

Command and Collapse: The Fundamental Problem of Command in a Partially Centralized Economy

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Abstract

When a principal in a hierarchy issues a command to an agent and advances resources for its implementation, the temptations for the agent not to comply but to shirk or steal from the principal constitute the fundamental problem of command. Historically, partially centralized command economies have evolved various enforcement mechanisms to solve this problem, assisted by nesting the fundamental problem of exchange within the problem of command. The Soviet economy provides some relevant data. The Soviet command system combined various enforcement mechanisms in a shifting equilibrium as principals and agents learned and comparative costs and benefits of each mechanism also changed. When the conditions for an equilibrium disappeared, the system collapsed.

Acknowledgements

This paper is prepared for a conference on “Performance and Efficiency in the USSR: New Measurements and the Bergson Legacy” to be held in memory of Abram Bergson (1914–2003) at Harvard University, 23 and 24 November, 2003. It contributes to research on the political economy of the Soviet Union under Stalin funded by the Hoover Institution (principal investigator, Paul Gregory). I thank Leonid Borodkin, Paul Gregory, and Avner Greif for an inspirational conversation at Stanford University in July 2003, and Michael Ellman, Paul Gregory, Peter Law, Valery Lazarev, and Andrei Markevich for comments and advice. I am responsible for errors.

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In *The Economics of Planning* Abram Bergson (1964: 327-9) distinguished between the economic merit and the rationality of socialism. The merit of socialism was to be gauged by the efficiency with which it satisfied consumer welfare. In contrast its rationality could be assessed either by the same standard or in relation to the objectives expressed by “planners’ preferences”. Rationality in either sense, he suggested, is best measured by

the degree to which conduct conforms to the material ends sought ... We are thus led to ask, in respect to Soviet conduct regarding resource use, the cardinal question that arises in respect to economic conduct generally: In terms of what material ends and to what extent is such behavior economically rational?

It is likely that few will have changed their minds about the *merits* of socialism as a result of the opening of the former Soviet archives. The chief advantage that access to new documentation has given us is new insight into the *rationality* of the Soviet command system. We are able to learn in unprecedented detail how Soviet officials conducted themselves in the privacy of their offices and why they behaved as they did. Specifically, we find that officials at each level were continually issuing new decrees and instructions to those below them, who rarely did exactly as they were told. At the time the same officials were receiving reports and information from below, some distorted and the rest incomplete; their core problem was to verify and control what people were really doing when they claimed to be obeying orders. The fact that officials at each level of the command system were *not* merely passive instruments of higher authority is what makes its operation an interesting problem.

How did Soviet officials command people and allocate resources? How did Stalin and his successors get others to do their bidding? This paper is about the rational behaviour of a principal who gives an order and the agent who is expected to carry it out. In studying the behaviour that we observe historically it tries to answer Bergson’s

“cardinal question”: “In terms of what material ends and to what extent is such behavior economically rational?”

According to Avner Greif (2000), any institution that persists must be understood as an equilibrium of individual motivations and constraints: each person participates in it because it is in their interest to do, conditional upon their expectation that others have made the same calculation. How is the equilibrium of individual motivations and constraints achieved in the case of market institutions? Greif describes the “fundamental problem of exchange” as a game that arises from the sequential nature of a transaction. Two players contemplate a contract to engage in mutually beneficial exchange. The first player must initiate the contract and advance the means to fulfil it to the second player, or alternatively abstain. The second must decide to cooperate by completing the contract or to renege by stealing the proceeds of the exchange, including the advance, at the expense of the first player. In the absence of an enforcement mechanism the best strategy of the second player is to renege, and that of the first is to abstain. Historically, therefore, the rise of market exchange required the development of a variety of public and private enforcement mechanisms that overcame this problem.

Hierarchies give rise to a corresponding fundamental problem of command. The origin of the problem is the same, the sequential nature of a transaction. A principal gives an order to an agent and advances the means to implement it. Why is an order necessary? Because the principal desires an allocation of resources that differs from the one that would result from the agent’s pursuit of her own self-interest; if this were not the case then the desired allocation would result from the agent’s action without having to be told. It follows that for the hierarchy to find an equilibrium the obedient agent must be induced to forego opportunities for private gain. This problem must be solved for a hierarchy to find an equilibrium.

Hierarchies have existed in many forms and for many reasons. One form is the modern corporation. The transaction-cost approach of Coase (1937) and Williamson (1975) suggests that corporations exist in order to realize potential efficiency gains. A neo-Marxian alternative has proposed that they exist to exert power and monopolize

resources (Hymer, 1960/1976; Marglin, 1974; Cowling, 1982). In the first case the hierarchy grows because its superior efficiency gives it a competitive advantage, and society gains as a result. In the second case it grows by stifling competition and extracting a monopoly rent, while society suffers a deadweight welfare loss.

In this paper we will think about a particular kind of hierarchy, the command system. The command system is a hierarchy that attempts to monopolize a territory by force; it is driven by monopolization, not cost reduction. The idea of a hierarchy that monopolizes a territory suggests that we are looking at something similar to Mancur Olson (1993) when he analyzed a proprietary dictator. Monopolization is also the strategy that Evgenii Preobrazhenskii (1926/1965) advocated for the Soviet economy in the 1920s.

At the same time the problem that I describe has a more general aspect in that it may be common to all complex, vertically organized institutions from governments and budgetary service providers to voluntary groups and private corporations, even where their existence is predicated on superior efficiency. This is because, even if an organization exists solely to enable its members to exploit a mutual efficiency gain that is shared with society, any individual within the organization may derive a greater gain by behaving opportunistically at the expense of the other members.

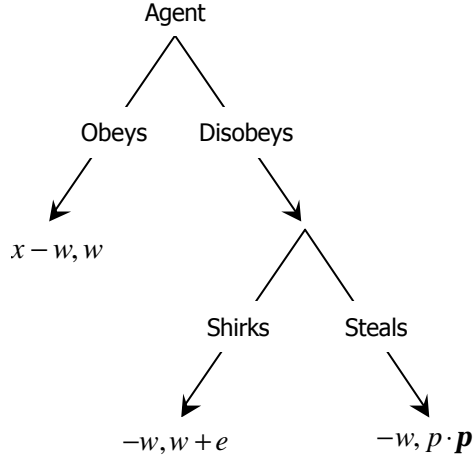
Such opportunities have always been present in command systems because, as a matter of historical fact, their monopolizing drive was never entirely successful. As a result, the control of resources remained partially, not fully centralized. We will use the Soviet economy as an example.

1. The Fundamental Problem of Command

In a market system each player's first option is to abstain. In a command system there is compulsion: to abstain amounts to mutiny or desertion. The agent may not abstain, but must decide to obey or disobey, and disobedience may take more than one form. Figure 1 illustrates her possible strategies. The obedient agent receives the wage advanced w and returns the planned output x to the principal who thus receives a surplus $x - w$. The disobedient agent may shirk. In this case she takes the wage and ignores the command.

Her payoff is the wage plus the gain in reduced effort, $w + e$, which is always preferable to the wage alone, while the principal records a loss, $-w$.

Figure 1. The Fundamental Problem of Command



The one-shot game looks bad for the command system: even if the agent will not steal, she will always shirk. Stealing also looks more likely if we start from the presumption that a command system does not allocate resources efficiently and must leave many profit opportunities for private networks to exploit.

Suppose the principal's response to one-time disobedience is to terminate the agent's participation and expel her from the hierarchy, so that she is left with nothing to take into the horizontal network in the next round; then obedience is the agent's only move that can allow her to take part repeatedly, and this is the principal's best hope. Repeated infinitely, obedience will return $\frac{1}{1-d} \cdot w$ to the agent where d is the discount factor and $1 > d > 0$. It follows that a forward-looking agent will prefer compliance to shirking where $\frac{d}{1-d} \cdot w > e$, and the latter is more likely the less the agent discounts the future.

Similarly the agent will prefer compliance to theft if $\frac{1}{1-d} \cdot w > p \cdot p$. To draw out the intuition $\frac{1}{1-d} > 1$ means that the agent looks to the future; $p < 1$ means that the agent cannot rely on relational enforcement of a private deal; together these ensure that $\frac{1}{1-d} > p$. An agent in this position ought to comply even though the profit from dealing

privately exceeds her wage, so long as her wage is at least a fraction $p \cdot (1 - d)$ of the profit opportunity lost. This suggests how a command system could retain agents' compliance even when there was a clear efficiency deficit.

The fundamental problem of command can be interpreted broadly. The principal can be anybody who has a non-market relationship with an agent, from a great ruler to a lowly office manager. The unofficial network can be anybody external to the agent's hierarchy who may share the gain arising from the principal's loss: a principal in another hierarchy, a family friend, a criminal gang, or a foreign power. That of which the principal is cheated need not be understood as a narrowly financial object. For example, the problem of command also describes the situation of a proprietorial dictator (Olson, 1993) who aims to monopolize the loyalty of the citizens; in this context the citizen's loyalty is a reproducible, transferable asset and the citizen may invest it in the dictator, withhold it, or transfer it to the opposition (Wintrobe, 1990). These correspond to the agent's choices to comply, shirk, or steal.

2. The Soviet Economy as a Command System

The fundamental problem of command may be fairly obvious as a theoretical idea and yet have little or nothing to do with the historical organization of a real-life command system. In order to show a connection between history and theory I will use the Soviet economy to provide some data.

While the Soviet economy is well known as a command system, some details are relevant. As Bergson (1964: 15-48) described it most enterprises were state owned and most producers were agents of a government principal, usually a minister acting as the legal fundholder. Horizontal relationships of specialization, exchange, supply, and demand were organized by order from above through vertical hierarchies rather than directly between buyers and sellers on a voluntary basis. Vertical subordination permitted orders to flow downwards on the basis of the information that flowed upwards.

The Soviet hierarchy was formed by a dictator, Stalin, whose word went unchallenged by his closest associates from 1932 until his death in 1953 (Davies, Ilic, and Khlevniuk, 2002). His decisions were unconstrained by law: thus it was said that “the plan is the law” (e.g. Gregory, 2003: 164). The dictator ruled by delegation, so under him there ruled many smaller dictators who exercised unconstrained power within the specialized fiefs that Stalin allocated to them. Power cascaded downward through branching networks of agents that collectively formed the so-called *nomenklatura*, but in practice the “big” *nomenklatura* of a million posts was fractionalized because every little dictator nested his own little *nomenklatura* inside the big one and demanded its loyalty (Khlevniuk, 2003; Lewin, 2003).

Consequently, the Soviet state took the form of a nested dictatorship (Gregory and Markevich, 2002; Gregory, 2003: 156) in which “each organization duplicated the administrative control structures of its superior in the vertical chain of command”. The dominant administrative relationship at each level of the state was that of principal and agent, with each principal in turn acting as the agent of a higher principal until we reach the top where the great dictator ruled alone as *capo di capi*.

The Soviet command system was defined by hierarchical complexity: parallel hierarchies that were functionally differentiated at lower levels converged at the top in unified leading bodies such as the council of ministers and the politburo. To fulfil its function each specialized hierarchy had to engage in horizontal exchange with others. For example the defence ministry purchased equipment and fuel from industry and food from agriculture; the ministry for engineering bought metals from the steel industry and power from the electricity generating industry. The coordination problem created by specialized hierarchies was solved for the most part through centralization, but imperfectly so. Rather there was “centralised pluralism” (Nove, 1977: 60-4), meaning that beneath a centralized façade there were strong elements of decentralized allocation (see also Zaleski, 1970; Zaleski, 1982; Markevich, 2002).

One reason for partial centralization was the impossibility of compelling full information sharing in hierarchies. The process of reaching economic equilibrium in

markets requires agents to share information. This sharing is voluntary and partial: voluntary because self-interested, and incomplete because each agent does not need to know everything about all other agents for an equilibrium to result. According to Hayek (1945) economizing on information-sharing is one of the merits of the market system. In the Soviet command system, in contrast, the sharing of information was subject to coercion. Coercion arose because agents had incentives to conceal information rather than share it. The coercion was asymmetric: the principal had a right to know everything but the agent did not have a right to know anything. However, there were also limits to the principal's coercion. The principal depended on the agent to select and aggregate information since he could not handle high-volume detail. The agent had self-interested motives to disclose information selectively and to distort it before disclosure. Thus, the principal could not trust what the agent told him, and did not know what the agent did not tell him, unless he could verify this information by other means at an additional cost.

Faced with this information problem, central authorities delegated responsibility for the detail of inter-ministerial exchange to ministerial officials. Such exchanges were authorized in high-level plans and decrees only in broad outline; then the ministries themselves had to negotiate detailed contracts for specific commodities that implemented the plan (Gregory, 2003). In principle, the implementation of contracts rested on budget authorization by the ministry of finance and credit authorization by the state bank. In practice, because the plan dealt only with aggregates and the budget dealt only with rubles, there were wide spheres of informal market allocation where firms competed for real resources with each other and with households (Harrison and Kim, 2002). Markets were wider for general-purpose intermediate products and consumables than for more specialized products such as special-purpose machinery where supply or demand were more easily monopolized. Whether or not competition existed, weak oversight promoted ministerial discretion and led to often protracted inter-ministerial bargaining and disputes (Kroll, 1986; Harrison and Simonov, 2000; Belova and Gregory, 2001; Belova, 2001a).

It is well known that elements of market organization persisted inside and alongside the command system. There were illegal markets for many industrial materials and

consumer goods and services and legal markets for labour and labour-intensive foodstuffs (Katsenelinboigen, 1977). Historically these markets evolved in various ways. For the majority that escaped penal servitude the labour market remained relatively free but there were 15 years of much heavier regulation before, during, and after World War II (Filtzer, 2002). At first the authorities tried to suppress the food market altogether, and they achieved a broad state monopoly of grains and larger livestock, but the food shortages that resulted compelled them to concede legality to the market supply of backyard food products (Davies, 1994).

3. Monitoring and Enforcement

In the Soviet economy principals waged a continual struggle against the agents' opportunistic actions that constitute the fundamental problem of command: shirking and theft. They also faced the fact that agents who intended to comply with orders did not always accept them unconditionally but sometimes tried to renegotiate them before complying. The authorities developed a wide range of mechanisms for monitoring and enforcement that secured the participation of the players in the command system. The outcome was an equilibrium of behaviours and expectations that was associated with the willing participation of all the players.

The need to solve the fundamental problem of command provides a parsimonious explanation of a number of Soviet economic institutions. It also suggests an agenda for more research. The development of several distinct mechanisms for monitoring and enforcement, each with different technologies, costs, and returns, implies that the dictator had scope to optimize on several margins at once. More research may point us towards a more unified explanation of the great shifts in Soviet reliance on propaganda and education, legal and relational enforcement, forced labour, secrecy, and military power, in terms of a general equilibrium rather than considering each in isolation.

3.1. Multi-Layer, Multi-Stage Monitoring

Information asymmetries pervaded the Soviet command system. Agents could exploit them at the expense of the principal, for example by persuading the principal that they had fulfilled an assignment when they had not (Harrison, 1998). If the principal could not tell whether he was receiving a yield of x , 0, or $-w$ he did not have much hope of solving the fundamental problem of command. Since the dictator could not trust agents in the direct line of command to tell the truth, he developed other means that met this need including separate hierarchies for planning and auditing (Gregory, 1992; Gregory, 2001; Belova and Gregory, 2001), financial and legal regulation (Gorlizki, 2002), contractual observance (Belova, 2001a), and so on. Thus, many agencies monitored agents' activities, tracked outcomes, and reported to the boss.

Himself inscrutable and devious, Stalin required complete openness in those he allowed to report to him. He reacted severely to the least suspicion of a self-interested lie, more so if it appeared to involve horizontal collusion (Gorlizki and Khlevniuk, forthcoming). Stalin's distrust of his own monitors was rational. The problem that resulted was: *quis custodiet ipsos custodes* [who watches the watchmen]? In the mid-1930s Stalin handed over the role of monitoring the monitors to the security "organs" with results that are well known.

The authorities intensified monitoring by advancing w in instalments and frequently checking intermediate results. Breaking production and innovation cycles down into many stages shortened the period over which an agent could behave badly before being expelled from the hierarchy. A by-product was the creation of sunk costs that, in a context of credit and fiscal centralization, gave rise to Kornai's (1980) famous "soft" budget constraint (Qian, 1994; Dewatripont and Maskin, 1995).

Multi-layer, multi-stage monitoring was costly. The centralization of information that it relied on probably had historical limits of feasibility. On one hand the cost of monitoring given outcomes was falling. Since the nineteenth century the telegraph, typewriter, duplicator, and filing cabinet had cut information costs, and this made

monitoring cheaper. During the twentieth century such costs fell at an accelerating rate. But the outcomes being observed were changing too: the share of services in output was rising and there was growing scope for variation in product and service quality. Real output and value added were becoming harder to observe and accurately measure (Harrison, 2002). As a result the viability of centralized, multi-layer monitoring followed an inverse U curve: it was more effective between 1870 and 1970, less before and less after (Broadberry and Ghosal, 2002).

3.2. Enforcement Mechanisms

3.2.1. *Internalization and Promotion.* One way to achieve a command equilibrium was to persuade the agent to desire the same outcomes as the principal, that is to internalize his valuations. Through schooling and the media Soviet leaders invested heavily in persuading citizens to respect authority and adopt patriotic and party-minded norms. They developed costly rites of passage into citizenship, party membership, and military service, and also used humiliation rituals such as the “boards of shame” that stigmatized bad citizens. They succeeded in inducing many to internalize preferences for the state to own basic industries, guarantee employment, social care, and minimum incomes, and protect the collective before the individual. These preferences typically outlasted the emigration of individuals (Silver, 1987) and the demise of the system itself (Blanchflower and Freeman, 1997).

The promotion of Soviet values may be thought of as the costly creation of a moral personal identity, that of a loyal and obedient *homo sovieticus*, to which the citizen could subscribe through loyal activity, become a joint stakeholder, and so gain access to a stream of psychological rewards. Siegelbaum (1988: 210-46) has described how the state created the identity of a Stakhanovite worker in the late 1930s. Akerlof and Kranton (2000) have suggested how the availability of differential identities may change economic behaviour and outcomes. Having made a personal commitment to this identity the citizen then found shirking or stealing to be more costly than before since it triggered an additional loss of personal identity and social reputation. But Stalin also learnt to fear

the associated risk that the differential identities that bound individuals to specific institutions such as the armed forces, the security organs, or the scientific or cultural elites, could come before the state itself.

It was possible to induce the agent to adopt the values of the principal by offering promotion in return for loyal behaviour. Then the obedient agent could hope to become a principal. A problem was that the number of aspiring agents tended to exceed the number of retiring principals. Under Stalin this problem was solved by frequent purges combined with ministerial subdivisions that created new leading positions in great numbers; “I need not mention,” Stalin (1939/40: 650) reported, “that the division of organizations has made it possible to promote hundreds and thousands of new people to leading posts.” But purges and reorganizations were also costly. Valery Lazarev (2002) has suggested that the promotion mechanism eventually became unviable and threatened the command system with bankruptcy.

3.2.2. *Artificial Punishment and Rewards.* In the first turbulent years, the Stalinist leadership tried to run a high-employment, low-wage economy (Kuromiya, 1988) with predictable results: widespread shirking, demoralization, and increasingly punitive reflexes. From 1931 onwards Soviet leaders tilted the balance of incentives towards compliance by supplementing w with side payments to induce high effort that Bergson (1964: 72-92) described. They also threatened to cut or confiscate incomes altogether as the penalty for shirking and other disloyalty. They expelled non-compliant agents from the hierarchy by resort to firing and forced labour.

The efficacy of this route was limited for two reasons. One is that rewards and punishments were hard to target on effort with much accuracy. This was because effort was always hard to monitor (Dearden, Ickes, and Samuelson, 1990) and output was increasingly hard to measure (Harrison, 1998). In addition the output-effort relationship was dominated by a large stochastic element so that in the 1930s and 1940s the application of penalties for supposed shirking became nearly random (Filtzer, 2002). To make matters worse the penalties available were very costly and after Stalin the credibility of punishment went into a long decline (Harrison, 2002).

Another reason for limited effectiveness is that penalisation of some agents must be carried out by others who require a reward in return. Therefore, in any hierarchy the balance of rewards to penalties should rise as we ascend from one level to the next; a regressive distribution of managerial rewards for fulfilment is exactly what we see in the figures that Bergson (1964: 76) assembled. In a context of persistent labour shortage, however, it was often more costly to impose effective punishments on ordinary workers than on their managers. As a result, labour-management collusion still tended to pervade the Soviet enterprise.

In some contexts the authorities tried to solve these problems through decentralization. Under Stalin collective farms and labour camps (Solzhenitsyn, 1975: 173-6) were run on the basis of collective responsibility for results; the brigade enforced equal effort as a condition of equal reward. In other contexts, especially in the postwar period of economic reforms, the authorities tried to differentiate rewards and target them according to individual effort. The dynamic problems that resulted are too well known to review here but see Brus (1986) and Kornai (1986).

3.2.3. *General Criminalization, Selective Sanctions.* Within the command system there was considerable scope for corruption. The authorities struggled to inhibit the formation of potential networks of horizontal trust within or external to the official hierarchies but could never root them out. By criminalizing unauthorized transactions the authorities dealt themselves a natural advantage in this struggle: even without detecting or punishing a single violation they ruled out public enforcement of unauthorized exchange agreements and thereby sowed mistrust. They successfully nested the fundamental problem of exchange within the problem of command. As a result, agents wishing to divert the principal's assets into private trade had to rely solely on relational enforcement. Probably, the private enforcement of illegal exchange was easier where transactions were small enough to be quickly sequenced, or based on long personal acquaintance through the "economy of favours" (Ledeneva, 1999). Illicit transactions that were large, unique, or complex were impeded.

The authorities discriminated between two kinds of corruption. Not all corruption arose from disloyal motivations. Some agents took bribes for personal enrichment, while others extracted cash, resources, and favours for use in fulfilling plan assignments. Those who intended to comply with commands often had little alternative but to engage corruptly with external networks in order to carry them out (Belova, 2001b; Gregory, 2003: 164). Principals could control the balance between loyal and disloyal corruption by varying the tautness of plan assignments (Harrison and Kim, 2002).

When detecting illegal or corrupt exchanges the authorities punished violations selectively, passing over those “loyal” but corrupt transactions that were designed to promote fulfilment of the plan (Gregory, 2003) and bearing down more heavily on those that served the personal enrichment of the agent (Belova, 2001). In turn, the risk premium that agents required for engaging in loyal trade should have been lower than for trade aimed at lining their own pockets. By implication, the authorities discouraged disloyal networks while exploiting the networks of the loyal.

3.2.4. *Heavy Defence Spending.* This framework supports a simple interpretation of the domestic calculations behind foreign policy and military spending. Facing adversaries at home and abroad, Stalin did not fear them acting singly but he feared their combination (Khlevniuk, 1995, Simonov 1996a). The potential for internal and external foes to combine is portrayed in the fundamental problem of command as the scope for an agent to trade with a network representing a foreign power. From this point of view the powerful armed forces supported by a large defence industry that recent work has described (Simonov, 1996; Barber and Harrison, 2000; Samuelson, 2000; Sokolov, forthcoming) inhibited a coalition of enemies by driving down both p , the expected payoff to an agent considering a transaction with a foreign power, and p , the probability of relational enforcement of the transaction. By paying the soldiers and defence producers well Stalin was also able to raise w , the opportunity cost to his agent of collaboration with the enemy.

Thus the scale of the defence effort combined with the privilege it gave to the servants of the military-industrial complex helped to solve the fundamental problem of

command. This solution was very expensive, commanding one tenth to one fifth of national resources; in the postwar years this share was a closely guarded secret.

3.2.5. *Secretiveness.* The Soviet state carried secrecy to extraordinary lengths (Davies, 2001). Secrecy of economic information may have assisted principals in inhibiting the temptation to steal. A prerequisite for trade is the sharing of information: buyer and seller must be able to signal each other about *ex ante* supplies and demands (Hayek, 1945). When trade is between an agent in a hierarchy and an outsider, an agent in another ministry, a private criminal network, or even the agent of a foreign power, criminalizing signals inhibits exchange (Harrison, 2003). This effect works by both reducing information and increasing mistrust. By criminalizing the exchange of signals the principal can reduce p , the probability of honour among thieves. Alternatively, the agent must invest additionally in restoring trust and establishing the credibility of the signals she sends and receives. This cost arises even before we look at the possibility that illicit signalling may be detected and punished.

Secrecy was costly. There were enforcement costs and efficiency costs. Enforcement relied on the costly administration of complex rules for tracking secret documents. It required further efforts to monitor and investigate cases of disclosure. The punishment of disclosure led to the loss of human capital already sunk in agents who then turned out to be disloyal. Efficiency costs arose because secrecy created barriers to the sharing of information that was required to allocate resources efficiently; for example, principals decided the overall allocation of resources in ignorance of specific facts, while agents made specific allocations while insufficiently informed of the wider context. Thus secrecy may also have increased the probability of planning mistakes, lowering x .

3.3. Summary

A range of enforcement mechanisms solved the fundamental problem of command in the Soviet economy. Internalization, promotion, and side payments and penalties controlled shirking. The criminalization of disloyal networks, heavy defence spending, and secretiveness limited agents' trading at the principal's expense. The Soviet system

combined these mechanisms in a shifting balance while principals and agents learned and the comparative costs and benefits of each mechanism altered through time. It seems that at the end of the 1980s the ensemble ceased to be viable and the system collapsed (Harrison, 2002). If the dictator had succeeded in optimizing simultaneously on each margin, one would expect that each mechanism failed at about the same time. This is roughly what is meant by the collapse of a system.

4. Command and Negotiation

To command is not always to command well. So far we have assumed that the returns to different activities were common knowledge. But in hierarchies an uneven distribution of information is normal: the principal may have better general knowledge than the agent but in local knowledge the agent has the advantage. This gave rise to the possibility that a principal might issue a mistaken command. One way of improving the returns to agents' participation in the command system was to permit them to renegotiate commands. The obedient agent could then choose to obey unconditionally or to bargain with the principal

Stalin (1930/1955: 357) sanctioned plan re-negotiation at the very dawn of the command system. In a speech to the sixteenth party congress in June 1930, he based his defence of the recent radical increases in final targets for the first five-year plan on the possibility of plan mistakes. The five-year plan was, he suggested:

merely ... a first approximation, which has to be made more precise, altered and perfected in conformity with the experience gained in the localities, with the experience gained in carrying out the plan. No five-year plan can take into account all the possibilities latent in the depths of our system and which reveal themselves only in the course of the work, in the course of carrying out the plan in the factory and mill, in the collective farm and state farm, in the district, and so forth. Only bureaucrats can think that the work of planning ends with the drafting of a plan. The drafting of a plan is only the beginning of planning. Real guidance in planning develops only after the plan has been drafted, after it has been tested in the localities, in the course of carrying it out, correcting it and making it more precise.

At the time Stalin meant to encourage agents to make plans more ambitious, but in subsequent years he allowed his comments to be taken out of context and reinterpreted to

sanction all kinds of plan modifications including the relaxation of targets when the plan turned out to be too ambitious (Harrison, 1985: 17).

Figure 2. Unconditional and Conditional Obedience

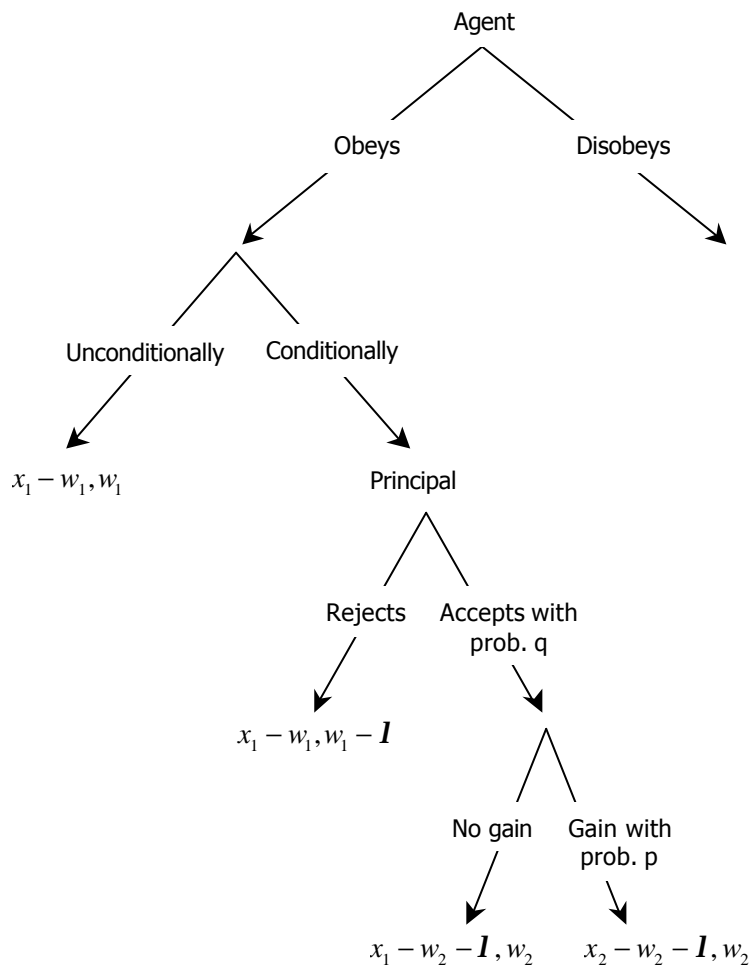


Figure 2 portrays vertical bargaining as an attempt by the agent given an order to trade private information about plan mistakes and unexploited opportunities with the principal before complying in return for a bigger share of the principal's rent. By improving the principal's information the agent loses the ability to shirk or steal and becomes committed to a course of obedience, but may make her obedience conditional on renegotiation. The principal initially advanced w_1 and expected to receive x_1 . The agent then takes I out of the wage advanced and invests it in lobbying the principal to persuade him that there is a better project that can yield both x_2 for the principal and w_2 for the agent. The principal expects that the agent's proposal will yield $x_2 > x_1$ with probability p and will otherwise yield only x_1 so p is the probability that his original

command was in error. The agent expects her lobbying to succeed with probability q ; if it succeeds then the principal must advance $w_2 > w_1$ to the agent and also reimburse I , the cost of lobbying, but if lobbying fails the agent will get only the original advance out of which she must now meet the cost of the fruitless attempt to renegotiate the order.

The fundamental problem of command is mitigated if the agent's payoff from lobbying turns out to exceed her payoff from unconditional compliance. The agent will gain from renegotiation provided $q \cdot (w_2 - w_1) > (1 - q) \cdot I$, i.e. the expected wage gain adjusted by the probability of success in lobbying exceeds the cost of lobbying taking into account the probability of failure. The greater is q , the probability that the principal is open to persuasion, the greater is the agent's scope for renegotiation. The principal in turn will gain from plan bargaining where $p \cdot (x_2 - x_1) > (w_2 - w_1) + I$, i.e. the his expected gain from correcting a mistake exceeds the compensation the agent extracts from him as a return on her successful lobbying, plus the deadweight cost of renegotiation. The larger is p , the probability of a mistaken command, the greater will be the principal's gain. Thus, allowing the agent a voice in decisions can reduce the relative attractions of shirking or stealing.

However, while this may help to secure the agent's participation there are still costs that the principal must be able to offset. Thus, to permit renegotiation is not the solution for the principal's problem under all circumstances.

Plan bargaining went on in the Soviet economy at all levels. In the Politburo ministers lobbied Stalin to improve their shares of budgetary or material resources (Gregory, 2001: 22-4). At lower levels Bergson (1964: 81-2) noted the tendency of firms to complain of burdensome quotas or demand increased supply allocations as a condition for fulfilling them (see also Kornai, 1992: 121-4; Gregory, 2003: 202-4). Of course principals preferred to be told that the plan was too modest while agents preferred to tell them that it was too ambitious. In some periods they organized countervailing pressure for higher plans or higher productivity such as the counter-plan campaign of the early

1930s or the Stakhanov campaign a few years later (Kuromiya, 1988; Davies and Khlevniuk, 2002). Still, there was always bargaining.

In the years of Stalin's dictatorship plan renegotiation remained informal. The post-Stalin process of economic reform institutionalized bargaining processes. For example Kornai (1986: 1700) described Hungary in the 1980s as:

a bargaining society, and the main direction is vertical, namely bargaining between the levels of the hierarchy, or between bureaucracy and firm, not horizontal, between seller and buyer. All issues ... – entry, exit, appointment, output, input, price, wage, tax, subsidy, credit, and investment – are subject to meticulous negotiations, fights, lobbying ... The Hungarian literature calls this phenomenon “regulator bargaining”; it has taken the place of “plan bargaining” which had prevailed in the command economy.

What has escaped analysis so far in the literature is why such bargaining might have been increasingly in the principal's interest. The plan system was based on imperfect information and incorporated mistakes; perhaps this understanding was increasingly shared so that the agent's representations won increasing credibility. As faith in the system declined rent-sharing, the agent's trading of additional private information in return for additional income, became more formalized.

5. Conclusions

Abram Bergson sought to examine the rationality of the Soviet economic system according to various efficiency standards, including that of the system's directors. In terms of what material ends and to what extent was their behaviour rational? We have looked at Soviet institutions and behaviours from the point of view of a rational principal and agent in a command system that faces a problem. The fundamental problem of command is that of enforcement when agents may shirk or steal rather than comply. The equilibrium of the Soviet command system was conditional upon finding solutions to this problem, and we have looked at some enforcement mechanisms that together may have provided the necessary conditions at the time but were also costly in different ways. This approach suggests that the system collapsed when the costs of enforcement could no longer be sustained.

References

- Akerlof, George A., and Rachel E. Kranton (2000). "Economics and Identity." *Quarterly Journal of Economics*, 115(3), 715-53.
- Barber, John, and Mark Harrison, eds (2000). *The Soviet Defence-Industry Complex from Stalin to Khrushchev*. London and Basingstoke: Macmillan.
- Belova, Eugenia (2001a). "Contract Enforcement Under Dictatorship: the Case of the Soviet Economy." PERSA Working Paper No. 14. University of Warwick, Department of Economics.
- Belova, Eugenia (2001b). "Economic Crime and Punishment." In Paul R. Gregory, ed., *Behind the Façade of Stalin's Command Economy*, 131-58. Stanford, CA: Hoover Institution Press.
- Belova, Eugenia, and Paul R. Gregory (2001). "Dictators, Loyal and Opportunistic Agents, and Punishment: the Soviet Archives on Creating the Soviet Economic System." PERSA Working Paper No. 2, University of Warwick, Department of Economics. Forthcoming in *Public Choice*.
- Berghahn, Volker (1973). *Germany and the Approach of War in 1914*. London: Macmillan.
- Bergson, Abram (1964). *The Economics of Soviet Planning*. New Haven and London: Yale University Press.
- Blanchflower, David G., and Richard B. Freeman (1997). "The Attitudinal Legacy of Communist Labor Relations." *Industrial and Labor Relations Review*, 50(3), 438-59.
- Broadberry, S.N., and Sayantan Ghosal (2001). "Technology, Organisation, and Productivity Performance in Services: Lessons from Britain and the United States, 1870-1990." University of Warwick, Department of Economics.
- Brus, Wlodzimerz (1986). "1956 to 1965: in Search of Balanced Development." In Michael Kaser, ed., *The Economic History of Eastern Europe 1919-75*. Vol 3, *Institutional Change Within a Planned Economy*, 71-138. Oxford: Clarendon Press.
- Coase, Ronald H., (1937). "The Nature of the Firm." *Economica*, 4, 386-405.
- Cowling, Keith (1982). *Monopoly Capitalism*. London: Macmillan.
- Davies, R.W, Melanie Ilic, and Oleg Khlevniuk (2002). "Stalin, the Politburo and Economic Policy." University of Birmingham, Centre for Russian and East European Studies.
- Davies, R.W. (1994). "Changing Economic Systems: an Overview". In R.W. Davies, Mark Harrison, and S.G. Wheatcroft, eds, *The Economic Transformation of the Soviet Union, 1913-1945*, 1-23. Cambridge: Cambridge University Press.
- Davies, R.W., and Oleg Khlevniuk (2002). "Stakhanovism and the Soviet Economy." *Europe-Asia Studies*, 54(6), 867-905.
- Dearden, James, Barry W. Ickes and Larry Samuelson (1990). "To Innovate or Not To Innovate: Incentives and Innovation in Hierarchies." *American Economic Review*, 80(5), 1105-24.
- Dewatripont, Mathias, and Eric Maskin (1995). "Credit and Efficiency in Centralized and Decentralized Economies." *Review of Economic Studies*, 62(4), 541-55.
- Filtzer, Don (2002). *Soviet Workers and Late Stalinism: Labour and the Restoration of the Stalinist System after World War II*. Cambridge: Cambridge University Press.
- Gorlizki, Yoram (2002). "Industry, Justice, and the Politics of Soviet Regulation." Paper to the Summer Research Euro-Workshop, University of Warwick, Department of Economics, 8 to 19 July.
- Gorlizki, Yoram, and Khlevniuk, Oleg (forthcoming). *Cold Peace: Stalin and the Soviet Ruling Circle, 1945-1953*. New York: Oxford University Press.
- Gregory, Paul R. (2001). "The Dictator's Orders." In Paul R. Gregory, ed., *Behind the Façade of Stalin's Command Economy*, 11-33. Stanford, CA: Hoover Institution Press.
- Gregory, Paul R. (2003). *The Political Economy of Stalinism: Evidence From the Soviet Secret Archives*. Cambridge: Cambridge University Press.

- Gregory, Paul R., and Andrei Markevich (2002). "Creating Soviet Industry: The House That Stalin Built." *Slavic Review*, 61(4), 787-814.
- Gregory, Paul R., and Robert C. Stuart (2001), *Russian and Soviet Economic Performance and Structure*, 7th edn, Addison Wesley: Boston, MA
- Greif, Avner (2000). "The Fundamental Problem of Exchange: A Research Agenda in Historical Institutional Analysis." *European Review of Economic History*, 4, 251-84.
- Harrison, Mark (1985). *Soviet Planning in Peace and War, 1938-1945*. Cambridge: Cambridge University Press.
- Harrison, Mark (1998). "Prices, Planners, and Producers: an Agency Problem in Soviet Industry, 1928-1950." *Journal of Economic History*, 58(4), 1032-62.
- Harrison, Mark (2002). "Coercion, Compliance, and the Collapse of the Soviet Command Economy." *Economic History Review*, 55(3), 397-433.
- Harrison, Mark (2003). "Why Secrets? The Uses of Secrecy in Stalin's Command Economy." University of Warwick, Department of Economics.
- Harrison, Mark, and Byung-Yeon Kim (2002). "Corruption and Growth in a Partially Centralized Economy." University of Warwick, Department of Economics.
- Harrison, Mark, and Nikolai Simonov (2000). "Voenpriemka: Prices, Costs, and Quality in Defence Industry." In Mark Harrison and John Barber, eds. *The Soviet Defence Industry Complex from Stalin to Khrushchev*, 223-45. London and Basingstoke: Macmillan.
- Hayek, F.A. (1945). "The Use of Knowledge in Society." *American Economic Review*, 35(4), 519-30.
- Hymers, Stephen H. (1960/1976). *The International Operations of National Firms: a Study of Direct Foreign Investment*. Cambridge, MA: MIT Press.
- Katsenelinboigen, Aron (1977). "Coloured Markets in the Soviet Union." *Soviet Studies*, 29(1), 62-85.
- Khlevniuk, O.V., A.V. Kvashonkin, L.P. Kosheleva, and L.A. Rogovaia, eds (1995). *Stalinskoe Politbiuro v 30-e gody. Sbornik dokumentov*. Moscow: AIRO-XX.
- Khlevniuk, Oleg (1995). "The Objectives of the Great Terror, 1937-1938." In Julian Cooper, Maureen Perrie, and E.A. Rees, eds, *Soviet History, 1917-53: Essays in Honour of R. W. Davies*, 158-76. London and Basingstoke: St Martin's Press.
- Khlevniuk, Oleg (2003). "Sistema tsentr-regiony v 1930-1950-e gody. Predposylki politizatsii nomenklatury." *Cahiers du Monde russe*, 44(2-3), in press.
- Kornai, János (1980). *The Economics of Shortage*. Vols 1 and 2. Amsterdam: North-Holland.
- Kornai, János (1986). "The Hungarian Reform Process: visions, Hopes, and Reality." *Journal of Economic Literature*, 24, 1687-1737.
- Kornai, János (1992). *The Socialist System: the Political Economy of Communism*. Oxford: Clarendon Press.
- Kroll, Heidi (1986). "Decentralization and Precontract Disputes in Soviet Industry." *Soviet Economy*, 2(1), 51-71.
- Kuromiya, Hiroaki (1988). *Stalin's Industrial Revolution: Politics and Workers, 1928-1932*. Cambridge: Cambridge University Press.
- Lazarev, Valery (2002). "Political Economy of the Soviet Elite and Its Post-Communist Transformation." PERSA Working Paper No. 11 (Revised Version 27 February). University of Warwick, Department of Economics.
- Ledeneva, Alena V. (1998). *Russia's Economy of Favours: Blat, Networking and Informal Exchange*. Cambridge: Cambridge University Press.
- Lewin, Moshe (2003). "Rebuilding the Soviet Nomenklaturas, 1945-1948." *Cahiers du Monde russe*, 44(2-3), in press.
- Marglin, Stephen (1974). "What Do Bosses Do? The Origins and Functions of Hierarchy in Capitalist Production." *Review of Radical Political Economics*, 6(2), 33-60.
- Markevich, A.M. (2003). "Was the Soviet Economy Planned? Planning in the People's Commissariats in the 1930s." PERSA Working Paper No. 25. University of Warwick, Department of Economics.
- Nove, Alec (1977), *The Soviet Economic System*, London: Allen & Unwin

- Olson, Mancur. (1993). "Dictatorship, Democracy, and Development." *American Political Science Review*, 87(3), 567-76.
- Preobrazhensky, E.A. (1926/1965). *The New Economics*. Oxford: Oxford University Press.
- Qian, Yingyi (1994). "A Theory of Shortage in Socialist Economies Based on the 'Soft Budget Constraint'." *American Economic Review*, 84(1), 145–56.
- Samuelson Lennart (2000). *Plans for Stalin's War Machine: Tukhachevskii and Military-Economic Planning, 1925-41*. London and Basingstoke: Macmillan.
- Siegelbaum, Lewis H. (1988). *Stakhanovism and the Politics of Productivity in the USSR, 1935-1941*. Cambridge: Cambridge University Press.
- Silver, Brian D. (1987). "Political Beliefs of the Soviet Citizen: Sources of Support For Regime Norms." In James R. Millar, ed., *Politics, Work, and Daily Life in the USSR: a Survey of Former Soviet Citizens*, 100-41. Cambridge: Cambridge University Press.
- Simonov N.S. (1996a). *Voенно-promyshlennyi kompleks SSSR v 1920-1950-e gody: tempy ekonomicheskogo rosta, struktura, organizatsiia proizvodstva i upravlenie*. Moscow: ROSSPEN.
- Simonov N.S. (1996b). "'Strengthen the Defence of the Land of the Soviets': the 1927 'War Alarm' and Its Consequences." *Europe-Asia Studies*, 48(8), 1355-64.
- Sokolov, A.K. (forthcoming). "Predislovie." In V.A. Zolotarev et al., eds, *Istoriia sozdaniia i razvitiia oboronno-promyshlennogo kompleksa Rossii i SSSR. 1901-1963 gg. Dokumenty i materialy*. Vol. 2. *Sovetskoe voенно-promyshlennoe proizvodstvo (1918-1926)*. Moscow: ROSSPEN, in preparation.
- Solzhenitsyn, Alexander (1974). *The Gulag Archipelago, 1918-1956*. Volume 1. London: Collins/Fontana.
- Stalin, J.V. (1940). *Leninism*. London: Lawrence & Wishart.
- Stalin, J.V. (1955). *Works*, 12. Moscow: Foreign Languages Publishing House.
- Williamson, Oliver E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: The Free Press.
- Wintrobe, Ronald (1990). "The Tinpot and the Totalitarian: an Economic Theory of Dictatorship." *American Political Science Review*, 84(3), 849-72.
- Wintrobe, Ronald (1998). *The Political Economy of Dictatorship*. Cambridge: Cambridge University Press.
- Zaleski, Eugene (1971), *Planning for Economic Growth in the Soviet Union, 1918–1932*, Chapel Hill, NC: University of North Carolina Press.
- Zaleski, Eugene (1980). *Stalinist Planning for Economic Growth, 193-1952*. London and Basingstoke: Macmillan.