# Growth, Stagnation, and Transition: Economic Implications of Soviet Ministerial Organization

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Soviet institutions have been blamed for causing the "productivity slowdown" of the 1970s and the economic decline of the 1980s. As a modern centrally planned system, the Soviet economy could not generate dynamic growth in part because incentive schemes within industrial ministries failed to reward innovation and hard work on the part of managers. However, in the early years of the Soviet Union, ministries effectively implemented policies specifically designed to fulfill the leaders' economic goal of catching up to Western economies in heavy industry production.

Industrial ministries were organizations that Stalin and other Soviet leaders created in 1932 to implement development policy and promote their interests within the centrally planned economy. Such administrative organizations are important economic actors because they affect the rules of the game by which decision makers play [Greif, 1995; North, 1994]. The rules of the game change at the time an organization is established and as the organization matures, influencing the progress of economic institutions over time. Analyzing the choice of the organizational form of Soviet ministries will lead to a greater understanding of how leaders structured incentives in order to achieve development goals and point toward sources of inefficiencies that came about as the system of industrial administration evolved.

By way of a system of political decision making and bureaucratic organization, Soviet central planning supplanted two key functions of a market economy's price mechanism: the allocation of resources and the incentive to expend effort. Broad outlines of the allocation of resources between sectors were made at the highest levels at the inception of planning. Soviet leaders decided what would be produced, approving targets for the production of various goods. They also had a great deal of influence over which sectors

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would be changing production techniques by controlling technology, encouraging Western imports of machinery and equipment in key sectors [Sutton, 1968]. But, despite the fact that leaders were deciding what and how to produce, the system still had to solve the problem of encouraging managers and workers to carry out leaders' directives. The bureaucratic structure and the rules embodied in it had to provide sufficient incentive for economic actors within the system.

## Historical Influences on Stalin's Choice of Organizational Form

From the perspective of Soviet leaders, this organizational design problem can be viewed as a one-time challenge to build a system that would allow the USSR to catch up with Western nations economically and militarily. They were not concerned with how economic organizations would evolve over time, partly because the short-term survival of their own power was quite important to them. In addition, since Western nations had superior technology, it made sense to buy capital equipment from abroad and adopt modern production techniques in key sectors. Therefore, the organizational structure of ministries had to allow for the rapid diffusion of technology borrowed from the West rather than encourage its development at the shop or laboratory level. This dissertation envisions Soviet leaders' decision over organizational design as essentially static – leaders wanted a system of planning that permitted the realization of short-term economic goals.

While seemingly at odds with Marxist ideology, strong material incentives for performance came into use with the formalization of planning. The dismantling of the previous organization that encompassed both planning and administration involved the separation of planning from management functions during the early 1930s. This action severed the implementation of production plans from the allocation of resources to sectors and determination of overall production goals. Separating these functions was crucial to the success of incentive schemes in the 1930s. This change in organizational structure removed a great deal of the regional and sectoral fighting over resources from the planners' coordination function. In addition, responsibility for carrying out plans was placed squarely on the backs of ministries and enterprise managers. With the change in the organizational form of planning and administration of industry came a dramatic increase in the use of incentives to encourage workers and managers to exert more effort.

To promote rapid growth in heavy industry, Soviet leaders gave "socialist" incentives to managers and workers. The term "socialist competition" encompasses several different incentive schemes pursued by Soviet leaders from the late 1920s. These various schemes entailed either group or individual material incentives (payments or privileges to a single manager, worker, or groups of workers) along with moral incentives fostered through "education."

One part of socialist competition involved a set of contests between pairs of factories. These inter-enterprise competitions set targets for cost

reduction or productivity increases and gave bonuses to the winning enterprise's workers and managers. The first contest, in 1927, challenged managers to decrease costs at enterprises throughout the Soviet Union, offering a small number of bonuses to directors and technical personnel [Carr and Davies, 1969, p. 344]. Thereafter, pair-wise matching of firms in particular industries was used to provide incentives to workers and managers. The competitions became common in the 1930s as a way of measuring the success of the management of a particular plant [Granick, 1954, pp. 192-3].

**"Socialist Competition" and Unbalanced Soviet Development**

After Lenin's death in 1924, a disjointed Soviet leadership wrestled with the question of how to structure a Marxist economy. Their choice of whether to organize ministries on a regional or an industry basis emerged subsequent to the debate over the way economic development should proceed. Both political and economic in nature, the industrialization debates of the mid-1920s centered around whether favoring industry or agriculture would be the best way to modernize the economy. During the course of these debates, Stalin succeeded in ejecting his rivals from the inner circle of political power. The remaining Soviet leaders wanted rapid growth in heavy industry above all else. Since they believed enterprise directors were a significant source of resistance to the high growth rates planned for industrial output, it is likely that leaders contemplated the consequences on managerial incentives of various possible organizational structures to administer industry.

Incentive schemes in the form of "socialist competition" represented viable alternatives to market forces in the newly nationalized economy. The pair-wise matching of enterprises into contests designed to increase productivity provided the incentive for managerial effort in an uncertain economic environment. Since leaders could not credibly commit to stable individualistic incentive contracts, they took advantage of the revolutionary fervor that produced competitions between groups of workers. At the level of the enterprise, competitions provided the incentive to increase work effort on the part of managers and workers alike. Commitment to contests between enterprises were credible because of the publicity necessary to make the competition possible.

Branch planning and socialist competitions were introduced at the same time resource allocation and administrative functions were divided into separate organizations. Separating the coordination and incentive functions in the planned economy diminished problems of rent-seeking, but also allowed for the provision of stronger incentives within the bureaucratic system. In 1932, industrial ministries became exclusively responsible for administering industry and implementing incentive schemes. We can think of Stalin's organizational design problem as a question of how to pair enterprises into competitions – either by region or by industry – to encourage the desired managerial effort allocation at the lowest cost to the incentive scheme. The model in this dissertation shows that the greater the correlation between the shocks facing

two competitors, the lower the incentive cost to elicit the same level of effort from managers. In addition, the more unbalanced the development strategy leaders pursue, the greater the economic rationale for choosing industrial branch, rather than regional planning.

## Historical Evidence on Sectoral Priorities and Technology Adoption

During the Soviet industrialization drive, the nature of uncertainty surrounding production changed as leaders pushed the economy to the limits of extensive growth while directing enterprises to adopt Western technology. Extensive growth, entailing the mobilization of underutilized resources, affected uncertainty about the quality and availability of inputs to the production process. Furthermore, the use of new Western technology intensified the importance of the quality aspect of the newly mobilized resources.

Uncertainty facing managers of enterprises located in the same region would be similar where there were regional disturbances in basic inputs or infrastructure. Regional shocks are likely to be highly correlated in cases where there is regional variation in inputs with limited means to transport those inputs across regions. Both quantity and quality of labor may have been responsible for correlations in regional shocks. However, labor was extremely mobile during the 1920s and the industrialization drive. Railroad was the primary mode of long-distance transport and accounted for the bulk of increasing proportion of transportation investments. In addition, the most important regional factor for infrastructure was the provision of electricity. Lenin's plan for the electrification of Russia had been fulfilled just as the industrialization drive was beginning.

Technological change came from the top, most of it borrowed from the West, rather than being developed at the level of shop or laboratory. The government attempted to transplant the best large-scale technical practices of Western companies wholesale to industry throughout the Soviet Union in a very short span of time. Such widespread adoption of new technologies at this point in Soviet history led to similar realizations of shocks within industries. Building new industrial enterprises in geographically distinct, but comparably undeveloped parts of the Soviet Union produced parallel difficulties for managers in particular industries. The common method of modernizing an industry involved importing Western machinery and equipment, and procuring the assistance of foreign consultants. At the same time, an admiration of Taylorism encouraged the standardization of production techniques as they were widely distributed [Beissinger, 1988]. For older enterprises, the issue of the complementarity of new and old capital would create greater difficulties and uncertainty in the use of new production techniques. The extensive discussion of the "rationalization" movement, encouraging the tailoring of new technology to the local environment, in Soviet leaders' speeches during the early 1930s indicates the lack of complementarity of new technology to existing Soviet conditions.

The widespread borrowing of technology also led to difficulties in matching qualities of inputs to Western specifications and coordinating various parts of the production process. Since managers in most industries had no alternative but to hire unskilled labor, they tended to substitute unskilled for skilled labor. This process caused uncertainty to be related within industries since optimal capital-labor ratios would be the same for enterprises using the same modern equipment. For these reasons, inexperienced Bolshevik managers in disparate regions faced similar challenges in dealing with the modernization of their industry.

**Complementary Institutional Arrangements**

Throughout the industrialization drive of the 1930s, Soviet leaders implemented a combination of policies complementary to their overall goal of growth in heavy industry and their choice of branch planning. Anything that decreases the variances of industry and resource shocks, or that increases the correlation of industry shocks will improve the information content of the contest between managers and decrease the cost of the incentive scheme. Therefore, increasingly restrictive labor policy, group and individual work incentive schemes, and the educational focus on technology all facilitated the pursuit of unbalanced development through branch planning.

Labor policy over this period reinforced the effectiveness of socialist incentive schemes: labor mobility was increasingly restricted, diminishing the variance of regional resource shocks. New workers flowing into industry from the local countryside contributed to uncertainty of production on a regional basis, but the dramatic relocation of labor to urban areas also had industrial branch ramifications. Workers for major industrial projects were recruited from throughout the country and concentrated into several new industrial centers. In addition, the massive effort to bring women and other young, inexperienced workers into the industrial workforce occurred throughout the country. Soviet education policy promoted increasingly specialized and technical training for all types of workers, but especially in heavy industry. Policies standardized on an industrial basis, rather than allowing for regional variation, enhanced the effectiveness of the branch system of planning.

Many complementary "socialist" industrial policies increased the correlation between industry shocks. One program that began in 1930 had brigades of "shock" workers travel from one factory or mine to another that had lower performance [Davies, 1989, p. 259]. The idea behind moving teams of workers was to spread socialist enthusiasm, but this process would also increase the correlation of stochastic shocks between enterprises in the same industry. The more standardized the response to new technology in any particular ministry, the more similar the difficulties encountered in the rationalization process for a given industry.

Many Soviet scholars argued that socialist competition aided the diffusion of new techniques of production and methods of organizing production processes [Kuzminov, 1977, p. 13]. If groups of workers or

managers had wanted to improve their chances of winning the competition, however, it is unlikely they would have willingly shared information with competitors. In the oil and gas ministry, an examination of how information was shared shows that ministries held conferences to introduce technology to groups that may be competitors [Saakov and Veliev, 1957, p. 59]. Seminars for groups of workers sometimes took the form of meetings between winning brigades discussing innovations at their disparate drilling or refining sites. These practices within ministries would likely increase the correlation of the shocks between enterprises, making a competition between enterprises within the ministry more effective.

Managers were expected to transform production processes by taking on unskilled workers and embracing modern technology borrowed from the West. A faster pace of development would increase the uncertainty managers faced, making incentive schemes more costly to implement. Therefore, policies designed to reduce the costs of implementing the tournament incentive scheme went hand-in-hand with the choice of the structure of central planning.

While the choice of branch planning in the early 1930s facilitated Soviet leaders' unbalanced development objectives, it also proved to be a lasting choice. The primary explanation for highly correlated industry shocks is the difficulty in adapting Western technology to Soviet circumstances. Because the Soviets viewed the importation of capital goods from the West as a one-time effort to catch up technologically, it is likely that the reasons to pursue branch planning would diminish over time. After the massive industrialization drive, the correlation of industry shocks would likely decline, as would the overwhelming desire to promote capital goods sectors at the expense of others. Despite the fact that it may have ultimately been a superior system, switching to regional planning became politically infeasible by the time Khrushchev attempted it in the late-1950s.

## Conclusion

Although Soviet industrial output and labor productivity grew rapidly in the years between the World Wars, this growth was limited by the way in which it was achieved. Branch ministries were particularly effective at carrying out the unbalanced development objectives of Soviet leaders during the 1930s. As the economy grew, however, industrial ministries were able to shift the institutional rules governing resource allocation in their favor. The combination of branch ministerial planning and the geographic dispersion of Soviet industry on political grounds created a situation of ever-rising costs of coordinating production.

Soviet administrative organizations that maintained a complex set of economic relations to ensure coordination and provide incentives in a non-market system became less efficient over time. Strong incentives for economic performance in the form of nonlinear bonus schemes for plan fulfillment meant that industrial ministries became autarkic. In a manner similar to that described by Chandler [1977, p. 488] for American corporations, Soviet

ministries integrated backward in order to have greater control over the supply of inputs. Rather than having managerial coordination as in American corporations, the Soviet system entailed ministerial coordination: industrial ministries allocated (and reallocated, in cases where there had been errors in planning) supplies to enterprises under their authority in various regions throughout the Soviet Union. American corporations were successful because, in the end, their operations had to pass a market test, while Soviet ministries merely had to appease leaders who had become beholden to the ministries. The flexibility of the American corporate form allowed for vertical integration to be undone as it became profitable to do so, but Soviet ministries remained integrated. As large successful ministries gained bargaining power over leaders and central planners, the problem of departmental competition intensified. Stalinist central planning set up a trade-off between the strength of incentives for economic performance and leaders' ability to determine the sectoral and geographic allocation of resources, but this trade-off was not stable during the course of Soviet history, leading to the downfall of the system itself.

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