the financing of investments through the issuance of new shares. Entrustment of such packages of shares to combined property management companies with federal and regional state shares in the capital—but nevertheless profit-oriented—seems reasonable.

One can hardly expect that MIC enterprises will implement large conversion programs in the near future. Nonetheless, if a MIC enterprise succeeds in the implementation of at least several relatively small investment projects, this will offer a chance for faster transition to large-scale conversion and reorganization. For this purpose, some general conditions referring to the rate of taxes and custom duties are needed. The existing fiscal system does not provide for efficient investment activity in either military or civil industries.

The system of Russian financial institutions and, in the first instance, commercial banks should be ready to perform its investment mission; for this, concentration of bank capital is the principal precondition. It appears that in the near future this process will be accelerated, stimulated by both objective circumstances and by a toughening of requirements by the Bank of Russia regarding the sufficiency of bank capital.

PART III

An Industry Perspective: The Aviation Industry

Alexander Vorobyev

1. Introduction

Current trends in the former Soviet aviation industry cannot be understood fully without a brief examination of its previous history. Like any complex structure, the relatively large and broadly diversified aviation sector in the former USSR—the number of locally produced planes serving internal and external flights exceeded 2,500 and hundreds of airplanes, mostly military ones, were exported annually—maintains its own developmental inertia despite profound politic and economic shocks. Moreover, none of the post-Soviet states has introduced fundamental innovations in their policies toward the aviation industry to date.

Traditionally, the aircraft and aerospace industries were seen as elite industrial sectors, vital for economic development and the realization of national strategic goals. The two industries were given the highest priority in the centralized distribution of material funds and financial resources. Soviet productive facilities were almost exclusively inherited by Russia (which retained the bulk), Ukraine and to some extent Uzbekistan, Georgia and Kazakhstan. Russia and Ukraine have repeatedly stressed the primary importance of their aviation complexes for national development. Nevertheless, for obvious economic, financial and technical reasons, the necessary prerequisites for the preservation and upgrade of the aviation industry exist only in Russia. Ukraine must concentrate on joint or cooperative projects in close coordination with Russia. Other post-Soviet states can support their aviation facilities only by complete subordination to Russia's strategy. The research analysis below therefore focuses on Russia with necessary illustrations from Ukraine.

2. Government policy toward the civil and military aviation industry

2.1 Major inherited specific features

Major specific features that distinguished the Soviet aviation industry and have been inherited by the Russian and Ukrainian ones include the following:

- *Merger of military and civil sectors.* Similarly to other sophisticated engineering industries in the Soviet Union, the military and civil sectors in the aviation industry were and continue to be integrated, heavily influencing the structure of military and civil orders. Thus, according to crude estimates, about 70–80 percent of military spending was channeled through civil ministerial departments, and a portion of military state orders was in fact financed by civil projects.
- *Complicated structure.* The ex-Soviet aviation industry includes about 200 production enterprises and sites, design bureaus, scientific and research institutions and supportive laboratories. Resolute subordination of the industry to the realization of global politic and military goals and non-market mechanisms of distribution of financial and material resources stimulated the rise of parallelism between different productive and design units and encouraged their ‘overdevelopment’ in the form of excessive accumulation of productive and research facilities and labor. At the same time, many important components and technologies were produced and developed in unspecialized units and were only partially integrated into the aviation industrial complex. The unarticulated system of property rights and the absence of ‘exit’ on the micro-level—no firm created for specific purposes has ever been closed down—added to the complexity of the industrial structure.
- *Separation of production stages.* The complicated organizational structure and lack of adjustment mechanisms produced a situation in which, according to Valentin Klimov, General Director of Tupolev Aviation Science-Technical Complex, “functions of design and construction of airplane[s] are separated.” Previously, the government played an integrating role by linking different firms into the united process of airplane production. With the weakening of central authorities and the progressive dismantling of their authoritative grip, however, design bureaus gradually moved into the positions of integrating poles.

- *Intricate system of central control and financing.* Officially, the Ministry for Aviation centralized the overall responsibility for the industry. At the same time, however, the Industrial, Science and Military Complex Departments of the CPSU Central Committee and the Ministry of Defense powerfully influenced aviation industry development and finalized state orders. Other state organizations—such as the State Committee for Economic Relations, the State Committee for Science and Technology, and specialized departments in the Ministry for Foreign Economic relations—actively participated in shaping the industry’s strategy.
- *Dominance of the elite design bureaus and producers.* From the beginning, firms and plants concentrated around the Tupolev, Ilyushin, Iakovlev, Antonov, Sykhai, Miasishev and Mikoyan design bureaus constituted—in Soviet jargon—the ‘ministries within the ministry.’ These design bureaus represent vertically integrated units, uniting tens and sometimes hundreds of enterprises and controlled by the chief bureau in Moscow. Personal contacts at the country’s political peak allow this limited number of bureaus to maintain their high standards despite mounting economic, financial and political difficulties.

The majority of experts share the view that, in the late 1970s, central control over the industry as a balanced complex was finally lost and its development started to depend mostly on the arbitrary bureaucratic decisions taken in different central ministries and organizations under the influence of numerous lobbying groups. As a rule, lobbying groups crystallized around production of a specific airplane and/or new projects, incurring massive state spending.

2.2 Government control over the industry in Russia and Ukraine

In Russia at present, the aviation industry is supervised on the federal level by ROSKOMOBORONPROM (the Committee on Defense Industry of Russia), the State Committee on Industrial Policy, the Department of Aviation Industry in the State Committee on Machinery Building (inherited functions of the Ministry of Aviation of the USSR and the State Committees for Economic Relations and Science and Technology) and the Ministries of Defense and Foreign Economic Relations (both inherited functions of their Soviet counterparts). Recurrent structural and personal changes, loose coordination between

different government bodies, the lack of a cohesive strategic view of the industry within each state organization and controversies between them do not allow the formulation of clear-cut, medium- and long-term policies for the industry. This organizational chaos in the government structures enabled the Ministry of Defense and ROSKOMOBORONPROM to move into the leading positions.

In Ukraine, with its relatively small aviation industry, development is supervised by the Ministry for Machinery Building, Military–Industrial Complex and Conversion. The limited number of production enterprises and design bureaus makes central control easier in principle. Nevertheless, it seems that the ineffectual Ukrainian bureaucracy continuously fails to work out a cohesive strategy. For this reason, the special conversion program for aviation industry development virtually authorizes the Antonov design bureau (Kiev) to function as a coordinating body for the entire Ukrainian aviation industry.

Currently, the tendency towards the growing importance of design bureaus is gaining momentum. The collapse of the central authorities renders producers and their associations especially powerful. Decisions related to the aviation industry taken on the federal level, in both Russia and Ukraine, reflect the views of elite groups in the aviation industry.

2.3 State programs of industry support

Currently in Russia, government spending on the aviation industry is channeled through the federal budget and specialized non-budgetary ‘target’ funds. The federal budget for 1993 (n.4968-1, adopted on 14 May 1993 by the Russian Supreme Soviet) contemplated spending of 65.6 billion rubles directly for the development of civil aviation. It is important to note that the program for civil aviation is one of the three special federal programs (along with programs for the aerospace and electronic industries) included in the budget as separate line items. Direct expenditures on the military aviation sector are not specifically presented in the budget. Taking into account the integration of the military and civil aviation industries in Russia, however, economic experts claim that no less than 2–2.5 percent of total budget expenditures were supposed to be spent that year on the development of the civil and military aviation industry (estimates are made on the basis of data presented in Table 1).

Table 1: Russian Federation 1993 budget

	Absolute figure (in billions of rubles)	Percentage
Total budgetary expenditures	18,725.1	100
Civil expenditures directly and indirectly associated with the aviation industry, including the federal program of civil aviation	65.6	0.35
Federal space program	72.7	0.39
Scientific research and design-testing programs	284.6	1.5
Military expenditures directly and indirectly associated with the aviation industry, including state orders for arms and military equipment	569.5	3.0
Scientific research and design-testing programs	224.6	1.2

Unfortunately, the federal budget for 1994 provides no direct figures for spending in the aviation industry. Considering the extremely moderate volumes of expenditure on the Russian space program (28 billion rubles), conversion of defense industries (755 billion rubles), state orders for arms and military equipment (8.44 trillion rubles) and defense scientific research and design-testing programs (2.43 trillion), however, one cannot expect large state support of the aviation industry. Total budget expenses for economic uses equal 45.32 trillion rubles, while approximately 8 trillion rubles from this sum are consumed by subsidies to the coal miners' wages.

The principal source of centralized resource injections into the aviation industry was the "Program of Civil Aviation Development in Russia until the Year 2000," adopted on 12 August 1993 by the Russian Supreme Soviet. The program, supported by Prime Minister Victor Chernomyrdin, envisions spending 1.06 trillion rubles from budget and non-budgetary funds during 1993–2000 and attracting US \$436 million from external sources (see Table 2; the nominal exchange rate in August 1993 was 985.3 rubles per dollar). The program was supported by a special government resolution on "Mutual Cooperation of the Ministry of Defense and the Russian Aviation Fund in Attracting Non-budgetary Financial Resources for Creation and Usage of Aviation Technic of Double Usage, Export of Military Aviation Technic and Equipment."

Table 2: Financial expenditures planned in accordance with the federal program of civil aviation development until 2000

In billions of rubles and millions of US dollars

Budgetary expenditures on scientific research and design-testing works	486.7 billion rubles
Non-budgetary state credits on conversion	351 billion rubles
Non-budgetary investment credit	17.5 billion rubles
Non-budgetary non-state sources	202.9 billion rubles
Foreign investment	US \$436 million

Expert views on the long-term program vary considerably. Economic experts emphasize the fact that the fulfillment of the program highly contradicts the proclaimed goals of macroeconomic stabilization and strongly doubt that the program will be implemented practically. Industrial experts, assuming an inflationary nature to the program, nevertheless believe that aviation producers will succeed in obtaining necessary financial resources from the government and private sources.

Another program connected with the aviation industry is the “Program of Arming the Military Forces,” submitted at the beginning of August 1993 by the Ministry of Defense. This program fixes and regulates state military orders. Some important points are worth highlighting. First, in accordance with the law “On Defense” of the Russian Federation, the Ministry of Defense becomes the sole regulator of the volume and composition of state orders for military airplanes and aviation technology. This fundamentally changes the Ministry’s relations with producers and design bureaus as well as with the other state organizations traditionally involved in the placement of military orders, especially ROSKOMOBORONPROM. In the view of experts from the Ministry, the latter should concentrate on the coordination of work between different producing and design units engaged in the realization of the military orders. Second, the time framework for the program is limited by the year 2000, but special provisions for products with long production cycles are made until 2005, 2010 and 2015. Military airplanes are surely among those products. Third, special directorates uniting representatives of the government, the army, industry and science are being created to monitor specialized programs within state military orders.

2.4 Ideology of industrial-financial groups

All the figures of planned expenditures mentioned above are given in current prices. With annual inflation in the range of 2,500 percent in 1992 and 1,500–1,800 percent in 1993, however, real expenditures are rapidly declining compared with the previous years. In the view of the majority of experts, the government had no resources to support the aviation industry as a whole and was forced to concentrate on selected productive enterprises and design bureaus. Nevertheless, the transition from an overall to a selective approach faces tremendous difficulties. As ex-advisor to the president on military conversion Michael Maley explained: “Instead of closing three out of five plants producing similar products, production is cut by 20% at each of them, scarce financial resources are distributed evenly and all the five are kept afloat.”

The deteriorating economic situation and shrinking centralized resources forced the government to search for a solution. An escape from the investment deadlock was found in the concept of ‘industrial-financial groups’ (FIGs). The idea has been aggressively advocated by the first deputy of the Minister of Defense, Andrey Kokoshin. In his view, “concentration of scarce resources on the very few projects allow[s one] to get the maximum.” In addition, FIGs enable the simplification of central governance and create a “critical mass of closed technologies of the highest order.” In turn, this allows the maintenance of high technological and research levels of selected enterprises, more or less irrespective of the economic situation and financial abilities of the Ministry of Defense. Among other firms, Saratov Aviation Plant, Moscow Aircraft Production Organization (MAPO, a MiG-29 assembly plant) and Ilyushin design bureau are cited by Kokoshin as natural bases for FIG creation.

The FIG concept, which envisions the transformation of state production units and design bureaus into share-holding societies of different types, was strongly supported by the State Committee on Industrial Policy and by the Ministry of Foreign Economic Relations while former minister Glaziev remained in his office. The latter used the concept of ‘homogeneous industrial clusters,’ which is quite similar to the FIG idea. An analysis of the international competitiveness of Russian industry undertaken by a research team headed by Mr. Glaziev revealed that the aviation sector is one of the few with export potential, but that practical realization of this comparative advantage demands fundamental institutional restructuring of

the existing organizational structures into cross-holdings, which unite technological processes into one organizational entity.

As all the most influential government bodies share the same view on the inevitability and necessity of rapid institutional transformation of enterprises into share-holding societies, the creation of FIGs in the aviation industry has become a priority governmental task for the coming years. It is important to stress that government experts clearly realize that the “ideology of FIGs should finally bury [the] principle of branch control” (Grigory Napolov, first deputy of the State Committee on Industrial Policy). The alternative scenario of a return to the discredited branch approach in planning is not seriously discussed.

Views on possible foreign participation in the FIGs are more cautious. Andrey Kokoshin does not exclude this possibility, but restricts foreign participation to civil aviation and undoubtedly bends to favoritism of national producers. “It seems that there is nothing bad in projects of non-military airplanes with foreign engines, but [Russia] should never lose its own engine manufacturing facilities.” It should be noted that in the view of Ministry of Defense experts, the military sector must be closed to national private capital as well.

Institutional reconstruction in line with the FIGs idea was actually launched by the major aviation producers and design bureaus in 1990. The progressively weakened central government had no other choice but to authorize the grass roots initiatives, and any attempt to stop this restructuring is likely doomed to failure.

3. Restructuring of the aviation industry

3.1 General trends

On the grassroots level of producers and design bureaus, four major interest groups have manifested themselves to date. The first and the second groups are represented by the elite aviation sector, the third unites most of the aviation engine producers and the fourth consists of a number of producers and design bureaus of secondary and tertiary importance—mainly producers of aviation parts and specific aviation systems. However artificial and vague this division may look, it allows one to provide systemic and consistent generalizations about ongoing organizational restructuring and explain profound differences in attitudes toward cooperation with foreign capital.

3.1.1 Elite design bureaus and producers

Both elite groups not only adjusted relatively easily to the collapse of central control, but also did their best to destroy it. It did not take long for the top managers of the elite design bureaus and producers to realize that privatization gives them a unique opportunity to eliminate the last elements of ministerial control and to transform themselves into legitimate (co)owners of one of the most dynamic and internationally competitive sectors of the Russian economy. Not surprisingly, the elite aviation enterprises were among the pioneers of institutional restructuring and, more recently, the vanguards of privatization in the military–industrial complex. As Victor Chepkin, general designer at scientific-production amalgamation Saturn (which used to be the main producer of Sykhoi airplanes), stresses: “We started long-term restructuring at the very beginning of perestroika (e.g., no later than 1985) . . . [the] 70% drop in military orders did not take us by surprise and unprepared.”

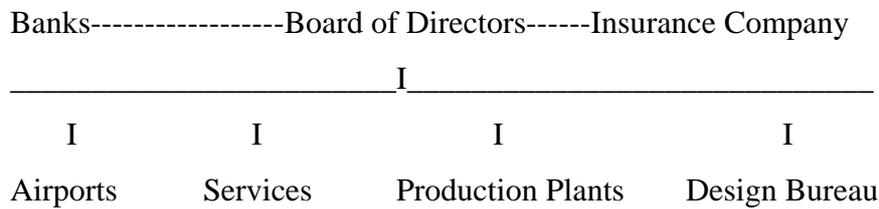
Concrete forms of institutional transformation depend on a mixture of factors: the type and closeness of cooperative relations between different producers centered around chief design bureaus, the personality and personal energy of the top managers, participation in state military and civil programs, and so on. As a rule, the primary directions and stages of restructuring are being worked out in the elite bureaus themselves and subsequently are being authorized on the central government level.

The conversion of aircraft producers and design firms into modern corporate structures followed a more or less unified path. At the first stage, each separate enterprise was transformed into a joint-stock company and acquired a legal status. Although in 1990–1991 producers had to press the government to hasten the transformation, government resolution n.906 (adopted on 18 November 1992) lifted remaining bureaucratic barriers and simplified the conversion procedure, rendering it almost automatic. Thus, the first stage was accomplished by summer 1993.

After the creation of separate share-holding societies, the major design bureaus tried to initiate the generation of cross-holding structures, aimed at uniting different stages of the technological process into one holding structure. The actual speed of reorganization along these lines depends on how rapidly interested parties—design bureaus, aviation producers and the government bodies involved—succeed in reconciling their interests and in reaching a compromise on the division of shares. Currently, all of the major design bureaus are passing the second stage.

Aviation scientific-industrial complex Sykhoi design bureau was privatized in accordance with the special government decision n.2456-p of 30 December 1992. According to the decision, the collective received the controlling package of shares. Although the state initially retained 50 percent of shares, they were to be sold to independent investors in 1993–1994. Nonetheless, the government retained the so-called ‘golden share’—i.e., the right to veto any important decision—until 1995. The Sykhoi bureau is the first fully privatized enterprise among the ‘white elephants’ of the military–industrial complex. Currently, the idea of a Sykhoi financial-industrial group is being discussed. The proposed skeleton of the cross-holding structure, which is supposed to unite approximately 50 legally and organizationally independent enterprises, is presented in Figure 1.

Figure 1: Skeleton of Sykhoi New Technologies group



To a large extent, the plan of restructuring is based on the results of a study undertaken by the Scientific Research Institute of Economy under the order of the Ministry of Defense. The study showed that out of a more than five-fold gap in labor productivity between the Soviet and Western aviation industries, only one-third can be attributed to the technological backwardness of the former. No less than two-thirds of the gap can be explained by the loose central control over military–industrial giants. The study recommends restructuring large units into small and medium-sized ones, making them completely independent in management issues, and subsequently uniting them through cross-sharing mechanisms. The whole structure was given the label of ‘internal holding.’

The Moscow machinery building plant Skorost (Speed) was privatized in accordance with the special government decision n.2354-p of 16 December 1992. The collective and administrative staff share in the funding capital is 44.9 percent while 55.1 percent of the shares are planned to be sold to independent investors and to aviation producers that are traditionally linked with the design bureau by dense cooperative ties. Other design bureaus are in the process of transformation along similar lines. The division of shares and concrete forms of holding structures are often chosen ad hoc.

As many cooperative producers of the Tupolev and Iakovlev design bureaus are situated outside Russia in the newly independent states, these two bureaus face specific problems. The majority of important Tupolev production sites are situated in Ukraine. As Russian-Ukrainian relations are far from excellent and, in the view of some experts, Russian authorities do not encourage Russian-Ukrainian industrial integration in sensitive industries, the Tupolev complex must follow an import-substituting strategy on some of its productive

sites in Russia to replace Ukrainian suppliers. Newly created productive facilities are being integrated into the main holding structure.

The task of the Ilyushin design bureau is easier. The huge airplane industrial complex in Tashkent (Uzbekistan) is not considered likely to transform itself into a serious competitor of Russian producers. Thus Genrikh Novozilov, the general bureau's designer, is arguing in favor of an inter-state holding company with participation from Uzbek producers. That, in turn, demands special amendments to be introduced into the present Russian and Uzbek legislation.

3.1.2 Aviation engine producers

Aviation engine producers number about 90, of which 58 joined the Association of the Aviation Engine Producers (AAEP) in 1988. Institutionally, the majority have already accomplished the transformation into joint-stock companies.

Compared with the elite groups, they face fundamentally different problems. Engines are the technologically weakest point of the Russian aviation industry. Their production in the USSR was initiated through the imitation of the German engines JUMO-004 and BMW-003 and the assembly of the British Derwent and Nine (the Soviet classifications for the four engines are Rd-10, Rd-20, Rd-500 and Rd-45, respectively). All of these models are outdated and uncompetitive. The sole relatively modern engine of national origin, PS-90A, received its technical certificate in April 1992, and its current modification is also uncompetitive.

As Russian airplanes equipped with the outdated engines are internationally uncompetitive and cannot measure up to ecological standards, design bureaus and airplane producers have resorted to cooperation with foreign engine producers. The supply of Pratt and Whitney and Rolls-Royce engines for Il-96 and Tu-204 aircraft endangered the positions of domestic producers, who for decades had enjoyed a calm, conducive environment behind protectionist walls. In response, Victor Chyiko, president of the AAEP, has asserted that Russia should rely on its own technical capabilities. One of the engine designers from the science-production association Aviadvigatel (Aviation Engine) has classified the appearance of foreign engines as a "mine with [a] delayed active mechanism" and has stressed that "this

means a planned destruction of [the] Russian aviation engines industry.” Alexander Inozemtsev, a chief designer for the same association, has argued that national engines are considerably cheaper compared to their Western counterparts (the PS-90A costs about US \$500,000 compared to US \$12 million for the similar Western engine). Finally, engine producers argue that practical testing of the PS-90A and the Pratt and Whitney PW-2337 did not show any technical superiority of the latter.

Despite such opposition, three major cooperative projects with foreign firms in the field of aviation engines are currently being implemented in Russia:

- Pratt and Whitney has signed an agreement with Permskie Motory and Aviadvigatel (both of Perm, Northern Ural) to create a joint venture to design a new engine, PS-90P, on the basis of PS-90A. Pratt and Whitney will provide modern technology, while the Russians will supply production facilities. The engine is due to receive its technical certificate in 1996. The American company was chosen because it proposed more attractive terms than its French competitor, SNECMA. The Russian producers will gain priority in marketing of the modernized engine and will obtain access to the American cooperator’s marketing networks.
- Pratt and Whitney (Canada) has signed an agreement to assemble its engines in Russia with the scientific-production association Klimov (St. Petersburg).
- SNECMA (France) and General Electric (United States) are cooperating with the Ilyushin design bureau, the Voronezh Aviation Plant (in Central Russia, a traditional producer of Ilyushin airplanes) and Aeroflot toward the modernization of the Il-86. The airplanes will be equipped with the SNECMA CFM56-5C engine, which allows decreased fuel consumption and extended distance range. The project is supported by the European Commission on Transport. In addition, SNECMA is examining the possibility of assembling its engines in Russia.

3.1.3 Rest of the industry

This group of design bureaus and producers consists of two typical types of units: (1) enterprises of secondary importance, which never received the same attention and resources as the cream of the industry; and (2) those integrated into larger design and production

networks but, as one director puts it, “with deterioration of the economic situation ha[ve] dropped out of the saddle.”

The majority of the group has no future and eventually will be closed. Not surprisingly, they oppose the current macroeconomic and privatization policy and lobby for preservation of non-selective state support. For economic considerations, they also strongly oppose the opening of the national aviation industry to the world market. In their demands, they join a portion of the engine producers with no market future. As a rule, these ‘counter-reformist’ enterprises are situated in the periphery of the country and their political and economic influence on the central government is negligible.

At the same time, some enterprises from this group can find their niche in the evolving division of labor, internally or externally. For instance, the Hidromash plant (Nizhniy Novgorod) signed a contract to participate in the production of undercarriages for the European airplane A-340, while the machinery production association Banner of the Revolution (Moscow), which produces fuel control systems, compensated for the decline of aviation orders by transferring to production of medical and other sophisticated equipment.

3.1.4 Strategies of integration into the world economy

The existing data allows the classification of the following typical strategies of integration into the world economy:

- *Close partnership relations with foreign firms to produce and renovate final products.* Examples include the Permskie Motory joint venture with United Technologies/Pratt and Whitney (United States) to assemble the PS-90P engine; the Jakovlev corporation’s joint venture with Hyundai (South Korea) to produce a new airplane modification; and the Miasishev design bureau’s contract with an Indian space laboratory to produce the light airplane M102. Regardless of the close cooperative ties that exist, the business partners involved seek to preserve their full independence and can withdraw after realization of the project without negative effects on their own productive and technological capacities. Such types of cooperation may be considered ‘temporary alliances.’ After acquiring basic knowledge from each other and experience in mutual work, some ‘temporary alliances’

- have the potential to develop into ‘strategic alliances.’ In this case, business partners will follow a coordinated global strategy and, possibly, exchange stocks of controlled firms.
- *Assembly or use of more sophisticated and reliable foreign products.* Examples include scientific-production association Klimov’s joint venture with United Technologies and Pratt and Whitney (Canada) to assemble foreign engines and the usage of modern engines and advanced avionics from such firms as Rolls-Royce, Allied Signal, Rockwell Collins and ANM Lithe Signals in Il-96M, Tu-204 and Be-200 airplanes. Such cooperation is a sort of ‘strategic alliance’ on a lower level and assumes foreign participation in the national firm’s capital.
 - *Fulfilling of foreign orders for conducting research work and/or manufacturing particular parts and sub-parts.* Thus, the Russian Scientific Institute of Parachute Design concluded a contract with Sisma (Spain) and Fokker (The Netherlands) to design an extraction system for the West European missile Arian-5, and a metallurgical complex in the Upper Salda (Siberia) obtained a contract to produce titanium semi-finished parts for engines.

Naturally, all variants of market adjustment can overlap. Elite design bureaus and associated production enterprises generally combine all three ways in their different production facilities.

3.1.5 International competitiveness

Comparison of the technical characteristics of Russian and foreign airplanes indicates that, on average, the former satisfy the highest international standards and in some cases are fully comparable (see Table 3). With announced prices 20–25 percent lower than their foreign counterparts, Russian industry has a significant potential to penetrate world markets. Nevertheless, several factors undermine the general competitiveness of domestic airplanes.

Table 3: Major technical characteristics of Russian civil airplanes in comparison with their foreign counterparts

<i>Long-distance airplanes</i>	Il-96M	Boeing 747-400	Airbus 340-300	Airbus 330-300	McDonnell Douglas MD-11
Weight at take-off, in tons	270	390	251	208	274
Number of passengers	318–386	412–509	295–428	295–428	293–395
Cruise speed, in km/h	870	910	940	940	940
Flight distance, in km	12,500	12,000	12,000	6,950–9,000	12,935

<i>Medium-distance airplanes</i>	Tu-204-200	Boeing 757-200	Boeing 767-300	Airbus A321	Airbus A320
Weight at take-off, in tons	108	113	157	83	73.5
Number of passengers	190–214	174–220	218	220	134–150
Cruise speed, in km/h	850	900	920	900	840
Flight distance, in km	2,750–3,500*	5,000–7,900	6,000–8,000	6,500	3,200–5,300
	3,300–4,200**				

<i>Short-distance airplanes</i>	Tu-334	Yak-42M	Boeing 737-300	Fokker-100
Weight at take-off, in tons	41.5	63	59	43.3
Number of passengers	86–102	168	128	97–122
Cruise speed, in km/h	820	830	920	780
Flight distance, in km	2,000	2,200	3,000	1,600

<i>Local airlines airplanes</i>	Il-114	British Aerospace ATP	ATR-42	ATR-72	Fokker-50
Weight at take-off, in tons	21	22	16.7	21.5	20.6
Number of passengers	60	64–72	42–50	64–74	44–56
Cruise speed, in km/h	500	490	490	530	490
Flight distance, in km	1,300	1,700	1,700	2,620	1,650

* with PS-90A engine

** with RB-211-535E4 engine

The first is the general backwardness of the engine-producing industry—it is enough to remember that the test flight of the Tu-204 in November 1994 was interrupted by engine failure. Second, outdated avionics is also incompatible with the globally dominant air surveillance and air communication systems.

National producers, in entering the global competitive race, should actively seek international cooperation with engine and aviation equipment firms in order to increase their comparative advantages. Of course, this will produce a harmful effect on uncompetitive national industries. Nevertheless, some national producers in both fields will be forced to increase their technological levels and will survive. More importantly, without close cooperation with foreign partners the possibility for national airplane producers to compete globally seems very weak.

3.1.6 Privatization and institutional restructuring

After several years of privatization experiments, the Russian aviation industry exhibits a wide diversity of institutional forms of firms and enterprises. The most typical forms of business organization include the following:

1. *Full-fledged corporations that, through cross-sharing, enjoy control over numerous productive, science and research and financial enterprises.* As a rule, the elite design bureaus and associated producers were converted into full-fledged corporations by special presidential and governmental decisions. These firms, such as Ilyushin, Tupolev, Iakovlev,

MAPO and others, may unite tens of enterprises situated across Russia and follow more or less unified technological, scientific and financial strategies. In fact, elite design bureaus perform the role of growth poles in the aviation industry. Despite noticeable successes, due to the novelty of the concept of a fully independent firm and to retained state control over the economy, newly established Russian aviation corporations require several years to transform into a classical form in the standard market understanding. In any case, the federal government will retain up to 25 percent of the shares of corporations.

2. *Independent firms, privatized in accordance with the second variant of privatization, in which the working collective receives the largest proportion of shares.* In addition, a certain percentage of shares is retained by federal and/or regional bodies (see Table 4). In principal, such firms are similar to corporate holding structures, but they command incomparably smaller resources. This group, in its turn, must be subdivided into two sub-groups: (1) enterprises that are technologically independent and serve final markets (Aviastar, IAPO, Beriev), and (2) enterprises that for various reasons have dropped out of the previously united technological chains or used to be included in general production chains (Permskie Motory). Needless to say, the latter have much worse chances of surviving unless they are included into a greater network. After primary privatization, real market restructuring begins, in which the strategic investor seeks the consolidation of the bulk of the shares. For instance Mikrodin, which acquired 5 percent of the shares of Permskie Motory during the first stage of privatization, is currently trying to increase its stake to a controlling share. Concrete ways of consolidation of controlling shares are diverse; this could be achieved at the expense of the working collective, for example, or by lowering the state share.
3. *Independent private firms, established from scratch or separated from large producers (AVIATIKA).* Such firms are small in number and at best serve as an intermediate bridge to core producers and designers.

Table 4: Ways of restructuring aviation enterprises

Enterprise	Share of the working collective	State share	External investor
Aviastar	65%	6%	Permskie Motory: ? Volga-Dnepr Company: 3.2%
Permskie Motory	?	20%	Mikrodin: 5%
Irkutsk Aviation Production Association (IAPO)	56%	14.5%	Tekhnologiya private firm: 20% IAPO: 7%
Beriev Company	?	?	IAPO: 7% Unnamed joint venture: 15%

The institutional environment in Russia is still chaotically flexible and will remain so for three to five years to come. Thus, further institutional changes are inevitable. Judging by recent experience, one may predict that only full-fledged corporations, organized on the basis of elite design bureaus and producers, and some independent firms from the first subdivision of the group have a chance to survive and reinforce themselves as independent units. The bulk of producers, which do not constitute self-sufficient technological units, are doomed to closure or accumulation by stronger units.

More fundamentally, privatization and immediate post-privatization experiences in Russia have demonstrated that no clear correspondence exists between the specific organizational form of the enterprise and its business success. In addition, with the progressive transition towards market rules, the importance of pure economic and technological factors—such as exhaustion of capital stock and its technological level, availability of unique technology, accumulated experience, skillful manpower and brain stock—will vanish unless these factors are mobilized by market style management. Market style management, including aggressive marketing, day-to-day scrutinized financial discipline, and active searches for commercial credits and new business partners, has become the dominant factor in firms' stability and competitiveness.

3.2 Initial results of restructuring

The preliminary results of industrial restructuring in the leading design bureaus are presented in Table 5. In the view of the majority of experts, the process of institutional reorganization is not yet completed and is too novel a phenomenon to accurately assess its influence on the activity of enterprises. Nevertheless, ongoing changes have already brought some positive results.

1. The transformation into joint-stock companies helped end the drastic situation of 1988–1992, in which the top managers' behavior combined socialist and capitalist features. Before 1992 (the practice still continues, but not as much as before), directors of aviation design bureaus and productive enterprises exercised significant pressure on the government in an attempt to gain additional financial resources. At the same time, mainly because the property rights system was unarticulated, resources were often used in the least economically effective manner—e.g., they were channeled into wages and salaries funds.
2. The lack of available data does not allow a detailed description of the situation, but judging by the existing information, two main ways of linking the personal interests of the top managers to the enterprise's economic activity have already crystallized. First and the most widespread, the top managers may acquire 5–10 percent of total shares in the joint-stock company (Iakovlev design bureau). Second, the top managers may sign a special, detailed treaty on their rights and responsibilities with the collective of the enterprise (Ulan-Ude Aviation Plant, Buriatia).
3. Property rights transformation combined with the break from the inherited tradition of secrecy allowed a dramatic increase in producers' and designers' flexibility. Currently, they may easily create so-called 'firms on the side,' which combine the efforts of several companies in the commercialization of a particular technology or airplane. Thus, the Mikoyan design bureau established the joint company AVIATIKA with Moscow Aviation Institute and one of the aviation plants. The combination of flexibility with high technological standards and superb production facilities previously used to assemble military airplanes enabled the creation and successful international promotion of the super-light business airplane AVIATIKA-890. Cooperation with private national firms outside the aviation industry is also gradually spreading.

4. The same factors led to a rapid opening of the aviation industry to cooperation with foreign producers.
5. Interestingly enough, the major design bureaus are trying to diversify their production. In the above-mentioned study of the Scientific Research Institute of the Economy, the narrow production base was pinpointed as one of the weakest aspects of design bureaus and producers. Minor changes in demand and in the liberalization of foreign trade can endanger the very existence of national producers. The study therefore recommended production diversification as a key dimension of industrial restructuring.

All these developments—which were hardly imaginable two or three years ago—add to the financial stability of the core design bureaus and airplane producers. From a longer perspective, they build a badly needed bridge between industrial and financial capital and create a necessary foundation for the diffusion of the highest technologies into related sectors.

Table 5: Initial results of industrial restructuring

	Conversion into joint-stock company	Dismemberment/enlargement	Creation of companies outside	Diversification of interests	Cooperation with foreign firms
MIG	yes	no	yes	yes	yes
SU	yes	no	yes	yes	yes
IAK	yes	no	yes	yes	yes
TU	yes	no	yes	yes	yes
IL	yes	no	yes	yes	yes
MI	yes	no	yes	yes	yes

MIG: Mikoyan design bureau
 SU: Sykhoi design bureau
 IAK: Iakovlev design bureau
 TU: Tupolev design bureau
 IL: Ilyushin design bureau
 MI: Miasishev design bureau

Judging by expert assessments, the already established tendencies in corporate restructuring will continue in the next three to five years. Optimization of technical cycles—e.g., creation of vertically integrated enterprises—remains the most important motivating factor behind the formation of cross-holding structures in the industry. Despite the possible transfer of a portion of shares to new owners, the leading aviation enterprises will remain essentially the same. Some experts point to the fact that being “an attractive piece of property, the aviation industry attracts diverse interests of external investors.” Nevertheless, this raises the

suspicious of the limited and closed circle of the top managers and chief designers concerning ‘strangers.’ In order to avoid becoming an easy catch for outsiders, they will stick together more tightly than before.

Experts predict two sets of problems ahead. The first is linked to reconciliation of different interests within the ‘internal holding,’ and includes potential contradictions between:

- Ministerial bodies, retaining a portion of shares, on the one side and designers and producers on the other
- Core designers versus producers, which has already manifested itself in the dispute between Mikoyan design bureau and its major assembling plant MAPO regarding who should export MiG airplanes (although this particular conflict developed between two separate legal entities before the holding structure was created, such controversies can surely develop within the holding as well)
- Core designers and producers versus producers of the specific parts and systems

Although it plays a positive role in shaping the future of FIGs, the struggle for optimization of the technical process also brings negative influences when the market behavior of the financial-industrial group is concerned. In the longer run, the dominance of an ‘engineering mentality’ among the top managers of design bureaus and aviation producers represents the most serious obstacle to the development of the industry. Traditionally motivated by technological considerations, Russian top managers with engineering backgrounds face tremendous difficulties in adjusting to the market environment. The market is predominantly seen as a sophisticated optimization process, not as a ‘lose–win’ game. Concepts of a cost-benefits approach, the supremacy of profitability, aggressive marketing and so on are absorbed and—more importantly—transformed into practice very slowly.

In the view of some skeptical observers: “It seems that many of the directors in the military–industrial complex do not realize fully, that after finally getting rid of state control their enterprises will find themselves in [a] non-delicate market environment without subsidies and [the] possibility to solve any problem by picking up the telephone.” The future shock of contradictions between actual life and ‘technological dreams’ could be severe. Among other things, the adjustment to reality will demand a shift of decision-making from the current elite

to a new generation of managers with more market-oriented mentalities. Common sense and historical evidence prove that this is not an easy or smooth process.

An understanding among national producers is growing that “foreign capital investments will be channeled into real private firms only” (Alexander Ermishin, general director of Saratov Aviation Plant). Generally speaking, it seems that aviation producers and designers, especially at the elite enterprises, are looking into potential cooperation with foreign capital more favorably. Nevertheless, the views of the top managers remain diverse.

Design bureaus with a primarily military orientation, such as Mikoyan and Sykhoi, do not feel foreign cooperation to be necessary because their production is internationally competitive. Klimov, chief designer at the Tupolev bureau—which controls about 70 percent of the internal market for passenger airplanes—also excludes cooperation with foreign firms in projects oriented toward the internal market. On the other hand, he believes cooperation in export-oriented projects is natural, and the Tupolev bureau has begun to cooperate with Rolls-Royce toward this end; the latter supplies its engines for the export variant of the Tu-204 airplane. Oleg Demchenko, director of the Iakovlev design bureau, is more favorable to cooperation with foreign companies—evidently because the new Iak-114 was designed mostly for export.

The developments described above are only indirectly linked with the ongoing privatization and institutional restructuring process. In the view of some experts, elite design bureaus and producers in the Soviet aviation and aerospace industries were always very similar to their Western counterparts, but operated in a different, non-market environment. Now, changes in the environment are not affecting the internal structures of aviation enterprises as profoundly as was expected. More shrewd observers note that until recently, none of the huge industrial enterprises in Russia felt the presence of a real market situation. State support was always at hand in emergency situations, strengthening the technical illusions of the managerial staff. Thus, the differences between quasi-market entities—holdings or FIGs—and real private firms will inevitably manifest themselves soon.

4. Obstacles and prospects

In 1992, the volume of production in the aviation industry declined by 21 percent (in constant prices) compared to the 22.5 percent average for the machinery building industry as a whole. In 1993 and especially in the first half of 1994, the production slowdown worsened (in the first half of 1994, the decline averaged 30 percent in the machinery building sector compared to the same period of the previous year) while sectoral output in the aviation industry still lagged by several percentage points behind the average rate of decline of machinery production. Nevertheless, the majority of experts share the view that the core producers and design bureaus in Russia have already surpassed the worst of the crisis caused by the break of cooperative ties and transitional shocks, and have begun to show preliminary indications of revival.

4.1 Diminishing state orders

Military orders in 1993 declined considerably and negatively affected all the producers and major design bureaus. The share of military work in total economic activity of the Tupolev bureau dropped to 15 percent, compared to 85 percent in 1992. At the Ilyushin bureau, military orders have dropped to zero. At the Sykhoi bureau, on the other hand, military work still constitutes 95 percent of total activity. Concrete figures for the Mikoyan bureau are not available, but as one designer explained: “There are no fools in the government, who want to kill the hen producing golden eggs.” The most impressive performance, however, was demonstrated by MAPO, which managed to partially compensate for falling military orders with export expansion.

The relatively better positions of the Sykhoi bureau and MAPO can be explained by several factors. First, the types of airplanes they produce constitute the backbone of the Russian military air force. Second, both have traditional export markets. In 1992, 24 Su-27s were the only airplanes exported (to China). In 1993, however, MAPO dramatically burst through to Russian traditional markets in selling 32 MiG-29s to Hungary, Slovakia, Romania and Iran. All combat aircraft were sold for Russian debt obligations. In June 1994, MAPO signed a historical contract with Malaysia, undermining the monopoly of Western competitors in the armaments market of Southeast Asia. According to the contract terms, MAPO will sell 18

modernized MiG-29s in exchange for hard currency and palm oil (25 percent of the deal payments). Tupolev military aircraft—strategic bombers such as the Tu-160—cannot be exported without breaking confirmed international obligations.

Civil orders have dropped considerably as well. For decades, the sole buyer of civil airplanes was Aeroflot. Before the dissolution of the Soviet Union, the airplane fleet consisted of 80 Il-86s, 170 Il-62s, 500 Tu-154s, 450 Tu-134s and 150 Iak-42s. About 70 percent of the fleet was near exhaustion. In 1990, Aeroflot placed an order for 300 Tu-204s, but because of the lack of resources and the division of Aeroflot into smaller, independent joint-stock companies, the fate of that order currently remains unclear. In any case, due to the physical exhaustion of the existing fleet of airplanes, the demand for civil airplanes will reach 2,000 for internal flights and 250 for international airlines in 1994–2100 according to tentative estimates.

New mechanisms for the placement of civil orders do not yet exist. For military orders, the Ministry of Defense and ROSKOMOBORONPROM have developed a procedure and have prepared a corresponding governmental decree. At best, the government adopts ad hoc decisions. For instance, the government took a special decision to provide directed financial help to Aviastar and the Ulyanovskii aviation plant, which assemble Tu-204s and An-180s, respectively. A similar decision is expected soon for plants assembling Il-96s (see also the section on first-priority projects below). Such decisions support producers directly and avoid problems in selling airplanes as well as issues related to property rights over the airplanes sold.

Recently, some experts proposed the creation of a Russian leasing company with mixed state-private capital, which will buy airplanes and lease them to air-transportation companies for 12–14 years. The funding capital of the company would reach 600 billion rubles. In the view of other experts, neither state orders nor rare and very limited foreign injections into the industry can solve the problem of effective demand for airplanes in a satisfactory manner under the given circumstances. “The industry is ready for real privatization, it just has no other choice.”

The top managers of the elite design bureaus could not give a clear answer to the problem of declining orders. For years, the problems of marketing and selling were not among their tasks and competencies. To a large extent, this remains true today.

4.2 Major operational problems

Major operational difficulties named by representatives of the leading design bureaus are summarized in Table 6. It must be stressed that the materials presented in the table reflect the personal, very subjective views of some of the managerial staff and experts' evaluations. For this reason, they should be considered cautiously. In addition, export-oriented design bureaus pinpoint problems related to certification of their production in accordance with internationally recognized standards as key obstacles. Currently, no Russian airplane has international certification and most avionics and supportive aviation systems do not match international standards.

Table 6: Major operational difficulties facing the leading design bureaus

	Special problems caused by collapse of central control	Lack of financial resources	Out-migration of skilled personnel	Break of cooperative links
MIG	partially yes	yes	no	yes
SU	yes	yes	no	yes
IAK	yes	yes	no	yes
TU	yes	yes	no	yes
IL	yes	yes	no	yes
MI	yes	yes	no	yes

MIG: Mikoyan design bureau

SU: Sykhai design bureau

IAK: Iakovlev design bureau

TU: Tupolev design bureau

IL: Ilyushin design bureau

MI: Miasishev design bureau

The evaluations presented above and other data allow the conclusion to be drawn that four out of the leading six bureaus—Mikoyan, Sykhai, Ilyushin and Tupolev—are in a slightly better position compared to the other two. Subjectively, the top designers and directors feel that their firms are doing well. Mikhail Simonov, chief designer of the Sykhai design bureau, claims: “Our bureau feels better as compared to others. We succeeded in finding the place on market. Our production, both military and sporting airplanes are highly competitive internationally. Our standards are sometimes even higher than average international ones.”

Valentin Klimov, chief designer at Tupolev bureau, stresses that even “finding of financial resources will not constitute a problem when problems of privatization and property rights are solved.”

Eventually, all aviation producers and design bureaus will face the problem of out-migration of skilled personnel. Nevertheless, in the core bureaus, losses of personnel do not exceed 5–10 percent, and none of the top managers or designers cited the problem as a serious one. As stressed above, an excessive labor force—including engineering staff—was one of the specific features of ‘socialist enterprises.’ Thus, out-migration of part of the labor force is a necessary adjustment with few negative consequences. This process is completely different from the similar one that takes place in the market environment in years of crisis.

Interviews and discussions with decision-makers indicate that the microeconomic operational problems of enterprise have not yet received enough attention. Figuratively speaking, the majority of ‘red directors’ adjust to external economic shocks in a socialist way. The most typical adjustment tactics are presented in Table 7.

Table 7: Major elements of adjustment tactics

	Lobbying for state support	Barter foreign trade	Barter chain with cooperative producers	Selling of part of equipment
MIG	yes	yes	yes	no
SU	yes	yes	yes	no
IAK	yes	yes	yes	no
TU	yes	yes	yes	no
IL	yes	yes	yes	no
MI	yes	yes	yes	no

MIG: Mikoyan design bureau

SU: Sykhoi design bureau

IAK: Iakovlev design bureau

TU: Tupolev design bureau

IL: Ilyushin design bureau

MI- Miasishev design bureau

Even the most market-oriented and successful Russian managers and directors follow a special path of microeconomic adjustment that is absolutely non-typical according to established Western standards. Thus, Alexander Ermishin, director of Saratov Aviation Plant, was forced to channel more material and financial resources to the social sphere and then to create a network of retail firms around the plant in order to adjust to the changed environment. This allowed not only an increase in total employment from 18,000 to 20,000, but also the acquisition of financial resources to facilitate technological reconstruction of the main production lines.

It is difficult to get rid of the impression that the prevalent optimism in the leading plants and design bureaus rests on the subjective perceptions of top managers. Preoccupied primarily with privatization (part of which is self- privatization), they frequently tend to underestimate existing and coming difficulties. There is no doubt that production continues because of the enormous accumulated inertia.

4.3 Concentration on first-priority projects

The optimism of the leading design bureaus rests upon their undisputed technological superiority and monopolization of the internal market. The state cannot reorient to other producers, and imported airplanes are at least 20–25 percent more expensive even if average world prices are applied to calculations of production costs. Nevertheless, the painstaking transition has forced the producers and the government to concentrate on only a few projects.

The Ukrainian government and producers, with no alternative, have followed the same modest path (see Table 8).

Table 8: First-priority projects in Russia and Ukraine

Airplane	Proposed price	Tentative estimate of market demand	Design bureau	Major assembling plant	Type of state support
Tu-204	US \$35 million	500	Tupolev	Aviastar (Ulyanovsk Tatarstan)	Special government decision on financial support
Tu-334	US \$20–25 million	*	Tupolev	Taganrog Aviation Plant	*
Il-96M	US \$75 million	150	Ilyushin	Voronezh Aviation Plant	*
Il-114	*	*	Ilyushin	Kymartauss Aviation Production Amalgamation	*
An-124-100	*	*	Antonov**	Aviastar (Ulyanovsk Tatarstan)	*

* no information available

** Ukrainian design bureau

The most critical observers of the industry claim that the present high standards of the post-Soviet aviation industry are based on five to seven year-old laboratory and testing work. As spending on prospective projects has been virtually eliminated, they forecast a severe crisis and the inevitable decline of national aviation positions in the coming five to ten years. This dark pessimism is not unanimously shared, however. While nobody rejects the fact that the insatiable hunger of the aviation and aerospace industries will not be satisfied as easily as before, the necessary basis for 20–25 years of practical implementation of already-developed technical ideas is guaranteed.

To a large extent, speed in the practical realization of technical ideas depends on global political developments. Because of the huge volume of resources required, such projects can be undertaken only internationally. As practically all modern technologies are characterized by dual civil/military usage, international cooperation can begin only after strategic political decisions on national military–industrial complex convergence are made.

APPENDICES

I. List of Workshop Participants

**“Learning to Restructure: Conversion of Russian High-Tech and Defense Industries”
25–26 November 1994, Moscow**

Valentin Chistyakov

*Doverie-R Regional Conversion Fund,
St. Petersburg*

Tarja Cronberg

Technical University of Denmark

Joseph Di Chiaro III

*Bonn International Center for Conversion
(BICC)*

Gennady Feshin

Russian Ministry of Defense

Sergey Glaziev

*Chairman of the Committee on Economic
Policy, Russian Duma*

Ksenia Gonchar

*Bonn International Center for Conversion
(BICC) and Institute of World Economy and
International Relations (IMEMO)*

Yevgeny Kuznetsov

The World Bank, Washington, DC

Dmitri'i Lvov

*Central Economic and Mathematical Institute,
Moscow*

Andery Markin

Russian Ministry of Defense

Igor Musienko

Strat-Ekon, Novosibirsk

Petra Opitz

*Carl von Ossietzky University, Oldenburg,
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Alexander Ozhegov

*Russian Bank for Reconstruction and
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Victor Rassadin

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Alexander Tsapin

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*Statistics and Information Department,
Russian Committee on Defense Industries*

Victor Volkonsky

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*Russian Fund of Foreign Economic Policy,
Moscow*

II. Regional, Sectoral and Size Distribution of Enterprises in Case Studies

Regional distribution:

Voronezh region	3
Novosibirsk region	4
Moscow and metropolitan area (Aleksandrov, Fryazino, Zelenograd)	7
Tula	1
Eastern Siberia and Far East (Tomsk, Komsomolsk na Amure)	2
St. Petersburg and the region	4
Urals (Izhevsk, Ekaterinburg)	2
North (Severodvinsk)	1

Sectoral distribution:

Aircraft and space	4
Shipbuilding	1
High-precision mechanics	4
Radio equipment, communications, electronics	12
Ammunition, armored vehicles	3

Size distribution (1993):

Less than 5,000 employees	3
5,000–10,000	14
More than 10,000	7